

**Item No. 1 :- Excavation for foundation upto 1.5 m depth including sorting out and stacking of useful materials and disposing off the excavated stuff upto 50 Meter lead.(C) Hard Murrum.**

➤ **All sorts of soil**

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

**1.0. General**

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

**2.0. Clearing the site**

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

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

**3.0. Setting out**

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

**4.0. Excavation**

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

**5.0. Disposal of the excavated stuff**

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

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

**6.0. Mode of measurements & payment**

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

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

**Item No. 2 :- Excavation for foundation for depth from 1.5 m to 3.0 m including sorting out and stacking of useful materials and disposing off the excavated stuff upto 50 Meter lead. (D) Soft rock not requiring Blasting.**

**1.0. General**

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

**2.0. Clearing the site**

- 2.1.** The site on which the structure is to be built shall be cleared, and all obstructions loose stone, materials and rubbish of all kind bush wood and trees shall be removed as directed. The materials so obtained shall be property of the Government and shall be conveyed and stacked as directed within all lead & lift. The roots of the trees coming in the sides shall be cut and coated with hot asphalt.
- 2.2.** The rate of side clearance is deemed to be included in the rate of earth work for which no extra will be paid.

**3.0. Setting out**

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

**4.0. Excavation**

The excavation in foundation shall be carried out in true line and level and shall have the width and depth as shown in the drawings or as directed. The contractor shall do the necessary shoring and shutting or providing necessary slopes to a safe angle, at his own cost. The payment for such precautionary measures shall be paid separately if not specified. The bottom of the excavated area shall be leveled both longitudinally and transversely as directed by removing and watering as required. No. earth filling will be allowed for bringing it to level. If by mistake or any excavation is made deeper or wider than, that shown on the plan or directed. The extra depth or width shall be made up with concrete of same proportion as specified for the foundation concrete at the cost of the contractor. The excavation **depth from 1.5 mt. to 3.00 mt.** shall be measured under this item.

- 4.1.** The excavation in soft or disintegrated rock shall be carried out by crow bars, pickaxes or pneumatic drills or any other suitable means
- 4.2.** If contractor desires to resort to blasting, he can do so with permission of the Engineer-in-charge but nothing extra shall be paid to him.
- 4.3.** The materials available from soft excavation shall be properly stacked within all lead and lift and shall be the property of department.
- 4.4.** The classification of strata of the foundation soil shall be done by the Engineer-in-charge and shall be acceptable to the contractor.
- 4.5.** However this shall include the type of rock and boulder which may be quarried or split with crow bars. Laterite and conglomerate also come under this category.

**5.0. Disposal of the excavated stuff**

- 5.1.** The excavated stuff of the selected type shall be used in filling the trenches and plinth or leveling the ground in layers including ramming and watering etc.
- 5.2.** The balance of the excavated quantity shall be removed by the contractor from the site of work to a place as directed with all lead & lift.

**6.0. Mode of measurements & payment**

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

**Item No. 3 :- Providing and laying controlled cement concrete M-150 and curing complete including the cost of form work and reinforcement for reinforced concrete work in : (a) Foundations, footings Bases of columns and the like and Mass concrete..**

**1.0. Materials**

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

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

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

**2.0. General**

2.1. The concrete mix shall be designed from preliminary tests. The proportion of the concrete mix shall be 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) by volume concrete work shall have exposed concrete surface or as specified in the item.

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

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

Grade of Concrete	Compressive strength of 15 cms. cubes in kg/cmt. at 28 days, conducted in accordance with I.S. 516-1959.	
	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./m<sup>3</sup> in plain concrete and not less than 250 kg/m<sup>3</sup> in reinforced concrete.

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

#### **4.0. Clearing and Treatment of forms:**

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

#### **5.0 Stripping time:**

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

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

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

(c) Removal of props slabs:

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

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

(d) Removal of props t beams and Arches:

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

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

#### **6.0 Procedure when removing the form work :**

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

#### **7.0 Centering:**

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

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

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

#### **8.0 Scaffolding:**

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

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

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

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

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

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

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

(e) Raking or circular cutting.

#### **9.0 Re-Use:**

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

#### **10.0. Mode of measurement & payment**

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

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

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

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

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

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

**Item No. 4 :-** Providing and laying controlled cement concrete M 250 using B.T. stone aggregate and curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in. (A) Foundation footing, base of columns & mass concrete...

The work shall be executed as per specification of **Item No. 3** except for the item is work of Providing and laying controlled cement concrete M 250 using B.T. stone aggregate and curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in. (A) Foundation footing, base of columns & mass concrete...

**Item No. 5 :-** Providing and laying controlled cement concrete M 250 using B.T. stone aggregate and curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in. For RCC Columns up to Plinth level.

The work shall be executed as per specification of **Item No. 3** except for the item is work of Providing and laying controlled cement concrete M 250 using B.T. stone aggregate and curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in. For RCC Columns up to Plinth level.

**Item No. 6 :- Providing and laying cement concrete 1:3:6 (1-Cement : 3- coarse sand : 6- hand broken stone aggregates 40 mm nominal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth (upto 10 ton).**

**1.0. Materials**

1.1. Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Hand broken stone aggregate 40 mm. nominal size shall conform to M-12.

**2.0. Workmanship**

**2.1. General**

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

**2.2. Proportion of Mix**

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

**2.3. Mixing:**

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

**2.4. Transporting & placing the concrete:**

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

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

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

**2.6. Curing:**

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

**3.0. Mode of measurement and payment**

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

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

**Item No. 7 :-** Providing and Laying controlled cement concrete M-250 & including finishing smooth with curing complete including the cost of form work but excluding cost of reinforcement concrete for RCC PLINTH BEAM for any cross sectional area of beam....

The work shall be executed as per specification of **Item No. 3** except for the item is work of Providing and Laying controlled cement concrete M-250 & including finishing smooth with curing complete including the cost of form work but excluding cost of reinforcement concrete for RCC PLINTH BEAM for any cross sectional area of beam....

**Item No. 8:-** Brick work using common Brunt clay building bricks having crushing strength not less than 35 Kg./Sq.cm.. in cement mortar 1:6 (1cement : 6 fine sand) (b) Conventional In Foundation and Plinth.

**1.0. Materials**

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

**2.0. Workmanship**

**2.1. Proportion:**

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

**2.2. Wetting of bricks:**

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

**2.3. Laying:**

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

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

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

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

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



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

**2.4. Joints:**

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

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

**2.5. Curing:**

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

**2.6. Preparation of foundation bed:**

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

**3.0. Mode of measurements & payment**

**3.1.** The measurements of this item shall be taken for the brick masonry fully completed in foundation up to plinth. The limiting dimensions not exceeding those shown on the plinths or as directed shall be final. Battered tapered and curved portions shall be measured net.

**3.2.** No deduction shall be made from quantity of brick work nor any extra payment made for embedding in masonry of marking holes in respect of following item.

(1) Ends of joints, beams, posts, girders, rafters, purlins trusses corbel, steps etc. where cross sectional area does not exceed 500 sq.cm.

(2) Opening not exceed in 1000 sq.cm.

(3) Wall plate sand bed plates bearing of slab, chhajjas and like whose thickness does not exceed 10 cms. and the bearing does not extend the full thickness of wall.

(4) Drainage holes and recesses for cement concrete blocks to embed hold fasts for doors, window etc.

(5) Iron fixtures, pipes up to 300 mm. dia. hold fasts of doors, and window built into masonry and pipes etc. for concealed wiring.

(6) Forming charges of section not exceeding 350 sq.cm. in masonry.

**3.3** Apparatuses for fire places shall not be deducted nor shall extra labour required to make splaying of jumps, throating and making trenches over the aperture be paid for separately.

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

**Item No. 9 :-** Filling in foundation and plinth with murrum or selected soil in layers of 20cm. thickness including watering, ramming and consolidating etc. completed...

## **1.0 MATERIALS**

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

## **2.0 WORKMANSHIP**

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

## **3.0. MODE OF MEASUREMENTS & PAYMENT**

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

**Item No. 10 :-** 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..

## **1.0 WORKMANSHIP**

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

## **2.0. Mode of Measurements & Payment**

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

**Item No. 10 :- Filling foundation and plinth with sand under floors including watering, ramming and consolidating dressing etc, comp...**

**1.0 WORKMANSHIP**

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

**2.0. Mode of Measurements & Payment**

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

**Item No. 12 :     Applying general insecticide pest control treatment to floors, cupboards etc. including labour and materials etc. complete..**

**1.0     MATERIALS**

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

	<b>Chemicals</b>	<b>Concentration</b>
1	Aldrin or other same this properties	0.50% (By Weight)
2	Heptachlor	0.50% (By Weight)
3	Chlordane	1.00% (By Weight)

**2.0     WORKMANSHIP**

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

## **FORM OF GUARANTEE BOND**

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

2.7 This guarantee shall remain in force for the period of 10 years from the completion of the work under the contract and it shall remain binding to the contractor for period of 10 years.

2.8 The deposit at the rate of 50% of the cost of this item from the running and final bills shall be recovered and remained for the first one year after completion of the work or at least on monsoon season passed which ever is later and 10% shall be retained for the balance of the guarantee period and shall be refunded only after completion of the guarantee period.

### **3.0 MODE OF MEASUREMENT AND PAYMENT**

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

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

**Item No. 13 :- Providing and laying trimix vacume dewatering process cement concrete work ordinary M-200 and curing complete including compaction & Finishing of cement concrete road by trimix process providing extra labour charge for trimix vaccum dewatering service process on cement concrete road surface by using vaccum dewatering pump floater surface vibrator including making groove 5mm width and filling with polynile kpolynier and rough finish to surface as per instruction including levelling etc complete. for RCC TRIMMIX FLOOR SURFACE.**

This work shall consist of furnishing and placing **ordinary cement concrete M-200 for trimix road surface flooring** of the shape and dimensions shown on the drawings and conforming to these Specifications or as approved by the Engineer in charge.

Prior to the start construction the contractor shall design the mix in case of design mix concrete or propose nominal mix in case of nominal mix concrete and submit to the Engineer in charge for approval the proportions of materials including admixtures to be used water reducing admixtures ( Including plasticizers or super plasticizers ) may be used at the contractors option subject to the approval of Engineer in charge Other types of admixtures shall be prohibited unless specifically permitted by the Engineer in charge.

Weigh Batch Machine of appropriate capacity shall be used continuously during the entire process of execution of this item.

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

In the designation of a concrete mix, letter "M" refers to the mix and the number the specified 28 days works cube compressive strength of that mix on 250 mm. cubes expressed in kg./cm<sup>2</sup>

Ingredients required for ordinary concrete containing one 50 Kg. bag of cement of different proportions of mix shall be as given in Table below

Grade of Concrete	Mix By volume	Total quantity of dry aggregate by volume per 50 kg of cement	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 kg of cement (liter)
M-100	1:3:6	300	General 1:2 for fine aggregate to coarse aggregate by volume but subject to a upper limit of 1:1.5 and lower limit 1:3	34
M-200	1:2:4	220		32
M-200				30
M-250	1:1:2	100		27

## **MATERIALS**

### **1.0 WATER**

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

**1.2** If required by the Engineer in charge it shall be tested by comparison with distilled water compression shall be made by means of standard cement tests for soundness time of setting and

mortar strength as specified in I S 269-1976 Any indication of unsoundness charge in time of setting by 30 minutes or more or decrease of more than 10 percent strength of mortar prepared with distilled water sample when compared with the result obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.

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

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

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

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

## **2.0 CEMENT**

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

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

## **3.0 SAND**

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

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

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

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

<b>IS. Sieve Designation</b>	<b>% by wt. passing</b>
4.75 mm	100
2.3 6mm	100
1.18 mm	75 to 100
600 MC	40 to 85
300 MC	05 to 50
150 MC	00 to 10

## **4.0 STONE COARSE AGGREGATE FOR NOMINAL MIX CONCRETE**



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

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

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

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

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

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

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

## **5.0 WORKMANSHIP**

### **General**

**5.1** Prior to the start construction the contractor shall design the mix in case of design mix concrete or propose nominal mix in case of nominal mix concrete and submit to the Engineer in charge for approval the proportions of materials including admixtures to be used water reducing admixtures Before stating concrete the bed of foundation trenches shall be cleared of all loose materials leveled watered and rammed as directed.

**5.2 Complete including mixing plasticizer Conplast P - 211 @ 100 ML / bag including mixing** shall be used including making c channel size required to level and slope and thickness of the concrete road leveling of placed concrete with surface vibrator and finishing with power floater shall be done. Floater and trowel light booming the surface shall be done **expansions joints** shall be cut as directed.

**5.3** For sub base shall be leveled up prior to start the Trimix concrete.

The channel shall be placed on both side and shall be check by plumb & to spirit level in true level and longitudinal slope and gradient and camber.

**6.0 MIXING:**

**FOR MASS CONCRETE WORK. :**

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

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

**6.3** The concrete shall be mixed in a mechanical mixer. At the site of work Hand mixing may however be allowed for smaller quantity of work if approved by the Engineer-in-charge. When hand mixing is permitted by the Engineer-in-charge in case of break-down of machineries and in the interest of the work. Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed to be the Engineer in-charge, the first batch of concrete from the mixer shall contain only two thirds of normal quantity of coarse aggregate. Mixing plant shall be thoroughly cleaned before changing from one type of cement to another.

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

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

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

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

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

**6.9** In the case of reinforced concrete work workability shall be such that the concrete surrounds and properly grips all reinforcement. The degree of consistency which shall depend upon the nature of work and methods of vibration of concrete shall be determined by regular slump, tests. Following slump shall be adopted for different types of works.

type of work vibrators used.	Slumps	
	Where vibrators Are used	Where are not
Mass concrete in R.C.C. foundations footings and retaining walls.	10 - 25 mm	80 mm
(ii) Beams, slabs and columns simply reinforced	25 – 40 mm	100-120 mm
(iii) Thin R.C.C. section or section with mm. congested steel	40 – 50 mm	125 -150 mm

## 8.0 Segregation

**8.1** When concreting has to be resumed on a surface which has hardened, it shall be roughened, swept, clean, thoroughly wetted and covered with a 13 mm. thick layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has not fully hardened, allegiance shall be removed by scrubbing the well surface with wire or bristle brushes, care : being taken to avoid dislodgement of any particles of coarse aggregate. The surface shall then be thoroughly wetted, with neat cement grout. The first layer of concrete to be placed on the Is surface shall not exceed 150mm.in thickness, and shall be well rammed against old work particular attention being given to corners and close spots.

## 9.0 Transporting & Placing the Concrete:

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

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

**9.3** All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators, unless otherwise permitted by the Engineer-in-charge for exceptional cases, such as concreting under water, where vibrators can not be used sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the event of break downs.

## 9.4 After Placing

The mechanical vibrator shall be installed on channel and it shall be run in forwarded direction of concrete placing. The vibrator shall be start and shall be use as per instruction of Engineer-in-charge.

The water shall be suck by dewaterization equipment by spreading vaccum sheet on concrete after sufficient vibrator the floating water shall be sufficiently suck from concrete so that the sufficient strength of concrete shall be achieved.

The mechanical trowel shall be start after dewatering from concrete. The trowel shall be run in such a way that the required finish top surface of concrete shall be achieved mat finish or glossy finish.

#### **10.0 Curing :**

**10.1** Immediately after compaction, concrete shall. be protected against harmful effects of weather, including rain, running water, shocks, vibration, traffic, rapid temperature charges, frost and driving out process shall be covered with wet jute bags or the similar absorbent material approved by the Engineer-in-charge soon after the initial set, and shall be kept continuously wet for a period of not less than 14 days from the date of placement. Masonry work over the foundation concrete may be started after 48 hours of its laying but the curing of concrete shall be continued for a minimum period of 14 days.

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

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

**11.1** The payment will be made on Cum. basis of the finished work.

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

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

**11.4** The unit rate concrete shall include the cost of all materials, tools and plant required for mixing, placing in position, compacting, and cost Water recuding concrete ad mixture at 100 ml per bag of cement and making channel 75 mm x 75 mm required to level and slope and thickness of the concrete road leveling of placed concrete with surface vibrator and finishing with power floater and trowel light booming the surface and cutting Expansions joints by machine as directed by The Engineer in charge and finishing as per direction of the Engineer-in-charge, curing and all other incidental expenses for producing concrete of specified strength to complete the structure or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and removing of all centering and forms required for the work.

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

**11.6** The rate shall be for a unit of One Cum.

**Item No.14 :-** Providing and laying controlled cement concrete M-200 and curing comp. including the cost of form work but excluding the cost of reinforcement for reinforced concrete work for Columns, pillars, posts and struts AT GROUND FLOOR.

The work shall be executed as per specification of **Item No. 3** except for the item is work of Providing and laying controlled cement concrete M-200 and curing comp. including the cost of form work but excluding the cost of reinforcement for reinforced concrete work for Columns, pillars, posts and struts AT GROUND FLOOR.

**Item No.15 :-** Providing and Laying controlled cement concrete M-200 and with curing etc.complete. Including the cost of formwork but excluding the cost of reinforcement for R.C.C work in Column heving any cross section area of Column.For First Floor Column..

The work shall be executed as per specification of **Item No. 3** except for the item is work of Providing and Laying controlled cement concrete M-200 and with curing etc.complete. Including the cost of formwork but excluding the cost of reinforcement for R.C.C work in Column heving any cross section area of Column.For First Floor Column..

**Item No.16 :-** Providing and Laying controlled cement concrete M-200 and with curing etc.complete. Including the cost of formwork but excluding the cost of reinforcement for R.C.C work in beam heving any cross section area of BEAM. for First floor.

The work shall be executed as per specification of **Item No. 3** except for the item is work of Providing and Laying controlled cement concrete M-200 and with curing etc.complete. Including the cost of formwork but excluding the cost of reinforcement for R.C.C work in beam heving any cross section area of BEAM. for First floor.

**Item No.17 :-** Providing and laying controlled cement concrete M-200 and curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in Lintels Ground Floor.

The work shall be executed as per specification of **Item No. 3** except for the item is work of Providing and laying controlled cement concrete M-200 and curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in Lintels Ground Floor.

**Item No.18 :-** Providing and laying controlled cement concrete M-200 and curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in CHHAJJAS For All FLOOR.

The work shall be executed as per specification of **Item No. 3** except for the item is work of **Providing and laying controlled cement concrete M-200 and curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in CHHAJJAS For All FLOOR.**

**Item No.19 :-** Provinding and Laying controlled cement concrete M-200 including finising smooth with curing complete including the cost of form work but excluding cost of reinforcement for reinforced concrete work in VARTICAL AND HORIZONTAL FINS/ PADADI For all floor..

The work shall be executed as per specification of **Item No. 3** except for the item is work of **Provinding and Laying controlled cement concrete M-200 including finising smooth with curing complete including the cost of form work but excluding cost of reinforcement for reinforced concrete work in VARTICAL AND HORIZONTAL FINS/ PADADI For all floor..**

**Item No. 20 :- Providing TMT Bar FE 500D reinforcement for R.C.C.work including bending, binding and placing in position complete upto floor two level..**

**1.0. GENERAL**

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

**2.0. MATERIAL**

**2.1. TMT Bars**

Reinforcements may be either T.M.T. tensile steel, confirms to IS 1786-2008 bars. They may be uncoated or coated with epoxy or with approved protective coatings.

**2.2.** T.M.T. bars reinforcement for R.C.C. work shall conform IS 432 (Part II) 1982 (Reaffirmed 1995) 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, all scale or loose or thick rust at the time of placing.

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

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

**3.0. Pitch**

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

**4.0. Binding wire**

**4.1.** Mild steel binding wire shall be of 1.63 mm or 1.22 mm (16 to 18 gauge diameter and shall conform IS 280-2006.

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

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

**5.0. PROTECTION OF REINFORCEMENT**

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

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

**6.0. Workmanship**

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

## **7.0. BENDING OF REINFORCEMENT**

- 7.1. Bar bending schedule shall be furnished by the Contractor and got approved by the Engineer before start of work.
- 7.2. Reinforcing steel shall conform to the dimensions and shapes given in the approved bar bending Schedules.

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

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

## **8.0. PLACING OF REINFORCEMENT**

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

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

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

In case of beam and slab construction, industrially produced polymer cover blocks of thickness equal to the specified cover shall be placed between the bars and formwork subject to Satisfactory evidence that the polymer composition is not harmful to concrete and reinforcement. Cover blocks made of concrete may be permitted by the Engineer, provided they have the same strength and specification as those of the member.

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

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

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

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

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

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

## **9.0. Lapping**



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

## **10.0. Welding**

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

**10.2.** While welding may be permitted for T.M.T. reinforcing bars conforming to IS:432, welding of deformed bars conforming to IS: 1786 shall in general be prohibited. Welding may be permitted in case of bars of other than S 240 grade including special. Welding grade of S 500D grade bars conforming to IS:1786, for which necessary chemical analysis has been secured and the carbon equivalent (CE) calculated from the chemical composition using the formula:

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

is 0.4 or less.

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

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

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

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

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

As far possible bars of full length shall be used in case this is not possible, overlapping of bars shall be done as directed by the Engineer in charge When practicable overlapping bars shall

not touch each other, but be kept apart by 25 mm Where no feasible overlapping bars shall be bound with annealed wires not less than 1 mm thick twisted tight The overlaps shall be staggered for different bars and located at points along the span where neither sheer not bending moments is maximum.

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

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

## **11.0 MODE OF MEASUREMENTS & PAYMENT**

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

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

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

**11.2.** Reinforcement shall be measured in length including hooks, if any, separately for different diameters as actually used in work, excluding overlaps. From the length so measured, the weight of reinforcement shall be calculated in tonnes on the basis of IS: 1732. Wastage, overlaps, couplings, welded joints, spacer bars, chairs, stays, hangers and annealed steel wire or other methods for binding and placing shall not be measured and cost of these items shall be deemed to be included in the rates for reinforcement..

**11.3.** The contract unit rate for coated/uncoated reinforcement shall cover the cost of material, fabricating, transporting, storing, bending, placing, binding and fixing in position as shown on the drawings as per these specifications and as directed by the Engineer, including all labour, equipment, supplies, incidentals, sampling, testing and supervision.

The unit Rate for coated reinforcement shall be deemed to also include cost of all material, labour, tools and plant, royalty, transportation and expertise required to carry out the work. The rate shall also cover sampling, testing and supervision required for the work.

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

**Item No. 21 :- Providing and laying brick work using common burnt clay building conventional type bricks having crushing strength not less than 35 Kg./Sqcm. in super structure in cement mortar 1:6 (1 cement : 6 fine sand) for Ground floor including the cost of all materials and labour charges etc. complete.**

**1.0. Materials**

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

**2.0. Workmanship**

**2.1. Proportion:**

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

**2.2. Wetting of bricks:**

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

**2.3. Laying:**

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

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

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

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

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

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

**2.4. Joints:**

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

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

## **2.5. Curing:**

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

## **2.6. Preparation of foundation bed:**

- 2.6.1.** If the foundation is to be laid directly on the excavated bed, it shall be leveled, cleared of all loose materials, cleaned and wetted before starting masonry, If masonry is to be laid on concrete footing, the top of concrete shall be cleaned and moistened. The contractor shall obtain the engineer's approval for the foundation bed before foundation masonry is started. When pucca flooring is to be provided flush with the top to plinth, the inside plinth offset shall be kept lower than the outside plinth top by the thickness of the flooring.
- 2.7.** The frames of doors, windows, cupboards etc. shall be housed into the brick work at the correct location and level as directed. The heavy steel doors, window frames etc. shall be built in with work, but for ordinary steel doors and windows required opening for frames, hold-fasts etc. shall be in the wall and frame embedded later on in order to avoid damage to the frames.
- 2.8.** Necessary scaffolding shall be provided. The supports of the scaffolding shall be sound and strong tied, together with horizontal pieces over which the scaffolding plunks shall be fixed. Simple scaffolding shall be allowed normally. In this case scaffolding hole shall rest in hole header horizontal coarse only. Minimum number of holes be left in brick work for supporting horizontal scaffolding poles. The contractor is responsible for providing and maintaining sufficiently strong scaffolding so as to withstand all loads likely to come upon it.
- 2.9.** For the face of brick work, where plastering is to be done, joints shall be racked out to a depth not less than thickness of joints. The face of brick work shall be cleaned and mortar dropping removed on very same day that brick work is laid.

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

- 3.1.** The masonry work of G.F. & First floor shall be measured and paid under this item rate includes cost of all materials & labour.
- 3.2.** Brick work in parapet shall be included in the corresponding masonry item of floor immediately below the floor above which the parapet is built.
- 3.3.** No deduction shall be made from quantity of brick work nor any extra payment made for embedding in masonry of marking holes in respect of following item.
- (1) Ends of joints, beams, posts, girders, rafters, purlins trusses corbel, steps, etc. where cross sectional area does not exceed 500 sq.cm.
  - (2) Opening not exceed in 1000 sq.cm.
  - (3) Wall plate sand bed plates bearing of slab, chhajjas, and like whose thickness does not exceed 10 cms. and the bearing does not extend the full thickness of wall.
  - (4) Drainage holes and recesses for cement concrete blocks to embed hold fasts for doors, window etc.
  - (5) Iron fixtures, pipes up to 300 mm. dia. hold fasts of doors, and window built into masonry and pipes etc. for concealed wiring.
  - (6) Forming charges of section not exceeding 350 sq.cm. in masonry.

(7) Apparatuses for fire places shall not be deducted nor shall extra labour required to make splaying of jumps, throating and making trenches over the aperture be paid for separately.

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

**Item No.22 :- Providing and laying brick work using common burnt clay building conventional type bricks having crushing strength not less than 35 Kg./Sqcm. in super structure in cement mortar 1:6 (1 cement : 6 fine sand) for First floor including the cost of all materials and labour charges etc. complete.**

The work shall be executed as per specification of **Item No. 21** except for the item is work of **Providing and laying brick work using common burnt clay building conventional type bricks having crushing strength not less than 35 Kg./Sqcm. in super structure in cement mortar 1:6 (1 cement : 6 fine sand) for First floor including the cost of all materials and labour charges etc. complete.**

**Item No. 23 :-** Providing and fixing rolling shutters of approved make made of 80 mm wide M.S. laths inter-locked together through their entire length and jointed together at the ends by end locks mounted on specially designed pipe shaft with bracket plates, guide channels and arrangements for inside and outside locking with push-pull operation including the cost of hood cover and spring etc. complete.(B) Shutters having width 3.5 M. and above...

**32. Rolling Shutters**

- 32.1.** The rolling shutters shall conform to I.S.6248-1979. Rolling shutters shall be supplied of specified type with accessories. The size of the rolling shutters shall be specified in the drawings. The shutters shall be specified in the drawings. The shutters shall be constructed with interlocking lath sections formed from cold rolled steel strips not less than 0.9 mm. thick and 30 mm. wide for shutters below 3.5 m width not less than 1.25 mm. thick and 30 mm wide for shutters 3.5 m. in width and above unless otherwise specified.
- 32.2.** Guide channels shall be of mild steel deep channel section and of rolled pressed or built up (fabricated) joint less construction. The thickness of sheet used shall not be less than 3.15 mm.
- 32.3.** Hood covers shall be made of M S. Sheets not less than 0.90 mm. thick. For shutters having width 3.5 Meter and above the thickness of M.S. sheet for the hood cover shall be not less than 1.25 mm.
- 32.4.** The spring shall be of best quality and shall be manufactured from tested high tensile spring steel wire of strip of adequate strength to balance the shutters in all position. The spring pipe shaft etc. shall be supported on strong M.S. of malleable C.I. brackets. The brackets shall be fixed on or under the lintel as specified with raw plugs and screws bolts etc.
- 32.5.** The rolling shutters shall be of self rolling up to 8 Sq.m. clear area without ball bearing and up to 12 Sq.m. clear area with ball bearing. If the rolling shutters are of larger, then gear operated type shutters shall be used.
- 32.6.** The locking arrangement shall be provided at the bottom of shutter at both ends. The shutters shall be opened from outside.
- 32.7.** The shutters shall be completed with door suspension shafts, locking arrangements with push-pull operation / gear system, handles and other accessories.

The payment shall be made on **Sq.mt.** basis.

#### Item No. 24

**Providing and fixing Glass bricks Partition using glass brick of required design, type size of glass brick 19 x 19 cm and fixing the same with 4mm dia aluminium bar at every 3rd layer with white cement etc. complete..**

#### **General**

This work shall consist of **providing and fixing Glass bricks partition using glass brick of required design type size of glass brick 19 x 19 cm** of the shape and dimensions shown on the drawings and conforming to these Specifications or as approved by the Engineer in charge.

#### **1.0 MATERIAL**

##### **1.1. Glass Bricks**

- 1.1. The Glass bricks shall be approved brand and make having size **19 x 19 cm** as approved by the Engineer in Charge. They shall be free from cracks and flaws and nodules and shall have smooth rectangular faces with sharp corners and shall be of uniform shape.
- 1.2. The Glass bricks shall be factory product of **19 x 19 cm** and 7.5 cm. deep on one of its flat sides. The bricks shall conveyed care fully so that no brick is damaged.
- 1.3. Only Glass bricks of one standard and approved size shall be used on one work. The following tolerances shall be permitted in the conventional size adopted in a particular work. Length + 1/8" (3.0 mm.) Width  $\pm$  1/16" (1.50 mm.) Height + 1/16" (1.50 mm.)
- 1.4. Glass bricks shall be of white or of other best quality as approved by engineer in charge. Type and shape and colour of the Glass bricks shall be approved by Engineer in charge.
- 1.5. Glass bricks shall be hard close uniform and homogeneous in texture. They shall have even crystalline grain and free from defects and cracks. The surface shall be shining to an even and perfect plane surface and edges shall be factory made in true square shape and size of the Glass bricks shall be as per requirement of item of work.

#### **2.0 WORKMANSHIP**

- 2.1. The Glass bricks shall be fixed in window openings as and where directed. The Glass bricks shall be fixed tight in window opening with silicon structural sealant SSG-400 in the pattern shape and designed as directed by Engineer in Charge.

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

- 3.1. The unit rate Glass bricks shall include the cost of all materials, tools and plant required for lifting to required height with all lead and lift, placing & fixing in position, all required specials and jointing white cement, finishing as per direction of the Engineer-in-charge, and all other incidental expenses for producing Marble slab work of specified size to complete the structure or its components as shown on the drawings and according to these specifications.
- 3.2. The Glass bricks work shall be measured for its width and height limiting to specified capacity to those specified on plan or as directed. The rate shall be for a unit of square meter.
- 3.3. The payment will be made on **square meter** basis of the finished work.

**Item No. 25 :- Providing & fixing M.S. Grill using 16 mm dia M.S. Bars @ 15 cm C/C fixed in frame using angle 35 mm x 6 mm, 35 x 6 mm flat in center, and Galvanized wiremesh jali 20mm x 20 mm spacing, including red lead primer coat and two coats of oil painting etc. complete..**

**1.0. Materials**

- 1.1. The material shall be use as per general specifications attached here with.
- 1.2 The material shall be use as per description of item given above and as directed by the Engineer in charge.
- 1.3 As per relevant additional general specification item.

**2.0 Workmanship**

- 2.1 As per description given above and to the satisfaction of the Engineer in charge.
- 2.2 As per best fair industries practice.
- 2.3 As per relevant specifications describe in Additional General furnishing specification.
- 2.4 M.S. Grill using 16 mm dia M.S. Bars @ 15 cm C/C fixed in frame using angle 35 mm x 6 mm, 35 x 6 mm flat in center, and Galvanized wiremesh jali 20mm x 20 mm spacing, including red lead primer coat and two coats of oil painting etc as directed by Engineer in charge.

**3.0 Mode of measurement & payment:**

- 3.1 The rate shall be includes cost of all materials and labour required for satisfactory completion of this item as described above.
- 3.2 The work shall be measured for the finished work.
- 3.3. The rate shall be for a unit of **Sqmt.**



**Item No. 26 :- Providing 10 mm thick cement plaster in single coat on fair side brick/concrete walls for interior plastering upto floor two level and finished even and smooth in cement mortar 1:3 (1 cement : 3 sand) including finishing with a floating coat of neat cement slurry etc. complete for Ceiling ..**

**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 and soffits of stairs plaster which shall be independent of the walls.

**2.2. Preparation of back ground :**

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

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

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

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

**2.3. Application of plaster :**

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

- 2.3.2.** Cement plaster shall be used within half an hour after addition of water and mortar or plaster which is partially set shall be rejected and removed forthwith from the site.
- 2.3.3.** In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically, when recommencing the plaster, the edges of the old work shall be scraped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of the wall and nearer than 15 cm. to any corners or arises. It shall not be closed on the body of features such as plaster bands and cornices not at the corners or arises. Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.
- 2.3.4.** Each coat shall be kept damp continuously till the next coat is applied or for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking of walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air or dry weather shall be prevented by hanging matting or gunny bags on the outside of the plaster and keeping them wet.
- 2.3.5.** The plastering work shall be in single coat for plastering up to floor two level, finished even and smooth in **C.M. 1:4**.
- 2.3.6** The coat of cement and fine sand mortar of proportion 1:1 (1.5 mm thick about) shall be applied to the plastered surface with a trowel to provide uniform texture while the base coat is still plastic.
- 2.3.7.** In any continuous face of wall the finishing treatment should be carried out continuously and day to day breaks made to coincide with architectural breaks in order to avoid unsightly Junctions. The smooth concrete shall be suitably sawed to provide necessary bond before plastering.
- 2.3.8. Curing :** All the plaster work shall be kept damp continuously for a period 7 days.

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

- 3.1.** The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.
- 3.2.** All plastering shall be measured in square meters unless otherwise specified. Length breadth or height shall be measured correct to a centimeter.
- 3.3.** Thickness of the plaster shall be exclusive of 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 payment shall be made extra for this work over and above the plaster work
- 3.11. The rate shall be for a unit or 1 Kg of water proofing materials used in 1 bag of weighing 50 Kg. cement used extra over the rate of plastering work.
- 3.12. The rate shall be for a unit of **One sq. meter.**

**Item no. 27 :- Providing 15mm thick cement plaster in single coat on brick/concrete walls for interior plastering upto floor two level and finished even and smooth in (i) Cement mortar 1:4 (1-cement:4-sand) MALA finish plaster etc. complete. for Ground Floor.**

The relevant specifications of **Item No. 26** except the item is shall be followed for the work of **Providing 15mm thick cement plaster in single coat on brick/concrete walls for interior plastering upto floor two level and finished even and smooth in (i) Cement mortar 1:4 (1-cement:4-sand) MALA finish plaster etc. complete. for Ground Floor.**

**Item No. 28 :-** 20mm thick sand faced cement plaster on walls upto height 10 metres above ground level consisting of 12mm thick backing coat of C.M. 1:3 (1-cement : 3-sand) and 8mm thick finishing coat of C.M. 1:1 (1-cement : 1-sand) etc. complete....

**1.0. Materials**

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

**2.0. Workmanship**

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

**2.2. Scaffolding:**

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

**2.3. Preparation of back ground :**

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

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

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

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

**2.4. Application of plaster :**

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

Hounding or chamfering, corners, arises junctions etc. shall be carried out with proper templates to be size required.

- 2.4.2.** Cement plaster shall be used within half an hour after addition of water and mortar or plaster which is partially set shall be rejected and removed forthwith from the site.
- 2.4.3.** In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically, when recommencing the plaster, the edges of the old work shall be scraped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of the wall and nearer than 15 cm. to any corners or arises. It shall not be closed on the body of features such as plaster bands and cornices not at the corners or arises. Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.
- 2.4.4.** Each coat shall be kept damp continuously till the next coat is applied or for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking of walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air or dry weather shall be prevented by hanging matting or gunny bags oh the outside of the plaster and keeping them wet.
- 2.4.5.** Before the first coat hardens its surface shall be beaten up by edges of wooden tapers and close dents shall be made on the surface. The subsequent coat shall be applied after this coat has been allowed to set for 3 to 5 days, depending upon the weather conditions. The surface shall not be allowed to dry during this period.
- 2.4.6.** The second coat shall be completed to 8 mm. thickness in C.M. 1:1 as described above, including raising sand facing by bushing. The sample of sand face shall be got approved before the work is started. The whole work shall be carried out uniformly as per sample approved.
- 2.4.5.** The plastering work shall be in single coat on rough side of half brick wall for interior plastering up to floor two level, finished even and smooth in C.M. 1:3.

**2.4.6 Curing :**

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

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

**3.0. Mode of measurements & payment**

- 3.1.** The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.
- 3.2.** All plastering shall be measured in square meters unless otherwise specified. Length breadth or height shall be measured correct to a centimeter.
- 3.3.** Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum 20 mm at any point on this surface.

- 3.4. This item includes plastering up to floor two level including making necessary cornices as directed.
- 3.5. The measurement of wall plastering shall be taken between the walls or partition (dimensions before plastering being taken) for length and from the top of floor or skirting to ceiling for height. Depth of cover of cornices if any shall be deducted.
- 3.6. Soffits of stairs shall be measured as plastering on ceilings, following soffits shall be measured separately.
- 3.7. For jambs, soffits, sills etc. for openings not exceeding 0.5 sq. met each in area for ends of joints beams, posts, girders, steps etc. not exceeding 0.5 sq.mt each in area and for openings exceeding 0.5. sq.mt and not exceeding 3.00 sq.mt. in each area deductions and additions shall be made in the following manners.
- (a) No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 sq. mt each and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings, for finish to plaster around ends of joints, beams posts etc.
- (b) Deduction for openings exceeding 0.5 sq. mt but not exceeding 3 sq.mt. each shall be made as follows and no addition shall be made for ravel, jambs, soffits, sills etc. of these openings, (i) When both faces of all wall are plastered with same plaster, deduction shall be made for one face only, (ii) When two faces of wall are plastered with different types of plasters or if one face is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for door, window etc. on which width of reveals is less than that on the other side but no deductions shall be made on the other side. Where width of reveals on both faces of all are equal, deductions of 50% of area of opening on each face shall be made from areas of plaster and / or pointing as the case may be.
- 3.8. For openings having door frames equal to or projecting beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the wall.
- 3.9. In case of openings of area above 3 sq. mt. each, deduction shall be made for openings but jambs, soffits sand sills shall be measured.
- 3.10. The rate shall be for a unit of **One Sq. meter. No extra payment for making necessary cornices shall be made.**

**Item No. 29 :- Providing and laying polished Kota stone slab flooring over 20mm (Average) thick base of cement mortar 1:6 (1-cement : 6-coarse sand) laid over and jointed with grey cement slurry including rubbing and polishing etc. complete.(A) 25mm thick.**

**1.0. Materials**

- 1.1. Water shall conform to M-1. Lime mortar shall conform to M-10. Cement mortar shall conform to M-11. 25mm thick polished kota stone slab shall conform to M-49.
- 1.1. Kota stone slab shall be hard even sound, and regular in shape and generally uniform in colour. The colour of the stone shall generally be green. Brown coloured shall not be allowed for use. They shall be without any soft veins cracks or flaws Kota stone slab shall be hard, even, and regular in shape and it should be without fault.
- 1.2. The size of the Kota stone slab to be used for flooring shall be of size 600 mm x 600 mm and or as approved by Engineer in charge or Architect. However smaller sizes will be allowed to be used to the extent of maintaining required pattern. Thickness shall be as specified.
- 1.3. Tolerance of minus 30 mm. on accounts of chisel dressing of edges shall be permitted for length as well as breadth. Tolerance in thickness shall be +3 mm.
- 1.4. The edges of Kota stone slab shall be truly chiseled and table rubbed with coarse sand before paving. All angles and edges of the stones shall be true, square and free chipping and surface shall be true and plain.
- 1.5. When machine cut edges are specified the exposed and the edges at joints shall be machine cut the thickness of the exposed machine cut edges shall be uniform.
- 1.6. The stones shall have machine polished surface. When brought on site, the stones shall be single polished or double polished depending upon its use. The stones for paving shall generally be single polished. The stones to be used for dado, skirting, sink, veneering, sills, steps etc. where machine polishing after the stones are fixed in situ is not possible shall be double polished.

**2.0. Workmanship**

- 2.1. Each slab shall be cut to the required size and shape and fine chisel dressed at all the edges. The sides thus dressed shall have a full contact if a straight edge is laid along. The sides shall be table rubbed with coarse sand before paving. All angles and edges of the slabs shall be true square and free from chippings and giving a plane surface. The thickness shall be 20 mm. (Average) as specified in the item but not less than 25 mm. at any place of the slab.
- 2.2. Bedding for the polished kota stone slab shall be of cement mortar 1:6 (1 cement : 6 coarse sand) of average thickness 20 mm given in the description of the item. Sub grade shall be cleaned wetted and mopped mortar of the specified mix and thickness shall then be spread on an area sufficient to receive one blue kota stone slab. The slab shall be washed clean before laying. It shall be laid on top, pressed, tapped gently to bring it in level with the other slabs. It shall then be lifted and laid aside. Top surface of the mortar shall then be corrected by adding fresh mortar at hollows or depressions. The mortar shall then be allowed to harden bit. Over this surface, cement slurry of honey-like consistency shall be applied. The slab shall then be gently placed in position and tapped with wooden mallet till it is properly padded in level with and close to the adjoining slab. The joint shall be as fine as possible. The slabs fixed in the floor adjoining, the walls shall enter not less than 10 mm. under the plaster, skirting or dado. The junction

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

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

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

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



**Item no. 30 :- Providing and laying water proofing tretment with chaina mosaic tiles flooring over avg 40 mm C.C. 1:2:4 {1 Cement : 2 sand : 4 Kapachi / Gritt 6 to 12 mm size} bedding for maintaining slope for plain and curve surface & 12 mm to 20 mm of broken piece of seramic / glazed tiles ( one for more color as directed ) to be laid over cement mortar bedding of C M 1:3 ( 1 cement : 3 sand ) containg one Kg of water profing materials per bag of O P C at plain or / and slops and to be tempered to bring mortar eramic up to surface with using white cement and colour pigment including rounding of junctions and extending them up to 15 cm along the wall and curing with bends any pattens or design as per drawing and cleaning by using oxalic acid etc complete..**

## **1.0 MATERIAL - WATER**

- 1.1 Water shall not be salty brackish and shall be clean, reasonably clear and free objectionable quantities of silt and traces of oil injurious alkalis salts organic matter and other deleterious material which will either weaken the mortar of concrete or cause efflorescence or attack the steel in R.C.C. container for transport storage and huddling of water shall be clean. Water shall confirm to the Standard Specification in I.S. 455 - 1978.
- 1.2 If required by the Engineer in charge, it shall be tested by comparison with distilled water compression shall be made by means of standard cement tests for soundness, time of setting and mortar strength as specified in I.S. 269 - 1976. Any indication of unsoundness charge in time of setting by 50 minutes or more or decrease of more than 10 percent strength of mortar prepared with distilled water sample when compared with the result obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.
- 1.3 Water for curing, mortar concrete or masonry should not be too acidic/too alkaline.
- 1.4 It shall be free of elements which significantly affect the hydration reaction or otherwise interface with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces.
- 1.5 Hard and bitter water shall not be used for curing.
- 1.6 Potable water will generally found suitable for curing mortar or concrete.

## **2.0 CEMENT**

- 2.1 Cement shall be ordinary Portland slag cement as per I.S. 1624 - 1974 or Portland slag cement as per I.S.455-1976.
- 2.2 Cement shall be stored above the ground level in perfectly and dry and water tight sheds. Wherever bulk storage containers are used, there capacity should be sufficient to cater to the requirements at site and should be cleaned at least once every 3 to 4 months. The aggregate shall be stored in such a way as to prevent admixture of foreign materials. Different size of fine or coarse aggregate shall be stored in separate stock piles sufficiently away from the each other to prevent inter mixing the materials.

### 3.0 SAND

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

**COARSE SAND** - The fineness modules of coarse sand shall not be less than 2.5 and shall not exceed 3.0. The sieve analysis of coarse sand be as under :

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

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

I.S. Sieve Designation	% by wt. passing
4.75 mm	100
2.36 mm	100
1.18 mm	70 to 100
600 MC	40 to 85
300 MC	05 to 50
150 MC	00 to 10

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

### 1.4 WATER PROOFING COMPOUND

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

### 1.5 BRICK BATS

Brick bat aggregates shall be broken from well burnt or slightly over burnt and dense bricks it shall be homogeneous in texture roughly cubical in shape clean and free from dirt or any other foreign material brick bats shall be of 12 to 20 mm nominal size unless otherwise specified in the item the under burnt or over burnt bricks bats shall not be used.

### 1.6 CHINA MOSAIC TILE PIECES

China mosaic tiles pieces shall be of 50 mm to 90 mm nominal size, tiles pieces shall be made from hard and good quality of tiles.

### 1.7 WHITE CEMENT

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

## **WORKMANSHIP**

- A** First of all surface of the entire terrace shall be cleaned by thoroughly brooming and then by wire brushes. All the loose material, dust and debries shall be removed thoroughly from the entire surface of the terrace.
- All joints and cracks shall be racked off and cut in trench which shall be filled by neat cement slurry admixed with water proofing compound. The joints with parapet shall be racked up to 30 cm height and shall be applied by neat cement slurry admixed with water proofing compound.
- Neat cement slurry shall be prepared and a water proofing compound of approved make shall be mixed with the slurry in proportion specified by the manufacturer of the compound and shall be laid through out the surface of the terrace by the use of brushes mala etc. Cement slurry shall be prepared by adding adequate quantity of water so as to spread it uniformly on the surface.
- B** 40mm thick Cement concrete 1:2:4 (1 part of cement and 2 part of coarse sand and 4 part coarse aggregate 20mm nominal size by volume) admixed with water proofing compound of approved make in specified proportion) of specified thickness shall be laid (Specification of C.C. 1:2:4 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. 1:3 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. 1:3 and China mosaic tilling and finally finishing the surface with trowel with white cement slurry.
- F** After two days proper curing the terrace shall be flooded for 15 days.

### **7.0 MODE OF MEASUREMENT AND PAYMENT**

- 7.1** The unit rate of flooring shall include the cost of all materials, tools and plant required for mixing, laying of base layer in true level and slope as required applying and placing broken pieces of china mosaic tile in position, compacting, finishing, curing, providing treatment of 30 cm high allover the length of parapets and corners and sill of doors etc. and all other incidental expenses for producing flooring work to complete the structure of its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing of all scaffolding and forms required for the work.
- The rate of plastering shall include the cost of all labour, materials, tools and plants, scaffolding and all incidental expenses as described herein above.
- 7.2** The plaster work shall be measured for its length and width, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one Square Meter.

7.4 A guarantee bond on appropriately stamped paper shall be given by the contractor to the Department in the manner and form prescribed below.

7.3 The payment will be made on **Square Meter** basis of the finished work.

### **FORM OF GUARANTEE BOND** **(For water proofing work)**

Name of Work :-

Agreement No. :-

I \_\_\_\_\_ hereby guarantee that work will remain unaffected and will not be in anyway damaged by water leakages or any other similar type of defect surface will remain good for the period of five years after completion of the work of water proof as per the terms and conditions of the contract and the contractor that might be caused on account of bad materials or workmanship and or the similar type of cause and hereby guarantee to make good any loss or damage suffered by the Govt. of Gujarat and further guarantee to redo the effective work without claiming any extra cost.

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

The deposit at the rate of **15%** of the cost of this executed item from the running or the final bills as taken of guarantee for work shall be recovered and shall be released after the first three years after completion of the work for 1/3 of deposit and as half 1/3 amount shall be released for the fourth years after date of final balance of guarantee period, if no leakage is found.

### **MODE OF MEASUREMENT AND PAYMENT**

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

**Item No. 31 :- 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 Birla Putty.....**

**1.0. Materials**

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

**2.0. Workmanship**

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

**The lappy (putty) shall be carried out on undecorated wall surface & ceiling to give an even shade.**

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

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

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

**2.3. Priming coat :**

**2.3.1.** A priming coat of primer of approved manufacture and shade shall be applied over the papered surface in case of new work on undecorated surface. If the distemper priming is done after the wall surface dries completely, the distemper primer shall be applied.

**2.3.2.** Application of primer shall be done as under: The primer shall be applied with a brush on the clean dry and smooth surface. Horizontal strokes shall be given first and vertical strokes shall be applied immediately afterwards. This entire operation will constitute one coat. The surface shall be finished as uniformly as possible leaving no brush marks. It shall be allowed to dry for at least 48 hours before oil bound distemper or paint is applied.

### **2.3.3. Preparation of Mix :**

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

### **2.4. Application :**

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

**2.4.2.** The paint shall be laid on evenly and smoothly by means of crossing and laying off the crossing and consist of covering the area over with paint, brushing the surface hard for the first time over and then, brushing alternately in opposite direction two or three times and then finally brushing lightly in direction at right angles to the same. In this process, no brush Marks shall be left after the laying off is finished. No hair marks from the brush or clogging of paint puddles in the corners of panels, angles of moldings, etc. shall be left on the work. The full process of crossing and laying off will constitute one coat.

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

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

### **2.5. Precautions :**

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

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

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

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

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

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

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

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

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

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

not exceeding 0.5 sq.mt. each in area and for openings exceeding 0.5 sq.mt. and not exceeding 3.0. sq.mt. each in area, deductions and additions shall be made as under.

- 3.2.** No deductions shall be made for ends of joists, beams, posts, etc. and openings not exceeding 0.5 sq mt. each. No addition shall be made for reveals, jambs, soffits, sills etc. of these openings not for finish around ends of joints, beams, posts etc.
- 3.3.** No deductions for openings exceeding 0.5 sq.mt. but not exceeding 3 sq.mt. each shall be made as follows and no addition will be made for reveals, jambs, soffits etc. of these openings :
- (a) When both the faces of wall surfaces are provided with finish, deduction shall be made for one face only.
  - (b) When each face of wall surface is provided with different finish, deduction shall be made for that side of frame for door, windows, etc. on which width of reveals is less than that of the other side. Where width of reveals on both faces of wall are equal, deduction of 50% of area of opening on each face shall be made from total area of finish.
  - (c) When only one face of wall is treated and the other face is not treated, full deduction shall be made if the width of reveal on the treated side is less than that on the untreated side, but if the width of the reveal is equal or more than on the untreated side neither deductions nor additions to be made for reveals, jambs, soffits, sills etc.
- 3..4** In case of area of openings exceeding 3 sq. mt. each, deductions shall be made for openings but jambs, soffits, sills shall be measured.
- 3.5.** No deductions shall be made for attachment such as casing, conducts, pipe, electric wiring and the like.
- 3.6.** Corrugated surfaces shall be measured flat as fixed and not girth. The quantities so measured shall be increased by the following percentage and the resultant shall be included with the general areas:
- (a) Corrugated steel sheets..... 14%
  - (b) Corrugated A.C. sheets..... 20%
  - (c) Semi corrugated A.C. Sheets..... 10%
  - (d) Nainital pattern roof (Plain sheeting sheets)..... 10%
  - (e) Naintial pattern roof (with corrugated sheets)..... 25%
- 3.7.** Cornices and other wall features, when they are not picked out in a different finish/colour shall be girthed and included in the general area.
- 3.8** The rate includes cost of ail materials, labours, scaffolding, protective measures etc. involved in all the operations described above. This shall also include conveyance, delivery, handing, unloading, storing work etc.
- 3.9** The rate shall be for a unit of **One sq.** meter.

**Item No. 32 :- Finishing wall with weatherproof exterior emulsion paint on wall surface (two coats) to give an required shape even shade after thoroughly brushing the surface to remove all dirt and remains of loose powdered materials.etc.complete...**

### **General**

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

## **MATERIALS**

### **1.0 Exterior Emulsion Paint**

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

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

### **2.0 WORKMAN SHIP**

#### **2.1 Scaffolding :**

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



### **3.0 Application coat :**

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

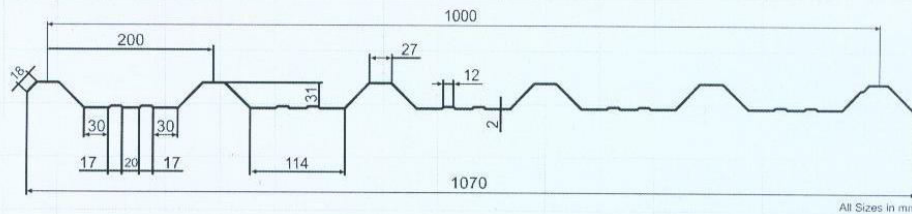
- 3.1** For undecorated surfaces, after the primer coat is dried for at least 48 hours, the surface shall be lightly sand papered to make it smooth for receiving the exterior emulsion paint, taking care not to rub out the priming coat. All loose particles shall be dusted off after rubbing. Minimum two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

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

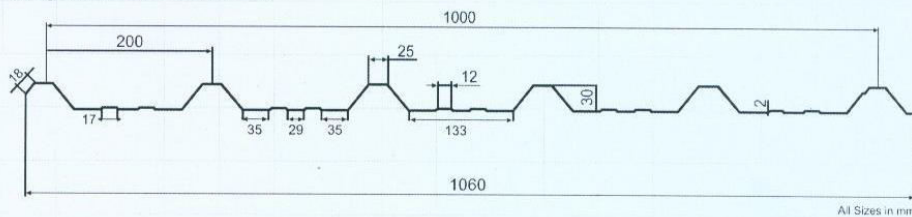
- 3.1.** The unit rate wall painting with exterior emulsion paint shall include the cost of all materials, tools and plant required for mixing, cleaning brushing sand papering & painting with all required specials and Lapi compound, finishing as per direction of the Engineer-in-charge, and all other incidental expenses for producing pipe line work of specified diameter to complete the structure or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.
- 3.2** The rate of wall painting with exterior emulsion paint shall include the cost of all labour, materials tools and plant scaffolding and all incidental expenses as described herein above.
- 3.3.** The wall painting with exterior emulsion paint shall be measured for its length and height limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one square meter.
- 3.4.** The payment will be made on **square meter** basis of the finished work.

**Item No. 33 :- Providing and Fixing PROFLEX type self supported Roof (Arch Type) using Cold rolled,Galvalume steel colour coated sheet 1.0mm thick conforming to ASTMA 653,A792 DIN,ALU Zinc Coating : AZ150 and Regular Modified Polyester painting with epoxy primer service coat at bottom,including necessary fixtures & Fastening for Lighting arrangement and turbo ventilator with sky light..**

**Trapezoidal Profile - I**

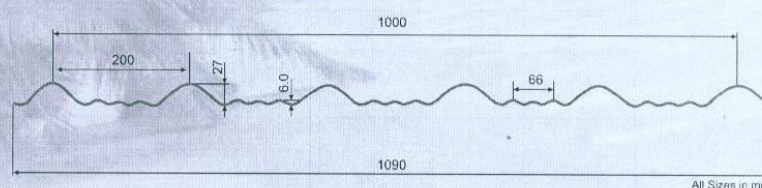


**Trapezoidal Profile - II**



Product	Sheet Width	Effective Width	Crest Depth	Crest Distance
Trapezoidal Profile	1060 mm	1000 mm	30 mm	200 mm c/c with 2 ribs at the centre for stiffening.
	1070 mm		31 mm	

**TILE PROFILE**





## Turbine Roof Ventilator



Turbine Roof Ventilators are a natural, economical and effective way of exhausting air round the clock without power or operating costs. This turbine ventilation system totally is operated by a non-conventional method of exhaust system. They are energy savers that give excellent performance requiring negligible maintenance.

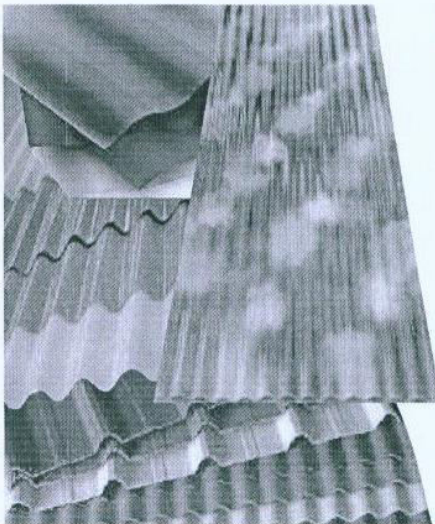
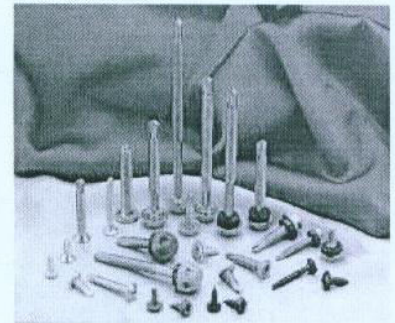
They are really practical and energy-saving products without noise and pollution, so they can save much electric power and labours for users, in order to lower the production cost, to improve the working surrounding of the workshop, to rise the working efficiency and even to strengthen the quality of their products.

The constituents of the material are made of Stainless Steel or Aluminum which needs no maintenance, are anti-acid and anti-corrosion. They can exhaust the hot air, waste gas, dust and other harmful gas from the workshop so as to better the working surroundings.

### STORAGE & HANDLING

The Steel is best stored clear of the ground. It is recommended that following precautions may be taken while stacking.

- ◆ Keep it dry.
- ◆ Raise at one end to ensure good drainage.
- ◆ Always use safety equipments during installation.
- ◆ Keep the sheets under cover to prevent water condensation.
- ◆ It is advised to erect the sheets immediately on arrival at the site.
- ◆ If possible store indoors and do not leave uncovered stacks of sheets lying in open.
- ◆ Remove nails, rivets, leaves from the roof, to avoid corrosion during & after installation.
- ◆ Inspect the storage site regularly to ensure that moisture has not penetrated the sheets.

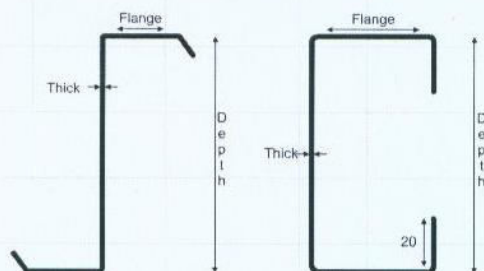
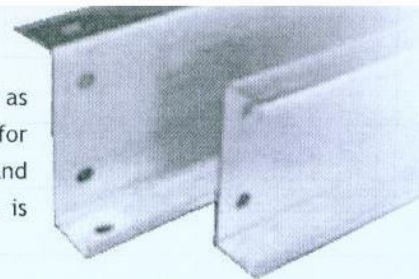


Fiber Glass Products for more than a decade, offers wide range of FRP products for roofing, cladding as well industrial use. The thickness ranges from 0.60mm to 10.00 mm in different colors and corrugation as per customer requirements. We can supply FRP sheets in different profile, like AC corrugation, GI corrugation, Trapezoidal Profile, Decking profile, Plain sheets, Doors, Door etc., depending on applications and in uniform thickness which comes in different colors and shades.



## Cold Rolled Purlins

C & Z Purlins are processed / Cold Roll formed from High Tensile steel coils to use as support for framed structures. They are designed to use as secondary support for roofing and cladding applications. They are light weight, high tensile, efficient and economical requiring minimum maintenance and will last for longer period. It is available in customized length and dimensions as per requirement.



Yield Strength : 245 Mpa

(Higher strength optional)

Roof Slope : 10 to 14 Degree

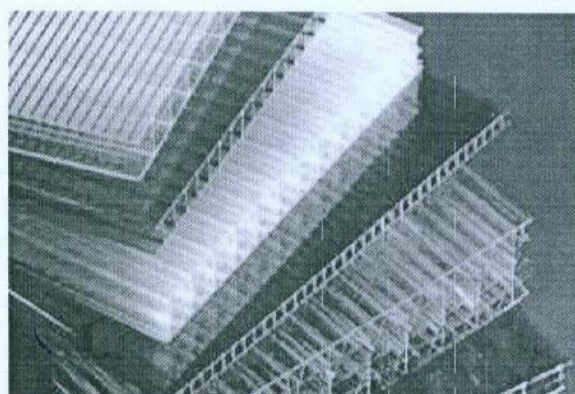
Wind Load : 150 Kg/m<sup>2</sup>

Span in (Mtr)	Galvalume (550mp)	No. of SAG Rods	Wt/Mtr (Kg)
4.5	Z 180 x 50 x 1.8	-	4.25
5.0	Z 180 x 50 x 1.8	-	4.25
5.5	Z 180 x 50 x 2.0	-	4.70
6.0	Z 200 x 60 x 2.0	1	5.40
6.5	Z 200 x 60 x 2.5	1	6.75
7.5	Z 230 x 75 x 2.3	1	7.22
8.0	Z 230 x 75 x 2.5	2	7.85
8.5	Z 250 x 75 x 2.0	2	6.65
9.0	Z 250 x 75 x 2.3	2	7.65
9.5	Z 250 x 75 x 2.5	3	8.35
10.0 - 11.0	Z 280 x 75 x 2.5	3	8.95

## Polycarbonate / Multiwall

Polycarbonate is a polymer with a unique blend of desirable properties. Polycarbonate roof sheets are manufactured by the process of extrusion. Following are a few salient properties of corrugated roof sheets:

- ◆ Polycarbonate sheets possess superb impact strength.
- ◆ Excellent flexural strength hence can be cold curved
- ◆ Very high light transmission of upto 90%.
- ◆ Superlative fire performance.
- ◆ Light in weight hence easy to handle & install.
- ◆ Available in tailored lengths, hence minimum wastages.
- ◆ High temperature tolerance
- ◆ Excellent thermal and electrical insulation properties.



Polycarbonate sheets can be thermoformed to make them suitable for a host of different applications where high performance is sought in combination with transparency. These are used for Industrial Sky Lights to provide daylight solutions in Industrial and Commercial Structures. These polycarbonate roof sheets are available in a variety of profiles matching to commonly used industrial roofing sheets like asbestos sheets, metal Trap corrugated sheets, plastic corrugated sheets. Polycarbonate corrugated sheets can be manufactured from compact clear, embossed or opal white sheets depending upon the amount of light required for the specific industrial application. The process of forming these sheets is generally referred to as Thermoforming.

Industrial roofing is principally done with the help of various types of corrugated/profiled sheets. If polycarbonate sheets are available in matching profile to the plastic corrugated roof sheets which are used on the roof, fixing the sheets becomes extremely easy and highly cost effective. Generally, the skylighting area in an industrial structure varies between 5% to 10% of the overall roof area. We can offer you the entire range of corrugations / profiles to match the roofing sheet of your choice, no matter how small or big the requirement may be.

## Technical Specifications

**Galvanized Steel :** Zinc metallized coating can provide corrosion protection in rural and urban areas. Atmospheric conditions will not rust steel protected by a Zinc metallized coating. Therefore, a Zinc metallized coating does not distort the shape of the steel nor it will affect its metallurgical structure. If the product is scratched and the base metal is revealed, zinc will sacrifice itself and protect the exposed area until it is consumed entirely.

### Pre-painted Galvanized Steel

Thickness (TCT)	: 0.30 mm - 0.80 mm
Metallic Coating	: Z 120 (total on both sides) Higher or lower coating optional.
Tensile Strength	: 340 - 550 Mpa
Paint Coating	: RMP / SMP / PVDF
Paint Thickness	: 18 - 22 micron on Top & 5 - 8 micron primer on bottom
Thickness Tolerance	: As per ISI
Standard followed	: IS 277, ASTM A653 AS 1397 JISG3312

**Galvalume Steel :** Zinc-Aluminium alloy coating gives corrosion resistance and superior heat reflectivity. Galvalume Steel reflects a high percentage of heat and can withstand in any weather conditions, without surface discoloration. It is also suited for coastal areas. Bare Galvalume coating is inorganic and does not contain volatile compounds that can harm the environment.

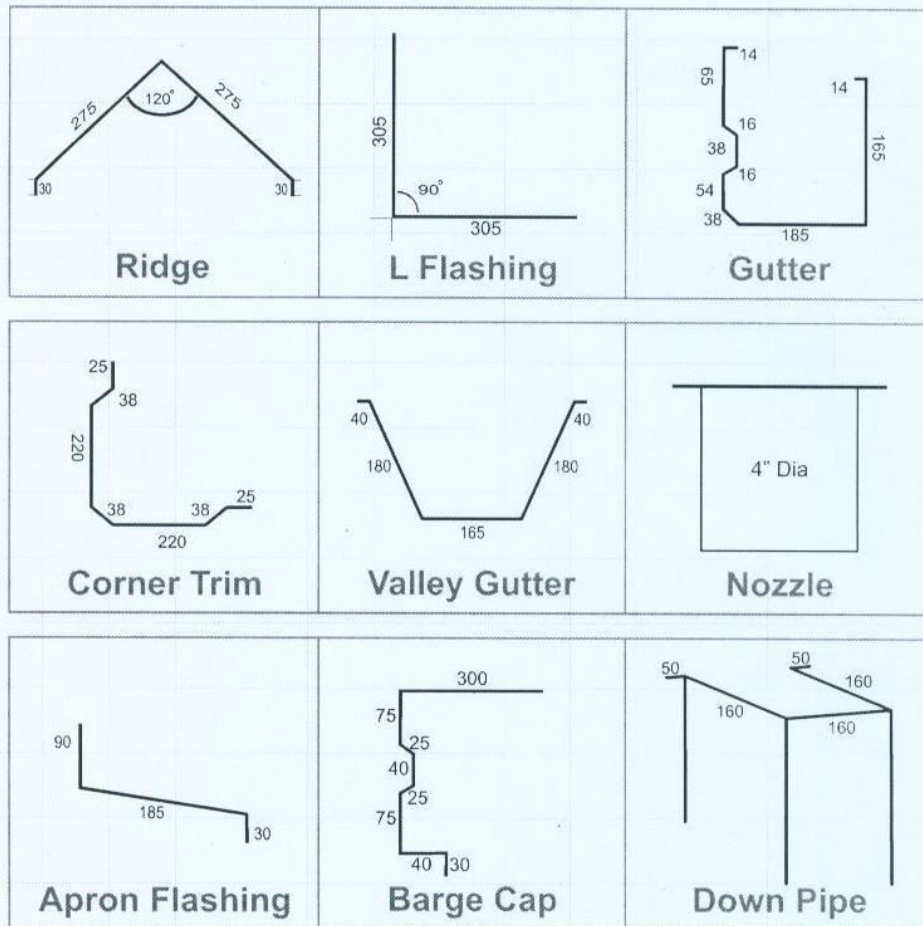
### Pre-painted Galvalume / Bare Galvalume Steel

Thickness (TCT)	: 0.30 mm - 0.80 mm
Metallic Coating	: Zinc-Aluminium Alloy Coating AZ150 Higher or Lower Coating optional.
Tensile Strength	: 550 MPa.
Paint Coating	: RMP / SMP / PVDF
Paint Thickness	: 18 - 22 micron on Top & 5 - 8 micron primer on bottom
Thickness Tolerance	: As per ISI
Standard followed	: IS277, ASTM1397 / A755 / A792, JISG3321/3322
Combination	: 55% Al, 43.4% Zn & 1.5 - 1.6% Si.

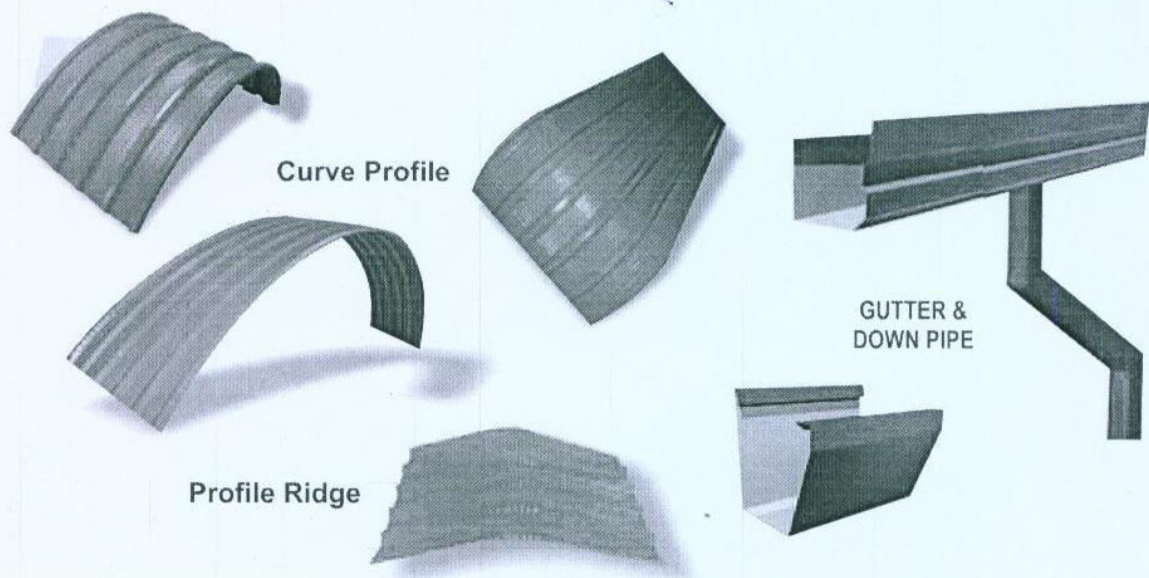


## Accessories

Wide range of accessories like, Gutter, Flashing, Ridges, Louvers, Downpipe, etc, which are manufactured out of the same material used for Roof and Cladding to ensure equal quality and durability.



All Sizes in mm



### ➤ Mode of measurements and payment

The unit rate includes the cost of all materials, accessories, fixtures and fastenings, labour charges necessary machineries etc. complete.

The rate shall be for a unit of per **Square meter**.

**Item No. 34 :- Providing and fixing Turbo Ventilator made from Alluminium and stainless steel with ploy Carbonate Sky Light of size 2 x 7 feet including fixing in roof as and where directed by Engineer in charge etc.complete..**

## **1.0. Materials**

### **1) Turbo Ventilators:-**

- a) Vortex Blades :- Industrial grade Aluminum; 42 vens of 0.5 mm thick.
- b) Turbine Shaft :- S.S. 304.
- c) Vertical & Horizontal bracings :- S.S. 304.
- d) Ball Bearings :- Double Shielded Deep Groove ( maintenance free )
- e) Bearing Housing :- S.S. 304.

2) **Size** :- 24" dia. ( i.e. 600 mm)

3) **Output of Ventilators** :- 2300 m<sup>3</sup> / hr.  $\pm$  10 %

Note :- The above mentioned output is guaranteed in ideal condition i.e.

1) wind velocity :- 6 Km / Hr.

2) Temperature difference :- 3° -4° C. ( in ideal condition)

The wind-powered ventilator operates mainly by utilizing wind velocity. The blades are very lightweight & therefore even slightest breeze causes turbine to spin.

The wind-operated ventilator creates a region of low pressure under the turbine caused by centrifugal force of spinning blades. The airflows from high-pressure area to low-pressure area, the hot air fumes & smoke is driven out through the turbine & continuously replaced by outside fresh air. Secondly temperature difference between the outside & inside of factory shed, warehouse, building etc. causes a difference in air density, which in turn causes difference in air pressure.

Even when the wind does not blow, due to the convection effect, the turbine keeps spinning. As the accumulated hot air, fumes, smoke etc. is driven out by ventilator it is replaced by fresh air at ambient temperature entering through doors, windows etc. Thus convection cycle is complete. In short this system brings down inside temperature by 4 -6 deg. Celsius & tries to maintain ambient temperature.

**Since** the ventilators spins using wind energy it has certain limitations regarding exhaust output. Unlike electrically operated devices, it does not exhaust fumes or smoke instantaneously; It removes heat, smoke or fumes slowly but continuously, because it has no fixed input energy. As the input varies, output also varies.

**Material of Construction** :- The main rotor which spin, is made out of industrial grade aluminum, Center shaft & bracings are of SS 304. It has double shielded two nos. of ball bearings. Since ball bearings are double shielded no greasing is necessary & effect of galvanized plane sheet. In case of corrosive fumes we recommend either stainless steel or powder coated rotor & other items like duct & base plate made of FRP moulding.

### **➤ Mode of measurements and payment**

The unit rate includes the cost of all materials, accessories, fixtures and fastenings, labour charges necessary machineries etc. complete.

The rate shall be for a unit of per **No.**

**Item No. 35 :- Providing throating or Plaster Drip and moulding to RCC Chhajja...**

**1.0. Materials**

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

**2.0. Workmanship**

- 2.1.** The work shall be carried out as directed. The proportion of mix for finishing shall be in C.M. 1:2 by volume. Curing shall be done for not less than 7 days. The work shall be carried out in best workman like manner. The throating or plaster drip and mounding shall be one centimeter in thickness.

**3.0 Mode of Measurement & Payment :**

- 3.1.** The payment will be made on running meter basis of the finished work.
- 3.2.** All necessary labour, materials equipment etc. shall be provided by the Contractor.
- 3.3** The unit rate plaster drip molding shall include the cost of all materials, tools and plant required for molding and finishing as per direction of the Engineer-in-charge, curing and all other incidental expenses for producing plaster drip molding of specified size to complete the item or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and removing of all centering and forms required for the work.
- 3.4** The throating or plaster drip shall be measured for its length, limiting dimensions to those specified on plan or as directed.
- 3.5** The rate shall be for a unit of one running meter.



**Item No. 36 :- Providing 12mm wide groove/notch in plaster including finishing the same etc.complete for all height.**

**1.0. Materials**

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

**2.0. Workmanship**

- 2.1.** The work shall be carried out as directed. The proportion of mix for finishing shall be in C.M. 1:2 by volume. Curing shall be done for not less than 7 days. The work shall be carried out in best workman like manner. The groove throating / notch in plaster shall be 12mm wide in thickness for all height.

**3.0 Mode of Measurement & Payment :**

- 3.1.** The payment will be made on running meter basis of the finished work.
- 3.2.** All necessary labour, materials equipment etc. shall be provided by the Contractor.
- 3.3** The unit rate groove throating / notch in plaster shall include the cost of all materials, tools and plant required for molding and finishing as per direction of the Engineer-in-charge, curing and all other incidental expenses for producing groove throating / notch in plaster of specified size to complete the item or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and removing of all centering and forms required for the work.
- 3.4** The groove throating / notch in plaster shall be measured for its length, limiting dimensions to those specified on plan or as directed.
- 3.5** The rate shall be for a unit of one running meter.

**Item No. 37 :-** Providing corrugated G.I.sheet of class-3 roof ing fixed with glavani shed iron JorL Hooks,Bolt sand nuts 8 mm diameter with bitume nand G.I.limpet washer orG.I.limpet washer.filled with white lead complete excluding the cost of purlins,Rafters andTrusses.(1) 0.80 mmthicksheet...

**1.0. Materials :**

Corrugated G.I. sheets Class-3 shall conform to M-23.

**2.0. Workmanship**

**2.1. Spacing of purlines :** One purline shall be provided at the ridge and one at the eaves. The spacing of other purlines for 0.8 mm. thick G.I. sheets shall not exceed 1.80 meters. The purline shall coincide with the centre line of the end lap. The ridge purlines shall be placed in such a way that the ridges can be fixed properly. The portion overhanging the wall support shall not be more than one fourth of the 'spacing of purlins.

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

**2.3. Laying of sheets :**

2.3.1. The sheets shall be laid in purlins to a true plane with the line of corrugations truly parallel or normal to the sides of area to be covered. The sheets shall not generally be built into gables and parapets. They shall be bent up along their side edges close to the wall, and the junction shall be protected by suitable flushing or by projecting drip course.

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

2.3.3. The sheets shall be cut to the dimensions or the shape of the roof either along their lengths or their width or in slant across the line of corrugations at hips and valleys. The sheets shall be cut carefully with a straight edge and chisel to give straight finish. The sheets shall be laid such that the laps are turned away from the usual direction of local heavy rain.

**2.3.4. Fixing of sheets :**

2.3.4.1. Sheets shall be fixed to the purlins or other roof members such as hips or valley rafter etc. with 'J' or 'L' galvanized hook bolts, and galvanized nuts 8 mm. dia. with bitumen limpet washers and G.I. washers. Limpet washers with white lead shall be used. Length of hook bolt shall be varied to suit the site requirement. Bolts shall be sufficiently long so that after fixing the project above the top of their nuts by not less than 12 mm the grip of 'J' or 'L' book bolts on the sides of purlins shall not be less than 25 mm. There shall be minimum of three hooks bolts placed at the ridge of corrugations in each sheet in every purlin and their spacing shall not exceed 300 mm. coach screw shall not be used for fixing the sheets to purlin, where the slopes of roof are not less than 2.1/2 degree (1 vertical and 2.1/2 horizontal). Sheets shall be jointed together at the side laps by galvanized iron boils and nuts 25 mm. x 6 mm. size each bolt with a bitumen and G.I. limpet washer filled with white lead. Where the overlaps at the sides extend to two corrugations, these bolts shall be placed zigzag over lapping corrugations, so that the ends of the overlapping sheets are drawn

tightly towards each other. The spacing of same bolts shall not exceed 600 mm. along each of the staggered rows.

- 2.3.5. Holes for all bolts shall be drilled and not punched in the ridges of the corrugations from the under side, while the sheets are on the ground. The holes in the sheets shall be at least 50 mm. from the edge. Sheets drilled wrongly shall be rejected. The holes in the washers shall be of the exact diameter of the hook bolts or the beam bolts. The nuts shall be tightened from above to give a leak-proof root

**3.0. Mode of measurements and payment**

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

**Item No. 38 :- Box cutting the road surface to proper slope and camber for making a base for road work including removing the excavated stuff with desposing on the road side slope as directed up to 50 mt. Lead.**

The sub grade / sub base / base to receive the water bound macadam course shall be prepared to the specified grade and camber and made of dust and other extraneous materials. Any nets of soft places shall be corrected in on approved manner and rolled until firm.

Cutting shall be paid on cross section area as established by the longitudinal level and cross sections for this purpose. The work shall be started after the initial longitudinal section of the ground and cross sections are taken and recorded.

The final surface shall confirm to proper profile, camber and super elevation etc. as directed by the Engineer. The earthwork shall be paid on sectional measurements, cross sectional etc. taken.

No allowance or payments shall be made for materials excavated prior to the taking of level by the Engineer.

The rate is inclusive of cutting in all soil and murrum including removal of all shrubs, jungle cutting, cutting stuff in slopes, side drain bank etc. complete.

This item also includes the clearing the sides and demarking the line as per requirement and cutting out the existing tress on the road side, not extra payment will be paid for.

At the time of preparing final bill, the road formation in embankment and cutting shall have be perfect condition true to grade, camber and side slope duly dressed and damages due to rain cuts etc. during entire working period shall have to be done by the contractor.

The work taken in length shall be completed in all respects viz. width, grades, camber, side drains, side slopes etc. and measurements for incomplete work shall not be taken otherwise.

**1.0 Mode of Measurement & Payment :**

The unit rate box cutting shall include the cost of all materials, tools and plant required for excavation in all type of soils in grade and camber, line and levels and finishing as per direction of the Engineer-in-charge, excavation and all other incidental expenses for producing item of box cutting of specified breadth and depth and grade to complete the item or its components as shown on the drawings and according to these specifications.

The box cutting shall be measured for its cross section area and compacting volumes in cubic metres by the method of average areas.

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

**Item No. 39 :- Spreading blindage or road crust filling the gap sin metal and leveling to camber and gradient as directed.(ii) Sand & Supplying of screened cleaned pea(rounded) gravel of following sizes) (B ) Supplying of unscreened gravel**

Spreading of material shall be started after the full supply in a particular K.M. is collected, measured and recorded in the measurement books. Permission of the Engineer-in-charge shall be obtained before spreading. It shall be seen that the formation is dressed to the required camber and grade. If the sand is to be spread over the metaled surface then the spreading shall be uniform and as its has to act as binding surface it shall be used for filling the interstices of metal and forming a smooth running surface as far as possible. Required material blindage shall be specified as blindage shall be spread evenly with a twisting motion of the baskets. No more material shall be used then specified as blindage. The rate is for gross measurements and no deduction of voids shall be made. The sand is to be spread over earthen embankment as a sub-base or for side shoulders or as blindage it shall be spread in a manner as directed by the Engineer-in-charge and as per required width and thickness. The contractor shall make good all unevenness, depression, projections etc. during consolidation work.

Rate of this item includes all these operation except consolidation.

The payment shall be made on Cmt. basis.

**Item No. 40 :-** Providing and laying, Spreading and compacting graded stone aggregate to wet mix macadam 150 mm thick in one layer each layer not exceeding 150mm in thickness as per MORT & H specification including premixing the material with water at OMC in mechanical mix plant carriage of mixed material by tipper to site laying in uniform layers with paver in sub base/base course on well prepared surface and compacting with vibratory roller to achieve the desired density..

#### **406. WET MIX MACADAM SUB-BASE/BASE**

##### **406.1. Scope**

This work shall consist of laying and compacting clean, machine crushed chips and granular material, premixed with water, to a dense mass on a prepared sub grade/sub-base/base or existing pavement as the case may be in accordance with the requirements of these specifications. The material shall be laid in single layer as necessary to lines, grades and cross-sections shown on the approved drawings or as directed by the Engineer.

The thickness of a single compacted Wet Mix Macadam layer shall not be less than 75mm. When vibrating or other approved types of compacting equipment are used, the compacted depth of a single layer of the sub-base course may be up to 75 mm with the approval of the Engineer.

##### **406.2. Materials**

##### **406.2.1. Aggregates**

##### **406.2.1.1. Physical requirements :**

Coarse aggregates shall be crushed stone. If crushed gravel / single is used, not less than 90 percent by weight of the gravel / single pieces retained on 4.75 mm sieve shall have at least two fractured faces. The aggregates shall conform to the physical requirements set forth in Table 400-12 below.

If the water absorption value of the coarse aggregate is greater than 2 per cent, the soundness test shall be carried out on the material delivered to site as per IS: 2386 (Part-5).

**TABLE - 400-12. PHYSICAL REQUIREMENTS OF COARSE AGGREGATES FOR  
WET MIX MACADAM FOR SUB-BASE/BASE COURSES**

<b>Test</b>	<b>Test Method</b>	<b>Requirements</b>
1. * Los Angeles Abrasion value or *Aggregate impact value.	IS: 2386 (PART-4) IS: 2386 (PART-4) or IS: 5640	40 percent (Max) **30 percent (Max)
2. Combined Flakiness and Elongation indices (Total)	IS: 2386 (PART-I)	35 percent (Max)**

\* Aggregate may satisfy requirements of either of the two tests.

\* To determine this combined proportion, the flaky stone from a representative sample should first be separated out. Flakiness index is weight of flaky stone metal divided by weight of stone sample. Only the elongated particles are separated out from the remaining (non-flaky) stone metal. Elongation index is weight of elongated particles divided by total non-flaky particles. The value of flakiness index and elongation index so found are added up.

##### **406.2.1.2. Grading requirements:**

The aggregates shall conform to the grading given in Table 400.13.

**TABLE 400.13**

**GRADING REQUIREMENTS OF AGGREGATES FOR WET MIX MACADAM**

IS Sieve Designation	Percent by weight passing the IS sieve
53.00 mm	100
45.00 mm	95-100
26.50 mm	-
22.40 mm	60-80
11.20 mm	40-60
4.75 mm	25-40
2.36 mm	15-30
600.00 Micron	8-22
75.00 Micron	0-8

Materials finer than 425 micron shall have Plasticity Index (PI) not exceeding 6.

The final gradation approved within these limits shall be well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve or vice versa.

**406.3. Construction Operations**

**406.3.1. Preparation of base:** The surface of the subgrade/sub-base/base to receive the wet mix macadam course shall be prepared to the specified lines and crossfall (camber) and made free of dust and other extraneous material. Any ruts or soft yielding places shall be corrected in an approved manner and rolled until firm surface is obtained if necessary by sprinkling water. Any sub-base/base/surface irregularities, where predominant, shall be made good by providing appropriate type of profile corrective course (levelling course) to Clause 501 of these Specifications.

As far as possible, laying wet mix macadam course over an existing thick bituminous layer may be avoided since it will cause problems of internal drainage to the pavement at the interface of two courses. It is desirable to completely pick out the existing bituminous course where wet mix macadam is proposed to be laid over it.

**406.3.2. Provision of lateral confinement of aggregates:** While constructing wet mix macadam, arrangement shall be made for the lateral confinement of wet mix. This shall be done by laying materials in adjoining shoulders along with that of wet mix macadam layer and following the sequence of operations described in Clause 404.3.3.

**406.3.3. Preparation of mix:** Wet Mix Macadam shall be prepared in an approved mixing plant of suitable capacity having provision for controlled addition of water and forced/positive mixing arrangement like pug mill or pan type mixer of concrete batching plant. The plant shall have following features:

- i. For feeding aggregates- three/ four bin feeders with variable speed motor
- ii. Vibrating screen for removal of oversize aggregates
- iii. Conveyor Belt
- iv. Controlled system for addition of water
- v. Forced/positive mixing arrangement like pug-mill or pan type mixer
- vi. Centralized control panel for sequential operation of various devices and precise process control
- vii. Safety devices

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

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

The mix may be spread either by a paver finisher or motor grader. For portions where mechanical means cannot be used, manual means as approved by the Engineer shall be used. The motor grader shall be capable of spreading

the material uniformly all over the surface. Its blade shall have hydraulic control suitable for initial adjustments and maintaining the same so as to achieve the specified slope and grade.

**The mix may be spread by a paver finisher. The paver finisher shall be self-propelled of adequate capacity with following features:**

- i. Loading hoppers and suitable distribution system, to provide a smooth uninterrupted material flow for different layer thicknesses from the tipper to the screed.
- ii. Hydraulically operated telescopic screed for paving width up to 8.5 m and fixed screed beyond this. The screed shall have tamping and vibrating arrangement for initial compaction of the layer.
- iii. Automatic levelling control system with electronic sensing device to maintain mat thickness and cross slope of mat during laying procedure.

In exceptional cases where it is not possible for the paver to be utilized, mechanical means like motor grader may be used with the prior approval of the Engineer. The motor grader shall be capable of spreading the material uniformly all over the surface.

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

The Engineer may permit manual mixing and /or laying of wet mix macadam where small quantity of wet mix macadam is to be executed. Manual mixing/laying in inaccessible / remote locations and in situations where use of machinery is not feasible can also be permitted. Where manual mixing/laying is intended to be used, the same shall be done with the approval of the Engineer.

#### **406.3.5. Compaction:**

After the mix has been laid to the required thickness, grade and cross fall / camber the same shall be uniformly compacted, to the full depth with suitable roller. If the thickness of single compacted layer does not exceed 100 mm, a smooth wheel roller of 80 to 100 KN weight may be used. For a compacted single layer up to 200 mm, the compaction shall be done with the help of vibratory roller of minimum static weight of 80 to 100 KN or equivalent capacity roller. The speed of the roller shall not exceed 5 km/h.

In portions having unidirectional cross fall / super elevation, rolling shall commence from the lower edge and progress gradually towards the upper edge. Thereafter, roller should progress parallel to the centre line of the road, uniformly over-lapping each preceding track by at least one third width until the entire surface has been rolled. Alternate trips of the roller shall be terminated in stops at least 1 m away from any preceding stop.

In portions in camber, rolling should begin at the edge with the roller running forward and backward until the edges have been firmly compacted. The roller shall then progress gradually towards the centre parallel to the centre line of the road uniformly overlapping each of the preceding tracks by at least one-third width until the entire surface has been rolled.

Any displacement occurring as a result of reversing of the direction of a roller or from any other cause shall be corrected at once as specified and/or removed and made good.

Along forms, kerb, walls or other places not accessible to the roller, the mixture shall be thoroughly compacted with mechanical tampers or a plate compactor. Skin patching of an area without scarifying the surface to permit proper bonding of the added material shall not be permitted.

Rolling should not be done when the sub grade is soft or yielding or when it causes a wave-like motion in the sub-base / base course or sub grade. If irregularities develop during rolling which exceed 12 mm when tested with a 3 metre straight edge, the surface should be loosened and premixed material added or removed as required before rolling again so as to achieve a uniform surface conforming to the desired grade and cross fall. In no case should the use of unmixed material be permitted to make up the depressions.

Rolling shall be continued till the density achieved is at least 98 per cent of the maximum dry density for the material as determined by the method outlined in IS: 2720 (Part-8).

After completion, the surface of any finished layer shall be well closed, free from movement under compaction equipment or any compaction planes, ridges, cracks and loose material. All loose, segregated or otherwise defective areas shall be made good to the full thickness of the layer and recomputed.

#### **406.3.6. Setting and drying :**

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



#### **406.4. Opening to Traffic**

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

#### **406.5. Surface Finish and Quality Control of Work**

**406.5.1. Surface evenness :** The surface finish of construction shall conform to the requirements of Clause 902.

**406.5.2. Quality control:** Control on the quality of materials and works shall be exercised by the Engineer in accordance with Section 900.

#### **406.6. Rectification of Surface Irregularity**

Where the surface irregularity of the wet mix macadam course exceeds the permissible tolerances or where the course is otherwise defective due to sub grade soil getting mixed with the aggregates, the full thickness of the layer shall be scarified over the affected area, reshaped with added premixed material or removed and replaced with fresh premixed material as applicable and recomputed in accordance with Clause 406.3. The area treated in the aforesaid manner shall not be less than 5 in long and 2 in wide. In no case shall depressions be filled up with unmixed and ungraded material or fines.

#### **406.7. Arrangement for Traffic**

During the period of construction, arrangement of traffic shall be done as per Clause 112.

#### **406.8. Measurements for Payment**

**Wet mix macadam** shall be measured as finished work in position in [cubic metres](#),

#### **406.9. Rates**

The Contract unit rate for [wet mix macadam](#) shall be payment in full for carrying out the following operations including full compensation for all components listed below.

1. Making arrangements for traffic to Clause 112 except for initial treatment to verges, shoulders and construction of diversions;
2. Supplying all materials to be incorporated in the work including all royalties, fees, rents where necessary and all leads and lifts;
3. All labour, tools, equipment and incidentals to complete the work to the Specifications;
4. Carrying out the work in part widths of road where directed and
5. Carrying out the required tests for quality control.