

Name of Work :- Construction of CLINIC - ANIMAL HUSBANDRY at Sidhpur, Ta. Sidhpur, Dist. Patan

Detailed Specification

Item No. 1

Demolition of Various Building upto Footing and removal or disposal of all Debris, stacking of serviceable materials & disposal of unserviceable materials with all required lead and lift.

1.0. Workmanship:

- 1.1. The demolition shall consist of demolition of one or more parts of the building as specified or shown in the drawings upto ground level. Demolition implies taking up or down or breaking up. This shall consist of demolishing whole or part of work including all relevant item as specified or shown in the drawings.
- 1.2. The demolition shall always be planned before hand and shall be done in reverse order of the one in which the structure was constructed. This scheme shall be got approved from the Engineer- in-charge before starting the work. This however will not absolve the Contractor from the responsibility of proper and safe demolition.
- 1.3. Necessary dropping, shoring and under pinning shall be provided for the safety of the adjoining work or property, which is to be left intact, before dismantling and demolishing is taken up and the work shall be carried out in such a way that no damages is caused to the adjoining property.
- 1.4. Wherever required, temporary enclosures or partitions shall also be provider. Necessary precautions shall be taken to keep the dust nuisance down as and where necessary.
- 1.5. Dismantling shall be commenced in a systematic manner. All materials which are likely to be damaged by dropping from a height or demolishing roof, masonry etc. shall be carefully dismantled first. The dismantled articles shall be properly stacked as directed.
- 1.6. All materials obtained from demolition shall be the property o. Government unless otherwise specified and shall be kept in safe custody until handed over to the Engineer-in-charge.
- 1.7. Any serviceable materials, obtained during dismantling or demolition shall be separated out and stacked properly as directed, with all lead and lift. All unserviceable materials, rubbish etc. shall be slacked as directed by the Engineer-in- charge. 1.8. On completion of work, the site shall be cleared of all debris rubbish and cleaned as directed.
- 1.9. Dismantling implies carefully taking up or down or removing without damage to adjacent property, The articles shall be passed by hand where necessary and lowered and where these are fixed by nail, screws, bolts etc. these shall be taken out with proper tools.

2.0 Mode of measurement and payment :

- 2.1 The rate shall include stacking the serviceable materials and disposal of unserviceable materials as directed with all lead and lift.

- 2.2 The measurement shall be made on plinth area of building in Sq.Mt. The rate shall be for a unit of Job and disposal of all the unserviceable material from site as directed and stacking of serviceable materials as directed. .

Item No. 2

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

SCRAPING OF EXISTING PLASTER

The demolition shall consist of demolition of plaster with niru finishing and /or sand faced plaster at any floor and at any height. Whenever required temporary enclosures or partition shall be provided necessary precaution shall be taken took up the must nuisance down as and where necessary.

Dismantling shall be commenced in systematic manner. Necessary scaffolding shall be provided for the safety of the adjoining work or property. Dismantling is taken up and work shall be carried out in such a way that no damage is caused to the buildings and adjoining properly. All usable materials obtained from dismantling shall be stacked as and where directed and unserviceable materials shall be disposed as and where directed. The rate includes the cost of tools, centering and labour required for dismantling at any existing surface of the wall. The rate shall be for a unit of one Sq.Mt. This shall include for making up of masonry joints as may be directed and disposal of all the debris for all leads and lifts as maybe erected at site of works.

Item No. 30

Providing T M T. bar reinforcement of Fe-500D for R.C.C. work including bending binding and placing in position complete up to All floor Level.

1.0. GENERAL

This work shall consist of furnishing and placing **TMT Fe500D Conforming to IS 1786 2008** 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 shall be **TMT Fe500D** steel bars. They may be uncoated or coated 'with epoxy or with approved protective coatings.

2.2. TMT bars reinforcement for RCC work shall conform to IS 1786 FE-500 and shall be of tested quality. It shall also comply with relevant part of IS 456-1966

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

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

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

3.0. Pitch

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

4.0. Binding wire

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

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

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

5.0. PROTECTION OF REINFORCEMENT

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

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

6.0. Workmanship

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

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

7.0. BENDING OF REINFORCEMENT

7.1. Bar bend g 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 TMT 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 500 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: $CE = C + Mn + Cr + Mg + V + Ni + Cu$ 6 5 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 from 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.

10.7. 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.

10.8. 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

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

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

11.2. Reinforcement shall be measured in length excluding overlaps, No Payment shall be made for lap as actually used in the work but work may carried out as per detailed drawings. Where welding or coupling is resorted to, in place lap joints, such joints shall not be measured for payment as equivalent length of overlap

as per design requirement. From the length so measured, the weight of reinforcement shall be calculated in Kgs. on the same basis of as per table given above even though steel is supplied to the contractor by the department on actual weight. Length shall include hooks at the ends. Wastage and annealed steel wire for binding shall not be measured and the cost of these items shall be deemed to be included in the rate for reinforcement.

11.3. The rate for reinforcement includes cost of steel binding wires, but including cost of lap length, its carting with all leads and lifts, cutting, bending, placing in position, binding and fixing in position as shown on the drawings and as directed. It shall also include all devices for keeping reinforcement in approved position, cost of joining as per approved method and all wastage and spacer bars including lap length.

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

Item No. 35

Providing and Fixing Double Shuttered Door having GRANITE frame with all open edges machine cut & machine polished, fixed SS hinges with factory made 35 mm th Solid Core, flushed door, having Lamination on both sides & 12 mm th Teak wood beading fixed around the door, Stainless steel ASIS 304 grade Tower Blot 30cm long, Aldrop 30 Cm long, handle 60 cm long, with locks etc complete as per detailed drawing

FOR SHUTTERS

1. Materials:

1.1. Wood for shutter shall conform to M-29. (2) Glass shall conform to M-38. (3)Pre-laminate shall conform to relevant IS specification.

2.0 Workmanship: The item covers the requirement of preparation of for doors, their supply and fixing.

2.1 FOR FRAMES

The frame shall be prepared from Granite as specified in item of work. The G.I. fasteners shall be provided as per requirement .

2.2. Shutters:

2.3.1 The shutter shall be flush door of specified thickness. The shutter shall be prelaminated using laminates of brand & pattern shall be as shown in the drawing or as directed.

2.3.2 The teak wood moulding shall be provided around shutter.

2.3.3 The 5 mm thick glass fully glazed panels shall be provided as per drawing.

2.5. Fixtures & Fastenings: 2.5.1.All fixtures and fastening shall be C.P. brass. Handles and latch locks shall be provided as per detailed drawing. The rate shall include all kind of fixtures and fastening. The size and number of hinges shall be as per table given in annexure-1.The hinges, bolts, and other items with moving parts shall be properly oiled by the contractor before handing over the building

3.0. Mode of measurements & payment:

3.1. The rate for door includes cost of providing block and clear for keeping the shutter in open position as directed.

3.2. The dimensions of the shutter shall be measured clear size of the opening.

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

Item No. 36

Providing and Fixing Single Shuttered Door having Telephone BLACK GRANITE frame with all open edges machine cut & machine polished, fixed by Zinc Coated hinges with double shutter of factory made & stamped I.S 12823 Grade One, Type One 35 mm th Solid Core, Melamine faced, Three layered resin, flushed door, having Decorative Lamination on both sides & 12 mm th Teak wood beading fixed around the door, from "NOVAPAN" or equivalent company holding licence for minimum 5 years, Stainless steel ASIS 304 grade Stopper 20cm long, Aldrop 20 Cm long, handle 15 cm long, etc complete as per detailed drawing.

FOR SHUTTERS

1. Materials:

1.1. Wood for shutter shall conform to M-29. (2) Glass shall conform to M-38. (3)Prelaminateshall conform to relevant IS specification.

2.0 Workmanship: The item covers the requirement of preparation of for doors, their supply and fixing.

2.1 FOR FRAMES

The frame shall be prepared from Black Granite as specified in item of work.

.2. Shutters:

2.3.1 The shutter shall be flush door of specified thickness. The shutter shall be prelaminated using laminates of brand & pattern shall be as shown in the drawing or as directed.

2.3.2 The teak wood moulding shall be provided around shutter.

2.3.3 The 5 mm thick glass fully glazed panels shall be provided as per drawing.

2.5. Fixtures & Fastenings: 2.5.1.All fixtures and fastening shall be C.P. brass. Handles and latch locks shall be provided as per detailed drawing. The rate shall include all kind of fixtures and fastening. The size and number of hinges shall be as per table given in annexure-1.The hinges, bolts, and other items with moving parts shall be properly oiled by the contractor before handing over the building

3.0. Mode of measurements & payment:

3.1. The rate for door includes cost of providing block and clear for keeping the shutter in open position as directed.

3.2. The dimensions of the shutter shall be measured clear size of the opening.

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

Item No. 37

Providing and fixing FRP frame size 100 X 50 mm and 35 mm thick FRP shutter with depressed panel shutter having reinforcement on sides and edges and in GEL coat finish. The core of shutter is to be filled up with injected fibre extinguishing grade polyurethane foam done in situ along with embedded wooden pieces for stiffening and also for taking hinges and fixtures. The whole FRP frame and shutter is to be water proof, weatherproof, termite proof and resistance to mild acid / Alkali resistance including S.S. hinges with necessary screws and aluminium fixtures and fastening.

Materials:-

Frame materials shall be of fire extinguishing grade FRP skin having section 100 mm x 50 mm chamfered type with thickness of 1.50 mm to 2.00 mm and core material shall be fire extinguishing grade rigid polyurethane foam having density 32 Kg/ cum to 36 Kg/ cum, flexural strength 1.8 Kg / Sqcm to 2.00 Kg / Sqcm and compressive strength 3.5 Kg / Sqcm to 4.5 Kg / Sqcm. Whole frame shall be water proof,

weather proof, termite proof and mild acid / alkali resistance. P.U foam shall be done in situ with plantation wooden pieces embedded inside for holding fixtures and stiffening.

Frame shall be straight in line, level and having three joint-less pieces. Frame shall be fixed in masonry / R.C.C with Mild Steel hold fast or with 115 mm long screws as hold fast with sleeve in position and finished in gel coat.

35 mm thick shutter in depressed panel design shall be having 1.5 mm to 2.0 mm thickness fire extinguishing grade FRP skin, sand-witch panel of 4 mm thick plywood and embedded wooden pieces for stiffening as well as holding hinges and fixture, all molded into a one piece shutter. Core material shall be injected fire extinguishing grade rigid polyurethane foam done in situ having density 32 Kg / Cucm to 36 Kg / Cucm compressive strength 1.8 Kg / Sqcm to 2.00 Kg / Sqcm, flexural strength 3.5 Kg / Sqcm to 4.5 Kg / Sqcm. Whole shutter shall be water proof, weather proof, termite proof and mild acid/alkali resistance.

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

Workmanship:

Frame shall be fixed in masonry/R.C.C member. Shutter shall be fixed in true line; level and proper manner having 2.0 to 3.0 ply i.e. air space for smooth and easy working.

Pull handles, Door stopper, Door stopper, bearing hinges & S.S self tapping Philips cross head special screws conforming to anti corrosive high grade AISI 316 stainless steel of the make KICH or as equivalent approved by Engineer-in-charge conforming to standards of KICH & anti corrosive high grade AISI 316 stainless steel only, & Tower bolt of the make Orbit or as equivalent approved by Engineer-in-charge conforming to standards of ORBIT & anti corrosive high grade AISI 304 stainless steel only

All fixtures and fastenings of the make KICH or as equivalent of approved by Engineer-in-charge shall conform to AISI 316 Grade Stainless Steel which shall be completely anti-corrosive and resist the adverse effects of chemicals.

The following table presents main elements (forming the Chemical composition) of AISI 316 Grade Stainless Steel.

Element %	316 Grade	Implications
Carbon	0.08	Increase in percentage decreases the corrosion resistance.
Silicon	1.00	-
Manganese	2.00	Affects the magnetic characteristic and hardness of Iron
Phosphorus	0.045	-
Sulphur	0.03	-
Chromium	16.0 to 18.0	Addition of 12% forms stainless steel from ordinary steel. Removes the corrosive effect of Carbon. Forms a passive film which prevents oxidation & consequent corrosion.
Molybdenum (MOLY)	2.00 to 3.00	Molybdenum increases the corrosion resistance to chlorides and sulphates including sulfurous acids in pulp industries. It has a superior tensile strength at high temperature as compared to 304 Grade steel. This element can resist major chemical reaction and thus being a very costly element.

Element %	316 Grade	Implications
Nickel	10.0 to 14.0	Nickel provides corrosion resistance, increases strength in both high & low temperature, increases toughness in low temperature and lowers the effects of work hardening. Thus higher percentage makes the steel superior in quality.

- It can withstand the corrosion caused by atmospheric / environmental or major chemical reactions.
- It can resist high temperatures without going under any deformity which makes it highly recommended for fire safety doors in any building.
- It shall have remarkable creep strength and Rupture strength.
- It shall be repelled the Bacteria & shall be made higher degree of hygiene.
- It shall be of natural finish, it shall not required regular cleaning or maintenance making it most suitable for public places.
- It shall tolerate forceful and intense use.

Specially developed fixing stud and grubs shall be used to ensure accurate fitting of elements and eliminates shaking of elements.

Testing shall be carried out in requisite laboratory for above chemical composition of AISI 316 Grade Stainless Steel & testing result for the same shall be submitted along with bill for claiming the amount of bill. If the results found fail, the fixtures and fastening of the same lot shall be rejected outright.

Fixtures & Fastenings:

Following fixtures and fastening shall be used for single shutter. All fixtures and fastening of the make shall be of anti corrosive high grade AISI 316 stainless steel in Glossy & satin combination finish only. Fixtures and fastening of the make KICH or as equivalent of approved by Engineer-in-charge shall be fixed by KICH Company's skill person only. Necessary bond shall be executed for life time guarantee for non-rusting of fixtures and fastenings.

± 1.50 mm tolerance will be allowed in thickness of shutter and ± 1.20 to 2.00 mm for size of frame.

Mode of measurements & payment:

The dimensions of the door shall be measured clear size of the opening made for fixing of door with frame. The rate shall be for a unit of one sq. meter.

Item No. 38

Providing and fixing mild steel door with 40 x 40 x 6 mm angle for frame and for shutter frame 30 x 30 x 3 angle. For windows frame of angle 35 x 35 x 5 & for shutter windows 25 x 25 x 3 mm size angle and 18 gauge sheet for panels & 10 mm dia bars at 10 cm c / c for grill and 40 x 6 mm flats on edge of shutter, & 20 x 6 mm binding patti, including one coat of primer and two coats of oil painting etc. comp. as per detail / as directed by Engineer in Charge.

1. Materials:

The mild steel shall confirm to M-22, red lead paint, oil paint shall confirm to their relevant specification.

2.0 Workmanship

The steel section as specified or required shall be cut to correct length as per drawing and design. The cut ends exposed to view shall be finished smooth. No Two pieces shall be welded or

otherwise jointed to make up the required length of the member. The doors and windows shall be fabricated of M.S. component as given in the description of item and detailed drawing. M.S. sheet shall be of 19 gauge shall be fixed to the frame with weld, with binding patti of M.S. flat shall be in T or L shape so that ensure proper bond. The hold fast shall be embedded in cement concrete. The door/window shall be coated with red lead priming coat before fixing it in position. It shall be fixed true line, level and plumb. The shutter shall be double leaf shutter. Necessary arrangement shall be made so that the shutter shall not closed back down in to opening.

The door frame shall be of 40 x 40 x 6 mm angle with 10mm square bars at bottom. The door frame shall be of 25 x 25 x 5 mm angle having Two vertical members and Six horizontal members in each leaf of shutter. Also 40 x 6 mm flat shall be there at the edge of shutter for proper closing of doors.

The window frame shall be of 35 x 35 x 5 mm M.S. angle around with 11 no. of 10mm dia safety bars. The bars shall be supported with 25 x 6 mm M.S. flat at middle. The window shutter frame shall be of 25 x 25 x 5 mm. Shutter frame shall consist of Two vertical members and Four horizontal members. The 5 x 6 mm flat shall be welded at the edge of One leaf for proper closing of shutter. The tidi shall be of 20 x 6 mm flat and 12mm dia bars. The M.S. sheet shall be of 19 gauge. The binding patti to M.S. sheet shall be fixed to all edges of cut sheet. It shall be of 25 x 6

All steel work shall be painted with One coat of red lead paint and Two coats approved quality oil paint

3.0. Mode of measurements & payment:

The item shall be measured and paid on weight i.e. in Kg. including frame shutters, locking arrangement etc. comp. The rate shall be for unit of 1 Kg. including all material, labour for manufacturing and fixing in position priming coat and Two coats of oil painting etc. comp.

Item No. 39

Providing and fixing colour anodised Aluminium Section SLIDING window (Three Track) using Jindal E Series { 30 mm} or equivalent section shutter top & bottom- 20993, 0.839 Kg. / Rmt. shutter inter lock-20550, 0.994 Kg. / Rmt. shutter side (handle) - 20553, 0.731 Kg. / Rmt. frame-bottom with Weep Hole 20928, 2.032 Kg / Rmt.. frame top & side - 20837, 1.197 Kg. / Rmt. using Three Shutter 5 mm thick transparent Tinted Float glass, rubber gasket, air lock strip and finishing joints with silicon sealant, with standard extruded colour anodized aluminum coated fittings and fixture & fastening etc complete. {Colour as directed by Engineer in charge except black & Alluminum section shall be Jindal or equivalent brand and glass of Modiguard, AIS or equivalent brand}

Material & Workmanship:-

Aluminium alloy used in the manufacturing of extruded section for windows shall confirm to HE9-WP of I.S 733 – 1956 and also hollow aluminium section confirm to IS designation HV9 – WP – IS – 1285 – 1958. Aluminium section of approved weight shall be procured at site. Fabrication shall be done as per I.S 1948 – 1961 & drawing or as directed. Details of the anodized powder coating section to be **as shown in item of work and Tinted float glass shall be 5 mm thick**

Float Glass:

5 mm thick Tinted float glass of the make MODI GUARD / ASAHI / SAINT GLOBAL or as equivalent of approved by Engineer-in-charge shall be used & shall be conforming to relevant I.S code. Necessary colour anodized aluminium glazing clips shall confirm to relevant IS code. Transparent Silicon Gasket and PVC track rubber shall confirm to quality approved by engineer in charge.

Fixtures & fastenings:

Fixtures and fastenings shall be provided as per requirement & as directed by Engineer in charge

Section used shall be single or double type as per requirement. Window - frame without shutter shall be prepared as per drawing or as directed by the Engineer – in – Charge. Whole framework shall be finished and erected in true line and level. The section shall be fixed with necessary screws & wooden peg nails required.

Size of glass for glazing at panels shall be as per drawing and shall be fixed in such a way so as to allow a clearance of 2.50 mm between the edges of glass and aluminium glazing clips surround clearance may be increased if directed. All stains from the surfaces of glass shall be removed and cleaned with thinner or spirit without any extra payment. Working of all hinges shall be smooth and free. If any hinges or locking arrangement found faulty, shall be replaced to the satisfaction of Engineer – in – Charge without claiming any extra charges. The size of mosquitoes proof jali at panels shall be as per drawing or as directed by Engineer-in-charge. The entire work shall be executed to the satisfaction of Engineer – in - Charge. The window shall be fully sliding as per drawing or as directed by Engineer – in – Charge

CONDITIONS FOR ALUMINUM WORKS

- (a) The glazing shall be fixed with the External finished surface (either stone cladding/external plaster) and hence all the necessary rubber strips, packing and polysulphide polymer (between the frame and concrete or other surface all around) shall be provided within the rate quoted so as to make the junctions fully water tight/air tight.
- (d) Approved make selected glass of thickness as specified shall be used in doors. Wired glass louvers shall be provided wherever shown on drawings.
- (e) Necessary locking arrangement of approved design (by Architect) shall be provided without any extra cost.
- (f) Wherever necessary, PVC lining (silver grey or white only) etc. shall be provided for air/water tightness.
- (g) Necessary operating device (as per design) for operation of louvers of windows, ventilators, sky lights, including necessary rods shall be provided without any extra cost.
- (h) The rates quoted shall be inclusive of manufacture, supply and installation at Site, and inclusive of all the necessary accessories rubber strips, locks, rods, excise duty, taxes, octroi, transport, labour charges, insurance, storage and safe custody, etc. complete.
- (i) The rates shall also be inclusive of providing and applying with gun as per latest I.S., of Dow Corning or equivalent and making the joints around glazing watertight, on the external periphery of the building at the junction of two different materials as directed by the Architect and site engineer.

- (j) Necessary provision for rain water disposal shall be done in the bottom guides/frames as directed and approved by Architect.
- (k) Work must be in accordance with detailed drawings with dimensions of aluminum sections in frames and shutters as shown in drawing. It shall be accompanied by the detailed drawing if any deviation is proposed.
- (l) All the door shutters shall have double action hydraulic floor springs/hinges as per approved shop drawings, of approved make with minimum one year guarantee. The floor springs shall be of least possible thickness.
- (m) Details/arrangements for after sales/maintenance services shall be furnished.
- (n) Work shall be carried out in co-operation and in coordination with all other agencies working at Site.
- (o) The civil work as required for fixing of floor springs, hold fast or other works required for the erection and completion of doors/windows etc. shall be done by the Contractor without any extra cost.
- (p) Any damage, if caused to the existing work done by other agencies, shall be reinstated by the Contractor to its original condition without any extra cost.
- (q) During the course of work, the Contractor shall pay due care to avoid any stains on the powder coating work and if required, the Contractors shall provide necessary protective arrangement as directed by the Architects for which no extra payments shall be made. After the installation is completed, if required by the Architects, the aluminum work shall be washed with mild solution of non alkali soap and water.
- (r) The Contractor shall be responsible for the windows/doors/grills etc. being set straight, in plumb level and for their satisfactory operations after the fixing is completed.
- (s) Wherever required and as directed strengthening of members shall be done by providing steel/M.S. concealed members without extra cost.
- (t) The door shutters may have hydraulic door closer of approved make with minimum one year guarantee as and where shown in the drawings and as directed.

Mode of measurement & payment:

The rate for window shutter with frame shall include the cost of materials & labour involved to finish the work.

The dimension of the window shall be measured clear size of the frame in closed position of shutter between the two outer edges of the frame.

The payment shall be made on completion of work.

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

Item No. 40

Providing and fixing standard extruded of aluminium section of size 63.50 x 38.10 x 1.95 mm (@ Wt 1.094Kg / Rmt with colour anodized aluminium frame with 5 mm thick transparent bronze colour tinted float glass as details etc complete for Fix window.

Material & Workmanship:-

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

1948 – 1961 & drawing or as directed. Details of the anodized powder coating section to be **as shown in item of work and Tinted float glass shall be 5 mm thick**

Float Glass:

5 mm thick Tinted float glass of the make MODI GUARD / ASAHI / SAINT GLOBAL or as equivalent of approved by Engineer-in-charge shall be used & shall be conforming to relevant I.S code. Necessary colour anodized aluminium glazing clips shall confirm to relevant IS code. Transparent Silicon Gasket and PVC track rubber shall confirm to quality approved by engineer in charge.

Fixtures & fastenings:

Fixtures and fastenings shall be provided as per requirement & as directed by Engineer in charge

Section used shall be single or double type as per requirement. Window - frame without shutter shall be prepared as per drawing or as directed by the Engineer – in – Charge. Whole framework shall be finished and erected in true line and level. The section shall be fixed with necessary screws & wooden peg nails required.

Size of glass for glazing at panels shall be as per drawing and shall be fixed in such a way so as to allow a clearance of 2.50 mm between the edges of glass and aluminium glazing clips surround clearance may be increased if directed. All stains from the surfaces of glass shall be removed and cleaned with thinner or spirit without any extra payment. Working of all hinges shall be smooth and free. If any hinges or locking arrangement found faulty, shall be replaced to the satisfaction of Engineer – in – Charge without claiming any extra charges. The size of mosquitoes proof jali at panels shall be as per drawing or as directed by Engineer-in-charge. The entire work shall be executed to the satisfaction of Engineer – in - Charge. The window shall be fully sliding as per drawing or as directed by Engineer – in – Charge

CONDITIONS FOR ALUMINUM WORKS

- (a) The glazing shall be fixed with the External finished surface (either stone cladding/external plaster) and hence all the necessary rubber strips, packing and polysulphide polymer (between the frame and concrete or other surface all around) shall be provided within the rate quoted so as to make the junctions fully water tight/air tight.
- (d) Approved make selected glass of thickness as specified shall be used in doors. Wired glass louvers shall be provided wherever shown on drawings.
- (e) Necessary locking arrangement of approved design (by Architect) shall be provided without any extra cost.
- (f) Wherever necessary, PVC lining (silver grey or white only) etc. shall be provided for air/water tightness.
- (g) Necessary operating device (as per design) for operation of louvers of windows, ventilators, sky lights, including necessary rods shall be provided without any extra cost.
- (h) The rates quoted shall be inclusive of manufacture, supply and installation at Site, and inclusive of all the necessary accessories rubber strips, locks, rods, excise duty, taxes, octroi, transport, labour charges, insurance, storage and safe custody, etc. complete.

- (i) The rates shall also be inclusive of providing and applying with gun as per latest I.S., of Dow Corning or equivalent and making the joints around glazing watertight, on the external periphery of the building at the junction of two different materials as directed by the Architect and site engineer.
- (j) Necessary provision for rain water disposal shall be done in the bottom guides/frames as directed and approved by Architect.
- (k) Work must be in accordance with detailed drawings with dimensions of aluminum sections in frames and shutters as shown in drawing. It shall be accompanied by the detailed drawing if any deviation is proposed.
- (l) All the door shutters shall have double action hydraulic floor springs/hinges as per approved shop drawings, of approved make with minimum one year guarantee. The floor springs shall be of least possible thickness.
- (m) Details/arrangements for after sales/maintenance services shall be furnished.
- (n) Work shall be carried out in co-operation and in coordination with all other agencies working at Site.
- (o) The civil work as required for fixing of floor springs, hold fast or other works required for the erection and completion of doors/windows etc. shall be done by the Contractor without any extra cost.
- (p) Any damage, if caused to the existing work done by other agencies, shall be reinstated by the Contractor to its original condition without any extra cost.
- (q) During the course of work, the Contractor shall pay due care to avoid any stains on the powder coating work and if required, the Contractors shall provide necessary protective arrangement as directed by the Architects for which no extra payments shall be made. After the installation is completed, if required by the Architects, the aluminum work shall be washed with mild solution of non alkali soap and water.
- (r) The Contractor shall be responsible for the windows/doors/grills etc. being set straight, in plumb level and for their satisfactory operations after the fixing is completed.
- (s) Wherever required and as directed strengthening of members shall be done by providing steel/M.S. concealed members without extra cost.
- (t) The door shutters may have hydraulic door closer of approved make with minimum one year guarantee as and where shown in the drawings and as directed.

Mode of measurement & payment:

The rate for window shutter with frame shall include the cost of materials & labour involved to finish the work.

The dimension of the window shall be measured clear size of the frame in closed position of shutter between the two outer edges of the frame.

The payment shall be made on completion of work.

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

Item No. 52

Providing and fixing pre-cast Rubber Dye inter locking concrete block 60mm thick with grade of concrete M200 pneumatic compressed by mechanically pressed and as per approved design including 75mm sand layer for levelling and filling the joint with sand in proper line and level etc. completed.

1504. INTERLOCKING CONCRETE BLOCK PAVEMENT

1504.1. Scope

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

1504.2. Materials

1504.2.1. The Concrete Paving Block shall conform to the relevant IS standard.

1504.2.2. Bedding sand : Bedding sand shall conform to the grading given in Table 1500.6.

1504.2.3. Joint filling sand : Joint filling sand shall conform to grading given in Table 1500.6.

TABLE 1500.6 : GRADINGS FOR BEDDING AND JOINT FILLING SAND

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

1504.3. Buffer

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

1504.4. Block Thickness

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

1504.5. Dimensions and Tolerances

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

TABLE 1500.7 : DIMENSIONS AND TOLERANCES FOR PAVING BLOCKS

S. No.	Dimension	Recommended Values	Tolerance Limit
(1)	Width W	To be specified by Manufacturer	±2 mm
(2)	Length L	To be specified by Manufacturer	±2 mm
(3)	Thickness T	60 to 80 mm	±3 mm
(4)	Aspect Ratio L/T	Maximum : 4.0	±0.2
(5)	Chamfer (Arris)	Maximum : 5 mm	±1 mm

S. No.	Dimension	Recommended Values	Tolerance Limit
		Maximum : 7 mm	
(6)	Plan Area	Maximum : 0.03 m ²	+0.001 m ²
(7)	Wearing Face Area	Minimum 75% of Plan Area	-1%
(8)	Squareness	Nil	±2 mm

1504.6. Compressive Strength

1504.6.1. The average 28 days compressive strength of 8 blocks shall be 30 MPa and strength of individual block shall not be less than 26 MPa.

1504.6.2. The 28 days compressive strength of paving blocks tested as per relevant IS specification shall be determined as explained hereinafter.

1504.6.2.1. Compression testing machine of adequate capacity shall be used for testing of blocks. The steel bearing plates shall have a minimum thickness of 25 mm. The surface area of the bearing side of the plate should be such that no edge of the bearing plate is less than 10 mm from the outer edge of the paving block being tested.

1504.6.2.2. In case the testing surface of the paving block departs from a plain surface by more than 0.05 mm, capping using suitable materials shall be adopted for testing as per IS:516.

1504.6.2.3. The blocks shall be stored for 24 ± 4 hours in water maintained at a temperature of (20± 5)°C before testing. The dimensions and plan areas of the block shall be determined. The bearing plates of the testing machine shall be wiped clean. The specimen shall be clamped between the plates in such a way that the axes of the specimen are vertically aligned with those of the bearing plates.

1504.6.2.4. The load shall be applied without shock and increased continuously at a rate of 15± 3 N/mm²/minute until no greater load can be sustained by the specimen or delamination occurs. The maximum load applied to the specimen shall be noted.

1504.6.2.5. The apparent compressive strength of individual block shall be calculated by dividing the maximum load (N) by the plan area (mm²). The corrected compressive strength shall be calculated by multiplying the apparent compressive strength by the appropriate correction factor from Table 1500.8. The strength shall be expressed to the nearest 0.1 N/ mm².

TABLE 1500.8 : CORRECTION FACTORS FOR THICKNESS AND CHAMFER OF PAVING BLOCK FOR CALCULATION OF COMPRESSIVE STRENGTH

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

1504.6.2.6. Water Absorption: The water absorption being the average of five blocks shall be not more than 6 per cent by mass.

1504.7. Edge Blocks

The edge blocks shall have equivalent cube compressive strength not less than 30 MPa. The road kerbs provided on the edges of the road also serve the purpose of edge blocks. In case the end kerbs are not provided, 300 mm x 300 mm x 150 mm of M30 grade concrete edge blocks or other suitable size as per drawings or direction of the Engineer shall be provided.

1504.7.2. Subgrade

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

1504.8. Sub-base

The sub-base shall be 100 mm thick granular layer conforming to Clause 401 or 100 mm thick WBM Gr.I conforming to Clause 405 of these Specifications. In case the subgrade soil is clayey, the sub-base shall be extended over the full formation width for proper drainage.

1504.9. Base Course

A minimum 100 mm thick layer of granular/stabilized base course shall be provided. The base course layer shall be extended at least 300 mm beyond the edge restraints. The material shall conform to Clause 402 of these Specifications.

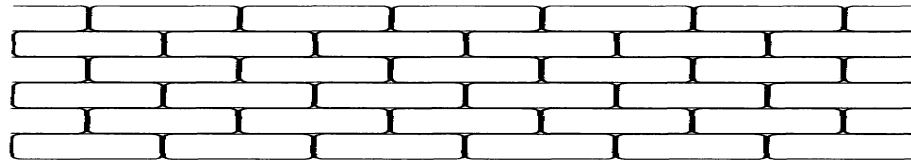
1504.10. Bedding Sand

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

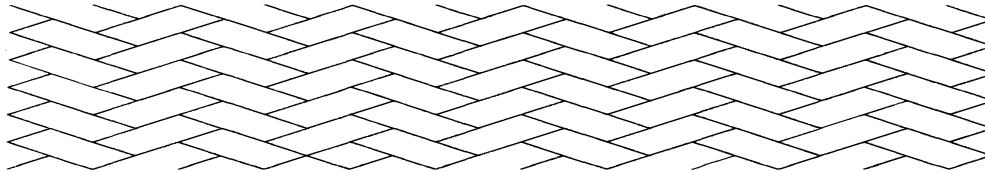
1504.11. Paving Pattern

The pattern in which blocks are to be paved shall be decided in advance from the two choices or their derived forms available. These are the herringbone and stretcher patterns, as shown in Fig. 1500.3.

1504.11.1. By and large, these patterns are the same as adopted for brick paving. All shapes of blocks are not amenable to the above paving patterns. For paving in trafficked areas, herringbone pattern shall be adopted for ensuring better performance. Paving shall commence and progress from one starting line only. Wherever possible, paving shall commence adjacent to or against edge restraint.



(a) STRETCHER OR RUNNING



(b) HERRINGBONE

Fig. 1500.3. Basic Bonds

1504.12. Paving and Compaction of Blocks

Blocks shall be placed at the correct angle to the start line to achieve the final orientation of the laying pattern. For curved or unfavourably oriented edge restraints, a string line shall be established to permit fast, easy laying such that it is not required to force a block between the blocks already paved. Control over alignment, laying pattern and joint width can be assisted by the use of chalked string lines set at about 5 m intervals. Nominal joint width of 2 to 4 mm shall be maintained by holding the paving unit lightly against the face of the adjacent block and allowing it to slide into position. Cutting paving units for filling the paving gaps occurring against edge restraints etc. shall be deferred until sufficient work has progressed to allow reasonably continuous operation. When space does not permit the use of cut pieces of blocks, premixed or dry packed concrete shall be used. After a section has been paved, compaction shall be effected by using vibrating plate compactors in the following sequence of operations:

- (i) Vibrate the blocks with 3 passes of the plate vibrator of adequate capacity.
- (ii) Spread a thin layer of fine joint filing sand on top of the paved blocks and sweep it into the joints, using suitable brooms.
- (iii) Vibrate the sand into the joints by making 3 passes of the compactor.
- (iv) Sweep off the excess sand from top of blocks.

As a guide to the characteristics of typical vibrating plate compactors, standard compactors have a weight of 90 kg, a plate area of 0.3 m² and apply a centrifugal force of 1500 kg. Heavy duty compactors weigh between 300 to 600 kg, have a plate area of about 0.5 to 0.6 m² and apply a centrifugal force in the range of 2000-3000 kg. Use of heavy duty compactors is desirable for trafficked pavements.

1504.12.1. Trial length : The contractor shall lay a trial length of 30 m and get it inspected and approved by the Engineer before proceeding with the regular paving work. The trial length shall be rectified/relaid if found deficient in any respect. The procedure demonstrated in the laying of trial length shall be followed while executing the main construction work.

1504.13. Opening to Traffic

The pavement can be opened to traffic as soon as the construction work is completed.

1504.14.1. Transverse profile : When measured by a camber template, the transverse profile shall not deviate by more than 10 mm from the design profile.

1504.14.2. Longitudinal profile :When measured by a 3 m straight edge, the longitudinal profile shall not deviate by more than 12 mm from the design profile.

1504.15. Acceptance Criteria

From each lot of 500 blocks, 5 blocks shall be selected at random for water absorption and compressive strength tests. In case the number of blocks in the lot is less than 500, a minimum 1 per cent of the blocks delivered to site shall be tested for water absorption and strength. The blocks shall be first tested for water absorption and these shall meet the requirement of Clause 1504.5.2.6 of these Specifications. The same five blocks (or minimum 1 per cent) shall be tested for strength and shall conform to the strength as per Clause 1504.5.1 of these Specifications.

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

1504.16. Measurements for Payment

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

1504.17. Rate

The contract unit rate shall include the cost of blocks, cost of stacking, transportation to site and paving including supply and application of bedding sand and joint filling sand. The rate shall include full compensation for labour, tools, plant, equipment, testing and all incidentals to the work, including all royalties, taxes, storage rents wherever necessary, and all leads and lifts.

Item No. 53

Providing and fixing pre-cast concrete kerb stone of gray cement based concrete block 30cm length, 30cm height and 15 cm thick of M 250 grade concrete as per approved design and including excavation for fixing in proper line and level, filling the joint with C:M 1:3 (1 Cement : 3 fine sand) etc complete.

1. Description

The work shall consist of scarifying the existing road surface to required depth, preparing pre cast kerb with kerb laying machine of required shape and size and fixing them in place in traffic island at Junction or as directed; as per drawing and joining them in C.M.1:3 and filling the central island portion with selected soil and compacting it and painting the sides as directed.

2. Material:

2.1: M-25 Pre Cast Kerb: (1) Water shall conform to M-1 (2) Cement shall conform to M-3 (3) Sand shall conform to M-6 (4) Mortar shall conform to M-11 (5) Aggregates shall conform to M-12 (6) Shuttering shall conform to M-26.

Pre cast C.C. Block: M250 Pre Cast block shall be sharp, smooth and in true line, level and shape as per drawing or as directed. Expansion joint shall be provided at every 10 mt. length

3. Construction:

The road surface shall be excavated to required depth on approved alignment. For the base of stone C.C. 1:5:10 base concrete shall be provided conforming to Standard Specification. The vertical C.C. stones shall be fixed as shown in drawing to line and level and expansion joint shall be provided. The outer sides of the vertical kerb stones shall be applied a coat of primer and subsequently white washed with two coats.

.0 Mode of Measurement and Payment: The measurement shall be on **running metre** basis and shall include all the work including necessary excavation, C.C. Blocks and soil filling and joining C.C. Blocks in C.M.1:3, curing, white washing, with all labour, material tools & plants etc complete.

Item No. 54

Providing and laying water proofing treatment with china mosaic tiles flooring over avg 40 mm C.C. 1:2:4 {1 Cement : 2 sand : 4 Kapachi / Grit 6 to 12 mm size} bedding for maintaining slope for plain and curve surface & 12 mm to 20 mm of broken piece of ceramic / glazed tiles (one for more colour as directed) to be laid over cement mortar bedding of C M 1:3 (1 cement : 3 sand) contain one Kg of water proofing materials per bag of O P C at plain or / and slopes and to be tempered to bring mortar ceramic 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 patterns 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 conform to the standard specified in I S 455 -1978

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

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:

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

3.2 FINE SAND: The fineness module 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
2.3 6mm	100
1.18 mm	75 to 100
600 MC	40 to 85
300 MC	05 to 50
150 MC	00 to 10

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

1.4. water proofing compound

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

1.5. C.C. 1:2:4 {1 Cement : 2 sand : 4 Kapachi / Grit 6 to 12 mm size} bedding

CC 1:2:4 bedding shall be provided conforming to specification item No. 14.71 (B)

1.6. china mosaic tile pieces

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

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

WORKMAN SHIP

A. First of all surface of the entire terrace shall be cleaned by thoroughly brooming and then by wire brushes All the loose material dust and debris shall be removed thoroughly for the entire surface of the terrace All joints and cracks shall be racked off and cut in v trench which shall be filled by neat cement slurry admixed

with water proofing compound The joints with parapet shall be 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 throughout the surface of the terrace by the use of brushes mala etc Cement slurry shall be prepared by adding adequate quantity of water so as to spread it uniformly on the surface.

B. cement concrete 1:2:4 (admixed with water proofing compound of approved make in specified proportion) of specified thickness shall be laid all over the surface of the terrace in true level and required slope including rounding of junctions of walls and slab

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 12 mm thick C M 1:3 and china mosaic tiling in true level and slope as directed by Engineer in charge & finally finishing the surface with trowel with white cement slurry (specification of white glaze tiles flooring shall be followed for the execution of this item.)

E. finishing the surface with 12 mm thick C M 1:3 and china mosaic tiling & 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 & PAYMENT :

7.1. The unit rate flooring shall include the cost of all materials, tools and plant required for mixing, laying of base layer in true level and slope as required applying & placing stones in position, compacting, finishing, curing mirror polishing, providing treatment of 30 cm high all over the length of parapets and corners and sill of doors etc, and all other incidental expenses for producing flooring work to complete the structure or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work. The rate of plastering shall include the cost of all labour, materials tools and plant scaffolding and all incidental expenses as described herein above.

7.2. The 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**.

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

Item No. 56

Providing 20 mm thick double coat mala cement plaster on interior brick / concrete work for plastering comprising of base coat of 12 mm thick cement plaster in cement mortar (1 Cement : 4 coarse sand) in rough finishing and 8 mm thick top coat of cement mortar 1:2 (1 Cement : 2 Coarse sand) finished with trowel including scaffolding curing etc. complete. for Ground Floor.

1 The specification for scaffolding and preparation of surface shall be as described in Item No. 17.58 (i) P No. 104 of GTS for building work book attached herewith

2 Mortar

The mix and type of fine aggregate specified in the description of the item shall be used for the respective coats. Generally the mix of the finishing coat shall not be richer than the under coat unless otherwise

described in item. Generally coarse sand shall be used for the under coat and fine sand for the finishing coat, unless otherwise specified for external work and under coat work.

3 Application

3.1 The plaster shall be applied in two coats i.e. 12 mm under coat in C.M. 1:4 and then 8 mm finishing coat in C.M. 1:2 and shall have an average total thickness of not less than 20 mm.

3.2 12 mm Under Coat : This shall be applied as specified in 17.58 (i) P No. 104 except that when the plaster has been brought to a true surface a wooden straight edge and the surface shall be left rough and furrowed 2 mm deep with a scratching tool diagonally both ways, to form key for the finishing coat. The surface shall be kept wet till the finishing coat is applied.

3.3 8 mm Finishing Coat : The finishing coat shall be applied after the under coat has sufficiently set but not dried and in any case within 48 hours and finished in the manner specified in 3.2.12

3.4 Specifications for Curing, Finishing, Precautions, Measurements and Rate shall be as described under 17.58 (i) P No. 104

Item No. 57

Providing 20 mm thick double coat mala cement plaster on interior brick / concrete work for plastering comprising of base coat of 12 mm thick cement plaster in cement mortar (1 Cement : 4 coarse sand) in rough finishing and 8 mm thick top coat of cement mortar 1:2 (1 Cement : 2 Coarse sand) finished with trowel including scaffolding curing etc. complete. for First Floor.

The relevant specification of item No. 56 shall be followed except that the work shall be carried out at first floor level.

Item No. 66

Providing and fixing chicken mesh jali with square of 12.50 x 12.50 mm of 25 gauge at junction the Brick. masonry and reinforcement cement concrete member including fixing materials scaffolding labour etc. complete.

This item is for providing and fixing Chicken mesh jali at RCC / masonry joints. The chicken mesh Jali shall be got approved from Engineer in charge before use.

The jali shall be fixed by nail as per detailed drawing as directed by Engineer in charge.

Payment shall be made on **Sq.Mt.** basis of chicken mesh jali fixed.

The rate includes the cost of all kind of labour, materials, scaffolding etc.

Item No. 67

Providing 12 mm wide groove / notch in plaster including finishing the same etc. complete for all height.

1. Scope of work

The item covers the work for making groove in plaster and finishing.

2. Workmanship:-

The groove shall be made as per detailed drawing / as directed by engineer in charge. The work shall be carried out at any height.

3 Mode of Measurement and Payment :-

The rate includes the cost of scaffolding. Payment shall be made on **Rmt.** Basis.

Item No. 82

**Providing and fixing PVC Cowl vent of following dia etc complete as directed
(A) 110 mm Dia**

General

This work shall consist of **Providing and fixing in position PVC cowl vent** of the shape and dimensions shown on the drawings and conforming to these Specifications or as approved by the Engineer in charge.

Material

1.0. Cowl vent

1.1. Cowl vent shall be of PVC and shall be sound and free from porosity or other defects which affect serviceability The thickness of the base metal shall not be less than 6.5 mm The surface shall be smooth and free from craze, chips and other flaws or any other kind of defects which affect serviceability The size of Cowl vent shall be specified

1.2. Cowl vent shall be of-quality approved by the Engineer-in-charge and shall generally conform to the relevant Indian Standards.

1.3. The cover shall be PVC perforated cover shall be provided on the trap of appropriate size.

2.0 MODE OF MEASUREMENTS & PAYMENT

2.1. The rate for cowl vent includes cost of vent, its carting from to work site with all leads and lifts placing and fixing in position,

2.2. The rate shall be for a unit of One **Number**.

Item No. 83

**Providing and fixing PVC Cowl vent of following dia etc complete as directed
(B) 160 mm Dia**

General

This work shall consist of **Providing and fixing in position PVC cowl vent** of the shape and dimensions shown on the drawings and conforming to these Specifications or as approved by the Engineer in charge.

Material

1.0. Cowl vent

1.1. Cowl vent shall be of PVC and shall be sound and free from porosity or other defects which affect serviceability The thickness of the base metal shall not be less than 6.5 mm The surface shall be smooth and free from craze, chips and other flaws or any other kind of defects which affect serviceability The size of Cowl vent shall be specified

1.2. Cowl vent shall be of-quality approved by the Engineer-in-charge and shall generally conform to the relevant Indian Standards.

1.3. The cover shall be PVC perforated cover shall be provided on the trap of appropriate size.

2.0 MODE OF MEASUREMENTS & PAYMENT

2.1. The rate for cowl vent includes cost of vent, its carting from to work site with all leads and lifts placing and fixing in position,

2.2. The rate shall be for a unit of One **Number**.

Item No. 90

Providing and fixing Special Needs Range CRUSE SET, EWC, 710 x 370 x 810 mm, New Cat No: S1021113 S Trap, S1021114 P Trap, S1060106 Cistern, B1520118 Soft Close Seat Cover, B1810112

Twin Flush Fittings, S2040101 Wash Basin 510 x 400 mm, F9030451 Spatula Lever basin mixer, B2210106 Wall mounted Grab bar 600 mm long, B2210106 Wall mounted Grab bar 600 mm long, B2210108 Wall mounted Hinged rail 750 x 750 {Cera or equivalent}

1.0. Materials

1.1. Special Needs Range CRUISE SET with all accessories as shown in item of work shall be got approved by engineer in charge as shown in pic.

2.0. Workmanship

2.1. The all parts of cruise set fixed in line and level as directed by engineer in charge. The colour is indicative and shall be got approved from engineer in charge.

3.0. Mode of measurements and payment

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

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



Item No. 92

Providing erecting and fixing double coated PVC. (ISI) mark water tank of reqd capacity each with all necessary fittings & connection etc. comp on terrace.

1.0 Materials:-

- 1.1 Polyethylene water storage tank shall be as per IS 12701, this materials should be light weight, non toxic all fitting materials shall be H.D.P.E. / Brass
- 1.2 The P.V.C. tank shall be of I.S.I. mark and approved quality and brand like infra or Sintex or equivalent. It shall be approved by Engineer in charge
- 1.3 The thickness of P.V.C. materials shall be as per Company's specification. The size of tank shall be decided by Engineer in charge
- 2.0 Workmanship :-
 - 2.1 Water tank shall be installed on perfectly plained and smooth surface.
 - 2.2 Outlet pipe shall be 7.5 cm high then bottom surface.
 - 2.3 Diameter of overflow pipe shall be bigger then inlet pipe diameter.
 - 2.4 Unions shall be used in inlet and outlet pipe.
 - 2.5 For connection in water tank required vicer, and check-nuts shall be used.
 - 2.6 Fitting shall be done by G.I. / P.V.C. pipes as per instruction of Engineer in charge in each tank. All joints shall be leak proof.
- 3.0 Mode of Measurement and Payment :-
 - 3.1 This shall be measured in one **liter** basis and rates are as per liter basis for the volumetric capacity of the water tank.
 - 3.2 Rate shall be inclusive of placing, lifting, storing and making connection for inlet, outlet, overflow pipe, out pipe with all necessary plumbing work and material. For complete work

Item No. 99

Providing and fixing in position 150 mm high, English letters made from 1.0 mm thick stainless steel sheet as directed by Engineer-in-charge with all necessary tools & plants etc. complete.

1.0 Material & Workmanship:-

The Letter shall be of AISI 304 grade stainless steel of approved quality & best quality confirming to relevant I.S code. All materials shall be got approved before starting the work. The entire work shall be carried out as per the instruction of Engineer-in-charge. The Height of letters shall be 150mm high and made from 1.0 mm thick sheet.

The Letters shall be fixed as directed by Engineer in charge at any height.

1.0 Mode of Measurement and Payment

- 2.1 The Rate shall include cost of all materials and all labour required for this items.
- 2.2 The Rate shall be for unit of **one No.**

Item No. 100

Constructing Sandwich Platform of 18 mm thick Polished Black Granite at top and 30 mm thick Kota stone slab flooring fitting at bottom with cementing Materials / adhesives including making necessary grooves in walls with Vertical Kotastone 30 mm x 2 No sandwich thick every 60 cm centre to centre including all labour material of approved quality incl. full moulded round front edge fixed in wall for partition and jointed with grey cement slurry including rubbing and polishing etc. complete

1.0 Materials

- 1.1 Kota stone shall conform to M 49
- 1.2 Granite stone shall conform to Relevant IS
- 1.3 Mortar shall conform to M-11

2.0 Workmanship

The item covers preparation platform of mirror polished granite top with 30 mm thick kota stone for bottom with cement mortar 1:1 for sandwich and fixed as directed by Engineer in Charge. the front of sandwich shall be covered the appropriate size granite patti with top edge full round & mirror polished. Necessary precaution shall be taken for fixing so it can not dropped. The platform shall be fixed on vertical supports of sandwiched type support. Outer supports of granite and kota stone & inner supports of kota stone..

The cement mortar 1:3 shall be used for filling between kota stone and granite slab. The average thickness of mortar shall not be more than 25 mm.

3.0 Mode of Measurement and Payment

The measurement shall be taken on **Sq.Mt.** basis of platform prepared as directed by Engineer in Charge. the measurement shall be taken on clear area of platform. The rate includes the cost of necessary supports. No extra payment shall be made for support.

Payment shall be made on Sq.Mt. basis of complete item as directed by Engineer in Charge

Item No. 102

Providing and fixing 110 cm high Stainless steel railing made from anticorrosive 304 grade S S pipe of 50 mm dia (16Gauge) as hand rail with S S 304 grade Baluster as a vertical support fixed in RCC slab at 1.66 m c / c including Five horizontal S S pipes of 20 mm dia (16Gauge) at equal distance including accessories as per detailed drawing as directed etc. complete.

Material & Workmanship:-

The necessary materials like AISI 304 grade stainless steel pipes of approved quality & best quality confirming to relevant I.S code. All materials shall be got approved before starting the work. The entire work shall be carried out as per the instruction of Engineer-in-charge.

S.S 304 Grade 1.8 mm wall thickness matt finish , 50mm Top hand rail, connected to 38 mm diameter stainless steel Vertical Balustrade having wall thickness 16 gauge with top modular "T" fixing support. The Vertical Balustrade is fixed in R.C.C steps at 1000 to 1200 mm C/C with anchor fastener 75 mm dia 8 mm thick flange and shoe cap in line and level using necessary S.S fixtures & fastenings of the make ORCHID or as equivalent of approved by Engineer-in-charge.

The 900 mm high Balustrade as a vertical support is connected with three nos of 16 mm Dia horizontal S.S pipe of 16 gauge fixed with L and Key. At turning Hand rail shall be fixed with modular bend. The entire railing shall be prepared as per design or as per drawing supplied or as directed by Engineer-in-charge.

Stainless Steel confirming to AISI 304 Grade Stainless Steel shall be completely anti-corrosive and resist the adverse effects of chemicals.

The following table presents main elements (forming the Chemical composition) of AISI 304 Grade Stainless Steel

Chemical Composition in Percentage:

Element %	304 Grade	Implications
Carbon	0.08	Increase in percentage decreases the corrosion resistance.
Silicon	1.00	-
Manganese	2.00	Affects the magnetic characteristic and hardness of Iron
Phosphorus	0.045	-
Sulphur	0.03	-
Chromium	16.0 to 18.0	Addition of 12% forms stainless steel from ordinary steel. Removes the corrosive effect of Carbon. Forms a passive film which prevents oxidation & consequent corrosion.
Molybdenum (MOLY)	2.00 to 3.00	Molybdenum increases the corrosion resistance to chlorides and sulphates including sulfurous acids in pulp industries. It has a superior tensile strength at high temperature as compared to 304 Grade steel. This element can resist major chemical reaction and thus being a very costly element.
Nickel	10.0 to 14.0	Nickel provides corrosion resistance, increases strength in both high & low temperature, increases toughness in low temperature and lowers the effects of work hardening. Thus higher percentage makes the steel superior in quality.

- It can withstand the corrosion caused by atmospheric / environmental or major chemical reactions.
- It can resist high temperatures without going under any deformity which makes it highly recommended for fire safety doors in any building.
- It has remarkable creep strength and Rupture strength.
- It shall be repelled the Bacteria & shall be made higher degree of hygiene.
- It shall be of natural finish, it shall not required regular cleaning or maintenance making it most suitable for public places.
- Wall thickness of pipe shall be of 16 guage
- It shall tolerate forceful and intense use.
- Specially developed fixing stud and grubs shall be used to ensure accurate fitting of elements and eliminates shaking of elements.
- Specially developed fixing stud and grubs shall be used to ensure accurate fitting of elements and eliminates shaking of elements.

Testing shall be carried out in requisite laboratory for above chemical composition of AISI 304 Grade Stainless Steel & testing result for the same shall be submitted along with bill for claiming the amount of bill. If the results found fail, the fixtures and fastening of the same lot shall be rejected outright.

All fixtures and fastening of the make shall be of anti corrosive high grade AISI 304 stainless steel in Glossy & satin combination finish only. Fixtures and fastening of the make ORCHID or as equivalent of

approved by Engineer-in-charge shall be fixed by ORCHID Company's skilled person only. Necessary bond shall be executed for life time guarantee for non-rusting of fixtures and fastenings.

The Contractor shall have to give a guarantee bond, for railing, on appropriate Stamp paper for a period of **FIVE** years. In this period he shall attend to and rectify all complaints without causing any inconvenience to the Owners/Client. The form of Guarantee Bond shall be as prescribed below:

"I/We (Contractor) hereby guarantee that the railing shall remain unaffected and shall not be in any way damaged by normal usage, pulls and pushes, for a period of **FIVE** years after the completion of the work of supplying & fixing the railing to cement concrete / cement concrete block masonry as per the terms and conditions of the Contract and guarantees to redo the affected work without claiming any extra cost."

- (m) Details/arrangements for after sales/maintenance services shall be furnished.
- (n) Work shall be carried out in co-operation and in coordination with all other agencies working at Site.
- (o) The civil work as required for fixing of railing, hold fast or other works required for the erection and completion of railing etc. shall be done by the Contractor without any extra cost.

- (p) Any damage, if caused to the existing work done by other agencies, shall be reinstated by the Contractor to its original condition without any extra cost.
- (q) During the course of work, the Contractor shall pay due care to avoid any stains on the railing & toughen glass work and if required, the Contractors shall provide necessary protective arrangement as directed by the Architects for which no extra payments shall be made. After the installation is completed, if required by the Architects, the metal work & glass work shall be washed with mild solution of non alkali soap and water.
- (r) The Contractor shall be responsible for the rails/windows/doors/grills etc. being set straight, in plumb level and for their satisfactory operations after the fixing is completed.
- (s) Wherever required and as directed strengthening of members shall be done by providing steel/M.S. concealed members without extra cost.

Laying of Stainless Steel railing

Stainless steel railing should be laid commencing from one end and proceed towards the other end. The railing can be placed to different levels or patterns as directed by Engineer in Charge. With the help of gauges, the joint width specification should be checked in the first few running meters, where it should be ensured that the railing alignment is correct. To start with, full railing section should be used; only subsequently, cutting and in filling at edges be permitted. Under no Circumstances should the railing be forced or hammered into the bedding at the stage of lying. For cutting railing, hydraulic or mechanical block cutters, or power saws are used. Cut units of any shape and size less than required should not be used. Supporting brackets made out of S.S sections fixing with anchor fastener only. 15mm thick toughened glass of approved brand, shall be fixed with approved quality & design of film on one side of toughen glass as per the direction of Engineer in charge.

The balusters of 38 mm dia S.S pipe shall be fixed in steps of stair / C.C block masonry at 1000 to 1200 mm center to center in line & level. Hand rail of 50 mm diameter having 16 gauge wall thickness shall

be jointed with baluster by appropriate accessories required of the make ORCHID or as equivalent of approved by Engineer-in-charge only. Three horizontal 16 mm dia 16 gauge is connected with Baluster with appropriate accessories. The entire work shall not be executed in loose fashion. If after erection railing found to be damaged due to erection or due to any type of negligence of the agency, the same shall be replaced without any extra cost.

Mode of measurement & payment:

The rate for railing with frame shall include the cost of materials & labour involved to finish the work. The payment shall be made on completion of work.

The payment shall be made on one Running meter.

Item No. 103

SIGNAGES ON Door

Providing, Fabricating & Fixing 304 grade Stainless steel 1.5 mm thick brushed steel finish plate fixed on a door using S. S. studs and with punched(laser cut) lettering carried out on S. S. plate of required size and text as directed by Engineer etc. complete..

Size: 12" x 6"

1.0 Materials

The item covers the work for providing and fixing Door signage's

The signage shall be fabricated as shown in item of work and directed by engineer in charge.

2.0 Workmanship

It shall be properly fixed as directed by Engineer in Charge.

It shall be fixed truly in line and level.

3 Mode of Measurement and Payment

Payment shall be made on No. basis of complete item carried out as directed by Engineer in Charge

Item No. 107

Box cutting the road surface to proper slope and chamber for making a base for road work including removing the excavated stuff and depositing on the road side slope as directed

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 or 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 levels 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 trees on the road side, no 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:

1.1. 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.

1.2. The box cutting shall be measured for its cross sectional area and computing volumes of earth work in cubic metres by the method of average end areas

1.3. The payment will be made on Cubic Metre basis of the finished work.

Item No. 108

Providing and laying W.B.M. of B.T.M.C. metal of size 45 mm to 63 mm size including 20% Grit {Stone screening} & stone dust as filler including spreading, watering & consolidation by vibratory roller 80KN to 100KN static weight.

404. WATER BOUND MACADAM SUB-BASE/BASE

404.1. Scope

404.1.1. This work shall consist of clean, crushed aggregates mechanically interlocked by rolling and bonding together with screening, binding material where necessary and water laid on a properly prepared subgrade/ sub-base/ base or existing pavement, as the case may be and finished in accordance with the requirements of these Specifications and in close conformity with the lines, grades, cross-sections and thickness as per approved plans or as directed by the Engineer.

404.1.2. It is, however, not desirable to lay water bound macadam on an existing thin black topped surface without providing adequate drainage facility for water that would get accumulated at the interface of existing bituminous surface and water bound macadam.

404.2. Materials

404.2.1. Coarse aggregates : Coarse aggregates shall be either crushed or broken stone, crushed slag, overburnt (Jhama) brick aggregates or any other naturally occurring aggregates such as kankar and laterite of suitable quality. Materials other than crushed or broken stone and crushed slag shall be used in sub-base courses only. If crushed gravel/ shingle is used, not less than 90 per cent by weight of the gravel/ shingle 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 400-6. The type and size range of the aggregate shall be specified in the Contract or shall be as specified by the Engineer. 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).

404.2.2. Crushed or broken stone: The crushed or broken stone shall be hard, durable and free from excess flat, elongated, soft and disintegrated particles, dirt and other deleterious material.

TABLE 400-6. PHYSICAL REQUIREMENTS OF COARSE AGGREGATES FOR WATER BOUND MACADAM FOR SUB-BASE/BASE COURSES

Test	Test Method	Requirements
1 * Los Angeles Abrasion value Or * Aggregate Impact value	IS:2386 (Part-4) IS:2386 (Part-4) or IS:5640**	40 per cent (Max) 30 per cent (Max)
2 Combined Flakiness and Elongation Indices (Total)	IS:2386 (Part-1)	35 per cent (Max)

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

** Aggregates like brick metal, kankar, laterite etc. which get softened in presence of water shall be tested for Impact value under wet conditions in accordance with IS: 5640.

*** The requirement of flakiness index and elongation index shall be enforced only in the case of crushed broken stone and crushed slag.

404.2.3. Crushed slag : Crushed slag shall be made from air-cooled blast furnace slag. It shall be of angular shape, reasonably uniform in quality and density and generally free from thin, elongated and soft pieces, dirt or other deleterious materials. The weight of crushed slag shall not be less than 11.2 kN per m³ and the percentage of glossy material shall not be more than 20. It should also comply with the following requirements:

- | | | | |
|-------|--------------------|---|---|
| (i) | Chemical stability | : | To comply with requirement of appendix of BS : 1047 |
| (ii) | Sulphur content | : | Maximum 2 per cent |
| (iii) | Water absorption | : | Maximum 10 per cent |

404.2.4. Overburnt (Jhama) brick aggregates : Jhama brick aggregates shall be made from overburnt bricks or brick bats and be free from dust and other objectionable and deleterious materials.

404.2.5. Grading requirement of coarse aggregates : The coarse aggregates shall conform to one of the Gradings given in Table 400-7 as specified, provided, however, the use of Grading No.1 shall be restricted to sub-base courses only.

TABLE 400-7. GRADING REQUIREMENTS OF COARSE AGGREGATES

Grading No.	Size Range	IS Sieve Designation	Per cent by weight passing
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1.	63 mm to 45 mm	75 mm	100
		63 mm	90-100
		53 mm	25-75
		45 mm	0-15
		22.4 mm	0-5

Note : The compacted thickness for a layer with Grading 1 shall be 100 mm while for layer with other Gradings i.e. 2 & 3, it shall be 75 mm.

404.2.6. Screenings: Screenings to fill voids in the coarse aggregate shall generally consist of the same material as the coarse aggregate. However, where permitted, predominantly non-plastic material such as moorum or gravel (other than rounded river borne material) may be used for this purpose provided liquid limit and plasticity index of such material are below 20 and 6 respectively and fraction passing 75 micron sieve does not exceed 10 per cent.

Screenings shall conform to the grading set forth in Table 400-8. The consolidated details of quantity of screenings required for various grades of stone aggregates are given in Table 400-9. The table also gives the quantities of materials (loose) required for 10 m² for sub-base/base compacted thickness of 100/75 mm.

The use of screenings shall be omitted in the case of soft aggregates such as brick metal, kankar, laterites, etc. as they are likely to get crushed to a certain extent under rollers.

TABLE 400-8. GRADING FOR SCREENINGS

Grading Classification	Size of Screenings	IS Sieve Designation	Per cent by weight passing the IS Sieve
A	13.2 mm	13.2 mm	100
		11.2 mm	95-100
		5.6 mm	15-35
		180 micron	0-10

TABLE 400-9. APPROXIMATE QUANTITIES OF COARSE AGGREGATES AND SCREENINGS REQUIRED FOR 100/75 MM COMPACTED THICKNESS OF WATER BOUND MACADAM (WBM) SUB-BASE/BASE COURSE FOR 10M² AREA

Classification	Size Range	Compacted thickness	Lose Qty.	Screenings			
				Stone Screening		Crushable type such as Moorum or Gravel	
				Grading Classification & Size	For. WHM Sub-base/ base course (Loose quantity)	Grading Classification & Size	Loose Qty.
Grading 2	63 mm to 45mm	75 mm	0.91 to 1.07 m ³	Type A 13.2mm	0.12 to 0.15 m ³	-do	0.22 to 0.24 m ³

404.2.7. Binding material : Binding material to be used for water bound macadam as a filler material meant for preventing ravelling, shall comprise of a suitable material approved by the Engineer having a Plasticity Index(PI) value of less than 6 as determined in accordance with IS: 2720 (Part-5).

The quantity of binding material where it is to be used, will depend on the type of screenings. Generally, the quantity required for 75 mm compacted thickness of water bound macadam will be $0.06-0.09 \text{ m}^3/10\text{m}^2$ and $0.08-0.10\text{m}^3/10\text{m}^2$ for 100 mm compacted thickness.

The above mentioned quantities should be taken as a guide only, for estimation of quantities for construction etc.

Application of binding materials may not be necessary when the screenings used are of crushable type such as moorum or gravel.

404.3. Construction Operations

404.3.1. Preparation of base: The surface of the subgrade/ sub-base/base to receive the water bound 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 water bound macadam course over an existing thick bituminous layer may be avoided since it will cause problems of internal drainage of the pavement at the interface of two courses. It is desirable to completely pick out the existing thin bituminous wearing course where water bound macadam is proposed to be laid over it. However, where the intensity of rain is low and the interface drainage facility is efficient, water bound macadam can be laid over the existing thin bituminous surface by cutting 50 mm x 50 mm furrows at an angle of 45 degrees to the centre line of the pavement at one metre intervals in the existing road. The directions and depth of furrows shall be such that they provide adequate bondage and also serve to drain water to the existing granular base course beneath the existing thin bituminous surface.

404.3.2. Inverted choke : If water bound macadam is to be laid directly over the subgrade, without any other intervening pavement course, a 25 mm course of screenings (Grading B) or coarse sand shall be spread on the prepared subgrade before application of the aggregates is taken up. In case of a fine sand or silty or clayey subgrade, it is advisable to lay 100 mm insulating layer of screening or coarse sand on top of Fine grained soil, the gradation of which will depend upon whether it is intended to act as a drainage layer as well. As a preferred alternative to inverted choke, appropriate geosynthetics performing functions of separation and drainage may be used over the prepared subgrade as directed by the Engineer. Section 700 shall be applicable for use of geosynthetics.

404.3.3. Spreading coarse aggregates : The coarse aggregates shall be spread uniformly and evenly upon the prepared subgrade/sub-base/ base to proper profile by using templates placed across the road about 6 m apart, in such quantities that the thickness of each compacted layer is not more than 100

mm for Grading 1 and 75 mm for Grading 1 and 3, as specified in Clause 404.2.5. Wherever possible, approved mechanical devices such as aggregate spreader shall be used to spread the aggregates uniformly so as to minimise the need for manual rectification afterwards. Aggregates placed at locations which are inaccessible to the spreading equipment, may be spread in one or more layers by any approved means so as to achieve the specified results.

The spreading shall be done from stockpiles along the side of the roadway or directly from vehicles. No segregation of large or fine aggregates shall be allowed and the coarse aggregate as spread shall be of uniform gradation with no pockets of fine material.

The surface of the aggregates spread shall be carefully checked with templates and all high or low spots remedied by removing or adding aggregates as may be required. The surface shall be checked frequently with a straight edge while spreading and rolling so as to ensure a finished surface as per approved drawings.

The coarse aggregates shall not normally be spread more than 3 days in advance of the subsequent construction operations.

404.3.4. Rolling: Immediately following the spreading of the coarse aggregate, rolling shall be started with three wheeled power rollers of 80 to 100 kN capacity or tandem or vibratory rollers of 80 to 100 kN static weight. The type of roller to be used shall be approved by the Engineer based on trial run.

Except on superelevated portions where the rolling shall proceed from inner edge to the outer, rolling shall begin from the edges gradually progressing towards the centre. First the edge/edges shall be compacted with roller running forward and backward. The roller shall then move inward parallel to the centre line of the road, in successive passes uniformly lapping preceding tracks by at least one half width.

Rolling shall be discontinued when the aggregates are partially compacted with sufficient void space in them to permit application of screenings. However, where screenings are not to be applied, as in the case of crushed aggregates like brick metal, laterite and kankar, compaction shall be continued until the aggregates are thoroughly keyed. During rolling, slight sprinkling of water may be done, if necessary. Rolling shall not be done when the subgrade is soft or yielding or when it causes a wave-like motion in the subgrade or sub-base course.

The rolled surface shall be checked transversely and longitudinally, with templates and any irregularities corrected by loosening the surface, adding or removing necessary amount of aggregates and re-rolling until the entire surface conforms to desired crossfall (camber) and grade. In no case shall the use of screenings be permitted to make up depressions.

Material which gets crushed excessively during compaction or becomes segregated shall be removed and replaced with suitable aggregates.

It shall be ensured that shoulders are built up simultaneously along with water bound macadam courses as per Clause 407.4.1.

404.3.5. Application of screenings: After the coarse aggregate has been rolled to Clause 404.3.4, screenings to completely fill the interstices shall be applied gradually over the surface. These shall not be

damp or wet at the time of application. Dry rolling shall be done while the screenings are being spread so that vibrations of the roller cause them to settle into the voids of the coarse aggregate. The screenings shall not be dumped in piles but be spread uniformly in successive thin layers either by the spreading motions of hand shovels or by mechanical spreaders, or directly from tipper with suitable grit spreading arrangement. Tipper operating for spreading the screenings shall be so driven as not to disturb the coarse aggregate.

The screenings shall be applied at a slow and uniform rate (in three or more applications) so as to ensure filling of all voids. This shall be accompanied by dry rolling and brooming with mechanical brooms, hand-brooms or both. In no case shall the screenings be applied so fast and thick as to form cakes or ridges on the surface in such a manner as would prevent filling of voids or prevent the direct bearing of the roller on the coarse aggregate. These operations shall continue until no more screenings can be forced into the voids of the coarse aggregate.

The spreading, rolling, and brooming of screenings shall be carried out in only such lengths of the road which could be completed within one day's operation.

404.3.6. Sprinkling of water and grouting : After the screenings have been applied, the surface shall be copiously sprinkled with water, swept and rolled. Hand brooms shall be used to sweep the wet screenings into voids and to distribute them evenly. The sprinkling, sweeping and rolling operation shall be continued, with additional screenings applied as necessary until the coarse aggregate has been thoroughly keyed, well-bonded and firmly set in its full depth and a grout has been formed of screenings. Care shall be taken to see that the base or subgrade does not get damaged due to the addition of excessive quantities of water during construction.

In case of lime treated soil sub-base, construction of water bound macadam on top of it can cause excessive water to flow down to the lime treated sub-base before it has picked up enough strength (is still "green") and thus cause damage to the sub-base layer. The laying of water bound macadam layer in such cases shall be done after the sub-base attains adequate strength, as directed by the Engineer.

404.3.7. Application of binding material: After the application of screenings in accordance with Clauses 404.3.5 and 404.3.6, the binding material where it is required to be used (Clause 404.2.7) shall be applied successively in two or more thin layers at a slow and uniform rate. After each application, the surface shall be copiously sprinkled with water, the resulting slurry swept in with hand brooms, or mechanical brooms to fill the voids properly, and rolled during which water shall be applied to the wheels of the rollers if necessary to wash down the binding material sticking to them. These operations shall continue until the resulting slurry after filling of voids, forms a wave ahead of the wheels of the moving roller.

404.3.8. Setting and drying: After the final compaction of water bound macadam course, the pavement shall be allowed to dry overnight. Next morning hungry spots shall be filled with screenings or binding material as directed, lightly sprinkled with water if necessary and rolled. No traffic shall be allowed on the road until the macadam has set. The Engineer shall have the discretion to stop hauling traffic from using

the completed water bound macadam course, if in his opinion it would cause excessive damage to the surface.

The compacted water bound macadam course should be allowed to completely dry and set before the next pavement course is laid over it.

404.4. Surface Finish and Quality Control of Work

404.4.1. The surface finish of construction shall conform to the requirements of Clause 902.

404.4.2. Control on the quality of materials and works shall be exercised by the Engineer in accordance with Section 900.

404.4.3. The water bound macadam work shall not be carried out when the atmospheric temperature is less than 0°C in the shade.

404.4.4. Reconstruction of defective macadam: The finished surface of water bound macadam shall conform to the tolerance of surface regularity as prescribed in Clause 902. However, where the surface irregularity of the course exceeds the tolerances or where the course is otherwise defective due to subgrade soil mixing with the aggregates, the course to its full thickness shall be scarified over the affected area, reshaped with added material or removed and replaced with fresh material as applicable and recompacted. In no case shall depressions be filled up with screenings or binding material.

404.5. Arrangement for Traffic

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

404.6. Measurements for payment

Water bound macadam shall be measured as finished work in position in cubic metres.

404.7. Rate

The Contract unit rate for WATER BOUND MACADAM sub-base shall be payment in full for carrying out the required operations including full compensation for :

- (i) malting arrangements for traffic to Clause 112 except for initial treatment to verges, shoulders and construction of diversions;
- (ii) furnishing all materials to be incorporated in the work including all royalties, fees, rents where necessary and all leads and lifts;
- (iii) all labour, tools, equipment and incidentals to complete the work to the Specifications;
- (iv) carrying out the work in part widths of road where directed; and (v) carrying out the required test for quality control.

Item No. 109

Providing and laying Controlled cement concrete M 200 for C. C. Road / wearing coat with polyester fiber (12mm) with triangular of equivalent cross section with specific gravity 1.35 to 1.40 (as a secondary reinforcement) in concrete of any grade at the rate of 125 gms per 50 kg of Cement consumption. and curing including cost of formwork, compaction and finishing of cement concrete road by trimix vacuum dewatering process on cement concrete road surface by using vacuum dewatering pump, surface floater, surface vibrator including channeling and making grooves and rough finish to surface by providing expansion joints, construction joints and filling of joints with asphalt filler as directed by Engineer In Charge and as per specification .

The concrete work shall be carried out in ordinary concrete, M200 grade conforming of specification Tender Item No. 12

All necessary labour, materials equipment, **Compaction and Finishing by Trimix Method** 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.

The payment will be made on cmt basis of the finished work including **Compaction and Finishing by Trimix Method {Specification attached herewith}** .

The unit rate of concrete shall include the cost of all materials, labour, tools and plan required for mixing, placing in position, vibrating and compacting finishing as per directions of the Engineer-in-charge, curing and all other incidental expenses for producing concrete of specified strength to complete the structure or its components as show on the drawings and according to these specifications. The rate shall also include the cost of making/fixing and removing of all centers and forms required for the work.

Compaction and finishing of cement concrete road by trimix process providing extra labour charges for the trimix vacuum dewatering service process on cement concrete road surface by using vacuum dewatering pump floater surface vibrator including making groves and rough finish to surface as per in including leveling the complete.

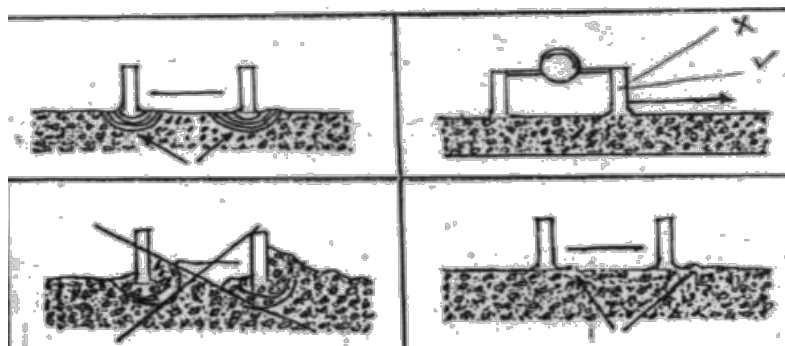
1. Working Method

Concrete Placing

Concrete can be placed & distributed by transit mixer and also sufficient man power is required. It is important to distributed the concrete evenly & as near the final level as possible.

2. Poker Vibration :

As a first step, concrete is vibrated with an immersion vibrator in order to remove entrapped air & voids & make the concrete homogeneous, please ensure that the areas close to channels & stop ands carefully vibrated. Do not distribute the concrete with the poker vibration along with the surface vibration



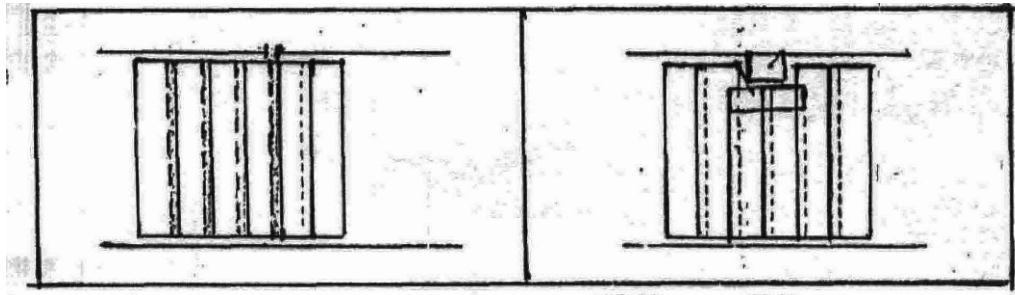
3. Surface Vibration :

Surface Vibration should always start as soon as there is enough concrete in front of surface vibrator. Two passes with the surface vibrator are required. During, the first pass, concrete must be distributed evenly in front of surface vibrator. There should be a roll of concrete of about 10-20 mm in front of leading beam along the entire length of the vibrator when the concrete has been placed

and vibrated to a length of about 5 mm, the second pass is carried but. The machine should be pulled at a speed of maximum 1 mtr./min and without interruption 'avoid linings' on the surface. Keep the surface of the channel. Clean from concrete

4. Vacuum Processing :-

Place the filter pads as soon as the sufficient concrete surface is vibrated. Please note that the vacuum dewatering process must start within 30 minutes from the: time of starting concrete pouring, Filter pads are placed in such away that there is at least 100 mm fresh concrete visible around the fitter pads on all four sides. Filter should be overlapped with each other by at least 250 mm. (all filter pads are marked with black line .to ensure proper overlapping.)



The recesses or other obstacles within the area to be vacuum processed must be covered & sealed using polyethylene sheet before the filter pads are placed. If the obstacles are flush with the surface level or above, filter pad must be folded.

The rolled up top cover is placed centrally on the filter pads. It is rolled out in such a way that it covers all filter pads & exposed concrete on the sides of the filter pads. Please note that this exposed concrete will ensure perfect sealing for the cover from laying top

Connect the central pipe of top cover to the suction hose, which is connected to the vacuum pump. When the pump is started vacuum will be created between the top cover & filter pads. Excess water will be taken in to the vacuum pump's tank & discharged. Normal suction cycle is 1 -1.5 min. per 10 mm. of concrete thickness. Guidelines for selecting dewatering time @ normal condition are shown in the following table.

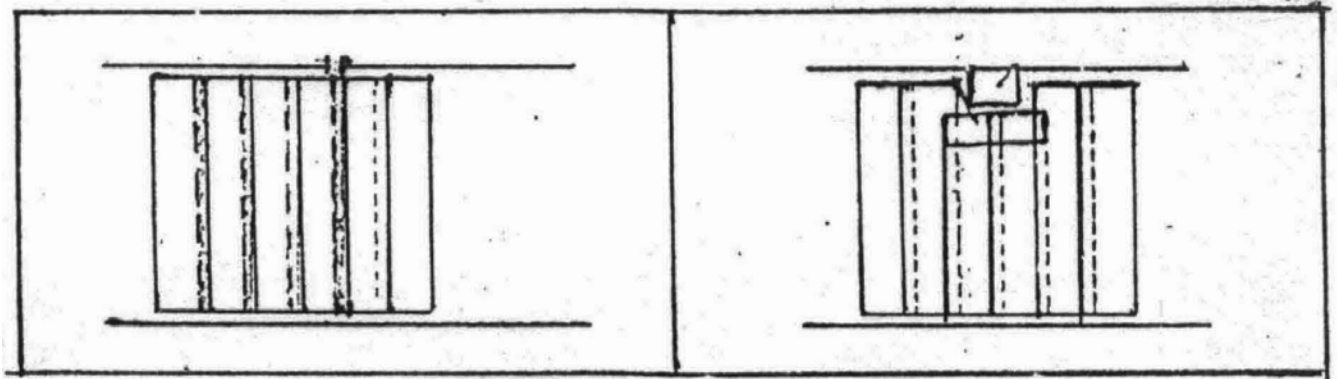
Thickness		Dewatering Time {Min}
MM	Inch	
50	2	7
100	4	15
125	6	20
150	8	30
200	10	40
250	12	45

Please note that dewatering time largely depends upon ambient conditions viz. Temperature, humidity, etc.

During the course of dewatering, the concrete surface gradually hardens & can be felt from the top of the top cover. The extent of hardness achieved by the concrete decides when to stop dewatering process.

When the vacuum processing is over, the cover is rolled up, to 100 mm so that the filter pads are visible. This will remove the water, that may have remained on the concrete surface, filter pads & in the suction hose. After about 30 seconds, the top cover is rolled completely & vacuum pump is switched off. Simultaneously, the suction hose & the top cover pipe are disconnected. Do not run the pump while the ball valve is open as likely that small aggregate are sucked into the pump due to vacuum. The entire process is repeated on the next concrete pane .

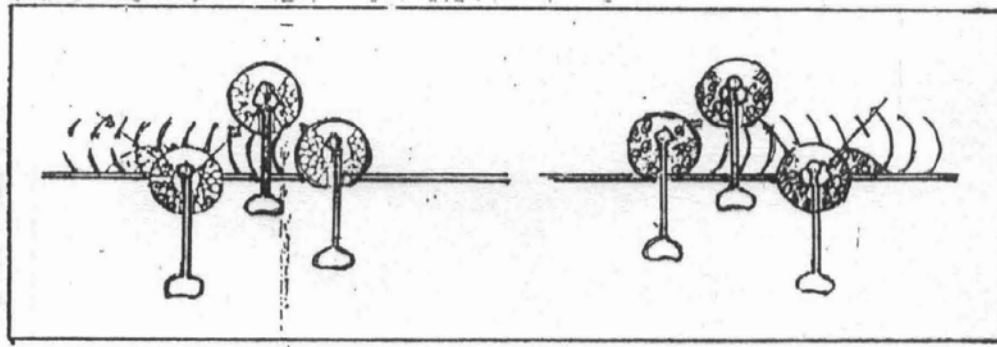
After first patch in any / given panel is dewatered, care should be taken while placing filter pad on the concrete surface next to the dewatered concrete. First filter pad should start from the edges of last filter pad of the previously dewatered concrete. The remaining filter pads than shall be placed as explained above.



While repeating dewatering process subsequently, in order that top cover should get proper scaling against the side already vacuum processed, it should be rolled out at least 300 mm over the vacuum dewatered area. Before spreading the top cover on the dewatered area, it is essential to give on pass of skim floater (with disc) along the edges of the dewatered concrete. The concrete surface will become wet as some will be come on the top surface. This will provide the necessary sealing. Subsequently roll out the top cover completely. Check that there are no wrinkles on the top ewer.

5. Floating :

The first finishing operation is floating where floating disc is used. that can not be reached by skim floater floated by hand. Care should be taken while floating near channels & edges. The skim floater is run over the channel up to disc center in order to avoid unevenness at the joint. All four sides of dewatered panel must be floated first central area is to be floated later. Any corrections, if required are to be carried out at this stage with the concrete at the time of raking only. Never use any cement paste, mixtures of cement & sand or fresh concrete for patchwork. Such materials will be pill off, will leave patches after the concrete floor is brought to use.



Normally two passes with disc with the skim floater operating at higher speed are sufficient for the skid free surfaces. This pass of skim floater should be given perpendicular to the previous pass. please note that the floating operation brings up certain amount of water to the surface. This moisture helps in carrying out finishing operation.

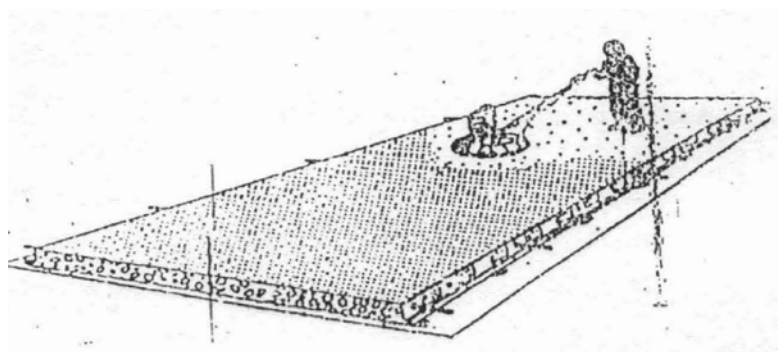
6 Troweling:-

Troweling is carried out with the same machine running on troweling blades. Normally, two pass of troweling blades are required for the smooth surface finish. However, the number of passes can be decided depending upon the surface finish required. The first troweling operation can start after the about 30 minutes after the final floating operation & surface is sufficiently dry. This pass is to be made using low speed & minimum blade angle. Please also use the lower speed when troweling near the channels, from the edges, obstacles etc. Blade angle & the speed can be increased for subsequent passed to achieved smoother surface finish.

7. Curing

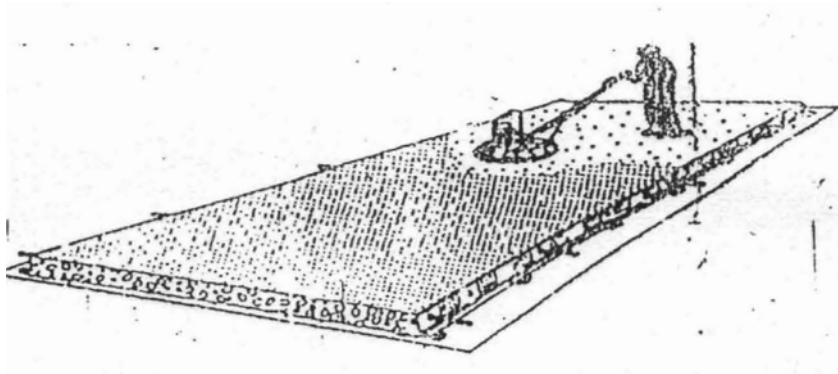
Concrete has to be protected from rapid drying which may result in cracking. Curing can be done by ponding, covering with plastic sheet or gunny bags. In any method, the surface should be always kept wet with water. Curing call also be done by application of curing compound. Curing must be done for at least 7 days.

Intermixing of toping First Pass



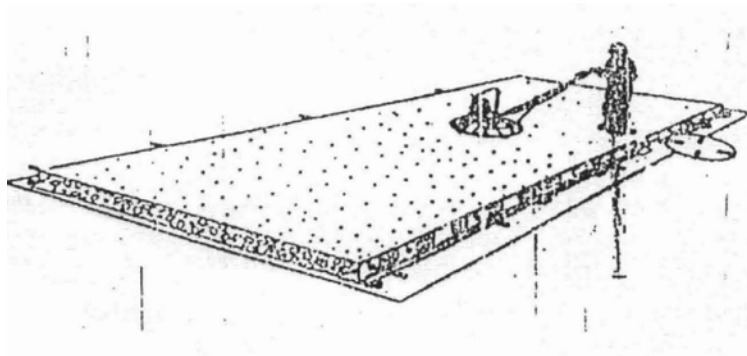
You can start the work when topping has darkened because the moisture under the concrete. The topping material is worked with care into concrete surface with a skim floated equipped with disc.

Intermixing of Topping Second Pass



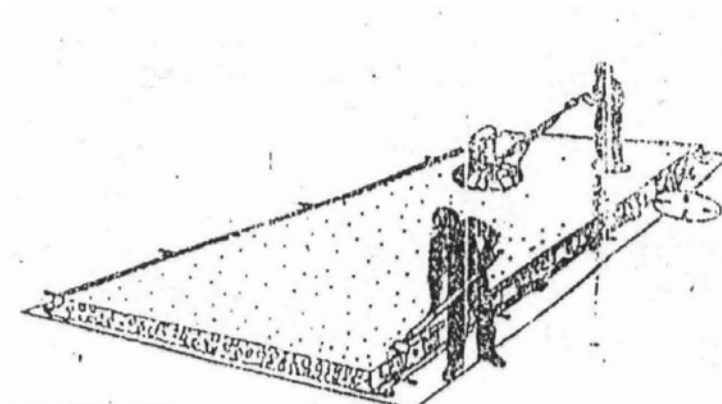
Check the surface flatness with straight edge and work the topping material into concrete as the first time.

Power Troweling First Pass



The first power troweling is carried out as a normal power troweling.

Power Troweling Final Pass



At the time of final power -troweling, surplus concrete must be off from the rails and stop ends., There must not be any damage at the rails when the floor is finished.

After the finished the surface, the groove shall be made using concrete cutter with appropriate spacing as directed by Engineer in Charge. The groove shall be filled up by bitumen.

The edges of panels shall not be damaged during the process of making grooves.

Item No. 114

Providing and Construction of Junction chambers of size 0.35 x 0.35 x 0.60 mt. with Foundation Concrete in CM 1:2:4 10 Cm thick, Half Brick Masonry wall in CM 1:4, 50 mm thick Flooring in CC 1:2:4 Inside Plaster 15 mm thick in C.M. 1:4 including connecting of rainwater pipe as per detailed drawing and as directed by Engineer in charge

1.00 MATERIAL :

Water shall conform to M-1 cement shall conform of M-3 sand M-6 brick M-15 stone agg. 20 mm nominal size M-12.

2.00 WORKMANSHIP :

1.00 The junction chambers shall be constructed of specified size and drawing as directed.

2.00 Excavation shall be conform as per specification book I.No. 4.00 (a) .

2.1 C.C. 1:2:4 shall be conform as per general specification of building book I.No. 5.3.13.

2.2 Half brick masonry in C.M. 1:4 shall be conform as per general specification building book I.No. 6.30 (I) B.

2.3 15 mm thick cement plaster shall be conform as per general specification of building book I.No. 17.58 (II)

2.4 Providing 50 mm thick I.P.S. (1:2:4) shall be conform as per general specification of building book I.No. 14.71 (B) .

3.00 MODE OF MEASUREMENT :

3.1 The work shall be measured for finished work.

3.2 The rate includes cost of all materials, labour etc. required for carrying out satisfactory completion of work & testing for function.

3.3 The rate shall be for unit of **ONE Number**.

Item No. 115

Providing and constructing filter chamber of size 2.06 x 1.21 x 1.20 mt. with Foundation Concrete in CM 1:2:4 12.5 Cm thick, 23 cm thick Brick masonry in CM 1:6, Half Brick Masonry Partition wall in CM 1:4, Inside Plaster 15 mm thick in C.M. 1:4 and cover slab 10 cm thick in CM 1:2:4 with necessary reinforcement and Filling 30 cm with 25 to 40 mm size Kapachi and Coarse sand for 90 cm as directed including connection rainwater pipes as per detailed as directed by Engineer in charge including cost of labour and material

1.00 MATERIAL :

Water shall conform to M-1 cement shall conform of M-3 sand M-6 brick M-15 stone agg. M-12.

2.00 WORKMANSHIP :

The filter chambers of size 2.06m 1.21 m x 1.20 m shall be constructed of specified size and drawing as directed.

- 2.1 Excavation shall be conform as per General specification Building book I.No. 4.00 (a) .
- 2.2 C.C. 1:2:4 for foundation shall be conform as per General Specification of building book I.No. 5.3.13
- 2.3 Brick masonry in C.M. 1:6 shall be conform as per general specification building book I.No. 6.13 (B)
- 2.4 Half brick masonry in C.M. 1:4 shall be conform as per General Specification Book I.No. 6.30 (I) B
- 2.5 15 mm thick cement plaster in C.M. 1:4 shall be conform as per general specification of building book I.No. 14.71 (B)
- 2.6 Form work shall be as per I.No. 9.1 (B)
- 2.7 Supply and stacking of Kapachi 25 mm to 40 mm size conform as per M-13

3.00 **MODE OF MEASUREMENT :**

- 3.1 The work shall be measured for finished work.
- 3.2 The rate includes cost of all materials, labour etc. required for carrying out satisfactory completion of work & testing of finished work
- 3.3 The rate shall be for unit of **ONE Number**.

Item No. 116

Providing water harvesting pit of 2.00 mt x 2.00mt x 4.00 mt. size for water logging with excavation in any strata upto four meter depth, filling the pit with B. T. Metal 40 mm in 0.60 mt. depth with 25-40mm kapachi, 0.30 mt. depth and 2.0 mt. depth with coarse sand in layers including making P.V.C. line for water inlet etc. as directed with 250mm dia bore 35 mt. depth and 150mm dia P.V.C. pipe of 10 Kg. f / Cm2 casing with gravel packing or as directed.

Sr. No.	Item of work	Item No.	Remarks
1	Excavation in any strata of	4.0.0.(a) 4.001(a) 4.002(a)	Excavation shall to be carried upto 4.00 mt. depth in any strata
2	Supply of Brick bats	M-14	The size of brick bat shall be 40 to 63mm
3	Supply of Kapachi 25 to 40mm	M-12	The size of Kapachi shall be 25 to 40 mm size as directed by Engineer in charge
4	Supply of Kapachi 10 to 20mm	M-12	The size of Kapachi shall be 10 to 20 mm size as directed by Engineer in charge
5	Supply of coarse sand	M-6	

The excavation of pits shall be of 2.00 x 2.00 x 4.00 mt. than 0.60 mt. thick layer of brick bats size 40 to 63 mm size and than 0.30 mt. depth of kapachi 25 to 40 mm size should be filled and 0.30 mt. depth grit of size 10 to 20mm should be filled. Than in 2.00 mt. depth sand have to be filled layer wise. Before filling the above materials 250mm dia bore of 35.00 mt. depth have to be drilled in

any strata and 150mm dia casing P.V.C. casing pipe of 10 Kg. F/Sq.cm working pressure to be lowered & between pipes and bore gravel shall to be filled . The top of pipe shall be covered with special type jali to prevent the entry of filled materials in the pipe.

The payment shall be made on No. of basis pit completed in all respect as directed by Engineer in charge including cost of excavation, brick bats, kapachi of both size sand and hire charges of rig, tools & plant, labouretc required for to complete the harvesting pit as directed

Item No. 117 to 173

Electrification work

PROCEDURE TO BE FOLLOWED FOR EXECUTION OF ELECTRICAL WORKS.

The Certificate copy of the agreement shall be sent by the Executive Engineer, Panchayat R. & B. Division, Patan for the Executive Engineer, Electrical Division, Mehsana.

The Civil works as per Part-I of Quantities shall be supervised, Measured, Billed passed and paid by the Executive Engineer, Panchayat R. & B. Division, Patan.

The Electrical works as per Part-II of Quantities shall be supervised, measured billed for and passed by Executive Engineer, Electrical Division, Mehsana.

The payment of bill of Electrical work duly passed by the Executive Engineer, Electrical Division, Mehsana, shall be made by Executive Engineer, Panchayat R. & B. Division, Patan.

So far as the Electrical works is concern, the decision and in Instruction given by the Executive Engineer, Electrical Division, Mehsana, shall be binding to the contractor and he shall be liable to set in accordance with the instruction issued for the quality & workmen ship etc.

Quality of works and part rate / reduce rate etc. for Electrical works shall be decided by the Executive Engineer, Electrical Division, Mehsana and shall be binding to the contractor.

The Contractor shall be observe the prevailing Rules and procedure for the Electrical work before during and after execution of Electrical works. As directed by the Executive Engineer, Electrical Division, Mehsana

Electrical work shall be carried out & completed simultaneously with civil work.

Before execution of Extra / Excess Electrical works as per part-II of Quantities approval form competent authority should be obtained.

**Signature of
contractor**

**Executive Engineer
R. & B. Panchayat Division
PATAN**

Schedule for Testing of Materials

For ensuring quality control and workmanship, various tests prescribed below corresponding to the material concerned shall be taken as periodic intervals as stipulated below.

The Material shall be got tested at GERI or Govt. recognized Laboratory or filed Laboratory of GERI

Brief Description of material to be tested.	Prescription of test which shall be carried out	Frequency @ which test shall be carried out (As per GERI Q.C. Vol. I, 2002)
1	2	3
Coarse Aggregate (Metal, gravel etc.)	Gradation test impact value, flakiness index, water absorption, stripping value.	1/150 M ³ for concrete or as per specification.
Fine aggregate (Sand)	Gradation fineness modulus, specific gravity, water absorption, silt content.	1/150 or concrete or as per requirement of relevant specification
Bricks	Dimension and tolerance, water absorption, compressive strength; efflorescence	1 test per 50,000 Bricks 5 bricks from (Sample) 5 Woks from (Sample) 5 bricks from (Sample)
C.C. Tiles	Water absorption. Transverse strength abrasion size tolerances.	1/2000 tiles (18 tiles for Sample)
Cement concrete	Compressive strength (I.S. 516-1959).	Q n t y . O f C . C . M 3 N o . o f T e s t 1 – 5 1 test 6 – 15 2 test 16 – 30 3 test 31 – 51 4 test 51 & above 4 + 1 For each Addnl. 50M ³ or part thereof
Cement	Consistency, setting time, compressive strength, fineness, Chemical analysis Soundness	Upto 50 T 1 test 50 – 100 T 2 test 100 – 200 T 3 test 200 – 300 T 4 test 300 – 500 T 5 test 500 – 800 T 6 test 800 – 1300 T 7 test and 8 test for larger consignment
Steel	Tensile strength, yield stress, Elongation Chemical Test	1/40 tonnes / per category

**Signature of
contractor**

**Executive Engineer
Panchayat R. & B. Division
PATAN**