

TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS

1.0 PREAMBLE:-

1.1 The Technical Specifications contained herein shall be read in conjunction with the other Bidding Documents as specified in this Volume.

1.2 Site Information:-

1.2.1 The information given here under provided elsewhere is given in good faith by the Employer but the Contractor shall satisfy himself regarding all aspects of site conditions and no claim will be entertained on the plea that the information supplied by the Employer is erroneous or insufficient.

2.0 GENERAL REQUIREMENTS:-

The technical specifications in accordance with which the entire work described herein after shall be constructed and completed by the Contractor shall comprise of the "SPECIFICATION"

2.1 Though "SPECIFICATION" for each item are attached with tender they are based on following.

(1) "SPECIFICATION FOR ROAD AND BRIDGE WORKS" (Fourth REVISION printed in year 2001) issued by the Ministry of Road Transport & Highways (MORT & H), Government of India and Published by the Indian Roads Congress, hereinafter to as MORT & H Specifications.

(2) The General Technical Specifications for Road works.

(3) The General Technical Specifications for Bridge works.

Note:- (2) To (3) are Conventional Specifications Booklets usually attached for (R&B) Works.

2.2 If, a particular clause (which is incorporated in "SPECIFICATION") of specification booklets (1) to (3) above is Amended / Modified/ Added upon then the Amendment/ Modification/Addition shall supersede the relevant clause incorporated in "SPECIFICATION"

2.3 In, so far as Amended / Modified / Added Clause may come in conflict or be inconsistent with any of the provisions of the MORT & H Specifications under reference, the Amended/Modified/ Added Clause and the additional specifications shall always prevail.

2.4 In the absence of any definite provisions on any particular issue in the aforesaid Specifications, reference may be made to the latest codes and specification, of IRC and BIS in that order. Where even these are silent, the construction and completion of the works shall conform to sound engineering practice as approved by the 'Engineer' and , in case of any dispute arising out of the interpretation of the above, the decision of the 'Engineer' shall be final and binding on the Contractor.

Name of Work:- **PKG No. Constructing Anganwadi Building 1)Du-Vaghpura-2, (2)Shiyali, (3)Arethi-1 Village . Ta. Zaghdia & Netrang Dist:Bharuch**

ITEM WISE SPECIFICATION

Item No.1 Demolition of Brick work and stone masonry including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift.(ii) In Cement Mortar.

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. Demolition implies taking up or down or breaking up. This shall consist of demolishing whole or part of work including all relevant items as specified or shown in the drawings.

1.2. The demolition shall always be planned before hand shall be done in reverse order to 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 propping, 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 damage is caused to the adjoining property.

1.4. Wherever required, temporary enclosures or partitions shall also be provided. 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 of 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 stacked 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.

2.0. Mode of measurements and payment

2.1. Measurements of all work except hidden work shall be taken before demolition or dismantling and no allowance for increase in bulk shall be allowed. The demolition of lime concrete shall be measured under this item. Specification for deduction for voids, openings etc. shall be on same basis as that employed for construction of work,

2.2. In measuring thickness of plastered walls, the thickness of plaster shall be included. The unserviceable materials shall be disposed off with all lead and lift. Ashlars face stones dressed stone etc., if required to be taken down intact shall be dismantled and measured separately in cubic meters.

2.3. The rate is exclusive of cleaning of bricks or stones. Honey comb works or hollow block walling shall be measured as solid.

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

Item No.2 Dismantling doors, windows, ventilators etc. (wood or steel) shutters including chowkhats architraves, holdfasts and other attachment etc. complete and stacking them within all lead and lift.(ii) Exceeding 3 Sq.M. in area.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. Demolition implies taking up or down or breaking up. This shall consist of demolishing whole or part of work including all relevant items as specified or shown in the drawings.

1.2. The demolition shall always be planned before hand shall be done in reverse order to 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 propping, 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 damage is caused to the adjoining property.

1.4. Wherever required, temporary enclosures or partitions shall also be provided. 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 of 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 stacked 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.

2.0. Mode of measurements and payment

2.1. Measurements of all work except hidden work shall be taken before demolition or dismantling and no allowance for increase in bulk shall be allowed. The demolition of lime concrete shall be measured under this item. Specification for deduction for voids, openings etc. shall be on same basis as that employed for construction of work,

2.2. The doors, windows, ventilator etc. not exceeding 3 sq. mt. in area (each) including shutters and chowkhats. Architraves, hold fasts and other attachments to frames etc. will be dismantled and measured under this item.

2.3. The rate includes stacking the serviceable materials as and where directed with all leads and lifts.

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

Item No.3 Dismantling tiled of stone flooring laid in mortar including stacking of serviceable materials and disposal of unserviceable materials with all lift.(i) In Cement Mortar

1.1. The demolition shall consist of demolition of one or more parts of the building as specified or shown in the drawings. Demolition implies taking up or down or breaking up. This shall consist of demolishing whole or part of work including all relevant items as specified or shown in the drawings.

1.2. The demolition shall always be planned before hand shall be done in reverse order to 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 propping, 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 damage is caused to the adjoining property.

1.4. Wherever required, temporary enclosures or partitions shall also be provided. 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 of 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 stacked 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.

2.0. Mode of measurements and payment

2.1. Measurements of all work except hidden work shall be taken before demolition or dismantling and no allowance for increase in bulk shall be allowed. The demolition of lime concrete shall be measured under this item. Specification for deduction for voids, openings etc. shall be on same basis as that employed for construction of work,

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

Item No.4 Demolition including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift. (i) R.C.C. work

1.1. The demolition shall consist of demolition of one or more parts of the building as specified or shown in the drawings. Demolition implies taking up or down or breaking up. This shall consist of demolishing whole or part of work including all relevant items as specified or shown in the drawings.

1.2. The demolition shall always be planned before hand shall be done in reverse order to 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 propping, 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 damage is caused to the adjoining property.

1.4. Wherever required, temporary enclosures or partitions shall also be provided. 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 of 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 stacked 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.

2.0. Mode of measurements and payment

2.1. Measurements of all work except hidden work shall be taken before demolition or dismantling and no allowance for increase in bulk shall be allowed. The demolition of lime concrete shall be measured under this item. Specification for deduction for voids, openings etc. shall be on same basis as that employed for construction of work,

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

Item No.5 Excavation for foundation upto 1.5 mt.depth including sorting out and stacking of useful materials and disposing off the excavated stuff upto 500 Meter lead.(B) Dense and hard soil

1.0. General

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

2.0. Clearing the site

2.1. The site on which the structure is to be built shall be cleared, and all obstructions loose stone, materials and rubbish of all kind bush wood and trees shall be removed as directed. The materials so obtained shall be property of the Government and shall be conveyed and stacked as directed within 50 m lead. The roots of the trees coming in the sides shall be cut and coated with a hot asphalt

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

3.0. Setting out

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

4.0. Excavation

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

5.0. Disposal of the excavated stuff

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

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

6.0. Mode of measurements & payment

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

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

Item No.6 Excavation for foundation upto 1.5 mt 3.0 mt depth including sorting out and stacking of useful materials and disposing off the excavated stuff upto 50 Meter lead.(B) Dense and hard soil.

1.0. General

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

2.0. Clearing the site

2.1. The site on which the structure is to be built shall be cleared, and all obstructions loose stone, materials and rubbish of all kind bush wood and trees shall be remove! as directed The materials so obtained shall be property of the Government and shall be conveyed und stacked as directed within 50 m lead. The roots of the trees coming in the sides shall be cut and coated with a hot asphalt

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

3.0. Setting out

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

4.0. Excavation

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

5.0. Disposal of the excavated stuff

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

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

6.0. Mode of measurements & payment

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

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

ItemNo.7 Providing and laying cement concrete 1:3:6 (1-Cement : 3- coarse sand : 6- handbroken stone aggregates 40 mm nominal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth

Materials

Water

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

confirm to the standard specified in I S 455 -1978

1.2 If required by the Engineer in charge it shall be tested by comparison with distilled water compression shall be made by means of standard cement tests for soundness time of setting and mortar strength as specified in I S 269-1976 Any indication of unsoundness 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

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.

1.0.Materials

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

2.0. General

2.1. The concrete mix is not required to be designed by preliminary testes. The proportion of the concrete mix shall be 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) by volume concrete work shall have exposed concrete surface or as specified in the item

2.2. The designation ordinary M-100, M-150m M-200, M-250 specified as per I.S. correspond approximately to 1:3:6, 1.2:4, 1:1.1/2:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively

2.3. The ingredients required for ordinary concrete containing one beg of cement of 50 kg. by weight (0.0342 Cu M.) for different proportions of mix shall be as under:

Grade of Concrete	Mix By Volume	Total Quantity of dry aggregates by volume per 50 Kg. of cement, to be taken as sum of the individual volumes of fine and coarse aggregates max	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 kg. of cement max.
1	2	3	4	5
(1 Cubic meter = 1000 liters)				
Ordinary	Liters			Liters
M.100	1:3:6	300	General 1:2 for fine aggregate to coarse aggregate by volume but subject to a upper limit of 1:1. ½ &	34
M.150	1:2:4	220		32
M.200	1:1.1/2:3	160		30

M.250	1:1:2	100	a lower limit of 1:3	27
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2.4.The water cement ratios shall not be more than specified in the above table. The cement content of the mix specified in the table shall be increased if the quantity of water in mix has to be met eased to overcome the difficulties of placements and compaction so that the water-cement ratio specified in the table is not exceeded.

2.5.Workability of the concrete shall be controlled by maintaining a water -cement-ratio that is found to give a concrete mix which is just sufficient wet to be placed and compacted without difficulty with the means available.

2.6.The maximum size of course aggregate shall be as large as possible within the limits specified but in no case greater than one forth of the minimum thickness of the member provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.

2.7.For reinforced concrete work; coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.

2.8.For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum clear distance between the main bar or 5 mm. less than the minimum cover to the reinforcement whichever is smaller.

2.9Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be so important, and the nominal maximum size may some times be as great as or greater than the minimum cover.

evidence that with the passage of time neither the compressive strength of concrete is reduced not are other requisite qualities of concrete and steel impaired by the use of such admixtures.

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

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

Grade of Concrete	Compressive strength of 15 cms. cubes in Kg./Cmt. at 28 days, conducted in accordance with I.S. 516-1959. Preliminary test Min.	Work test Min.
M-1	200	150
M-200	260	200
M-250	320	250
M-300	380	300
M-350	440	350
M-400	500	400

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

3.0. Workmanship

3.1. The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work question and can be properly compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that supply of properly graded aggregate of uniform quality can be maintained till the completion of work, grading of aggregate shall be controlled by obtaining the coarse aggregates in different sizes and bending them in the right proportions as required. Aggregates of different sizes shall be

stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregate shall be checked as frequently as possible, the frequency for a given job being determined by Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests..

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

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

2.0. Mode of measurement and payment

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

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

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

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

2.2. The rate shall be for one cubic meter.

Item No. 8 Providing and laying cement concrete 1:3:6 (1-Cement : 3- coarse sand : 6- handbroken stone aggregates 20 mm nominal size) and curing complete including cost of formwork in (A) Wall caps / coping

1.0. Materials

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

2.0. General

2.1. The concrete mix is not required to be designed by preliminary tests. The proportion of the concrete mix shall be 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) by volume. Concrete work shall have exposed concrete surface or as specified in the item.

2.2. The designation of ordinary M-100, M-150, M-200, M-250 specified as per I.S. corresponds approximately to 1:3:6, 1:2:4, 1:1:1/2:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively.

2.3. The ingredients required for ordinary concrete containing one bag of cement of 50 kg. by weight (0.0342 Cu M.) for different proportions of mix shall be as under:

Grade of Concrete	Mix By Volume	Total Quantity of dry aggregates by volume per 50 Kg. of cement, to be taken as sum of the individual volumes of fine and coarse aggregates max	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 kg. of cement max.
1	2	3	4	5
(1 Cubic meter = 1000 liters)				
Ordinary	Liters			Liters
M.100	1:3:6	300	General 1:2 for fine aggregate to coarse aggregate by volume but subject to a upper limit of 1:1. ½ & a lower limit of 1:3	34
M.150	1:2:4	220		32
M.200	1:1.1/2:3	160		30
M.250	1:1:2	100		27

2.4. The water cement ratios shall not be more than specified in the above table. The cement content of the mix specified in the table shall be increased if the quantity of water in mix has to be met eased to overcome the difficulties of placements and compaction so that the water-cement ratio specified in the table is not exceeded.

2.5. Workability of the concrete shall be controlled by maintaining a water -cement-ratio that is found to give a concrete mix which is just sufficient wet to be placed and compacted without difficulty with the means available.

2.6. The maximum size of coarse aggregate shall be as large as possible within the limits specified but in no case greater than one forth of the minimum thickness of the member provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.

2.7. For reinforced concrete work; coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.

2.8. For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum clear distance between the main bar or 5 mm. less than the minimum cover to the reinforcement whichever is smaller.

2.9 Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be so important, and the nominal maximum size may some times be as great as or greater than the minimum cover.

evidence that with the passage of time neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel impaired by the use of such admixtures.

2.1.2.10. Admixture may be used in concrete only with approval of Engineer-in-charge based upon the relevant specification of item No. 5.4.1. of ordinary concrete shall be followed except that the concrete mix shall be designed from preliminary tests. The proportioning of cement and aggregates shall be done by weight and necessary precautions shall be taken in the production to ensure that the required work cube strength is attained and maintained. The controlled concrete shall be in grades of M-100, M-150, M-200, M-250, M-300, M-350 & M-400 with prefix controlled added to it. The letter M refers to mix and the numbers specify 28 days work cube compressive strength of 150 mm. cubes of the mix expressed in Kg./Cm².

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

Grade of Concrete	Compressive strength of 15 cms. cubes in Kg./Cm ² at 28 days, conducted in accordance with I.S. 516-1959. Preliminary test Min.	Work test Min.
M-150	200	150
M-200	260	200
M-250	320	250
M-300	380	300
M-350	440	350
M-400	500	400

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

3.0. Workmanship

3.1. The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work question and can be properly compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that supply of properly graded aggregate of uniform quality can be maintained till the completion of work, grading of aggregate shall be controlled by obtaining the coarse aggregates in different sizes and bending them in the right proportions as required. Aggregates of different sizes shall be

stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregate shall be checked as frequently as possible, the frequency for a given job being determined by Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests..

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

3.3.It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates. I.S. 2386 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in controlled concrete shall not be less than 220 kg/M-3 in plain concrete and not less than 250 kg/M-3 in reinforced concrete.

2.0. Mode of measurement and payment

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

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

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

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

2.2. The rate shall be for one cubic meter.

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

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

77.2.The selected earth shall be good yellow soil and shall be got approved from the Engineer-in-charge. In no case black cotton soil or similar expansive and shrinkable soil shall be used. It shall be clean and free from all rubbish and perishable materials, stones or brick bats. The clods shall be broken to a size of 50 mm or less. Contractor shall make his own arrangement at his own cost for land for borrowing selected earth. The stacking of material shall be done as directed by the Engineer-in-charge in such a way not to interfere with any construction all activities and in proper stacks.

77.3.When excavated material is to be used only selected stuff got approved from the Engineer-in-charge shall be used. It shall be stacked separately and shall, comply with all the requirements of selected earth mentioned above.

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

Item No.10 'Providing and laying cement concrete 1:2:4 (1 Cement , 2 Course sand , 4 Graded stone aggregate 20mm nominal size) and curing complete excluding cost of formwork.in.(A) for foundation and plinth.

1.0.Materials & Workmanship

1.0.Materials

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

2.0.General

2.1.The concrete mix is not required to be designed by preliminary testes. The proportion of the concrete mix shall be 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) by volume concrete work shall have exposed concrete surface or as specified in the item

2.2.The designation ordinary M-100, M-150m M-200, M-250 specified as per I.S. correspond approximately to 1:3:6, 1.2:4, 1:1:1/2:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively

2.3.The ingredients required for ordinary concrete containing one beg of cement of 50 kg. by weight (0.0342 Cu M.) for different proportions of mix shall be as under:

Grade of Concrete	Mix By Volume	Total Quantity of dry aggregates by volume per 50 Kg. of cement, to be taken as sum of the individual volumes of fine and coarse aggregates max	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 kg. of cement max.
1	2	3	4	5
(1 Cubic meter = 1000 liters)				
Ordinary	Liters			Liters
M.100	1:3:6	300	General 1:2 for	34

			fine aggregate to coarse aggregate by volume but subject to a upper limit of 1:1. ½ & a lower limit of 1:3	
M.150	1:2:4	220		32
M.200	1:1.1/2:3	160		30
M.250	1:1:2	100		27

2.4.The water cement ratios shall not be more than specified in the above table. The cement content of the mix specified in the table shall be increased if the quantity of water in mix has to be met eased to overcome the difficulties of placements and compaction so that the water-cement ratio specified in the table is not exceeded.

2.5.Workability of the concrete shall be controlled by maintaining a water -cement-ratio that is found to give a concrete mix which is just sufficient wet to be placed and compacted without difficulty with the means available.

2.6.The maximum size of course aggregate shall be as large as possible within the limits specified but in no case greater than one forth of the minimum thickness of the member provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form

2.7.For reinforced concrete work; coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.

2.8.For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum clear distance between the main bar or 5 mm. less than the minimum cover to the reinforcement whichever is smaller.

2.9.Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be so important, and the nominal maximum size may some times be as great as or greater than the minimum cover.

2.10.Admixture maybe used in concrete only with approval of Engineer-in-charge based upon the evidence that with the passage of time neither the compressive strength of concrete is reduced not are other requisite qualities of concrete and steel impaired by the use of such admixtures.

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

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

Grade Concrete	Compressive strength of 15 cms. cubes in Kg./Cmt. at 28 days, conducted in accordance with I.S. 516-1959. Preliminary test Min.	Work test Min.
M-1 50	200	150
M-200	260	200
M-250	320	250
M-300	380	300
M-350	440	350
M-400	500	400

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

3.0.Workmanship

3.1.The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work question and can be property compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that supply of properly graded aggregate of uniform quality can be maintained till the completion of work, grading of aggregate shall be controlled by obtaining the coarse aggregates in different sizes and bending them in the right proportions as required. Aggregates of different sizes shall be

stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregate shall be checked as frequently as possible, the frequency for a given job being determined by Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests..

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

3.3.It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates. I.S. 2386 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in controlled concrete shall not be less than 220 kg/M-3 in plain concrete and not less than 250 kg/M-3 in reinforced concrete.

2.0.Mode of measurement and payment

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

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

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

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

2.2. The rate shall be for one cubic meter.

ItemNo.11 Providing and laying cement concrete M.200 and curing complete Exculding the cost of formwork and reinforcement for reinforced concrete work in (A) foundation ,footings base of column and mass concrete.

1.0.Materials

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

2.0. General

2.1. The concrete mix is not required to be designed by preliminary testes. The proportion of the concrete mix shall be 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) by volume concrete work shall have exposed concrete surface or as specified in the item

2.2. The designation ordinary M-100, M-150m M-200, M-250 specified as per I.S. correspond approximately to 1:3:6, 1.2:4, 1:1:1/2:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively

2.3. The ingredients required for ordinary concrete containing one beg of cement of 50 kg. by weight (0.0342 Cu M.) for different proportions of mix shall be as under:

Grade of Concrete	Mix By Volume	Total Quantity of dry aggregates by volume per 50 Kg. of cement, to be taken as sum of the individual volumes of fine and coarse aggregates max	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 kg. of cement max.
1	2	3	4	5
(1 Cubic meter = 1000 liters)				
Ordinary	Liters			Liters
M.100	1:3:6	300	General 1:2 for fine aggregate to coarse aggregate by volume but subject to a upper limit of 1:1. ½ & a lower limit of 1:3	34
M.150	1:2:4	220		32
M.200	1:1.1/2:3	160		30
M.250	1:1:2	100		27

2.4.The water cement ratios shall not be more than specified in the above table. The cement content of the mix specified in the table shall be increased if the quantity of water in mix has to be met eased to overcome the difficulties of placements and compaction so that the water-cement ratio specified in the table is not exceeded.

2.5.Workability of the concrete shall be controlled by maintaining a water - cement-ratio that is found to give a concrete mix which is just sufficient wet to be placed and compacted without difficulty with the means available.

2.6.The maximum size of course aggregate shall be as large as possible within the limits specified but in no case greater than one forth of the minimum thickness of the member provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.

2.7.For reinforced concrete work; coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.

2.8.For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum clear distance between the main bar or 5 mm. less than the minimum cover to the reinforcement whichever is smaller.

2.9Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be so important, and the nominal maximum size may some times be as great as or greater than the minimum cover.

evidence that with the passage of time neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel impaired by the use of such admixtures.

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

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

Grade of Concrete	Compressive strength of 15 cms. cubes in Kg./Cmt. at 28 days, conducted in accordance with I.S. 516-1959. Preliminary test Min.	Work test Min.
M-1 50	200	150
M-200	260	200
M-250	320	250
M-300	380	300
M-350	440	350
M-400	500	400

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

3.0. Workmanship

3.1. The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work question and can be properly compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that supply of properly graded aggregate of uniform quality can be maintained till the completion of work, grading of aggregate shall be controlled by obtaining the coarse aggregates in different sizes

and bending them in the right proportions as required. Aggregates of different sizes shall be

stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregate shall be checked as frequently as possible, the frequency for a given job being determined by Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests..

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

3.3.It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates. I.S. 2386 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in controlled concrete shall not be less than 220 kg/M-3 in plain concrete and not less than 250 kg/M-3 in reinforced concrete.

2.0. Mode of measurement and payment

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

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

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

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

2.2. The rate shall be for one cubic meter.

ItemNo.12 Providing and laying ordinary cement concrete M-200 and finishing smooth with,curing etc.complete including the cost of formwork but excluding the cost of reinforcement for R.C.C work in (B)COLUMNS: (ii)Having cross-sectional area more than 0.08 Sq.M and up to 0.18 Sq.M

1.0. Materials & Workmanship

1.1. The relevant specifications of item No. 5.3.13 shall be followed except that the work shall be carried out for reinforced concrete work for work as specified in item 1.2. In addition, the following stipulations shall be followed for:

(a) The bars shall be kept in position by the following methods :

(i) In case of beam and slab construction, sufficient number of precast cover blocks in cement mortar 1:2 (1 cement : 2 coarse sand) about 4 cms. x 4 cms. section and of thickness equal to the specified cover shall be placed between the bars and shattering as to secure and maintain the requisite cover of concrete over the reinforcement. In case of cantilevered or doubly reinforce beams or slabs, the main reinforcing bars shall be held in position by introducing chain spacers or supports bars at 1.0 to 1.2 meter centers.

(ii) In case of columns and walls, the vertical bars shall be kept in position by means of timber templates with slots accurately cut in them, the templates shall be removed after concreting has been done below it. The bars may be also be suitably tied by means of annealed steel wires to the shuttering to maintain their position during concreting.

1.2. All bars projecting from pillars, columns, beams, slabs etc, to which other bars and concrete are to be attached or bounded to later on, shall be protected with a coat of thin neat cement grout, if the bars are not likely to be incorporated with succeeding mass of concrete within the following 10 days. This coat of thin neat cement shall be removed before concreting.

2.0. Mode of Measurement & Payment

2.1. The relevant specifications of item No. 5.3.13 shall be followed.

2.2. The volume Occupied by reinforcement shall not be deducted from R.C.C. work.

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

ItemNo.13 Providing and laying ordinary cement concrete M-200 and finishing smooth with,curing etc.complete including the cost of formwork but excluding the cost of reinforcement for R.C.C work in (A)BEAMS: (ii) Having cross-sectional area more than 0.08 Sq.M and up to 0.18 Sq.M

1.0. Materials & Workmanship

1.1. The relevant specifications of item No. 5.3.13 shall be followed except that the work shall be carried out for reinforced concrete work for work as specified in item 1.2. In addition, the following stipulations shall be followed for:

- (a) The bars shall be kept in position by the following methods :
 - (i) In case of beam and slab construction, sufficient number of precast cover blocks in cement mortar 1:2 (1 cement : 2 coarse sand) about 4 cms. x 4 cms. section and of thickness equal to the specified cover shall be placed between the bars and shuttering as to secure and maintain the requisite cover of concrete over the reinforcement. In case of cantilevered or doubly reinforced beams or slabs, the main reinforcing bars shall be held in position by introducing chain spacers or support bars at 1.0 to 1.2 meter centers.
 - (ii) In case of columns and walls, the vertical bars shall be kept in position by means of timber templates with slots accurately cut in them, the templates shall be removed after concreting has been done below it. The bars may also be suitably tied by means of annealed steel wires to the shuttering to maintain their position during concreting.

1.2. All bars projecting from pillars, columns, beams, slabs etc, to which other bars and concrete are to be attached or bounded to later on, shall be protected with a coat of thin neat cement grout, if the bars are not likely to be incorporated with succeeding mass of concrete within the following 10 days. This coat of thin neat cement shall be removed before concreting.

2.0. Mode of Measurement & Payment

- 2.1.** The relevant specifications of item No. 5.3.13 shall be followed.
- 2.2.** The volume occupied by reinforcement shall not be deducted from R.C.C. work.
- 2.3.** The rate shall be for a unit of one cubic meter.

Item No. 14 Providing and laying cement concrete 1:3:6 (1-Cement : 3-coarse sand : 6-handbroken stone aggregates 40 mm nominal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth

1.1. The relevant specifications of item No. 5.3.13 shall be followed except that the work shall be carried out for reinforced concrete work for work as specified in item 1.2. In addition, the following stipulations shall be followed for:

- (a) The bars shall be kept in position by the following methods :

(i) In case of beam and slab construction, sufficient number of precast cover blocks in cement mortar 1:2 (1 cement : 2 coarse sand) about 4 cms. x 4 cms. section and of thickness equal to the specified cover shall be placed between the bars and shuttering as to secure and maintain the requisite cover of concrete over the reinforcement. In case of cantilevered or doubly reinforce beams or slabs, the main reinforcing bars shall be held in position by introducing chain spacers or supports bars at 1.0 to 1.2 meter centers.

(ii) In case of columns and walls, the vertical bars shall be kept in position by means of timber templates with slots accurately cut in them, the templates shall be removed after concreting has been done below it. The bars may be also suitably tied by means of annealed steel wires to the shuttering to maintain their position during concreting.

1.2. All bars projecting from pillars, columns, beams, slabs etc, to which other bars and concrete are to be attached or bounded to later on, shall be protected with a coat of thin neat cement grout, if the bars are not likely to be incorporated with succeeding mass of concrete within the following 10 days. This coat of thin neat cement shall be removed before concreting.

2.0. Mode of Measurement & Payment

2.1. The relevant specifications of item No. 5.3.13 shall be followed.

2.2. The volume Occupied by reinforcement shall not be deducted from R.C.C. work.

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

Item No.15 Providing and laying cement concrete work 1:2:4 (1- Cement :2- Coarse sand : 4- graded stone aggregates 20 mm nominal size) and curing complete excluding cost of formwork and reinforcement for reinforced concrete work in (A) Foundations, footings, Base or columns and Mass concrete

1.0. Materials

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

2.0. General

2.1. The concrete mix is not required to be designed by preliminary tests. The proportion of the concrete mix shall be 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) by volume

concrete work shall have exposed concrete surface or as specified in the item

- 2.2.** The designation ordinary M-100, M-150m M-200, M-250 specified as per I.S. correspond approximately to 1:3:6, 1:2:4, 1:1:1/2:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively
- 2.3.** The ingredients required for ordinary concrete containing one beg of cement of 50 kg. by weight (0.0342 Cu M.) for different proportions of mix shall be as under:

Grade of Concrete	Mix By Volume	Total Quantity of dry aggregates by volume per 50 Kg. of cement, to be taken as sum of the individual volumes of fine and coarse aggregates max	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 kg. of cement max.
1	2	3	4	5
(1 Cubic meter = 1000 liters)				
Ordinary	Liters			Liters
M.100	1:3:6	300	General 1:2 for fine aggregate to coarse aggregate by volume but subject to a upper limit of 1:1. ½ & a lower limit of 1:3	34
M.150	1:2:4	220		32
M.200	1:1.1/2:3	160		30
M.250	1:1:2	100		27

2.4.The water cement ratios shall not be more than specified in the above table. The cement content of the mix specified in the table shall be increased if the quantity of water in mix has to be met eased to overcome the difficulties of placements and compaction so that the water-cement ratio specified in the table is not exceeded.

2.5.Workability of the concrete shall be controlled by maintaining a water - cement-ratio that is found to give a concrete mix which is just sufficient wet to be placed and compacted without difficulty with the means available.

2.6.The maximum size of course aggregate shall be as large as possible within the limits specified but in no case greater than one forth of the minimum thickness of the member provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.

2.7.For reinforced concrete work; coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.

2.8.For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum clear distance between the main bar or 5 mm. less than the minimum cover to the reinforcement whichever is smaller.

2.9Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be so important, and the nominal maximum size may some times be as great as or greater than the minimum cover.

evidence that with the passage of time neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel impaired by the use of such admixtures.

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

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

Grade of Concrete	Compressive strength of 15 cms. cubes in Kg./Cmt. at 28 days, conducted in accordance with I.S. 516-1959. Preliminary test Min.	Work test Min.
M-1 50	200	150
M-200	260	200
M-250	320	250
M-300	380	300
M-350	440	350
M-400	500	400

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

3.0. Workmanship

3.1. The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work question and can be properly compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that supply of properly graded aggregate of uniform quality can be maintained till the completion of work, grading of aggregate shall be controlled by obtaining the coarse aggregates in different sizes and bending them in the right proportions as required. Aggregates of different sizes shall be

stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregate shall be checked as frequently as possible, the frequency for a given job being determined by Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests..

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

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

2.0. Mode of measurement and payment

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

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

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

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

2.2. The rate shall be for one cubic meter.

ItemNo.16 Providing and laying ordinary cement concrete 1:2:4 (1- Cement 2- coarse sand : 4- graded stone aggregates 20 mm nominal size) and finishing smooth with,curing etc. complete including the cost of formwork but excluding the cost of reinforcement for R.C.C work in (B) Column: (i) Having cross-sectional area 0.05 to 0.08 Sq.M

1.0.Materials

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

2.0. General

2.1. The concrete mix is not required to be designed by preliminary testes. The proportion of the concrete mix shall be 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) by volume concrete work shall have exposed concrete surface or as specified in the item

2.2. The designation ordinary M-100, M-150m M-200, M-250 specified as per I.S. correspond approximately to 1:3:6, 1.2:4, 1:1:1/2:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively

2.3. The ingredients required for ordinary concrete containing one beg of cement of 50 kg. by weight (0.0342 Cu M.) for different proportions of mix shall be as under:

Grade of Concrete	Mix By Volume	Total Quantity of dry aggregates by volume per 50 Kg. of cement, to be taken as	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 kg.
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sum of the individual volumes of fine and coarse aggregates max				of cement max.
1	2	3	4	5
(1 Cubic meter = 1000 liters)				
Ordinary	Liters			Liters
M.100	1:3:6	300	General 1:2 for fine aggregate to coarse aggregate by volume but subject to a upper limit of 1:1. ½ & a lower limit of 1:3	34
M.150	1:2:4	220		32
M.200	1:1.1/2:3	160		30
M.250	1:1:2	100		27

2.4.The water cement ratios shall not be more than specified in the above table. The cement content of the mix specified in the table shall be increased if the quantity of water in mix has to be met eased to overcome the difficulties of placements and compaction so that the water-cement ratio specified in the table is not exceeded.

2.5.Workability of the concrete shall be controlled by maintaining a water - cement-ratio that is found to give a concrete mix which is just sufficient wet to be placed and compacted without difficulty with the means available.

2.6.The maximum size of coarse aggregate shall be as large as possible within the limits specified but in no case greater than one forth of the minimum thickness of the member provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.

2.7.For reinforced concrete work; coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.

2.8.For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum clear distance between the main bar or 5 mm. less than the minimum cover to the reinforcement whichever is smaller.

2.9Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be so important, and the nominal maximum size may some times be as great as or greater than the minimum cover.

evidence that with the passage of time neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel impaired by the use of such admixtures.

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

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

Grade of Concrete	Compressive strength of 15 cms. cubes in Kg./Cmt. at 28 days, conducted in accordance with I.S. 516-1959. Preliminary test Min.	Work test Min.
M-1 50	200	150
M-200	260	200
M-250	320	250
M-300	380	300
M-350	440	350
M-400	500	400

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

3.0. Workmanship

3.1. The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work question and can be property compacted with means available except where ft can be shown to the satisfaction of the Engineer-in-charge, that supply of properly graded aggregate of uniform quality can be maintained till the completion of work, grading of aggregate shall be controlled by obtaining the coarse aggregates in different sizes and bending them in the right proportions as required. Aggregates of different sizes shall be

stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregate shall be checked as frequently as possible, the frequency for a given job being determined by Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests..

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

3.3.It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates. I.S. 2386 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in controlled concrete shall not be less than 220 kg/M-3 in plain concrete and not less than 250 kg/M-3 in reinforced concrete.

2.0. Mode of measurement and payment

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

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

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

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

2.2. The rate shall be for one cubic meter.

ItemNo.17 Providing and laying cement concrete 1:3:6 (1- Cement : 3- Coarse sand : 6- crushed stone aggregates 20 mm nominal size) and curing complete including cost of formwork in (A) Wall Caps / Coping (upto 10 ton).

1.1. The relevant specifications of item No. 5.3.13 shall be followed except that the work shall be carried out for reinforced concrete work for work as specified in item 1.2. In addition, the following stipulations shall be followed for:

(a) The bars shall be kept in position by the following methods :

(i) In case of beam and slab construction, sufficient number of precast cover blocks in cement mortar 1:2 (1 cement : 2 coarse sand) about 4 cms. x 4 cms. section and of thickness equal to the specified cover shall be placed between the bars and shuttering as to secure and maintain the requisite cover of concrete over the reinforcement. In case of cantilevered or doubly reinforced beams or slabs, the main reinforcing bars shall be held in position by introducing chain spacers or support bars at 1.0 to 1.2 meter centers.

(ii) In case of columns and walls, the vertical bars shall be kept in position by means of timber templates with slots accurately cut in them, the templates shall be removed after concreting has been done below it. The bars may also be suitably tied by means of annealed steel wires to the shuttering to maintain their position during concreting.

1.2. All bars projecting from pillars, columns, beams, slabs etc, to which other bars and concrete are to be attached or bounded to later on, shall be protected with a coat of thin neat cement grout, if the bars are not likely to be incorporated with succeeding mass of concrete within the following 10 days. This coat of thin neat cement shall be removed before concreting.

2.0. Mode of Measurement & Payment

2.1. The relevant specifications of item No. 5.3.13 shall be followed.

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

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

ItemNo.18 Providing and laying cement concrete work 1:2:4 (1- Cement :2- Coarse sand : 4- graded stone aggregates 20 mm nominal size) and curing complete excluding cost of formwork and reinforcement for reinforced concrete work in (B) Slabs, landing, shelves, Balconies, Lintels, Beams, Girders and Cantilever upto floor two level.

1.0. Materials

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

2.0. General

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

Grade of Concrete	Mix By Volume	Total Quantity of dry aggregates by volume per 50 Kg. of cement, to be taken as sum of the individual volumes of fine and coarse aggregates max	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 kg. of cement max.
1	2	3	4	5
(1 Cubic meter = 1000 liters)				
Ordinary	Liters			Liters
M.100	1:3:6	300	General 1:2 for fine aggregate to coarse aggregate by volume but subject to a upper limit of 1:1. ½ & a lower limit of 1:3	34
M.150	1:2:4	220		32
M.200	1:1.1/2:3	160		30
M.250	1:1:2	100		27

- 2.4. The water cement ratios shall not be more than specified in the above table. The cement content of the mix specified in the table shall be increased if the quantity of water in mix has to be met eased to overcome the difficulties of placements and compaction so that the water-cement ratio specified in the table is not exceeded.

2.5.Workability of the concrete shall be controlled by maintaining a water - cement-ratio that is found to give a concrete mix which is just sufficient wet to be placed and compacted without difficulty with the means available.

2.6.The maximum size of coarse aggregate shall be as large as possible within the limits specified but in no case greater than one forth of the minimum thickness of the member provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.

2.7.For reinforced concrete work; coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.

2.8.For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum clear distance between the main bar or 5 mm. less than the minimum cover to the reinforcement whichever is smaller.

2.9Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be so important, and the nominal maximum size may some times be as great as or greater than the minimum cover.

evidence that with the passage of time neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel impaired by the use of such admixtures.

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

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

Grade of Concrete	Compressive strength of 15 cms. cubes in Kg./Cmt. at 28 days, conducted in accordance with I.S. 516-1959. Preliminary test Min.	Work test Min.
M-1 50	200	150
M-200	260	200
M-250	320	250
M-300	380	300
M-350	440	350
M-400	500	400

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

3.0. Workmanship

3.1. The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work question and can be properly compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that supply of properly graded aggregate of uniform quality can be maintained till the completion of work, grading of aggregate shall be controlled by obtaining the coarse aggregates in different sizes and bending them in the right proportions as required. Aggregates of different sizes shall be

stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregate shall be checked as frequently as possible, the frequency for a given job being determined by Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests..

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

shall be maintained in clean, and serviceable condition. Their accuracy shall be periodically checked.

3.3. It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates, I.S. 2386 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in controlled concrete shall not be less than 220 kg/M-3 in plain concrete and not less than 250 kg/M-3 in reinforced concrete.

2.0. Mode of measurement and payment

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

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

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

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

2.2. The rate shall be for one cubic meter.

Item No.19 Providing and Laying ordinary cement concrete M.200 and finishing smooth with curing etc. complete including the cost of formwork but excluding the cost of reinforcement for R.C.C work in (iii) Slabs having more than 10cm and upto 13cm. Thickness

1.0. Materials & Workmanship

1.1. The relevant specifications of item No. 5.3.13 shall be followed except that the work shall be carried out for reinforced concrete work for work as specified in item 1.2. In addition, the following stipulations shall be followed for:

(a) The bars shall be kept in position by the following methods :

(i) In case of beam and slab construction, sufficient number of precast cover blocks in cement mortar 1:2 (1 cement : 2 coarse sand) about 4 cms. x 4 cms. section and of thickness equal to the specified cover shall be placed between the bars and shattering as to secure and maintain the requisite cover of concrete over

the reinforcement. In case of cantilevered or doubly reinforced beams or slabs, the main reinforcing bars shall be held in position by introducing chain spacers or supports bars at 1.0 to 1.2 meter centers.

(ii) In case of columns and walls, the vertical bars shall be kept in position by means of timber templates with slots accurately cut in them, the templates shall be removed after concreting has been done below it. The bars may also be suitably tied by means of annealed steel wires to the shuttering to maintain their position during concreting.

1.2. All bars projecting from pillars, columns, beams, slabs etc, to which other bars and concrete are to be attached or bounded to later on, shall be protected with a coat of thin neat cement grout, if the bars are not likely to be incorporated with succeeding mass of concrete within the following 10 days. This coat of thin neat cement shall be removed before concreting.

2.0. Mode of Measurement & Payment

2.1. The relevant specifications of item No. 5.3.13 shall be followed.

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

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

Item No. 20 Providing and laying cement concrete 1:2:4 (1-Cement : 2-Coarse sand : 4- graded stone aggregates 20 mm nominal size) for reinforced concrete Chhajjas not exceeding 10cm. thickness upto floor two level including finishing the exposed surfaces with cement mortar 1:3 (1-cement, 3 Fine

1.0. Materials

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

2.0. General

2.1. The concrete mix is not required to be designed by preliminary tests. The proportion of the concrete mix shall be 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) by volume. Concrete work shall have exposed concrete surface or as specified in the item.

2.2. The designation ordinary M-100, M-150, M-200, M-250 specified as per I.S. correspond approximately to 1:3:6, 1:2:4, 1:1 1/2:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively.

- 2.3.** The ingredients required for ordinary concrete containing one bag of cement of 50 kg. by weight (0.0342 Cu M.) for different proportions of mix shall be as under:

Grade of Concrete	Mix By Volume	Total Quantity of dry aggregates by volume per 50 Kg. of cement, to be taken as sum of the individual volumes of fine and coarse aggregates max	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 kg. of cement max.
1	2	3	4	5
(1 Cubic meter = 1000 liters)				
Ordinary	Liters			Liters
M.100	1:3:6	300	General 1:2 for fine aggregate to coarse aggregate by volume but subject to a upper limit of 1:1. ½ & a lower limit of 1:3	34
M.150	1:2:4	220		32
M.200	1:1.1/2:3	160		30
M.250	1:1:2	100		27

2.4. The water cement ratios shall not be more than specified in the above table. The cement content of the mix specified in the table shall be increased if the quantity of water in mix has to be met eased to overcome the difficulties of placements and compaction so that the water-cement ratio specified in the table is not exceeded.

2.5. Workability of the concrete shall be controlled by maintaining a water - cement-ratio that is found to give a concrete mix which is just sufficient wet to be placed and compacted without difficulty with the means available.

2.6. The maximum size of course aggregate shall be as large as possible within the limits specified but in no case greater than one forth of the minimum thickness of the member provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.

2.7. For reinforced concrete work; coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.

2.8. For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum clear distance between the main bar or 5 mm. less than the minimum cover to the reinforcement whichever is smaller.

2.9Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be so important, and the nominal maximum size may some times be as great as or greater than the minimum cover.

evidence that with the passage of time neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel impaired by the use of such admixtures.

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

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

Grade of Concrete	Compressive strength of 15 cms. cubes in Kg./Cmt. at 28 days, conducted in accordance with I.S. 516-1959. Preliminary test Min.	Work test Min.
M-1 50	200	150
M-200	260	200
M-250	320	250
M-300	380	300
M-350	440	350
M-400	500	400

In all cases, the 28 days compressive strength specified in above be the criteria for acceptance or rejection of the concrete. Where the strength of a concrete mix as

indicated by tests, lies in between the strength of any two grades specified in the above table, such concrete shall be classified in for purpose as concrete belonging to the lower of the grades between which its strength lies.

3.0. Workmanship

3.1. The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work question and can be properly compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that supply of properly graded aggregate of uniform quality can be maintained till the completion of work, grading of aggregate shall be controlled by obtaining the coarse aggregates in different sizes and bending them in the right proportions as required. Aggregates of different sizes shall be

stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregate shall be checked as frequently as possible, the frequency for a given job being determined by Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests..

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

3.3. It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates. I.S. 2386 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in controlled concrete shall not be less than 220 kg/M-3 in plain concrete and not less than 250 kg/M-3 in reinforced concrete.

2.0. Mode of measurement and payment

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

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

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

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

2.2. The rate shall be for one cubic meter.

ItemNo.21 Providing and laying cement concrete 1:2:4 (1-Cement : 2-Coarse sand : 4- graded stone aggregates 20 mm nominal size) for reinforced concrete Chhajjas not exceeding 10cm. thickness upto floor two level including finishing the exposed surfaces with cement mortar 1:3 (1-cement, 3 Fine

1.0.Materials

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

2.0. General

2.1. The concrete mix is not required to be designed by preliminary testes. The proportion of the concrete mix shall be 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) by volume concrete work shall have exposed concrete surface or as specified in the item

2.2. The designation ordinary M-100, M-150m M-200, M-250 specified as per I.S. correspond approximately to 1:3:6, 1:2:4, 1:1:1/2:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively

2.3. The ingredients required for ordinary concrete containing one beg of cement of 50 kg. by weight (0.0342 Cu M.) for different proportions of mix shall be as under:

Grade of Concrete	Mix By Volume	Total Quantity of dry aggregates by volume per 50 Kg. of cement, to be taken as sum of the individual volumes of fine and coarse aggregates max	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 kg. of cement max.
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1	2	3	4	5
(1 Cubic meter = 1000 liters)				
Ordinary	Liters			Liters
M.100	1:3:6	300	General 1:2 for fine aggregate to coarse aggregate by volume but subject to a upper limit of 1:1. ½ & a lower limit of 1:3	34
M.150	1:2:4	220		32
M.200	1:1.1/2:3	160		30
M.250	1:1:2	100		27

2.4.The water cement ratios shall not be more than specified in the above table. The cement content of the mix specified in the table shall be increased if the quantity of water in mix has to be met eased to overcome the difficulties of placements and compaction so that the water-cement ratio specified in the table is not exceeded.

2.5.Workability of the concrete shall be controlled by maintaining a water - cement-ratio that is found to give a concrete mix which is just sufficient wet to be placed and compacted without difficulty with the means available.

2.6.The maximum size of course aggregate shall be as large as possible within the limits specified but in no case greater than one forth of the minimum thickness of the member provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.

2.7.For reinforced concrete work; coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.

2.8.For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum clear distance between the main bar or 5 mm. less than the minimum cover to the reinforcement whichever is smaller.

2.9Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be so important, and the nominal maximum size may some times be as great as or greater than the minimum cover.

evidence that with the passage of time neither the compressive strength of concrete is reduced not are other requisite qualities of concrete and steel impaired by the use of such admixtures.

2.1.2.10.Admixture maybe used in concrete only with approval of Engineer-in-charge based upon the relevant specification of item No. 5.4.1. of ordinary concrete shall be followed except that the concrete mix shall be designed form preliminary tests. The proportioning of cement and aggregates shall be done by

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

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

Grade of Concrete	Compressive strength of 15 cms. cubes in Kg./Cmt. at 28 days, conducted in accordance with I.S. 516-1959. Preliminary test Min.	Work test Min.
M-1 50	200	150
M-200	260	200
M-250	320	250
M-300	380	300
M-350	440	350
M-400	500	400

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

3.0. Workmanship

3.1.The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work question and can be property compacted with means available except where ft can be shown to the satisfaction of the Engineer-in-charge, that supply of properly graded aggregate of uniform quality can be maintained till the completion of work, grading of aggregate shall be controlled by obtaining the coarse aggregates in different sizes and bending them in the right proportions as required. Aggregates of different sizes shall be

stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregate shall be checked as frequently as possible, the frequency for a given job being determined by Engineer-in-charge to ensure that the suppliers are

maintaining the uniform grading as approved for samples used in the preliminary tests..

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

3.3.It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates. I.S. 2386 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in controlled concrete shall not be less than 220 kg/M-3 in plain concrete and not less than 250 kg/M-3 in reinforced concrete.

2.0. Mode of measurement and payment

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

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

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

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

2.2. The rate shall be for one cubic meter.

Item No.22 Providing ISI Mark TMT Fe- 415 reinforcement for R.C.C. work including binding, and placing in position complete upto floor two level.

1.0. Materials

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

2.0. Workmanship

2.1. The work shall consist of furnishing and-placing reinforcement to the shape and dimensions shown as on the drawings or as directed

2.2. Steel shall be clean and free from rust and loose mill scale at the lime of fixing in position and subsequent concreting.

2.3. Reinforcing steel shall conform accurate to the dimensions given in the bar bending schedules shown on relevant drawings. Bars shall be bent cold to specified shape and dimensions or as directed, using a proper bar bender, operated by hand or power to attain proper radius of bends. Bars shall not be bent or straightened in a manner that will injure the material. Bars bent during transport or handling shall be straightened before being used on the work. They shall not be heated to facilitate bending Unless otherwise specified a "U" type hook at the end of each bar shall invariably be provided to main reinforcement. The radius of the bend shall not be less than twice the diameter of the round bar and the length of the straight part of the bar beyond the end of the curve shall be at least four times the diameter of the round bar. In case of bars which are not round and in case of deformed bars, the diameter shall be taken as the diameter of circle having an equivalent effective area. The hooks shall be suitably encased to prevent any splitting of the concrete.

2.4. All the reinforcement bars shall lie 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 stay blocks or metal chair spacers, metal hangers supporting wires or other approved devices at sufficiently close intervals, Bars shall not be allowed to sag between supports nor displaced during concreting or any other operations of the work. All devices used for positioning shall be of non-corrodible material. Wooden and metal supports shall not extend to the surface of concrete, except where shown on drawings. Placing bars on layers of freshly laid concrete as the work progresses for adjusting bar spacing shall not be allowed. Pieces of broken stone or brick and wooden blocks shall not be used. Layers of bars shall be separated by spacer bars, precast mortar blocks or other approved devices. Reinforcement after being placed in position shall be maintained in a clean condition until completely embedded in concrete. Special care shall be exercised to prevent any displacement of reinforcement in concrete already placed. To prevent reinforcement from corrosion, concrete cover shall be provided as indicated on drawings. All the bars protruding from concrete and to which other bars are to be laced and which are likely to be exposed for a period exceeding 10 days shall be protected by a thick coat of neat cement grout.

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

2.6. As far possible, bars of full length shall be used. In case this is not possible. Over lapping of bars shall be done as directed When practicable, overlapping bars shall not touch each other, but be kept apart by 25 mm. Where not feasible, overlapping bars shall be bound with annealed wires not less than 1 mm. thick

twisted tight. The overlaps shall be staggered for different bars and located at points, along the span where neither shear nor bending moment is maximum.

2.7. Whenever indicated on the drawings or desired by the Engineer-in-charge, bars shall be jointed by couplings which shall have a cross-section sufficient to transmit the full stresses of bars. The ends of the bars that are joined by coupling shall be upset for sufficient length so that the effective cross section at the base of threads is not less than the normal cross-section of the bar. Threads shall be standard threads Steel for coupling shall conform to I.S. 226.

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

3.0. Mode of Measurements & Payment

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

3.2. Reinforcement shall be measured in length including overlaps, separately for different diameters as actually used in the work. Where welding or coupling is resorted to in place lap joints, such joints shall be measured for payment as equivalent length of overlap as per design requirement. From the length so

measured, the weight of reinforcement shall be calculated in tones on the same basis of as per M-18 even though steel is supplied to the contractor by the department on actual weight. Length shall include hooks at the ends Wastage and annealed steel wire for binding shall not be measured and the cost of these items shall be deemed to be included in the rate for reinforcement.

3.3. The rate for reinforcement includes cost of steel binding wires. its carting from Department store to work site, cutting, bending, placing, 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.

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

Item No.23 TMT Bar FE 415 reinforcement for R.C.C. work including bending binding & placing in position complete up to floor level.

1.0. Materials

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

2.0. Workmanship

2.1. The work shall consist of furnishing and-placing reinforcement to the shape and dimensions shown as on the drawings or as directed

2.2. Steel shall be clean and free from rust and loose mill scale at the lime of fixing in position and subsequent concreting.

2.3. Reinforcing steel shall conform accurate to the dimensions given in the bar bending schedules shown on relevant drawings. Bars shall be bent cold to specified shape and dimensions or as directed, using a proper bar bender, operated by hand or power to attain proper radius of bends. Bars shall not be bent or straightened in a manner that will injure the material. Bars bent during transport or handling shall be straightened before being used on the work. They shall not be heated to facilitate bending Unless otherwise specified a "U" type hook at the end of each bar shall invariably be provided to main reinforcement. The radius of the bend shall not be less than twice the diameter of the round bar and the length of the straight part of the bar beyond the end of the curve shall be at least four times the diameter of the round bar. In case of bars which are not round and in case of deformed bars, the diameter shall be taken as the diameter of circle having an

equivalent effective area. The hooks shall be suitably encased to prevent any splitting of the concrete.

2.4. All the reinforcement bars shall lie 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 stay blocks or metal chair spacers, metal hangers supporting wires or other approved devices at sufficiently close intervals. Bars shall not be allowed to sag between supports nor displaced during concreting or any other operations of the work. All devices used for positioning shall be of non-corrodible material. Wooden and metal supports shall not extend to the surface of concrete, except where shown on drawings. Placing bars on layers of freshly laid concrete as the work progresses for adjusting bar spacing shall not be allowed. Pieces of broken stone or brick and wooden blocks shall not be used. Layers of bars shall be separated by spacer bars, precast mortar blocks or other approved devices. Reinforcement after being placed in position shall be maintained in a clean condition until completely embedded in concrete. Special care shall be exercised to prevent any displacement of reinforcement in concrete already placed. To prevent reinforcement from corrosion, concrete cover shall be provided as indicated on drawings. All the bars protruding from concrete and to which other bars are to be lapped and which are likely to be exposed for a period exceeding 10 days shall be protected by a thick coat of neat cement grout.

2.5. 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 each other at the time of fixing and concreting.

2.6. As far possible, bars of full length shall be used. In case this is not possible. Over lapping of bars shall be done as directed. When practicable, overlapping bars shall not touch each other, but be kept apart by 25 mm. Where not feasible, overlapping bars shall be bound with annealed wires not less than 1 mm. thick

twisted tight. The overlaps shall be staggered for different bars and located at points, along the span where neither shear nor bending moment is maximum.

2.7. Whenever indicated on the drawings or desired by the Engineer-in-charge, bars shall be jointed by couplings which shall have a cross-section sufficient to transmit the full stresses of bars. The ends of the bars that are joined by coupling shall be upset for sufficient length so that the effective cross section at the base of threads is not less than the normal cross-section of the bar. Threads shall be standard threads. Steel for coupling shall conform to I.S. 226.

2.8. When permitted or specified on the drawings, joints of reinforcement bars shall be welded so as to transmit their full stresses. Welded joints shall preferably be located at points when steel will not be subject to more than 75

percent of the maximum permissible stresses and welds so staggered that at any one section not more than 20 percent of the rods are welded. Only electric arc welding using a process which excludes air from the molten metal and conforms to any or all other special provisions for the work shall be accepted. Suitable means shall be provided for holding bars securely in position during welding. It shall be ensured that no voids are left in welding and when welding is done in two or three stages, previous surface shall be cleaned properly. Ends of the bars shall be cleaned of all loose scale, rust, stains, paint and other foreign matter before welding. Only competent welders shall be employed on the work. The M.S. electrodes used for welding shall conform to I.S. 814. Welded pieces of reinforcement shall be tested. Specimen shall be taken from the actual site and their number and frequency of test shall be as directed.

3.0. Mode of Measurements & Payment

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

3.2. Reinforcement shall be measured in length including overlaps, separately for different diameters as actually used in the work. Where welding or coupling is resorted to in place lap joints, such joints shall be measured for payment as equivalent length of overlap as per design requirement. From the length so measured, the weight of reinforcement shall be calculated in tones on the same basis of as per M-18 even though steel is supplied to the contractor by the department on actual weight. Length shall include hooks at the ends. Wastage and annealed steel wire for binding shall not be measured and the cost of these items shall be deemed to be included in the rate for reinforcement.

3.3. The rate for reinforcement includes cost of steel binding wires, its carting from Department store to work site, cutting, bending, placing, 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.

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

Item No.24 Brick work using common burnt clay building brick having crushing strength not less than 35 kg/sq. cm. in Foundation And Plinth in cement mortar 1:6 (1 Cement: 6 fine sand) (B) Convention for Ground Floor upto Plinth

Materials

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

2.0.Workmanship

2.1.Proportion:

2.1.1. The proportion of the cement mortar shall be 1:5 (1 cement: 5 fine sand) by volume.

2.2.Wetting of bricks:

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

2.3.Laying:

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

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

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

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

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

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

2.4.Joints:

2.4.1. Bricks shall be so laid that all joints are quite flush with mortar. Thickness of joints shall not exposed 12 mm. The face joints shall be raked out as directed

by raking tools daily during the progress of work, when the mortar is still green so as to provide key for plaster or pointing to done.

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

2.5.Curing:

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

2.6.Preparation of foundation bed:

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

3.0. Mode measurements & payment

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

3.2. No deduction shall be made from the quantity of brick work, for any extra payment made for embedding in masonry or making holes in respect of following items:

- (1) Ends of joists, beams, posts, girders, purlins, trusses, corbel, steps etc. where cross sectional area does not exceed 500 Sq.Cm
- (2) Openings not exceeding 1000 Sq.Cm.
- (3) Wall plates and bed plates, bearing of slabs, chajjas and the like whose thickness does not exceed 10 Cms. and the bearing does not extend to the full thickness of wall.
- (4) Drainage holes, and recesses for cement concrete blocks to embed hold fasts for doors, windows etc.
- (5) Iron fixtures, pipes up to 300 mm. dia hold fasts, and doors and windows built into masonry and pipes etc. for concealed wiring.
- (6) Forming chases of section not exceeding 350 -Sq. Cm. in masonry.

3.3. Apertures for fire places shall not be deducted nor shall be paid for separately.

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

Item No.25 Brickwork using common burnt clay building bricks having crushing strength not less than 35 kg./Sq.Cm. in Super structure in Cement Mortar 1:6 (1- Cement : 6 -fine sand) (B) Conventional (Above PL upto floor Two level)

Materials

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

2.0.Workmanship

2.1.Proportion:

2.1.1. The proportion of the cement mortar shall be 1:5 (1 cement: 5 fine sand) by volume.

2.2.Wetting of bricks:

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

2.3.Laying:

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

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

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

2.3.4. The brick shall be laid with frog up wards. A set of tools comprising of wooden straight edges, man son's spirit level, square half meter rub, and pins,

string and plumb shall be kept on the site of work for frequent checking during the progress of work.

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

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

2.4.Joints:

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

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

2.5.Curing:

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

2.6.Preparation of foundation bed:

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

3.0. Mode measurements & payment

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

3.2. No deduction shall be made from the quantity of brick work, for any extra payment made for embedding in masonry or making holes in respect of following items:

(1) Ends of joists, beams, posts, girders, purlins, trusses, corbel, steps etc. where cross sectional area does not exceed 500 Sq.Cm.

(2) Openings not exceeding 1000 Sq.Cm.

(3) Wall plates and bed plates, bearing of slabs, chajjas and the like whose thickness does not exceed 10 Cms. and the bearing does not extend to the full thickness of wall.

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

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

(6) Forming chases of section not exceeding 350 -Sq. Cm. in masonry.

3.3. Apertures for fire places shall not be deducted nor shall be paid for separately.

Item No.26 Brick work using common burn clay building brick having crushing strength not less than 35Kg/Sq,Cm, in for super structure above plinth level up to floor level in cement mortar 1:6 (1 cement, 6 sand) Conventional.

Materials

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

2.0.Workmanship

2.1.Proportion:

2.1.1. The proportion of the cement mortar shall be 1:5 (1 cement: 5 fine sand) by volume.

2.2.Wetting of bricks:

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

2.3.Laying:

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

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

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

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

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

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

2.4.Joints:

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

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

2.5.Curing:

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

2.6.Preparation of foundation bed:

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

3.0. Mode measurements & payment

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

3.2. No deduction shall be made from the quantity of brick work, for any extra payment made for embedding in masonry or making holes in respect of following items:

(1) Ends of joists, beams, posts, girders, purlins, trusses, corbel, steps etc. where cross sectional area does not exceed 500 Sq.Cm.

(2)Openings not exceeding 1000 Sq.Cm.

(3) Wall plates and bed plates, bearing of slabs, chajjas and the like whose thickness does not exceed 10 Cms. and the bearing does not extend to the full thickness of wall.

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

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

(6) Forming chases of section not exceeding 350 -Sq. Cm. in masonry.

3.3. Apertures for fire places shall not be deducted nor shall be paid for separately.

Item No.27 Providing and fixing steel door with shutter frame iron angle, 18mm steel plate with iron oxidised hinges handle stopper locking

arrangements including welding cutting hosting fixing in position oil painting 2 coats primer coat, etc complete for door.

1.0. Materials

Flush door shall conform to M-30. Plywood shall conform to M-37. Anodised aluminium butt hinges shall conform to M-43.

Workmanship

The relevant specifications of item No. 10.12 (A) (I) shall apply to this item except that the work is shuttered with (A) plywood (B) particle board (C) hard board panels (D) A.C. sheets panels as specified in item.

2.2. The shutter shall be prepared by fittings styles and rails (top, bottom, lock and frieze) as for panelled leaves with simple chamfer on edge only. The styles and rails shall be grooved with just sufficient width for receiving panels and plain panels of specified type panels shall be fitted into the grooves.

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

supply and fixing.

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

2.2. Shutters:

2.2.1. Paneled shutters shall be constructed in the form of timber frame work of styles and rails with panel inserted of type as specified in the detailed drawings. Panel shall be fixed by providing grooves in the style and rails. The styles and rails shall be joined to each other by mortise and tenon joints at right angles.

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

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

2.3. Timber paneling:

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

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

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

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

2.5. Fixtures and Fastenings:

2.5.1. The rate shall include anodised butt hinges including fixing with iron screws. The size and number of hinges shall be as per table given in annexure-1.

3.0. Mode of measurement and payment

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

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

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

Item No.28 Providing and fixing steel window shutter frame 50 x 50 x 6mm iron angle, 18mm steel plate with 10mm dia round bars hinges handle stopper locking arrangements etc steel welded built up section cutting hosting finishing in position oil painting 2 coats primer coat for windows. 1.0. Materials

Welded Steel Wire Fabric

34.1 Welded steel wire fabric for general purpose shall be manufactured from cold drawn steel wire "as drawn" or galvenised steel conforming to I.S. 226-1975 with longitudinal and transverse wire securely connected at every intersection by a process of electrical resistance welding and conforming to I.S.4948-1974. it shall be fabricated and finished in workmanlike manner and shall be free from injurious defects and shall be rust proof The type of mesh shall be oblong or square as directed The mesh sizes and sizes if wire for square 3b well as oblong welded steel wire fabric shall be as directed The steel wire fabric in panels shall be in one whole piece in each panel as far as stock sizes permit.

Teak wood

29.1. The teak wood shall be of good quality as required for the item to be executed. When the kind of wood is not specifically mentioned, good Indian teak wood as approved shall be used.

29.2. Teak wood shall generally be free from large, loose dead or cluster knots, flaws, shakes, warps, twists, bends or any other defects. It shall generally be uniform in substance and of straight fibers as far as possible. It shall be free from rot decay, harmful fungi and other defects of harmful nature which will affect the strength, durability or its usefulness for the purpose for which it is required. The colour shall be uniform as far as possible. Any effort like painting using any adhesive materials made to hide the defects shall render the pieces liable to rejection by the Engineer-in-charge.

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

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

29.5. First class teak wood

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

29.6. Second Class Teak Wood:

29.6.1. No individual hard and sound knots shall be more than 15 sq. cms. in size and aggregates area of such knots shall be not exceed 2% of the area of piece.

M-29. A Non-teak wood:

The non-teak wood shall be chemically treated, seasoned as per I.S. Specifications and of good quality. The type of wood shall be got approved before collecting the same on site Fabrication of wooden members shall be started only after approval.

For this purpose wood of Bio, Kalai, Sires. Saded, Behda, Jamun, Sisoo will be used for door where as only Kalai. Sires, Halda. Kalam etc. will be permitted for shutters after proper seasoning and chemical treatment.

The non-teak wood shall be free from large loose dead of cluster knots, flows, shakes, warps, bends or any other defects, It shall be uniform in substance and of straight fibers as far as possible It shall be free fro rots, decay, harmful fungi and other defects of nature which will effect the strength, durability or its usefulness for the purpose for which it is required. The colour of wood shall be uniform as far as possible. The scantlings planks etc. shall be saw in straight lines and planes in the direction of grain and of uniform thickness. The department will use the Agency to produce certificate from Forest Department in event of dispute and the decision of the Department shall be final and binding to the contractor. The tolerance in the dimension shall be allowed at 1.5 mm. per face to be planed.

2.0. The steel wire fabric 75 x 25 mm. mesh of weight of not less than 7.75 kg per Sq.M. to windows frames etc. shall be fabricated as per detail drawings. The wire fabric shall be fixed to windows frame by teak wood beading of 60 x 20 mm. size be by means of screws.

3.0. Mode of measurements & payment

3.1. The wire mesh (Hard drawn) shall be measured net clear opening of frame of windows in which mesh is fitted. Nothing shall be paid extra for fixing mesh in groove below teak woods-beading.

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

Item No.29 20mm thick sand faced cement plaster on walls upto height 10 metres above ground level consisting of 12mm thick backing coat of C.M. 1:3 (1-cement : 3-sand) and 8mm thick finishing coat of C.M. 1:1 (1-cement : 1-sand) etc. complete.

1.0.Materials

1.1.Water shall conform to M-1. Cement mortar shall conform to M-11.

2.0.Workmanship

2.1.The work shall be carried out in the coats. The backing coat (base coat) shall be 12 mm. thick in C.M. 1:3. The relevant specifications of item No. 17.58(I) shall be followed except that the thickness of back coat shall be 12 mm. average. Before the first coat hardens its surface shall be beaten up by edges of wooden tapers and close dents shall be made on the surface. The subsequent coat shall be applied after this coat has been allowed to set for 3 to 5 days, depending upon the weather conditions. The surface shall not be allowed to dry during this period.

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

2.3.Curing :

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

3.0.Mode of measurement & payment

3.1.The relevant specifications of item No. 17.58 shall be followed except that the sand face plaster on outside up to 10 m. above ground level shall be measured under this item.

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

Item No.30 Providing 15mm thick cement plaster in single coat on brick/concrete walls for interior plastering upto floor two level and finished even and smooth in (i) Cement mortar 1:3 (1-cement:3-sand) for finishing with a floating coat of neat cement slurry

This work shall consist of providing **15 mm thick cement plaster (Mala troweled finish) in single coat on brick/concrete wall for interior plastering** of the shape and dimensions shown on the drawings and conforming to these Specifications or as approved by the Engineer in charge

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.18.17. / P.No.127 except that using for two coats of Birla (White cement based) or Asian (acrylic lapy-putty) or equivalent & two coats of primer of approved brand and manufacture on new wall surface instead of color washing of undecorative wall .

Material

CEMENT

Cement shall confirm Specification No M-3,

SAND

Sand shall confirm specification no M-6,

WATER

Water shall confirm specification no M-1

WORKMANSHIP

specification no 17.61 (II) and 17.95 shall be applied for this item

The surface shall be Mala troweled finish

The plaster shall then be finished off with a trowel The straight edge shall be worked on screeds with a small upward and side way motion 50mm or 75mm at a time. Finally, the surface shall be finished off with a plaster's wooden float.

Mode of Measurement & Payment :

The Item shall be measured for its **breadth and height** limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one square meter.

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

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

Item No.31 Providing 10mm thick cement plaster in single coat on brick/concrete walls for interior plastering upto floor two level and finished even and smooth in (i) Cement mortar 1:3 (1-cement:3-sand) for ceiling

This work shall consist of providing **10 mm thick cement plaster (Mala troweled finish) in single coat on brick/concrete wall for interior plastering** of the shape and dimensions shown on the drawings and conforming to these Specifications or as approved by the Engineer in charge

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.18.17. / P.No.127 except that using for two coats of Birla (White cement based) or Asian (acrylic lapy-putty) or equivalent & two coats of primer of approved brand and manufacture on new wall surface instead of color washing of undecorative wall .

Material

CEMENT

Cement shall confirm Specification No M-3,

SAND

Sand shall confirm specification no M-6,

WATER

Water shall confirm specification no M-1

WORKMANSHIP

specification no 17.61 (II) and 17.95 shall be applied for this item

The surface shall be Mala troweled finish

The plaster shall then be finished off with a trowel The straight edge shall be worked on screeds with a small upward and side way motion 50mm or 75mm at a time. Finally, the surface shall be finished off with a plaster's wooden float.

Mode of Measurement & Payment :

The Item shall be measured for its **breadth and height** limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one square meter.

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

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

Item no. 32 Providing and fixing pre-cast Rubber Dye / steel Dye interlocking concrete block 60mm thick with grade of concrete M300 pneumatic compressed / vibrated mechanically and as per approved design Confirming to IS 15658 : 2006 including 35 mm Sand layer for levelling and filling the joint with sand in proper line and level as per guidelines of IRC : SP 63-2018 etc. Complete.

cast-in-situ cement concrete

The panels of specified size shall be cast on the prepared base in panels of specified size in a staggered manner. Construction joints shall be provided as per Section 1700 of the Specifications.

410.3.6 precast concrete Blocks and interlocking concrete Block pavements

The precast concrete blocks and interlocking concrete block pavement shall be laid on a

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bedding of sand of thickness specified in the drawing. The grading of the sand layer shall be as in Table 400-16.

table 400-16			
	is sieve size		percent passing
	9.52 mm		100
	4.75 mm		95–100
	2.36 mm		80–100
	1.18 mm		50–95
	600 micron		25–60
	300 micron		10–30
	150 micron		0–15
	75 micron		0–10

The joints shall be filled with sand passing a 2.35 mm size with the grading as in Table 400-17.

table 400-17			
	is sieve size		percent passing
	2.36 mm		100
	1.18 mm		90–100
	600 micron		60–90
	300 micron		30–60
	150 micron		15–30
	75 micron		0–10

The bedding sand slightly moist, the moisture content being about 4 percent. The bedding sand shall be compacted by vibratory plate compactor.

The blocks shall be laid to the levels indicated on the drawings and to the pattern directed by the Engineer. The surface tolerance shall be ± 10 mm with respect to the design level. The blocks shall be embedded using a hammer.

410.4 Measurements for payment

Footpaths and separators shall be measured in Sq.m between inside of kerbs. The edge restraint block and kerb shall be measured separately in linear meter. The items pertaining to drainage shall be measured separately.

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410.5 rate

Contract unit rates shall be inclusive of full compensation for all labour, materials, tools, equipment for footpaths including the base. Cost of providing pipes and arrangement for their disch.

Item No :33 Colour washing with lime on wall surface (three coat) over and including a primer coat of white washing to give an even shade after thoroughly brooming the surface to remove all dirt, dust, mortar drops and other foreign matter.

1.0. Materials

1.1. Clear-Cole : This shall be made from glue and boiling water by mixing 1 kg. of glue to every 15 liters of water. The mixing shall be suitably tinted to match with colour of colour washing as directed. Glue shall conform to I.S. 852-1969.

1.2. Lime : Lime used shall be freshly burnt class 'C' lime (Fat lime) and white in colour conforming to I.S. 712-1973.

1.3. Water : Water shall conform to M-1.

1.4. Gum ; Best quality of gum shall be used in the preparation of white or colour wash. The colour pigment of required tint and shade shall be mixed in lime cream. The mineral colour not affected by lime shall be used in preparing the colour wash.

2.0. Workmanship

2.1. Sufficient quantity of colour wash enough for the complete job shall be prepared in one operation to avoid any difference in shade. The basic white wash solution shall be prepared in accordance with item 18.11 Mineral colours not affected by lime shall be added to the white wash solution. No colour wash shall be done until a sample of the colour has been approved. It shall be noted that small samples of colour appear lighter in shade than when the same shades are applied precisely to large surface. The colour shall be of even tint, over the colour shall be of even tint, over the whole surface. If it is patchy or otherwise badly applied, it shall be rejected. Preparation of the colour wash with pigment shall be as under:

(a) With Yellow and Red Ocher :

Solid lumps if any in the powder shall be crushed to powder and solution in water prepared and then added to white wash sieving it through a coarse cloth, mixed evenly and thoroughly to white wash in-small quantities till required shade is obtained.

(b) With Blue Vitriol :

Fresh crystals of hydrous copper sulfate (i.e. vitriol) shall be ground to fine power and dissolved in small quantity of water. Sufficient quantity of solution enough to produce the colour wash of required shade shall be strained through a clean cloth, the filtrate being mixed evenly and thoroughly to the white wash.

(c) Colour wash from other colouring pigment shall be prepared in accordance with the instructions of the manufacturer.

2.2. Preparation of Surface :

The surface shall be prepared by removing mortar dropping and foreign matter and thoroughly cleaned with wire of fiber brush or any other suitable means as directed by the Engineer-in-charge. All loose pieces and scales shall be scrapped off and holes filled with mortar.

2.2.1. For scaffoldings and application of colour wash, relevant specification of item No. 18.11. above shall be followed. The colour wash shall be applied as under:

The colour wash shall be applied in accordance with the procedure given in item No. 18.11. "Application of white wash for colour washing on undercoated surface after the surface has been prepared. The first primary coat shall be of white wash and subsequent coats (minimum two) shall be colour wash and the entire surface shall represent a smooth and uniform finish. To start with, patch of 0.1 sq. mt. on prepared surface shall be colour washed with first coat of white wash and subsequent coats of colour wash solution entire work of colour washing is taken up in hand, it shall be noted that small areas of colour wash will appear lighter than when the same shade is applied to the large surface.

2.2.2. For colour washing on decorated surfaces, after (he surface has been prepared, a coat of white wash-shall be applied for the patches and repairs. Then one coat or more of colour wash shall be applied over the entire surface, such that the colour washed surface shall present a uniform colour shade. No primary coat is needed for a decorated surface bearing colour of same shade on surface required change of colour after the surface has been prepared as described above. Two coats of white wash shall be applied before application of specified number (minimum two) of coats of colour wash of the new shade.

2.3. Protective measure :

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

3.0. Mode of measurements and payment

3.1. The relevant specifications of item No. 18 11 shall be followed.

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

Item No. 34 meter. above. Measures Around Us - Scales-Horizontally and Vertically : Vertical Scales painted on the wall 15 cm wide and length 3mtr on existing wall surfaces with single coat including printing on existing wall surface and ceiling

The work of Measures Around Us - Scales-Horizontally and Vertically : Vertical Scales painted on the wall 15 cm wide and length 3mtr on existing wall surfaces with single coat including printing on existing wall surface and ceiling shall be executed as per Instruction & Direction given by Engineer-in-charge.

The Material used in the item shall be of Approved Banded& Standard Company.

MODE OF MEASUREMENT& PAYMENT

The Rate and Mode of measurement shall be as per completed item including all labour& materials involved to execute this item as per basis.

Contract rate shall be for a unit of one basis.

Item No. 35 Symmetry Around Us : Symmetrical shapes (like round, square etc.) with Revealing Part or Whole images (Painting on door or window surface) including painting whole door & window with finishing etc. complete

The work of Symmetry Around Us : Symmetrical shapes (like round, square etc.) with Revealing Part or Whole images (Painting on door or window surface) including painting whole door & window with finishing etc. complete shall be executed as per Instruction & Direction given by Engineer-in-charge.

The Material used in the item shall be of Approved Banded& Standard Company.

MODE OF MEASUREMENT& PAYMENT

The Rate and Mode of measurement shall be as per completed item including all labour& materials involved to execute this item as per basis.

Contract rate shall be for a unit of one basis.

Item No. 36 ColourTreasures : Painting colourtreasures on existing metal surface like fan colour wheel, metallic fan blades (each is a circle with dia 30cm approx.) with metal primer and enamel matt paint with all necessary finishing etc. complete

The work of ColourTreasures : Painting colourtreasures on existing metal surface like fan colour wheel, metallic fan blades (each is a circle with dia 30cm approx.) with metal primer and enamel matt paint with all necessary finishing etc. completeshall be executed as per Instruction & Direction given by Engineer-in-charge.

The Material used in the item shall be of Approved Banded& Standard Company.

MODE OF MEASUREMENT& PAYMENT

The Rate and Mode of measurement shall be as per completed item including all labour& materials involved to execute this item as per basis.

Contract rate shall be for a unit of one basis.

Item No. 37 Map Your World : Mapping the Neighbourhood/Village/Mapping the City/District/State/Mapping the Country/Mapping the World/Me and my World painting (1.5mtr Dia) on existing wall surface and print on plastered wall surface with cement primer and enamel (matt paint) etc.

The work of Map Your World : Mapping the Neighbourhood/Village/Mapping the City/District/State/Mapping the Country/Mapping the World/Me and my World painting (1.5mtr Dia) on existing wall surface and print on plastered wall surface with cement primer and enamel (matt paint) etc. shall be executed as per Instruction & Direction given by Engineer-in-charge.

The Material used in the item shall be of Approved Banded& Standard Company.

MODE OF MEASUREMENT& PAYMENT

The Rate and Mode of measurement shall be as per completed itemincluding all labour& materials involved to execute this item as per basis.

Contract rate shall be for a unit of one basis.

Item No. 38 Time Devices: Making Clock with MS arms and writing surface, 60 cm in diameter by making new chalkboard surface on existing masonry wall with 1:6 cement sand in two coats and finished coat with 1:2 cement marble stone dust and painting on this surface with providing and fixing hands of the wall clock with MS flat (0.4 cm thick and 2 cm wide) and MS

flat(0.4 cm thick and 1 cm wide) with galvanised steel bolts and washers with painting clock dial and hands including all necessary surface preparation etc. complete

The work of Time Devices: Making Clock with MS arms and writing surface, 60 cm in diameter by making new chalkboard surface on existing masonry wall with 1:6 cement sand in two coats and finished coat with 1:2 cement marble stone dust and painting on this surface with providing and fixing hands of the wall clock with MS flat (0.4 cm thick and 2 cm wide) and MS flat(0.4 cm thick and 1 cm wide) with galvanised steel bolts and washers with painting clock dial and hands including all necessary surface preparation etc. complete shall be executed as per Instruction & Direction given by Engineer-in-charge.

The Material used in the item shall be of Approved Banded& Standard Company.

MODE OF MEASUREMENT& PAYMENT

The Rate and Mode of measurement shall be as per completed item including all labour& materials involved to execute this item as per basis.

Contract rate shall be for a unit of one basis.

Item No. 39 272 Number Lines : (A) Number Line Caterpillar/Number Line Train Number/Number Line in a row of Children on existing walls sur]face as per approved drawing and design etc. complete.

The work of Number Lines : (A) Number Line Caterpillar/Number Line Train Number/Number Line in a row of Children on existing walls sur]face as per approved drawing and design etc. complete shall be executed as per Instruction & Direction given by Engineer-in-charge.

The Material used in the item shall be of Approved Banded& Standard Company.

MODE OF MEASUREMENT& PAYMENT

The Rate and Mode of measurement shall be as per completed item including all labour& materials involved to execute this item as per basis.

Contract rate shall be for a unit of one basis.

Item No. 40 Abacus as a Built Element : Making Hoop Abacus set for classroom on wall (Different length for different classes) as per approved drawingand design etc. complete.

The work of Abacus as a Built Element : Making Hoop Abacus set for classroom on wall (Different length for different classes) as per approved drawingand design etc. complete shall be executed as per Instruction & Direction given by Engineer-in-charge.

The Material used in the item shall be of Approved Banded& Standard Company.

MODE OF MEASUREMENT& PAYMENT

The Rate and Mode of measurement shall be as per completed item including all labour& materials involved to execute this item as per basis.

Contract rate shall be for a unit of one basis.

Item No. 41 Prewriting Patterns on Window Grills as per approved drawing and design etc. complete.

The work of Prewriting Patterns on Window Grills as per approved drawing and design etc. complete shall be executed as per Instruction & Direction given by 273 Engineer-in-charge.

The Material used in the item shall be of Approved Banded& Standard Company.

MODE OF MEASUREMENT& PAYMENT

The Rate and Mode of measurement shall be as per completed item including all labour& materials involved to execute this item as per basis.

Contract rate shall be for a unit of one basis.

Item No. 42 Prewriting Patterns on Wall Surfaces by making new chalkboard surface on existing masonry wall with 1:6 cement sand in two coats and finished coat with 1:2 cement marble stone dust with painting and printing on new chalkboard wall surface and ceiling

The work of Prewriting Patterns on Wall Surfaces by making new chalkboard surface on existing masonry wall with 1:6 cement sand in two coats and finished coat with 1:2 cement marble stone dust with painting and printing on new chalkboard wall surface and ceiling shall be executed as per Instruction & Direction given by Engineer in-charge.

The Material used in the item shall be of Approved Banded& Standard Company.

MODE OF MEASUREMENT& PAYMENT

The Rate and Mode of measurement shall be as per completed item including all labour& materials involved to execute this item as per basis.

Contract rate shall be for a unit of one basis.

Item No. 43 Writing and Displaying Surfaces/New Chalkboard : Providing writing and displaying surfaces on existing walls/Chalk Board by painting on existing wall surface etc. complete

The work of Writing and Displaying Surfaces/New Chalkboard : Providing writing and displaying surfaces on existing walls/Chalk Board by painting on existing wall surface etc. completeshall be executed as per Instruction &Direction given by Engineer-in-charge.

The Material used in the item shall be of Approved Banded& Standard Company.

MODE OF MEASUREMENT& PAYMENT

The Rate and Mode of measurement shall be as per completed item including all labour& materials involved to execute this item as per basis.

Contract rate shall be for a unit of one basis.

Item No. 44 Play with words : Making World Wall with Alphabet Border by Making 60x140 cm writing surface on Wall with 10 cm wide border including making new chalkboard surface 1:6 (cement: sand)in two coats and finished coat with 1:2 cement marble stone dust with painting grid/t

The work of Play with words : Making World Wall with Alphabet Border by Making 60x140 cm writing surface on Wall with 10 cm wide border including making new chalkboard surface 1:6 (cement: sand)in two coats and finished coat with 1:2 cement marble stone dust with painting grid/t shall be executed as per Instruction & Direction given by Engineer-in-charge.

The Material used in the item shall be of Approved Banded& Standard Company.

MODE OF MEASUREMENT& PAYMENT

The Rate and Mode of measurement shall be as per completed item including all labour& materials involved to execute this item as per basis.

Contract rate shall be for a unit of one basis.

Item No. 45 Dot Boards on floor and walls : Making DOT BOARD & GRID BOARD on floor and walls with painting and painting dots in straight rows, dots staggered in straight rows on existing wall surface and ceiling as per approved drawing and design etc. complete,

The work of Dot Boards on floor and walls : Making DOT BOARD & GRID BOARD on floor and walls with painting and painting dots in straight rows, dots staggered in straight rows on existing wall surface and ceiling as per approved drawing and design etc. complete shall be executed as per Instruction & Direction given by Engineer-in-charge.

The Material used in the item shall be of Approved Banded& Standard Company.

MODE OF MEASUREMENT& PAYMENT

The Rate and Mode of measurement shall be as per completed item including all labour& materials involved to execute this item as per basis.

Contract rate shall be for a unit of one basis.

Item No. 46 Grid Boards : Provide a Floor Grid Boards of size 60cm x 60cm with 1:2:4 P.C.C. flooring with glass/PVC strips as per approved drawing and design etc. complete

The work of Grid Boards : Provide a Floor Grid Boards of size 60cm x 60cm with 1:2:4 P.C.C. flooring with glass/PVC strips as per approved drawing and design etc. complete shall be executed as per Instruction & Direction given by Engineer-in-charge.

The Material used in the item shall be of Approved Banded& Standard Company.

MODE OF MEASUREMENT& PAYMENT

The Rate and Mode of measurement shall be as per completed item including all labour& materials involved to execute this item as per basis.

Contract rate shall be for a unit of one basis.

Item No. 47 Board games on floor : Making Indigenous Board Games/ Flat Dice like SapaatPasa, with necessary smooth floor finish as per drawing etc. complete.

The work of Board games on floor : Making Indigenous Board Games/ Flat Dice like SapaatPasa, with necessary smooth floor finish as per drawing etc. complete shall be executed as per Instruction & Direction given by Engineer-in-charge.

The Material used in the item shall be of Approved Banded& Standard Company.

MODE OF MEASUREMENT& PAYMENT

The Rate and Mode of measurement shall be as per completed item including all labour& materials involved to execute this item as per basis.

Contract rate shall be for a unit of one basis.

Item No. 48 Magic squares on floor and walls: Providing magic squares on floors and walls with 3x3 Magic Square/ 4x4 Magic Square by making new chalkboard surface on existing masonry wall 1:6 cement sand in two coats and finished coat with 1:2 with cement marble stone dust and than making painting.

The work of Magic squares on floor and walls: Providing magic squares on floors and walls with 3x3 Magic Square/ 4x4 Magic Square by making new chalkboard surface on existing masonry wall 1:6 cement sand in two coats and finished

coat with 1:2 with cement marble stone dust and than making paintings shall be executed as per Instruction & Direction given by Engineer-in-charge.

The Material used in the item shall be of Approved Banded & Standard Company.

MODE OF MEASUREMENT & PAYMENT

The Rate and Mode of measurement shall be as per completed item including all labour & materials involved to execute this item as per basis.

Contract rate shall be for a unit of one basis.

Item No. 49 Cubby Holes and Peep Holes on walls : Making cubbyholes with bricks in the existing low heights walls with necessary finishing etc. complete. As per design.

The work of Cubby Holes and Peep Holes on walls : Making cubbyholes with bricks in the existing low heights walls with necessary finishing etc. complete. As per design shall be executed as per Instruction & Direction given by Engineer-in-charge.

The Material used in the item shall be of Approved Banded & Standard Company.

MODE OF MEASUREMENT & PAYMENT

The Rate and Mode of measurement shall be as per completed item including all labour & materials involved to execute this item as per basis.

Contract rate shall be for a unit of one basis.

Item No. 50 Periscope : 2- For G round floor building periscope provided with 1.00 m clear height with 15 cm diapvc pipe including fixing with 2 elbows at top and and bottom with transperant glass including all necessary fixing with making necessary holes and finishing it etc complete.

The work of Periscope : 2- For G round floor building periscope provided with 1.00 m clear height with 15 cm diapvc pipe including fixing with 2 elbows at top and and bottom with transperant glass including all necessary fixing with making necessary holes and finishing it etc complete shall be executed as per Instruction & Direction given by Engineer-in-charge.

The Material used in the item shall be of Approved Banded & Standard Company.

MODE OF MEASUREMENT & PAYMENT

The Rate and Mode of measurement shall be as per completed item including all labour & materials involved to execute this item as per basis.

Contract rate shall be for a unit of one basis.

Item No. 51 Providing and Fixing PIN UP BOARD with necessary base fitting as per given drawing etc complete.

The work of Providing and Fixing PIN UP BOARD with necessary base fitting as per given drawing etc complete shall be executed as per Instruction & Direction given by Engineer-in-charge.

The Material used in the item shall be of Approved Banded& Standard Company.

MODE OF MEASUREMENT& PAYMENT

The Rate and Mode of measurement shall be as per completed item including all labour& materials involved to execute this item as per basis.

Contract rate shall be for a unit of one basis.

Item No. 52 Pipe phone : Making pipe phone by providing B class M S pipe of 50mm dia and necessary length with existing ramp including all fixing and finishing etc. complete

The work of Pipe phone : Making pipe phone by providing B class M S pipe of 50mm dia and necessary length with existing ramp including all fixing and finishing etc. complete shall be executed as per Instruction & Direction given by Engineer-in charge.

The Material used in the item shall be of Approved Banded& Standard Company.

MODE OF MEASUREMENT& PAYMENT

The Rate and Mode of measurement shall be as per completed item including all labour& materials involved to execute this item as per basis.

Contract rate shall be for a unit of one basis.

Item No.53 Providing 15mm thick cement plaster in single coat on Rough (Similar)side of single or half brick walls for interior plastering upto floor two level and finished even and smooth in (i) Cement mortar 1:3 (1-cement:3-sand)

This work shall consist of providing **15 mm thick cement plaster (Mala troweled finish) in single coat on brick/concrete wall for interior plastering** of the shape and dimensions shown on the drawings and conforming to these Specifications or as approved by the Engineer in charge

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.18.17. / P.No.127 except that using for two coats of Birla (White cement based) or Asian (acrylic lapy-putty) or equivalent & two coats of primer of approved brand and manufacture on new wall surface instead of color washing of undecorative wall .

Material

CEMENT

Cement shall confirm Specification No M-3,

SAND

Sand shall confirm specification no M-6,

WATER

Water shall confirm specification no M-1

WORKMANSHIP

specification no 17.61 (II) and 17.95 shall be applied for this item

The surface shall be Mala troweled finish

The plaster shall then be finished off with a trowel The straight edge shall be worked on screeds with a small upward and side way motion 50mm or 75mm at a time. Finally, the surface shall be finished off with a plaster's wooden float.

Mode of Measurement & Payment :

The Item shall be measured for its **breadth and height** limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one square meter.

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

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

Item No.54 Providing and fixing 25 mm thick shutters for cupboards etc. including anodised aluminium butt hinges with necessary serews (A) Indian teak wood (i) Fully Panelled

1.0. Materials

1.1. Water shall conform to M-1. Lime mortar shall conform to M-10. Cement mortar shall conform to M-11 Polished kota stone shall conform to M-49,

2.0. Workmanship

2.1. Each slab shall be cut to the required size and shape and fine chisel dressed at all the edges. The sides trust dressed shall have a full contract if a straight edge is laid along. The sides shall be table rubbed with coarse sand before paving. All angles and edges of the slabs shall be true square and free from chippings and giving a plane surface. The thickness shall be 25 mm.

(Average) as specified in the item but not less than 20 mm. at any place of the slab.

2.2. Bedding for the Kota stone slabs shall be of cement mortar 1:6 (1 cement : 6 coarse sand) or L.M. 1:1.5 of average thickness 20 mm given in the description of the item. Sub grade shall be cleaned, wetted and mopped Mortar of the specified mix and thickness shall then be spread on an area sufficient to receive one kota stone slab. The slab shall be washed clean before laying.

It shall be laid on top, pressed, tapped gently to bring it in level with the other slabs. If shall then be lifted and laid aside. Top surface of the mortar shall then be corrected by adding fresh mortar at hollows or depressions. The mortar shall then be allowed to harden bit. Over this surface, cement slurry of honey-like consistency shall be applied. The slab shall then be gently placed in position and tapped with wooden mallet till it is properly padded in level with and close to the adjoining slab. The joint shall be as fine as possible. The slabs fixed in the floor adjoining, the walls shall enter not less than 10 mm. under the plaster, skirting or dedo. The junction between the wall and floor shall be finished neatly. The finished surface shall be true to levels and slopes as directed

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

2.4. Polishing shall be normally commenced after 14 days of laying the stone slab. First polishing shall be done with carborundum stones of 120 grade grit fitted in the heavy machine and then second polishing shall be done with carborundum stone of 220 to 350 grade grit fitted in heavy machine. Water shall be properly used during polishing. The stone shall then be washed clean with water. When directed by the Engineer-in-charge, wax polish of approved quality shall be applied on the surface with the help of soft cloth over a clean and dry surface. Then the polishing machine fitted with bobs shall be run over it.

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

3.0. Measurement & payment

3.1. The rate shall include the cost of all materials and labour involved in all the operations described above. The kota stone flooring shall be measured in

square meters correct to two places decimal, length and breadth shall be measured correct to a centimeter and between the finished face of skirting dedo plaster and no deduction shall be made nor extra paid for any opening in floor of areas up to 0.1 sq

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

Item No.55 Providing & Fixing Polished Kota stone slab 25mm thick for sales as directed.

1.0. Materials

1.1. Water shall conform to M-1. Lime mortar shall conform to M-10. Cement mortar shall conform to M-11 Polished kota stone shall conform to M-49,

2.0. Workmanship

2.1. Each slab shall be cut to the required size and shape and fine chisel dressed at all the edges. The sides must be dressed shall have a full contract if a straight edge is laid along. The sides shall be table rubbed with coarse sand before paving. All angles and edges of the slabs shall be true square and free from chippings and giving a plane surface. The thickness shall be 25 mm. (Average) as specified in the item but not less than 20 mm. at any place of the slab.

2.2. Bedding for the Kota stone slabs shall be of cement mortar 1:6 (1 cement : 6 coarse sand) or L.M. 1:1.5 of average thickness 20 mm given in the description of the item. Sub grade shall be cleaned, wetted and mopped Mortar of the specified mix and thickness shall then be spread on an area sufficient to receive one kota stone slab. The slab shall be washed clean before laying.

It shall be laid on top, pressed, tapped gently to bring it in level with the other slabs. If shall then be lifted and laid aside. Top surface of the mortar shall then be corrected by adding

fresh mortar at hollows or depressions. The mortar shall then be allowed to harden bit.

Over this surface, cement slurry of honey-like consistency shall be applied. The slab shall then be gently placed in position and tapped with wooden mallet till it is properly padded in level with and close to the adjoining slab. The joint shall be as fine as possible. The slabs fixed in the floor adjoining, the walls shall enter not less than 10 mm. under the plaster,

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

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

2.4. Polishing shall be normally commenced after 14 days of laying the stone slab. First polishing shall be done with carborundum stones of 120 grade grit fitted in the heavy machine and then second polishing shall be done with carborundum stone of 220 to 350 grade grit fitted in heavy machine. Water shall be properly used during polishing. The stone shall then be washed clean with water. When directed by the Engineer-in-charge, wax polish of approved quality shall be applied on the surface with the help of soft cloth over a clean and dry surface. Then the polishing machine fitted with bobs shall be run over it.

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

3.0. Measurement & payment

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

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

Item No :56 Constructing a cooking platform 60 cm. width and 70 cm high resting on B.B.Masonry walls 23 cm.thick in C.M.(1:6) with (i) Fixing or precast R.C.C.1:2:4)8 cm. thick slab with marble chips set in C.M.(1:6)(6mm thick terrazo) with plastering on exposed faces walls in C.M. (1:4) etc complete.Materials

Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Burnt brick shall conform to M-15. Marble Mosaic chips shall conform to M-46. Stone aggregate 20 mm. nominal size shall conform to M-12. (a) M.S. Bars shall conform to M-18.

2.0. Workmanship

2.1. The cooking platform of size as directed shall be constructed in 60 cms. width and 70 cms. height. The brick masonry wall, in C.M. 1 :6 shall be constructed in 23 cms. thickness up to full depth. The relevant specifications of item 6.13 (B) shall be followed for masonry work.

2.2. The R.C.C. slab of 8 cms. thickness and of adequate design and size shall be precast and the same shall be put up on the B.B. masonry work.

2.3. The top and exposed sides of the R.C.C. slab shall be finished with marble mosaic terrazzo 8 mm. thick with required colour pigment. The work of terrazzo shall be carried out as per relevant specifications of item 14.4 (E).

2.4. The whole masonry work shall be finished with cement mortar in C.M. 1 :4. The relevant specification of item 17.59 (II) shall be followed.

3.0. Mode of measurements and payments

3.1. The work of cooking platform shall be measured for finished work.

3.2. The rate includes cost of all labour and materials, etc. required for satisfactory completion of this item as described above.

3.3. The rate shall be for a unit of One running meter

Item No : 57 Providing and laying Vitrified tiles 8 to 10 mm thick ,24" x 24" flooring treads of steps and landing laid on bed of 12 mm thick cement mortar 1:3(1-cement:3 coarse sand) finishing with flush pointing in white cement.2.1. Preparation of Surface:

In case of brick masonry wall, the joints shall be raked out to a depth of least 15 mm. while the masonry is being laid. In case of concrete wall the surface shall be chiseled and roughed with wire brushes. The surface shall be cleaned and wetted thoroughly before commencing the laying work.

2.2. Laying ;

2.2.1. The wall surface shall be covered with 10 mm. thick plaster of cement mortar 1:3 mix and allowed to harden. The plaster shall be roughened with wire brushes both way. The back of tiles shall be floated with grey cement slurry set and edges with white cement slurry in bedding mortar. The tiles shall be gently tapped in position on after the other keeping the joints as thin as possible. Top of skirting or dedo shall be truly horizontal and the joints vertical or as per required pattern.

2.2.2. Risers of steps, skirting and dedo shall rest on top of treads or flooring. Where full size tiles cannot be fixed, They shall be cut to the required size and the edges be smoothened.

2.2.3. The joints shall be cleaned and flush pointed with white cement. The surface shall be kept wet for seven days. After curing the surface shall be washed clean.

3.0. Mode of measurements and payment

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

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

Item No :58 Distempeing (Two coats) with oil bound washable distemper of approved brand and manufacture and of required shade on wall surfaces to give an even shade, over and including a priming coat with alkali resistance primer of approved brand after thoroughly brushing the surface and other foreign matter and also including preparing the surface even and sand parpered smooth. Including Applying two coats of Birla or Asian acrylic lapy (putty) & two coats of primer of approved brand and manufacture on new wall surface to give an even shade including thoroughly brushing the surface free from mortar dropping and other foreign matter and sand papered smooth.

1.0. Materials

1.1. Oil bound washable distemper and primer shall be of approved brand and manufacture. The distemper shall be of required colour and shade and the same shall conform to I.S. : 428-1969.

2.0. Workmanship

2.1. Scaffolding

Where scaffolding is required, it shall be erected in such a way that as far as possible no pail of scaffolding shall rest against the surface to be distempered. A properly secured and well tied suspended platform (Joola) may be used for distempering. Where ladders are used, pieces of old gunny bags shall be tied at top and bottom to prevent scratches to the walls and floors. For distempering to ceiling, proper stage scaffolding shall be erected where necessary.

2.2. Preparation of surface :

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

2.2.2. All unnecessary nails shall be removed. Pitting in plaster shall be made good with plaster again with a fine grade sand paper and made smooth. A coat of

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

2.3. Priming coat :

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

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

2.3.3. Oil bound distemper is not recommended to be applied within six months of the completion of wall

plaster.

2.4. Preparation of oil bound distemper :

2.4.1. The distemper shall be diluted with water or any other prescribed thinner in a manner recommended by the manufacturer only. Sufficient quantity of distemper required for a days work shall be prepared.

2.5. Application of Distemper coat:

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

2.5.2. Sufficient quantity of distemper shall be mixed to finish one room at a time. The application of a coat in each room shall be finished in one operation and no work shall be striated in any room which cannot be completed on the same day.

2.5.3. 15 cm. double bristled distemper brush shall be used. After day's work brushes shall be thoroughly washed in hot water with soap solution and hung down to dry. Old brushes which are dirty and caked with distemper shall not be used on the work.

2.6. Protective measurements : The surfaces of doors, windows, floors, articles of furniture etc. and such other parts of the buildings as are not to be distempered shall be protected from being splashed upon. Such surfaces shall be cleaned of distemper splashes if any.

3.0. Mode of measurements and payment

3.1. Priming coat of distemper primer, scraping of surface spoiled by struck roots, removal of oil and grease spots, treatment for infraction of effloresces., mould moss, fungi, algae and lichen and patch repairs to plaster shall be included in this item for which nothing extra shall be paid.

3.2. All the work shall be measured net in the decimal system as in place subject to the following limits unless otherwise stated hereinafter:

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

(b) Area in individual items shall be worked out to the nearest 0.01 sq. m. All work shall be made for ends of joints, beams, posts etc., and openings, not exceeding 0.5 sq.mt. each and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings not for finish around ends of joints, beams, posts etc.

3.3. Deductions of opening exceeding 0.5 sq.m. but not exceeding 3 sq. m. each shall be made as follows and net addition shall be made for reveals, jambs, soffits etc. of these openings :

(a) When both the faces of wall are provided with same finish, deductions shall be made for one face only.

(b) When each face of wall is provided with different finish, deduction shall be made for that side of frame for doors, windows etc. on which width of reveals is less than that of the other side but no deduction shall be made on the other side. Where the width of reveals on the both the faces of wall are equal, deduction of 50% of area of opening on each face shall be made from area of finish.

(c) When only one face of wall is treated and the other face is not treated, full deductions shall be made if the width of the reveal on treated side is less than that

on untreated side but if the width of the reveal is equal or more than that on untreated side neither deductions nor additions to be made for reveals, jambs, soffits, sills etc.

3.4. In case of opening of area exceeding 3 sq. m. each deduction shall be made for openings but jambs, sills and soffits shall be measured.

3.5. No deductions shall be made for attachments such as casings, conduits, pipes, electric wiring and the like.

3.6. Item includes removing nails, making good holes, patches with materials similar in composition of distemper.

3.7. The rate includes cost of all materials, labours, scaffolding, protective measures etc. involved in all the operations described above. This shall also include conveyance, delivery, handling, unloading, storing work etc

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

Item No :59 Providing and laying broken chine mosaic flooring for terrace using 12 mm to 20 mm broken pieces of glazed tiles to be laid over cement mortar 1:3 to plain or slope and to be tempered to bring mortar creme out upto surface using white cement including rounding off junctions and extending them upto 15 cm along the wall,clearing with water and oxalic acid etc. as directed.

1.0 Material

Water Shall confirm Material Specification no M- 1

Cement Shall confirm Material Specification no M- 3

Sand Shall confirm Material Specification no M- 6

Crushed stone aggregates Shall confirm Material Specification no M- 12

Brick aggregates Shall confirm Material Specification no M- 14

White Cement Shall confirm Material Specification no M- 4

Water proofing compound shall be done as per Specification no 17.70 Page No. 121

Chemicals and compounds of approved shall be of approved quality and make . The proportion of the compound shall be of specified proportion as specified by the manufacturer

2.0 Workmanship

cleaning the slab surface by mechanical means or wire brush to remove old paint, dust, dirt and all loose material

(a) providing first layer of C.M. 1 4 of 40 mm thickness mixed with water proofing compound at rate prescribed by manufacturer, including putting of brick bats of average thickness 40 mm Well immersed in water laid uniformly on first layer of mortar including applying cement slurry @ rate of 0.08 bag sqm. on fixed layer of brick bats including maintaining necessary slope

(B) providing second layer 40 mm thick C.M 1 4 mixed with water proofing compound as directed, including finishing smooth with cement slurry as directed complete.

(C)using 12 mm to 20 mm broken pieces of Glazed tiles to be laid over cement mortar 1 3 to plain or slope and to be tempered to bring mortar creme out up to surface using white cement including rounding off junctions and extending them up to 15 cm along the wall,clearing with water and oxalic acid etc.as directed.

(D) after finishing the whole terrace shall be flooded with water for a period of two weeks as directed

The waterproofing material of approved quality shall be mixed with the cement slurry as per specified proportion as directed by the manufacturer of the compound and as directed by The engineer in charge the mixture shall be applied uniformly to the surface in required coats as directed by the engineer in charge

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

FORM OF GUATANTEE BOND

I We (Contractor) hereby guarantee that water proofing work will remain leakage proof for period of 5 years after completion of the work of water proofing treatment as per the terms and conditions of the contact and leakage that might be caused in building where the water proofing treatment is done we hereby Guarantees to make good any loss of damages suffered by the Government of Gujarat and further gurantee to redo effective work without claiming any extra cost

2.1 This gurarantee shall remain in force for the period of 5 years from the completion of the work under the contract and it shall remain binding to the contractor for period of 5 Years.

2.2 The deposit at the rate of 50% of the cost of this item the running and final bills shall be recovered and retained for the first one years after completion of the guarantee period balance of gurantee period and shall be refunded only after the completion of the gurantee period.

3.0 MODE OF MEASUREMENT and PAYMENT

3.1 The unit rate of water proofing treatment shall include the cost of all materials, tools and plant chemicals and compounds required for water proofing, Applying the same to specified surface as per drawings, finishing, painting with three coats, etc, and all other incidental expenses for producing water proofing 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 water proofing shall include the cost of all labour, materials chemicals and compounds tools and plant scaffolding and all incidental expenses as described herein above.

3.2 The water proofing 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 sq.meter

3.3 The payment will be made on **sq. meter** basis of the finished work.

Item No.60 Finishing wall with water proofing cement paint of on wall surfaces (Three coats) to give an approved brand and manufacture and of required shape even shade after thoroughly brushing the surface to remove all dirt and remains of loose powered materials.

1.0. Materials

1.1. The water shall conform to M-1. Cement water proofing paint shall conform to I.S. 5410-1969.

2.0. Workmanship

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

2.2. Preparation of surface :

The relevant specifications of item No. 18.11 shall be followed except that the word white wash colour wash shall be substituted with water proofing cement paint. The surface shall be thoroughly wetted with clean water before cement water proofing paint is applied.

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

2.4. Application of Paint:

2.4.1. No painting shall be done when the paint is-likely to be exposed to a temperature of below 7⁰ c within 48 hours after application.

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

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

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

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

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

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

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

2.6. Protection measures shall be taken as per item No. 18.11 Para 2.6.

3.0. Mode of measurements and payment

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

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

Item No.61 Providing and fixing cast iron (Spun) Nahni trap of the following nominal diameter of self cleaning design with C.I. screaed down or higned grating including cost of cutting and making good the walls and floor 100mm inlet and 50mm outlet.

1.0. Materials

1.1. The cast iron (spun) Nahni trap shall conform to M-69. The C.I. hinged or screwed down cover shall be of best quality

2.0. Workmanship

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

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

3.0. Mode of measurements and payment

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

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

Item No:62 Providing and fixing water closet squatting Pan (Indian type W.C. Pan) size 580mm (Earthwork, bed concrete, foot rest and trap to be measured and paid for separately) (A) Vitreous China.(I) Long pattern White colour

1.0. Materials

1.1. Wash down water closet (European type W.C. Pan) shall conform to M-60. Cement mortar shall conform to M-11.

2.0. Workmanship

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

3.0. Mode of measurements and payment

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

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

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

Item No:63 Providing and fixing 100mm size P or S trap for water closet squatting pan including jointing the trap with the pan and soil pipe in cement Mortar 1:1 (1-Cement : 1-Fine sand) (A) Vitreous China.

1.0. Materials : The 100 mm. size 'P' or 'S' trap for water closet shall conform to M-62. Cement mortar shall conform to M-11.

2.0. Workmanship

2.1. The 'P' or 'S' trap shall be fixed with pan cast iron pipe with C.M. 1:1. The pan shall be provided with a 100 nun. 'P' or 'S' trap as specified in the item with an approximately 50 mm. seal The joint between the pan and the trap shall be made leak-proof with cement mortar 1:1(1 cement : 1 fine sand).

3.0. Mode of measurements and payment

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

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

Item No:64 Providing and fixing washbasin with single hole for pillar tap with C.I. or M.S. brackets painted white including sutting holes and making good the same but excluding fittings.(A) Vitreous China: (ii) Flat Back washbasin 550 mm x 400mm size.

1.0. Materials

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

2.0. Workmanship

2.1. The washbasin shall be fixed on the wall as and where directed. The wash basin shall be supported on a pair of M.S. or C.I. brackets fixed in C.M. 1:3 (1 cement : 3 sand). The bracket shall conform to I.S. : 775-1962. The wall plaster on the rear shall be cut to rest the top edge of the washbasin. After fixing the basing, plaster shall be made good and surface finished to match the existing one.

2.2. The brackets shall be painted white with ready-mixed paint.

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

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

2.5. The necessary inlet, outlet connections and fittings such as pillar cocks, CP dress waste trap waste pipe, stop cock, chain wish rubber plug etc. shall be fixed.

2.6. The payment of fittings shall be made separately under separate items.

3.0. Mode of measurements & payment

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

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

Item No:65 Providing and fixing screw down bib taps of (A) Brass screw down bib tap polished bright.(i) 15mm dia.

1.0. **Materials :** 15 mm. dia. brass screw down with bright polished finished shall conform to I.S. 781-1977. The bib cock shall be best Indian make and quality.

2.0. Workmanship

2.1. The screw down bib cock 15 mm. as specified above shall be fixed as directed. The threaded portion shall be smeared with white or red lead and around with a few turns of fine spun yarn round the screwed end of the pipe. The bib cock shall be then screwed and fixed to water tight position.

3.0. Mode of measurements and payment

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

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

Item No :66 Providing and fixing Gun metal check or non-return fullway wheel valve. (A) 15mm dia.

1.0. **Materials :** The gun metal check or not return full way wheel valve or specified dial, shall conform to I.S. : 778-1964. The non-return valve shall be of tested quality.

2.0. Workmanship

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

3.0. Mode of measurements and payment

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

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

Item No:67 Providing and fixing chromium plated brass half turn flush cock of approved quality including fixing in pipe line etc. complete (ii) 25mm dia.

1.0. Materials :

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

2.0. Workmanship

2.1. Cutting, Laying & Jointing

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

2.1.2. The taps and dies shall be used only for straightening screw threads which have become bent or damaged and shall not be used for turning of the threads so as to make them slack as the latter procedure may not result in the watertight joint. The screw threads for tube and fitting shall be protected from edge until they are fitted.

2.1.3. In jointing the tubes, the inside of the socket and the screwed end of the tubes shall be oiled and smeared with white or red lead and wrapped around with a few turns of fine spun yarn round the screwed end of the tube. The end shall then be tightly screwed in the socket, tees, etc. with a pipe wrench. Care shall be taken that all times free from dust, and dirt during fixing. Burr from the joints shall be removed after screwing. After laying the open ends of the pipes shall be temperately plugged to prevent access of water, soil, or any other foreign matter.

2.1.4. Any threads exposed after jointing shall be painted or in the case of underground piping thickly coated with approved anti-corrosive paint to prevent corrosion.

2.2. Fixing of tube fittings to wall ceiling & floors.

2.2.1. In case of fixing of tubes and fittings to the walls or ceilings, these shall run on the surface of the wall, or ceiling (not in chase) unless otherwise specified. The fixing shall be done by means of standard pattern, holder clamps keeping the pipes about 15 mm. clear of the wall. When it is found necessary to pattern, holder clamps keeping the pipes about 15 mm. clear of the wall. When it is found necessary to conceal the pipes and when specified so, chasing may be adopted or

pipe fixed in ducts or recesses etc. provided that there is sufficient space to work on the pipe with usual tools. The pipe shall not ordinarily be buried in walls or solid floors, where unavoidable, pipe may be buried for short distances provided that adequate protection is given against damage and where so required joints are not buried. Where required M.S. tube sleeve shall be fixed at a place a pipe is passed through a wall or floor for expansion and contraction and other movements. In case the pipe is embedded in walls or floors, it should be painted with anti-corrosive bitumastic paint of approved quality. The pipe should not come in contact with lime mortar or lime concrete as the pipe is affected by lime. Under the floors, the pipe shall be laid in layer of sand filling.

2.2.2. All pipes and fittings shall be fixed truly vertical and horizontal unless unavoidable. The pipes shall be fixed to walls with standard pattern clamps of required size and shape, one end of which shall be properly plugged or cemented into walls with cement mortar 1:3 (1 cement : 3 coarse sand) and the other tightened round the pipes to hold it securely. These clamps shall be spaced at regular intervals in straight lengths at 2 MC/C interval in horizontal run and 2.5 m. interval in vertical run. For pipe of 15 mm. dia. up to 25 mm. dia the holes in the walls and floors shall be made by drilling with chisel or jumper and not by dismantling the brick work or concrete. However for bigger diameter pipes the holes shall be carefully made cement : 3 coarse sand), and properly finished to match the adjacent surface.

2.3. Testing of joints :

2.3.1. After laying and jointing, the pipes and fillings shall be inspected under working conditions of pressure and flow. Any joints found leaking shall be redone, and all leaking pipes removed and replaced without extra cost.

2.3.2. The pipes and fittings after they are laid shall be tested to hydraulic pressure of 6 Kg./Sq cm. The pipe shall be slowly and carefully charged with water allowing all air to escape and avoiding all shocks and water hammer. The draw off takes and stop cock shall then be closed and specified hydraulic pressure shall be applied gradually. The pressure gauge must be accurate. The pipes and fittings shall be tested in sections as the work laying proceeds, keeping, the joints exposed for inspection during the testing.

3.0. Mode of measurements and payment

3.1. The rate includes cost of all materials and labour required for satisfactory completion of this item including fittings.

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

Item No:68 Providing and fixing chromium plated brass half turn flush cock of approved quality including fixing in pipe line etc. complete (ii) 25mm dia.

1.0. Materials & Workmanship

The ball cock of specified diameter shall conform to M-75

2.0. Mode of measurements & payment

2.1. The ball cock of specified diameter shall be fixed as directed. The fixing of ball cock shall be carried out as per relevant specification of item No. 23 (A) for joints etc.

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

Item No:69 Providing and fixing 100 mm dia PVC pigot and socket soil waste and ventilating pipe inclu. Fitting joints in lead or rubber base water proofing solution and fixing with clamp as directed etc. marking the walls good etc. as directed

1.0. Materials

1.1. The specified dia. PVC Spigot and socket soil or waste pipe shall conform M-68

2.0. Workmanship

2.1. The fixing of C.f. spigot and sockets soil, waste and ventilating pipe shall be carried out as per relevant specifications of item 15.93 (B) except the PVC spigot and socket shall be fixed. The joints shall be filled with cement mortar 1:2 (1 cement : 2 sand) span spun yarn. The joints shall be filled with cement mortar 1:2 (1 cement : 2 sand) and spurn yarn. The pipes without care shall be fixed to wall with M.S. clamps The pipes will earn shall be secured with 40 mm before steel or iron barrel distance pieces or boils and stout galvanised iron nails 10 cms long into hand wool plug fixed in walls. Access doors to fittings shall be provided with 3 mm. rubber insertion packing and secured without screws to made air and water tight

2.2. All soil pipes shall be earned up above the roof and shall have a wire ball on guarded or a cowl.

2.3. The ventilating pipe or shaft shall be carried out to a height of at least one meter above the outer covering of the roof of the building or in the case of windows in a gable wall or a dormer windows, it shall t carried up to a ridge of the roof or at least tow meters above the top of the windows. In case of flat roof to which access for use is provided, it shall be carried out up to a height of at least on meter above the parapet or two meters measured vertically from the top of any windows or opening which any exist up to a horizontal distance of five meters from the vent pipe into such building and in no case shall be carried out to a height less then three meters.

2.4. Where ventilating pipes are carried in pipe shafts, the shaft shall be of a minimum size of one meter. If the shells are also used to give light and air to rooms, the ventilating pipes must be carried out to a horizontal distance at root level not less than five meter from the site of the shaft.

2.5. The sand cast iron pipes above parapet shall be fixed with M.S. clamps and stays. The clamps shall be made from 1.5 mm. thick MS flat or 3 mm. width band to the required shape and size to fit tightly on the sockets when tightened with screw bolts. It shall be formed of two semi circular pieces with flanged ends on both sides, with holes to fit in the screw bolts and nuts 40 mm. dia. M.S. Bars, One end of the stay shall be bent to form a hook to be fixed with clamps by means of bolts and the other end shall be bent for embedding in wall in cement concrete block of size 200 mm. x 100 mm. x 100 mm. in 1:2:4 mix. The concrete shall be finished to match the surrounding surfaces.

2.6. The connection between the main pipe and branch pipes shall be made by using branches and bends with access doors for cleaning

2.7. The waste from lavatories, kitchens basins, sinks, baths and other floor traps shall be separately connected to respective stacks of upper floor. The waste stack of lavatories shall be connected directly to main hole while the waste stack of other shall be separately discharged over gulley trap.

3.0. Mode of measurements and payment

3.1. The length of pipe shall be measured including all fittings along its length in running meters correct to a centimeter. No allowance shall be made for the portion of pipe length entered in the sockets of the adjacent pipe or fittings.

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

3.3. The rate shall be for a unit of One running meter.

Item No:70 Providing and fixing to wall ceiling and floor 6.0 Kg. F/Cm² working pressure polythene pipes of the following outside Dia. Low density, complete with special flange compression type fittings, wall clip etc. including making good the wall ceiling and floor. (A) 20mm

1.0. Materials : The low density polythene pipe of specified diameter with 56 Kg/f. Sq. Cm. working pressure shall conform to I.S. 3076-1968. The specials and fittings required shall be of best quality.

2.0. Workmanship

2.1. The P.V.C Pipes of specified diameter shall be fixed as directed. Due to thermal expansion of rigid P-V.C. Pipes, due allowances shall be made

particularly in over-ground pipe line for any change in length of pipe line which may occur during installation or when pipe line is in service.

2.2. Above ground installation of rigid P.V.C. pipe should be undertaken after precautions are observed for their protection against dirt, sun rays and mechanical damage.

2.3. The rigid P.V.C. pipes should not be kept exposed above ground when it passes through public places, railway lines, roads, road side and foot paths.

2.4. P.V.C. pipe shall be supported at the following intervals ;

-20 mm dia 500 mm. -25 mm. dia. 750 mm. -32 mm. dia. 900 mm.

2.5. Close support spacing shall be provided if recommended by the manufacturer.

2.6. The guide lines indicated by the manufacturer regarding handling, transportation, storing, laying and jointing of pipes shall be kept in view during execution.

2.7. P.V.C. pipes shall be fixed on wall with wooden plugs suitable plastic clamps.

2.8. Jointing the pipes :

2.8.1. The pipes and sockets shall be accurately cut. The ends of the pipes and fittings should be absolutely free from dirt and dust. The outside surface of the pipes and the inside of the fittings shall then be roughened with emery paper, and then solvent cement shall be applied to the matching surface and pushed home and joint. Since solvent cement is aggressive to P.V.C. care must be taken to avoid applying excessive cement to the inside of pipe sockets as any surplus cement cannot be wiped off after jointing. Empty solvent cement tins, brushes, rags of paper impregnated with cement should not be buried in the trenches. They should be gathered, not left scattered about, as they can prove to be a hazard to animals, which may chew them.

2.8.2. If any manufacturer recommends its own methods of jointing the same shall be adopted after necessary approval from the Engineer-in-charge.

2.9. Laying pipes in trenches:

2.9.1. The pipes shall be laid over uniform relatively soft fine grained solid found to be free of presence of hard object such as large boulders, rocky projections, large tree roots etc. The width of the trenches shall be minimum width required for working.

2.9.2. The pipes laid underground shall not be less than one meter from the ground level. The pipe shall be positioned in the trenches so as to avoid any inducted stresses due to retraction. Any deviation required shall be obtained by using proper type of rubber ring joints.

3.0. Mode of measurements & payment

3.1. The relevant specifications of item No. 23.2. (A) shall be followed except that the P.V.C. pipes of specified dia. shall be paid under this item.

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

Item No:71 Providing and fixing to wall ceiling and floor 6.0 Kg. F/Cm² working pressure poluthene pipes of the following outside Dia. Low density, complete with special falnge compression type fittings, wall clipsetc. including making good the wall ceiling and floor. (B) 25mm

1.0. Materials : The low .density polythene pipe of specified diameter with 56 Kg/f. Sq. Cm. working pressure shall conform to I.S. 3076-1968. The specials and fittings required shall be of best quality.

2.0. Workmanship

2.1. The P.V.C Pipes of specified diameter shall be fixed as directed. Due to thermal expansion of rigid P-V.C. Pipes, due allowances shall be made particularly in over-ground pipe line for any change in length of pipe line which may occur during installation or when pipe fine is in service.

2.2. Above ground installation of rigid P.V.C. pipe should be undertaking after precautions are observed for their protection again dirt, sun rays and mechanical damage.

2.3. The rigid P.V.C. tines should not be kept exposed above ground when it passes through public places, railway lines, roads, road side and foot paths.

2.4. P.V.C. pipe shall be supported at the following intervals ;

-20 mm dia 500 mm. -25 mm. dia. 750 mm. -32 mm. dia. 900 mm.

2.5. Close support spacing shall be provided if recommended by the manufacturer.

2.6. The guide lines indicated by the manufacturer regarding handling, transportation, storing, laying and jointing of pipes shall be kept in view during execution.

2.7. P.V.C. pipes shall be fixed on wall with wooden plugs suitable plastic clamps.

2.8. Jointing the pipes :

2.8.1. The pipes and socket s shall be accurately cut. The ends of the pipes and fittings should be absolutely free from dirt and dust. The outside surface of the pipes and the inside of the fittings shall then be roughened with emery paper, and then solvent cement shall be applied to the matching surface and pushed home and joint. Since solvent cement is aggressive to P.V.C. care must be taken to avoid applying excessive cement to the inside of pipe sockets as any surplus cement cannot be wiped off after jointing. Empty solvent cement tins, brushes, rags of paper impregnated with cement should not be buried in the trenches. They should be gathered, not left scattered about, as they can prove to be a hazard to animals, which may chew them.

2.8.2. If any manufacturer recommends its own methods of jointing the same shall be adopted after necessary approval from the Engineer-in-charge.

2.9. Laying pipes in trenches:

2.9.1. The pipes shall be laid over uniform relatively soft fine grained solid found to be free of presence of hard object such as large feints, rocky projections, large tree roots etc. The width of the trenches shall be minimum width required for working.

2.9.2. The pipes laid underground shall not be less than one meter from the ground level. The pipe shall be positioned in the trenches so as to avoid any inducted stresses due to retraction. Any deviation required shall be obtained by using proper type of rubber ring joints.

3.0. Mode of measurements & payment

3.1. The relevant specifications of item No. 23.2. (A) shall be followed except that the P.V.C. pipes of specified dia. shall be paid under this item.

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

Item No:72 Providing and fixing to wall ceiling and floor 6.0 Kg. F/Cm² working pressure poluthene pipes of the following outside Dia. Low density, complete with special falnge compression type fittings, wall clipsetc. including making good the wall ceiling and floor. (C) 32mm

1.0. Materials : The low .density polythene pipe of specified diameter with 56 Kg/f. Sq. Cm. working pressure shall conform to I.S. 3076-1968. The specials and fittings required shall be of best quality.

2.0. Workmanship

2.1. The P.V.C Pipes of specified diameter shall be fixed as directed. Due to thermal expansion of rigid P-V.C. Pipes, due allowances shall be made

particularly in over-ground pipe line for any change in length of pipe line which may occur during installation or when pipe line is in service.

2.2. Above ground installation of rigid P.V.C. pipe should be undertaken after precautions are observed for their protection against dirt, sun rays and mechanical damage.

2.3. The rigid P.V.C. pipes should not be kept exposed above ground when it passes through public places, railway lines, roads, roadside and foot paths.

2.4. P.V.C. pipe shall be supported at the following intervals ;

-20 mm dia 500 mm. -25 mm. dia. 750 mm. -32 mm. dia. 900 mm.

2.5. Close support spacing shall be provided if recommended by the manufacturer.

2.6. The guide lines indicated by the manufacturer regarding handling, transportation, storing, laying and jointing of pipes shall be kept in view during execution.

2.7. P.V.C. pipes shall be fixed on wall with wooden plugs suitable plastic clamps.

2.8. Jointing the pipes :

2.8.1. The pipes and sockets shall be accurately cut. The ends of the pipes and fittings should be absolutely free from dirt and dust. The outside surface of the pipes and the inside of the fittings shall then be roughened with emery paper, and then solvent cement shall be applied to the matching surface and pushed home and joint. Since solvent cement is aggressive to P.V.C. care must be taken to avoid applying excessive cement to the inside of pipe sockets as any surplus cement cannot be wiped off after jointing. Empty solvent cement tins, brushes, rags of paper impregnated with cement should not be buried in the trenches. They should be gathered, not left scattered about, as they can prove to be a hazard to animals, which may chew them.

2.8.2. If any manufacturer recommends its own methods of jointing the same shall be adopted after necessary approval from the Engineer-in-charge.

2.9. Laying pipes in trenches:

2.9.1. The pipes shall be laid over uniform relatively soft fine grained solid found to be free of presence of hard object such as large boulders, rocky projections, large tree roots etc. The width of the trenches shall be minimum width required for working.

2.9.2. The pipes laid underground shall not be less than one meter from the ground level. The pipe shall be positioned in the trenches so as to avoid any inducted stresses due to retraction. Any deviation required shall be obtained by using proper type of rubber ring joints.

3.0. Mode of measurements & payment

3.1. The relevant specifications of item No. 23.2. (A) shall be followed except that the P.V.C. pipes of specified dia. shall be paid under this item.

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

ItemNo:73 Constructing Brick masonry road gully chamber 500mm x 450mm x 600mm including 500mm x 450mm C.I. horizontal grating with frame complete.

1.0. Materials and Workmanship : The relevant specifications of item 24.40 shall be followed except that the size of road gully chamber shall be 500 mm. x 450 mm. x 600 mm. including 500 mm. x 450 mm. C.I. horizontal grating with frame and vertical grating complete.

2.0. Mode of measurements and payment

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

2.2. The rate shall be for a unit of **Each**.

ItemNo:74 Providing and fixing in position PVC cowl vent of 100 mm dia pipes

1.0. Materials

1.1. The specified dia. C.I. Spigot and socket soil or waste pipe shall conform M-68.

2.0. Workmanship

2.1. The fixing of C.I. spigot and sockets soil, waste and ventilating pipe shall be carried out as per relevant specifications of item 15.93 (B) except the C.I. spigot and socket shall be fixed. The joints shall be filled with cement mortar 1:2 (1 cement : 2 sand) and spun yarn. The joints shall be filled with cement mortar 1:2 (1 cement : 2 sand) and spun yarn. The pipes without care shall be fixed to wall with M.S. clamps. The pipes will be secured with 40 mm diameter steel or iron barrel distance pieces or bolts and stout galvanised iron nails 10 cms long into hand wool plug fixed in walls. Access doors to fittings shall be provided with 3

mm. rubber insertion packing and secured without screws to made air and water tight

2.2. All soil pipes shall be earned up above the roof and shall have a wire ball on guarded or a cowl.

2.3. The ventilating pipe or shaft shall be carried out to a height of at least one meter above the outer covering of the roof of the building or in the case of windows in a gable wall or a dormer windows, it shall t carried up to a ridge of the roof or at least tow meters above the top of the windows. In case of flat roof to which access for use is provided, it shall be carried out up to a height of at least on meter above the parapet or two meters measured vertically from the top of any windows or opening which any exist up to a horizontal distance of five meters from the vent pipe into such building and in no case shall be carried out to a height less then three meters.

2.4. Where ventilating pipes are carried in pipe shafts, the shaft shall be of a minimum size of one meter. If !he shells are also used to give fight and air to rooms, the ventilating pipes must be carried out to a horizontal distance at root level not loss than five meter from the site of the shaft.

2.5. The sand cast iron pipes above parapet shall be fixed with M.S. clamps and stays. The clamps shall be made from 1.5 mm. thick MS flat or 3 mm. width band to the required shape and size to fit tightly one the sockets when tightened with screw bolts. It shall be formed of two semi circular pieces with flanged ends on both sides, with holes to fit in the screw bolts and nuts 40 mm. dia. M.S. Bars, One end of the stay shall be bent to form a hook to be fixed with clamps by means of bolts and the other end shall be bent for embedding in wall in cement concrete block of size 200 mm. x 100 mm. x 100 mm. in 1:2:4 mix. The concrete shall be finished to match the surrounding surfaces.

2.6. The connection between the main pipe and branch pipes shall be made by using branches and bends with access doors for cleaning

2.7. The waste from lavatories, kitchens basins, sinks, baths and other floor traps shall be separately connected to respective stacks of upper floor. The waste stack of lavatories shall be connected directly to main hole while the waste stack of other shall be separately discharged over gulley trap.

3.0. Mode of measurements and payment

3.1. The length of pipe shall be measured including all fittings along its length in running meters correct to a centimeter. No allowance shall be made for the portion of pipe length entered in the sockets of the adjacent pipe of fittings.

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

3.3. The rate shall be for a unit of **One running metr.**

ItemNo:75 Providing and fixing on wall face PVC rain water pipe 110 mm dia & 4 kg/sqm is used including filling the joints with approved brand

1.0. Materials : PVC. type of 110 mm. dia. shall conform to M-56.

2.0. Workmanship

2.1. The PVC pipe of 110 cms. fixed as rain water pipe as directed. The pipe shall be fixed about 1/4 dia. below the floor level so as to make approach of water easy. The inlet of pipe shall be rounded off for easy entry of rain water pipe. The pipe shall be fixed in C.M. 1:3.

3.0. Mode of measurements & payment

3.1. The rate includes of all labour and materials required for satisfactory completion of this item.

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

Item No :76 Providing and laying white glazed tiles 6 mm thick in flooring, treads of steps and landing laid on a bed of 12mm thick cement mortar 1:3(1 cement 3 coarse sand) finished with flush pointing in white cement.

1.0. Materials

Water shall conform to M-1 Cement mortar shall conform to M-11 White glazed tiles shall conform to M-55

2.0. Workmanship

2.1. Bedding :

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

2.1.2. The white glazed tiles shall be laid on cement mortar bedding of 12 mm. thick in C.M. 1:3. The mortar shall have sufficient plasticity for laying and there shall be no hard lumps that would interfere with the evenness of bedding. The base shall be cleared and well wetted. The mortar shall then be spread in thickness not less than 10 mm. at any place and average 12 mm. thickness. The proportion of the cement mortar shall be as specified in the item.

2.2. Fixing tiles :

2.2.1. The tiles before laying shall be soaked in water for at least tow hours. Neat gray cement grout at 33 kg/Cement/Sq. mt. of honey like consistency shall be

spread over the mortar bedding as directed. The edges of the tiles shall be smeared with neat cement slurry. The tiles shall be well pressed and gently tapped with a wooden mallet till they are properly bedded and in level with the adjoining tiles. There shall be no hollows in bed or joints. The joints between the tiles shall be as thin as possible in straight line or as per pattern.

2.2.2. The tiles shall not have staggered joints. The joints shall be true to centre line both ways. The Nahni trap coming in the flooring shall be so positioned that its grating shall replace only one tile as far as possible. Where full size tiles cannot be fixed they shall be cut (Swan) to the required size and the edges rubbed smooth to ensure straight and true joints. The joints shall be filled with grey cement grout with wire brush or trowel to a depth of 5 mm. and loose material removed. White cement shall be used for pointing the joints. After fixing the tiles finally in an even plane the flooring shall be kept wet and allowed to nature undisturbed for 7 days.

2.3. Cleaning :

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

3.0. Mode of measurements & payment

3.1. The work done shall be measured in sq. mt. for visible area of work done. The length and width of the flooring shall be measured not between the faces of skirting or dados or plastered face of wall as the case may be. The paving under dado or skirting shall not be measured. No deduction shall be made nor extra paid for any opening in the floor of area-up to 0.1 sq.mt. Nothing extra shall be paid for laying the floors at different levels in the same rooms.

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

Item No :77 Providing and fixing 600mm x 450mm bevelled edge mirror of superior glass mounted on 6mm thick A.C. sheet or plywood sheet and fixing to wooden plug with C.P. brass screws and washers.

1.0. Materials

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

2.0. Workmanship

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

3.0. Mode of measurements & payment

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

Item No :78 Providing and fixing C.P brass wast for washbasing or sink (A) 32mm dia.

1.0. Materials

1.1. The C.P. brass trap and unions shall be of 32 mm. dia. and of best quality and make as approved by the Engineer-in-charge

2.0. Workmanship

2.1. C.P. brass waste trap and union shall be connected to 32 mm dia waste pipe which shall be suitably bent towards the wail which shall discharge into drain through a floor trap The C.P brass waste trap shall be provided for wash basin or sink as the case may be.

3.0. Mode of measurement & payment

3.1. The rate includes all labours and providing C.P. brass waste trap and union including waste couplings of 32 nun fin. The rate excludes the cost of waste pipe of 32 mm. dia.

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

Item No :79 Providing and fixing fisher union for wash basing (A) 32mm dia.

1.0. Materials

1.1. Tho 32 mm dia M.I. Fisher union shall be of best quality and made as approved by the Engineer-in-charge.

2.0. Workmanship

2.1. The 32mm dia M I. Fisher union shall be fixed to wash basin or sink in best workman like manner.

3.0. Mode of measurements and payment

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

3.2. The rate shall be for a unit of Each.

Item No:80 Providing and laying (to level or slopes) and jointing with stiff mixture of Cement Mortar in proportion 1:1, Salt glazed stoneware pipes including testing of pipes and joints complete including Providing and laying Cement concrete 1:5:10 (1-Cement : 5-Fine sand :10-Graded stone aggregate 40mm nominal size) bedding for stoneware pipes of following internal diameters with necessary formwork and curing complete. (B) 150mm dia. (166mm Ave. bed thickness)

24.1.(A) Providing any laying (to level or slopes) and jointing with stiff mixture of cement mortar in proportion 1:1 salt glazed stone-ware pipes, following nominal internal diameters including testing of pipes and joints complete : 100 mm. dia.

1.0. Materials

(I) Water shall conform to M-1(2) Cement mortar of proportion 1:1 shall conform to M-11. (3) 100 mm. dia. glazed stoneware pipe shall conform to M-71.

2.0. Workmanship

2.1. The trenches for stoneware pipe drains shall be carried out as per relevant specifications of item No. 23.4 (A) except that the work is for stoneware pipes of 100 mm. dia.

2.2. Laying:

2.2.1. The pipes shall be laid accurately and perfectly true to line, levels and gradients, Great care shall be taken to prevent sand etc. from entering the pipes. The pipes between two manholes shall be laid truly in a straight line without vertical or horizontal undulation. All junctions and changes in direction and diameter shall be made inside manholes by means of curved tapered channels formed in Cement concrete finished smooth and benched on both sides. The body of the pipe shall rest for its entire length, on a even level bed grips being made or left on the bed to receive the sockets of the pipes.

2.3. Jointing:

2.3.1. Tarred gask in or yarn soaked in neat cement slurry shall first be placed around the spigot to each pipe and the spigot shall then be placed well home into the socket of the pipe previously laid. The pipe shall then be adjusted and fixed in the correct position and gaskin caulked home so as to fill not more than 1/4th of the total depth or (13 mm. in depth) of the socket.

2.3.2. The remainder of the sockets shall be filled with stiff mixture of cement mortar in proportion of one part of cement and one part of sharp sand. When the socket is fillet, a filled shall be formed round the joints with a trowel, forming an angle of 45° with the barrel of the pipe.

2.3.3. The mortar shall be mixed as necessary for immediate use.

2.3.4. After the joint is made, any extraneous materials shall be removed from the inside of the joints with a suitable scraper or "badger". The newly made joints shall be protected, until set, from the sun, dry winds, rain or frost, sacking or other suitable materials which shall be used for the purpose.

2.3.5. The mortar shall be cured for 10 days.

2.4. Testing of Joints:

2.4.1. If any leakage is visible the defective part of the work shall be made good at no extra cost. The pipe line shall be tested as directed.

2.4.2. A slight amount of sweating which is uniform may be overlooked, but excessive sweating from a particular pipe or joints shall be watched for and taken as indicating a defect to be made good.

3.0. Mode of measurements and payment

3.1. Pounding or buttering of the fit trenches bed to the lower part of the pipe and "Grips" dug to take socket, collars etc. are included in the rate of laying the pipes.

3.2. The measurements shall be net without any allowance for cutting, and waste. The length of bends, junctions, and other connections shall be included in the total length of the drain pipes. Nothing extra shall be paid for the same. The rate includes necessary excavation refilling trenches etc. complete,

3.3. The rate shall be for a unit of One running meter.

Providing and laying cement concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone : aggregate 40 mm. nominal size) bedding for stoneware pipe of following internal diameter with necessary form work and curing complete : 100 mm. dia. 300 mm. width (112 mm. average bed thickness).

1.0. Materials : (1) Water shall conform to M-1 (2) Cement shall conform to M-3. (3) Sand shall conform

to M-6 (4) Stone aggregate 40 run nominal size shall conform to M-12.

2.0. Workmanship

2.1. The relevant specifications of item 5.3.4. shall be followed except that the concrete work shall be carried out in trenches as bedding for stoneware pipes. The width of concrete shall be 300 mm. and average thickness of bedding shall be 112 mm The concrete shall be brought up at least to the invert level of the pipe to form a cradle and to avoid line contact between the pipe and the bed.

3.0. Mode of measurements & payment

3.1. The rate includes cost of all labour and materials required for satisfactory completion of this item.

3.2. The rate includes cost of necessary form work required if any

3.3. The rate shall be for a unit of One running meter.

Item No:81 Providing and Fixing PVC Water Tank ISI Marka Sintex or Equivalent As directed.

1.0 Materials:

P.V.C... Water storage tank shall be of SYNTEX Brand & Make of 500 liter storage capacity

2.0 Workmanship:

2.1 The .P.V.C... Water storage tank shall be for water storage the tank shall be fixed or placed at terrace level or as and where as directed by engineer in charge. Tank shall be connected with water supply line (inlet) for it and with outlet line (delivery line) with all necessary fitting such as inlet and outlet connection, coupling washer, solution and any other fitting required for complete the leakage proof connection for supply and delivery line including all labour

3.0 Mode of measurement & payment:

3.1 The rate includes of all labour and materials required for satisfactory complementation of this item.

3.2 The rate shall be for a unit of one No.

Item No:82 Providing and fixing Kitchen sink with C.I. or M.S. brackets, painted white including cutting holes in walls and making good the same but excluding fittings. (C) Vitreous China Sink. (i) 600mm x 450mm x 150mm size

1.0. Materials

1.1. White glazed vitreous china sink 600 mm. x 450 mm. x 150 mm. size shall conform to M-63.

2.0. Workmanship

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

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

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

3.0. Mode of measurements & payment

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

3.2. The rate shall be for a unit of Each.

Item No:83 'Providing soak pit of 5.00 Cu.M. Volume including excavating and filling brickbats with dry masonry work at top for 45cm. height including covering the top with stone including providing vatas in C.M. 1:3 with finishing, curing etc. complete as directed.

1.0. Materials : Water shall conform to M-1. Cement mortar conform to M-11. Burnt Bricks shall conform to M-15. Rough stone slab 40 x 50 mm. thick shall conform to M-48. Brick bat shall conform to M-14.

2.0. Workmanship

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

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

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

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

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

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

3.0. Mode of measurements and payment

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

3.2. The rate shall be for a unit of Each.

Item No:84 Providing and fixing a board showing "Anganwadi" of size 0.60 X 0.30mtr. including painting Gujarati Language as directed.

1. GENERAL

The colour, configuration, size and location of all traffic signs for highways other than Expressways shall be in accordance with Code of Practice for Road Signs, IRC:67 or as shown on the drawings. For Expressways, the size of signs, letters and their placement shall be as specified in the Contract drawings and relevant specifications. In the absence of any details or for any missing details, the signs shall be provided as directed by the Engineer. The Aluminium sheet size to be fixed shall be as specified in the Item.

The signs shall be either reflector zed or non-reflector zed as shown on the drawing or as directed by the Engineer. When they are of reflector zed type, they shall be of retro- refectories type and made of encapsulated lens type reflective sheeting vide Clause 801.3, fixed over aluminium sheeting as per these Specifications.

In general, cautionary and mandatory signs shall be fabricated. through process of screen printing. In regard to informatory signs with inscriptions, either the message could be printed over the reflective sheeting, or cut letters of non-reflective black sheeting used for the purpose which must be bonded well on the base sheeting as directed by the Engineer.

2. MATERIALS

The various materials and fabrication of the traffic signs shall conform to the following requirements:

1. **Concrete: Concrete** shall be of the grade shown on the contract drawings or otherwise as directed by the Engineer.

2. **Reinforcing Steel: Reinforcing** steel shall conform to the requirement of IS : 1786 unless otherwise shown on the drawing.
3. **Bolts, nuts, washers:** High strength bolts shall conform to IS: 1367 whereas precision bolts, nuts, etc. shall conform to IS:1364.
4. **Plates and supports:** Plates and support sections for the sign posts. shall conform to IS:226 and IS:2062 or any other relevant IS Specifications.
5. **Aluminum:** Aluminum sheets used for sign boards shall be of smooth, hard and corrosion resistant aluminum alloy conforming to IS:736 Material designation 24345 or 1900.
6. Signs with a maximum side dimension not exceeding 600 mm shall not be less than 1.5 mm thick. All others shall be at least 2 mm thick. The thickness of the sheet shall be related to the size of the sign and its support and shall be such that it does not bend or deform under the prevailing wind and other loads.
7. In respect of sign sizes not covered by IRC:67, the structural details (thickness, etc.) shall be as per the approved drawings.

3. **TRAFFIC SIGNS HAVING RETRO-REFLECTIVE SHEETING**

General Requirements : The retro-reflective sheeting used on the sign shall consist of the white or collared sheeting having a smooth outer surface which has the property of retro- reflection over its entire surface. It shall be weather-resistant and show colour fastness. It shall be new and unused and shall show no evidence of cracking, scaling, and pitting, blistering, edge lifting or curling and shall have negligible shrinkage or expansion. A certificate of having tested the sheeting for these properties in an unprotected outdoor exposure facing the sun for two years and its having passed these tests shall be obtained from a reputed laboratory, by the manufacturer of the sheeting. The reflective sheeting shall be either of Engineering Grade material with enclosed lens or of High Intensity Grade with encapsulated lens. The type of the sheeting to be used would depend upon the type, functional hierarchy and importance of the road

.High Intensity Grade Sheeting: This sheet shall be of encapsulated lens type consisting of spherical glass lens, elements adhered to a synthetic resin and encapsulated by a flexible, transparent water-proof plastic having a smooth surface. The retro-reflective surface after cleaning with soap and water and in dry condition shall have the minimum co-efficient of retro-reflection (determined in accordance with ASTM Standard E:810) as indicated in Table 800-1.

When totally wet, the sheeting shall not show less than 90 per cent of the values of retro-reflectance indicated in Table 800-1. At the end of 7 years, the sheeting shall retain at least 75 per cent of its original retro reflectance.

Engineering grade sheeting: This sheeting shall be of enclosed lens type consisting of microscopic lens elements embedded beneath the surface of a smooth, flexible, transparent, water-proof plastic, resulting in a non-exposed lens optical reflecting system. The retro reflective surface after cleaning with soap and water and in dry condition shall have the minimum coefficient of retro-reflection (determined In accordance with ASTM Standard: E-81 0) as indicated in Table 800-2. When totally wet, the, sheeting shall not show less than 90 per cent of the values, of retro-reflection indicated in Table 800-2. At the end of 5 years, the sheeting shall retain at least 50 per cent of its original retro reflectance.

Messages/Borders: The messages (legends, letters, numerals etc) and borders shall either be screen-printed or of cut-outs. Screen printing shall be processed and finished with materials and in a manner specified by the sheeting manufacturer. Cut-outs shall be of materials as specified by the sheeting manufacturer and shall be bonded with the sheeting in the manner specified by the manufacturer.

For screen-printed transparent coloured areas on white sheeting, the co-efficient of retro- reflection shall not be less than 50 per cent of the values of corresponding colour in Tables 800-1 and 800-2, as applicable.

Cut-out messages and borders, wherever used, shall be made out of retro-reflective sheeting (as per Clause 801.3.2 or 801.3.3 as applicable), except those in black which shall be of non-reflective sheeting

Color :Unless otherwise specified, the general colour scheme shall be as stipulated in IS:5 "Colour for Ready Mixed Paints",viz

Blue	-	IS	Colour No.166: FrenchBlue
Red	-	IS	Colour No.537 :SignalRed
Green	-	IS	Colour No.284 :IndiaGreen
Orange-		IS	Colour No.591 :DeepOrange

The colors shall be durable and uniform in acceptable hue' when viewed in day light or under normal headlights at night

Adhesives: The sheeting shall either have a pressure sensitive adhesive of the aggressive- tack type requiring no heat, solvent or other preparation for adhesion to a smooth clean surface, or a tack free adhesive activated by heat, applied in ct, heat-vacuum applicator, in a manner recommended by the sheeting manufacturer. The adhesive shall be protected by an easily removable liner (removable by peeling without soaking in water or other solvent) and shall be suitable for the type of material of the base plate used for the sign. The adhesive shall form a durable bond to smooth, corrosion and weather resistant surface of the base plate,

such that it shall not be possible to remove the sheeting from the sign base in one piece by use of sharp instrument. In case of pressure-sensitive adhesive sheeting, the sheeting shall be applied in accordance with the manufacturer's specifications. Sheeting with adhesives requiring use of solvents or other preparation for adhesive shall be applied strictly In accordance with the manufacturer's instructions.

Refurbishment: Where existing signs are specified for refurbishment, the sheeting shall have a semi-rigid aluminium backing pre-coated with aggressive-tack type pressure sensitive adhesive. The adhesive shall be suitable for the type of material used for the sign and should thoroughly bond with that material.

4. FABRICATION:

Surface to be refectories shall be effectively prepared to receive the retro reflective sheeting. The aluminium sheeting shall be degreased either by acid or hot alkaline etching and all scale/dust removed to obtain a smooth plain surface before the application of retro- reflective sheeting. If the surface is rough, approved surface primer may be used. After cleaning, metal shall not be handled, except by suitable device or clean canvas gloves, between all cleaning and preparation operation and application of reflective sheeting/primer. There shall be no opportunity for metal to come in contact with grease, oil or other contaminants prior to the application of retro-reflective sheeting.

Complete sheets of the material shall be used on the signs except where it is unavoidable; at splices, sheeting with pressure sensitive 1 adhesives shall be overlapped not less than 5 mm. Sheeting with heat activated adhesives may be spliced with an overlap not less than 5 mm or butted with a gap not exceeding 0.75 mm. Where screen printing with transparent colors is proposed, only butt jointing shall be used. The material shall cover the sign surface evenly and shall be free from twists, cracks and folds. Cut-outs to produce legends and borders shall be bonded with the sheeting in the manner specified by the manufacturer.

Warranty and durability: The contractor shall obtain from the manufacturer a seven year warranty for satisfactory field performance including stipulated retro-reflectance of the retro- reflective sheeting of high intensity grade and a five year warranty for the adhesive sheeting of engineering grade and submit the same to the Engineer. In addition, a seven year and a five year warranty for satisfactory in field performance of the finished sign with retro- reflective sheeting of high intensity grade and engineering grade respectively, inclusive of the screen printed or cut out letters/legends and their bonding to the retro-reflective sheeting shall be obtained from the Contractor/supplier and passed on to the Engineer. The Contractor/supplier shall also furnish a certification to that the signs and materials supplied against the assigned work meets all the stipulated requirements and carry the stipulated warranty.

Processed and applied in accordance with recommended procedures, the reflective material shall be weather resistant and, following cleaning, shall show no appreciable discoloration, cracking, blistering or dimensional change and shall not have less than 50 per cent of the specified minimum reflective intensity values (Tables 800- 1 and 800-2) when subjected to accelerated weathering for 1000 hours, using type E or EH weather meter (AASHTO Designation M 268).

5. INSTALLATION

Sign posts, their foundations and sign mountings shall be so constructed as to hold these in a proper and permanent position against the normal storm wind loads or displacement by vandalism.

All components of signs and supports, other than the reflective portion and G.I. posts shall be thoroughly descaled, cleaned, primed and painted with two coats of epoxy paint. Any part of mild steel(M.S.) post, below ground shall be painted with three coats of red lead paint.

The signs shall be fixed to the posts by welding in the case of steel posts and by bolts and washers of suitable size in the case of reinforced concrete or G.I. posts. After the nuts have been tightened, the tails of the bolts shall be furred over with a hammer to prevent removal.

6. MEASUREMENTS FOR PAYMENT

The measurement of standard cautionary, mandatory and information signs shall be in numbers of different types or signs supplied and fixed.

7. RATE

The Contract unit rate shall be payment in full for the cost of making the road sign, including all materials, installing it at the site and incidentals to complete the work in accordance with the specifications

Item No.85 Point wiring for Light/Fan/Bell/ Primary point with 2-1.0 sq.mm & earth wire of 1.0 sq. mm.(green) both are ISI marked FR PVC insulated multistrand copper wires, in existing pipe duly erected, complete with 6A tissino type ISI marked flush type switch / bell push and accessories erected on polished wooden block/metal/PVC/ box 278 covered with 3mm thick laminated sheet (PVC Copper Wire, Acocab, Finolex, RR Cable brand only) and (Electrical accessories i.e. Switches etc. CLIPSAL, MK, ANCHOR, TOYOMA brand only) for concealed wiring.Light/Fan/Bell.

The relevant specification shall be followed as per Tender for Electrical works booklet. P.1 TO 49 (seperate sheetattached)

Item No.86 Point wiring for Independent PLUG point with 2-1.0 sq.mm & earth wire of 1 sq. mm.(green) both are ISI marked FR PVC insulated

multistrand copper wires, in existing pipe duly erected, complete with ISI marked 3 pin 6 A. socket and 6A tissino type switch erected on polished board block/metal/PVC/ box covered with 3mm thick laminated sheet (PVC Copper Wire, Acocab, Finolex, RR Cable brand only) and (Electrical accessories i.e. Switches etc. CLIPSAL, MK, ANCHOR, TOYOMA brand only) for concealed wiring.

The relevant specification shall be followed as per Tender for Electrical works booklet. P.1 TO 49 (seperate sheetattached)

Item No.87 Point wiring for Looped PLUG point with complete with ISI marked 3 pin 6 A. socket and 6A tissino type ISI marked flush typesingle pole switch erected with earth continuity connection erected, on polished wooden block / metal / PVC Box covered with 3mm thick laminated sheet for open/ concealed wiring.

The relevant specification shall be followed as per Tender for Electrical works booklet. P.1 TO 49 (seperate sheetattached)

Item No.88 Mains with 1.1 KV grade FRPVC insulated ISI marked stranded copper conductor wire in existing pipe erected with 1.5 Sq.mm copper conductor FR PVC insulated stranded wire of green colour for earth continuity of following size.(PVC Copper wire, Avocab, Finolex, RR Cable brand only (a) 2 wre 1.5 Sq.mm.

The relevant specification shall be followed as per Tender for Electrical works booklet. P.1 TO 49 (seperate sheetattached)

Item No.89 Mains with 1.1 KV grade FRPVC insulated ISI marked stranded copper conductor wire in existing pipe erected with 1.5 Sq.mm copper conductor FR PVC 279 insulated stranded wire of green colour for earth continuity of following size.(PVC Copper wire, Avocab, Finolex, RR Cable brand only (b) 2 wre 2.5 Sq.mm.

The relevant specification shall be followed as per Tender for Electrical works booklet. P.1 TO 49 (seperate sheetattached)

Item No.90 Providing and erecting PVC casing patty conforming to ISS complete rected with necessary fitting fixed with adhesive solution (I) for open execution .

The relevant specification shall be followed as per Tender for Electrical works booklet. P.1 TO 49 (seperate sheetattached)

Item No.91 Providing & erecting PVC Corrugated FLEXIBAL Conduit with require Nos. of coupling, PVC bushes, Check Nuts Etc. complet of following size. 20 mm.

The relevant specification shall be followed as per Tender for Electrical works booklet. P.1 TO 49 (seperate sheetattached)

Item No.92 Providing & erecting PVC Corrugated FLEXIBAL Conduit with require Nos. of coupling, PVC bushes, Check Nuts Etc. complet of following size 25 MM.

The relevant specification shall be followed as per Tender for Electrical works booklet. P.1 TO 49 (seperate sheetattached)

Item No. 93 8. Backlite lamp holder The relevant specification shall be followed as per Tender for Electrical works booklet. P.1 TO 49 (seperate sheetattached)

Item No.94 Electronic Hum Free EME Socket Type steps Fan Regulator

The relevant specification shall be followed as per Tender for Electrical works booklet. P.1 TO 49 (seperate sheetattached)

Item No.95 Providing and erecting Bulk Head fitting with glass wire guard rubber gasket &porcelain holder suitable for 40 Watt to 100 Watt lamp suitable conduit entry to be erected as directed. 280

The relevant specification shall be followed as per Tender for Electrical works booklet. P.1 TO 49 (seperate sheetattached)

Item No.96 Supplying and erecting approved make 1 X 40 Watt. white stove enameled Patti type type fluorescent fitting made of M.S. 0.8 mm. thick white on reflector side. Complet with heavy duty polyester copper wound balast, lock type tube, starter, duly wired for use on 250 V A.C. supply and erected if required on varnish P.W. block/PVC bloack with lead wires & connection. Cat-III (CLIPSAL, PIERLITE, PHILIPS, CROMPTON brand only) (a) Suitable for 1 tube 40 watt. 1.20mt. Cat-III

The relevant specification shall be followed as per Tender for Electrical works booklet. P.1 TO 49 (seperate sheetattached)

Item No.97 Approved make G.F. lamp 230/250 V. 40/60 Watt Cat-III

The relevant specification shall be followed as per Tender for Electrical works booklet. P.1 TO 49 (seperate sheetattached)

Item No.98 Approved make fluorscent tube 120 cms. 36/40 Watt erected, if required. Cat-III

The relevant specification shall be followed as per Tender for Electrical works booklet. P.1 TO 49 (seperate sheetattached)

Item No.99 Providing and erecting decorative call bell Ting -Tong box type 250 V. complet erected on existing polished wooden block or 3 mm thick laminated sheet.

The relevant specification shall be followed as per Tender for Electrical works booklet. P.1 TO 49 (seperate sheetattached)

Item No.100 Providing & erecting approved make ceiling fan with condenser A.C. 230 V 50 Cys. 1200 mm. sweep complet, canopy, regulator and 30 cms. Down rod erected on existing hook or clamp with 24/0.2 flat 3 core flexible wire with earhing. With outregulator. 281

The relevant specification shall be followed as per Tender for Electrical works booklet. P.1 TO 49 (seperate sheetattached)

Item No.101 Supplying & erecting fan hook box of 10 mm M. S. Round bar grouted in RCC slab with Making the site as original.

The relevant specification shall be followed as per Tender for Electrical works booklet. P.1 TO 49 (seperate sheetattached)

Item No.102 Providing & erecting 240 V. MCB double pole motor &incuding load (C curve) having 10 KA breaking capacity & conforms ti IS : 8828 in existing box having following capacity.40 Amp. Cat-II

The relevant specification shall be followed as per Tender for Electrical works booklet. P.1 TO 49 (seperate sheetattached)

Item No.103 Providing & erecting Sheet steel powder coated enclosure suitable for incorporating one/two nos. MCB. (A) DP MCB

The relevant specification shall be followed as per Tender for Electrical works booklet. P.1 TO 49 (seperate sheetattached)

Item No.104 For using salt and charcoal / coke as required for pipe type earthing

The relevant specification shall be followed as per Tender for Electrical works booklet. P.1 TO 49 (seperate sheetattached)

Item No.105 Cast iron earth palte size 30 x 30 x0.35 cms. Hurried in specially prepared 2.5 Mtr. Deep earth pit complete with necessary G.I. strip in G.I. pipe 2 mtr. Long with coupleing and G.I. plug for earthingofswitch gear, conduuit run of power plug etc.

The relevant specification shall be followed as per Tender for Electrical works booklet. P.1 TO 49 (seperate sheetattached) Item

Item No.106 GEB Conn. Charges for PHC

The relevant specification shall be followed as per Tender for Electrical works booklet. P.1 TO 49 (seperate sheet attached) 282

Item No.107 Credit of Desmental Materials of RCC Work for Steel

Item No.108 Credit of Dismental Materials of Brick Work for Brick Bets.

Item No.109 Credit of Desmental Materials of Doors & Windows

Signature of Contractor

Executive Engineer

Panchayat (R&B) Division

Surat

- : SCHEDULE FOR TESTING OF MATERIALS:-

For ensuring quality control and workmanship various tests prescribed below for materials shall be taken at periodical intervals as stipulated below. The materials shall be got tested at Government recognized Laboratory (R&B) or field Laboratory of GERI (R&B) for which 1% of the estimated amount put to tender shall be recovered from the contractor from the RA bills and final bills and the testing charges shall be paid to the GERI by the Government . However if the charges increase over 1% no excess recovery shall be made from the contractor as per resolution of B & C department dated 10th May 1985 vide TNC/ 1085/ (4)/ S

It. No. as per schedule "B"	Brief description of materials to be tested	Qty of material	Prescription of test which shall be carried out	Frequency at which test shall be carried out		Total No of test to be taken.
1]	Coarse Aggregate		- Gradation test	1 to 100 cm	1 test	

	40 to 63 H.B.		- Impact value	100 to 500 cm	3 test	
	40 to 63 M.C		- Flakiness and elongation	500 to 1500 cm	5 test	
	25 to 40 M.C			1500 to 5000 cm	7 test	
	12 to 20 M.C.			Minimum 1 test/ work		
	40 mm					
	20 mm					
2]	Grit 6 to 10		- Stripping value	As above		
3]	Granular materials		- Gradation - Atterbeg limits	As above		
4]	Murum		- P I Value	One test per 50 cum.		
5]	Sand/ quarry spall		- Silt content - Gradation - CBR test	One test per work/ season One test per 200 cmt. One test per work		
6]	Asphalt		1 Penetration test as per IS 1203	1 to 10 tanker 11 to 20 tanker 21 to 50 " 51 to 100 " Remaining every 50"	1 test 2 test 3 test 4 test 1 test	
			2 Ductility test as per IS 1208			
			3 Specific gravity test as per IS 1202			
			4 Softening point test as per IS 1204			
			5 Viscosity test as per IS 1206			
7]	Cement		- Consistency	Up to 50 MT	1 test	
			- Setting time	100 MT	2 test	
			- Compressive strength	200 MT	3 test	
			- Fineness	300 MT	4 test	
			- Chemical analysis	500 MT	5 test	
			- Soundness	800 MT	6 test	
				1300 MT	7 test	
				and 8 test for larger		

				consignment		
8]	CC Cubes		- Compressive Strength (I.S. 519 – 1959)	1 to 5 cms	1 No	
	C.C.			6 to 15 cms	2 No	
	M-150			16 to 20 cms	3 No	
	M-100			21 to 50 cms	4 No	
				51 and above	4 + 1	
				(For each additional 50 m ³ or part thereof)		
9]	Water		- Chemical test	Once for approval of source of supply		
10]	Steel		- Tensile Strength - Yield Stress - Elongation - Size	1 test/ 40 tonnes/ per category		
11]	Bricks		- Water absorption - Efflorence - Size - Compressive Strength	1 test per 50,000 bricks		
12]	Prime coat/ Tack coat		- Quality of binder	Number of samples per lot and test as per IS:73		
			- Binder temperature for application	At regular close intervals		
			- Rate of spread of binder	Two test per 500 m ² and not less than two test per day		
13]	Carpet and Seal coat mix/ B.M/ M.S.S.		- Quality of binder	Number of samples per lot and test as per IS:73		
			- Grading	1 test on individual contents and mix aggregate from the dryer for each 100 tonns of mix subject to minimum of two test per plant per day		
			- Temperature of binder	At regular close intervals		
			- Binder content vide 45 IMD 2172	One test for each 100 tonnes of mix subject to mini. of Two per		

				day	
			- Rate of spread of mix materials	Regular control through checks on layer thickness	
14]	Granular Sub-base		- Gradation	As mentioned under serial number 3	
			- Atterberg limits	As mentioned under serial number 3	
			- Moisture content prior to compaction	As mentioned under serial number 3	
			- Density of compacted layer	One test per 500 m ²	
			- Deleterious constituents	As required	
			- C.B.R.	As required	
15]	Wet Mix Macadam		- Aggregate Impact Value	As mentioned under serial number 1	
			- Grading	As mentioned under serial number 1	
			- Flakiness and Elongation Index	As mentioned under serial number 1	
			- Atterberg limits of portion of aggregate passing 425 micron sieve	As mentioned under serial number 3	
			- Density of compacted layer	One test per 500 m ²	
16]	Water Bound Macadam		<ul style="list-style-type: none"> - Aggregate Impact Value - Grading - Flakiness Index and Elongation index - Atterberg limits of binding material - Atterberg limits of portion of aggregate passing 425 micron sieve 	As mentioned under serial number 1 As mentioned under serial No.1 As mentioned under serial number 1 As mentioned under serial number 1 As mentioned under serial number 1	

The Number of tests will be as per Manual of quality control or latest Govt. G.R./Circular and it will be considered final

The contractor shall have to pay 1% of the estimated cost put to tender towards all testing of materials and the same shall be deducted from their bills for the works.

Testing charges of GERI shall be borne by Govt. No refund be made nor extra charges over 1% shall be recoverable from the contractor.

If directed by the Engineer in charge, the materials intended to be used for the work but not included in the above schedule shall also be got tested at Government recognized Laboratory or field Laboratory.

Signature of Contractor

Executive Engineer
Panchayat (R&B) Division
Bharuch