Executive Engineer
Heritage Cell

Surat Municipal Corporation,
School No.16, Near Soham Circle,
Althan Canal Road, Althan, Surat

Quotation

H.R/S.C./Out/No.142
Date:03 /07/2025

TO_____
_____
_____
_____

Sub :- Construction of D.G. Set Platform Near Stall Area at Surat Castle ,Chowk Bazaar ,Surat (3rd Attempt).

Gentlemen,

Surat Municipal Corporation Heritage Cell Inviting Quotationfor Construction of D.G. Set Platform Near Stall Area at Surat Castle ,Chowk Bazaar ,Surat.

You are requested to send your offer in sealed cover in the office **of "Chief Accountant, Surat Municipal Corporation, Muglisara, Surat"on or before Dt.14/07/2025 up to 18.00 hrs By R.P.A.D/Speed Post Only.** Please note that the sealed cover Shall be duly super scribed with the name of " Construction of D.G. Set Platform Near Stall Area at Surat Castle ,Chowk Bazaar ,Surat" **(3rd Attempt)** .The terms & conditions for this offer are as follow, failing which the quotation shall be rejected out rightly.

TERMS AND CONDITIONS:-

1. Bidder has to submit Registration certificate of any department of state Government, Surat Municipal Corporation, Central Government etc. of "E-2" Class and above
2. The quotation complies in 1 cover.
   Sealed Cover-Registration Certificate of "E-2" Class and above, Bank Solvency of 20% of Offer Amount, P.F. Certificate /ESI, GST Certificate, Work Completion Certificate and sign all the documents and EMD of Rs. 2,000/-in the form of Crossed Demand Draft / Pay order/ Cheque of Local Nationalized Bank with duly sealed.
3. Bidder having experience similar works of Building Construction /Maintenance workis eligible to bid the quotation.

Cover shall mention on top name of work, name of agency and duly sealed.

4. Bidder shall have to attach Registration Certificate of "E-2" Class and above, Bank Solvency of 20% of Offer Amount, P. F. Certificate / ESI, GST Certificate,Work CompletionCertificate and sign all the documents and quotation offer letter otherwise the same shall not be considered.
5. Bidder has to deposit EMD of Rs. 2,000/- in the form of Crossed Demand Draft / Pay order/ Cheque of Local Nationalized Bank, acceptable to Surat Municipal Corporation, drawn in favour of the Municipal Commissioner,SURAT MUNICIPAL CORPORATION payable which shall be refunded after sanction of work.
6. Quotation once offered shall not be withdrawn by Bidder/Agency.
7. Quotation once accepted shall be binding to the Bidder/Agency..

8. The rate shall include all the prevailing taxes/levies/duties/cess or other impositions except GST & any other tax levied during execution period of work.

9. GST (Goods and Service tax) Circular no. acc/S.R./30, dtd. 08/09/17 and Circular no. acc/S.R./61, dtd. 26/03/18 of Surat Municipal Corporation is applicable and abides to the work. The decision of SMC regarding GST will be final and abiding to the Bidder.
10. The rates quoted must include all freight,insurance, transportation, delivery and loading /unloading at the site etc. complete.
11. The decision of Deputy Mu. Commissioner ,Heritage Cell, SMC shall be final in respect of disputes what so ever arise.
12. Right to accept any or to reject any or all the quotations without assigning any reason thereof is reserved by the competent authority of Surat Municipal Corporation, Surat.
13. The Intended Bidders has to contact Deputy Engineer/Asst.Engineer, Heritage Cell on working days between 9.00 AM to 5.00 PM at School No.16, Second Floor , Soham Circle Althan Canal Road, Althan, Surat & visit the site and gather information before quoting rates.
14. Accordingly,Bidder have to quote and submit in the above said time limit.
15. All necessary safety measures and precautions (including those laid down in the various relevant Indian Standards) shall be taken to ensure the safety of men, materials and machinery on the works as also of the work itself.
16. The Bidder/Agency's rate of the item of work shall be for the work completed in all respects.
17. Approval of the samples of various materials given by the Engineer-in-charges hall not absolve the Bidder/Agency's from the responsibility of replacing defective material brought on site or material used in the work found defective at a later date. The Bidder/Agency's shall have no claim to any payment or compensation what-so-ever on account of any such materials being rejected by the Engineer-in-charge.
18. Conditional quotation letter shall not be accepted.
19. The contract shall be constituted according to and subject to laws in India and state of Gujarat and under the jurisdiction of Courts of Gujarat at Surat City only.
20. Bidder to whom the award is made shall furnish a performance guarantee (Initial Security Deposit) for amount equal to Two percent (2.00%) of the contract amount by a demand draft of a Scheduled Nationalized Bank acceptable to owner on the Surat Branch Security Deposit shall be paid in time and if it is paid after Ten (10) days from the date of work order, then the penalty of 0.065 % per day of the amount of Security Deposit shall be recovered from the contractor.The performance guarantee (Security Deposit) will be returned to the contractor after the defect liability period (one year after completion of work) and on completion of audit related procedure. Two percent (2.00%) shall be deducted from running bills as retention money and will be released in final bill.Additional 5.00 % amount will be retained from each R.A. bill as additional retention money and will be released in final bill.
21. Time limit of the work is 02 (Two) months (Including Monsoon). If the bidder fails to complete the work within the stipulated completion date for the work, he shall pay liquidated damages 0.20% of contract value per day in completion or part there of as the case may however be, Subjected to a maximum of 10% (Ten Percent) of the contract value.

22. This work shall be carried out as per the attached detailed specification. I/We do hereby give quotation to execute above mentioned work in accordance with the accompanying specifications and conditions in considerations. Appointed Contractor has to Submit the Duly Sign Copy of Detail Technical Specification.
23. Successful contractor shall also be required to enter into contract agreement along with undertaking and local surety on Gujarat Stamp Paper purchased from Surat worth Rs.900.00 (i.e. 300.00 + 300.00 + 300.00 for each) (to be brought from Surat by the contractor) on getting the order. However, the stamp duty at prevailing rate shall be applicable if revised by Government.
24. The Bidder shall quote the rate in "price schedule". No alterations in form of tender and in "price schedule" and no additions in the shape of special stipulation will be permitted. Bidder/tenders, which do not fulfill all or any of the above conditions or are incomplete in any respect are liable to be rejected.

-SD-
Executive Engineer
Heritage Cell
Surat Municipal Corporation

Seal & Signature of the Bidder

Name :-

GST No. :-

Address :-

Date :-

Name of Work:- **Construction of D.G. Set Platform Near Stall Area at Surat Castle ,Chowk Bazaar ,Surat. (3rd Attempt).**

PRICE BID

Sr. No.	ITEM	Quantity	Unit	Rate Rs. Ps.	Amount Rs. Ps.
1	Boring holes 3.5mt. Deep in ordinary soil (for cast in situ piles) & disposal of the surplus excavated soil as directed within a lead of 50M. For following diameter of piles.				
	250mm	0.00	R.M.	326.84	0.00
	300 mm	16.00	R.M.	391.74	6267.84
2	Excavation of soil upto 1.5 mts. Depth including sorting out and stacking of useful materials and disposing of the excavated stuff upto50 meter lead.				
	(A) loose or soft soil	1.00	cu. Mt.	117.26	117.26
	(B) dense or hard soil	1.00	cu. Mt.	149.67	149.67
3	Filling in foundation and plinth with murrum or selected soil in layers of 20cm. thickness including watering, ramming and consolidating etc. complete	2.00	Cu.Mt	289.06	578.12
4	Demolition including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift. (i) R.C.C. work				
	(1) RCC	1.00	Cu. Mt.	1,057.85	1057.85
5	Dismantling tiled of stone floors laid in mortar including stacking of serviceable materilas and disposal of unserviceable materials with all lead and lift.	1.00	sq. Mt.	47.72	47.72
6	Providing formwork of ordinary timber plankings so as to give a rough finish including centering, shuttering , strutting and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4m and removal of the same for cast in situ reinforced concrete and plain concrete work.				
	(AA) foundation, footings, bases of columns, etc. and mass concrete.	10.00	sq. Mt.	174.98	1749.80
7	Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq.Cm. in foundation and plinth in Cement Mortar 1:5. (1-Cement : 5 -fine sand) .				
	(B) Conventional	2.00	Cu. Mt.	4,051.78	8103.56
8	Un coursed Rubble Masonry with hard stone of approved quality in foundations and plinth in Cement Mortar 1:5 (1-cement : 5-coarse sand including levelling up etc. complete.	1.20	Cu. Mt.	2,542.30	3050.76
9	Providing & laying cement concrete 1:1.5:3 (1 cement:1.5 sand:3 graded stone agg. 20 mm nominal size)& curing comp. Includ. cost of form work but exclu. Cost of reinforcement for reinforced concrete work in : (A) Foundation, footing, Base of columns and Mass concrete	2.00	Cu. Mt.	4,146.15	8292.30

10	Providing & laying ordinary cement con.1:1.5:3 (1cement:1.5sand: 3 graded stone agg. 20 mm nominal size) finishing smooth curing etc. comp. Incld. Cost of form work but excl. Cost of reinforcement for R.C.C. Work in : Up to G.L./P.L.				
	(1)Having c/s area up to 0.08 s.mt	1.50	Cu. Mt.	12,632.50	18948.75
	(2) Having c/s area more than 0.08 sq. mt. &upto 0.12 sq.mt	0.00	Cu. Mt.	11,166.97	0.00
11	Providing & laying ordinary cement con.1:1.5:3(1cement:1.5 sand:3 graded graded stone agg. 20 mm nominal size) finishing smooth curing etc. comp. Incl.. Cost of form work but excl. Cost of reinforcement for R.C.C. Work in :				
	(B) BEAMS :				
	(1)Having c/s area up to 0.08s.mt- Ground Floor	1.00	Cu. Mt.	9,102.61	9102.61
	(C) SLABS:				
	(1) Slabs having more than 13 cm. Thickness.- G.F.	1.50	Cu. Mt.	6,813.01	10219.51
12	Providing &layng cement concrete 1:2:4 (1cement: 2 sand : 4 graded stone agg.20 mm nominal size) & curing comp. Including cost of form work but excluding Cost of reinforcement for reinforced concrete work in : (A)Foundation, footing, Base of columns and Mass concrete.	2.00	Cu. Mt.	3,637.34	7274.68
	beams (1) Having c/s area up to 0.08 s.mt.	1.00	Cu. Mt.	8,593.80	8593.80
13	Providing & laying cement concrete 1:3:6 (1 cement: 3 coarse sand:6 crushed stone agg. 20mm nominal size) & curing comp. include cost of form work in : (A) foundation & plinth.	1.00	Cu. Mt.	3,005.76	3005.76
14	Providing & fixing IS Mark FE 500/500D TMT/CRS bar reinforcement for R.C.C. work incl. bending, binding, & placing in position etc. comp. upto two floor level	300.00	kg	76.21	22863.00
15	providing and fixing MS grills of required pattern to wooden frames of window etc. with MS plate at required spacing and frame around, square or round bar with rounded headed bolts and nuts by screws.				
	(AA) plain grill	500.00	kg	104.20	52100.00
	(BA) ornamental grill	10.00	kg	153.20	1532.00
16	Providing 20 mm thick double coat mala cement plaster on brick/concrete work for plastering comprising of base coat 12mm thick cement plaster in cement mortar (1Cement :4 coarse sand) in rough finishing and 8mm thick top coat of cement mortar 1:2 (1Cement :2 Coarse sand) finished with trovel including scaffolding curing etc. complete.	20.00	sq. mt.	272.48	5449.60
17	Applying priming coat over new steel and other metal surface after over and including preparing the surface by thoroughly cleaning oil, grease dirt and other foreign matter and scoured with brushes fine steel wool, scrapers and sand paper with ready mixed priming paint brushing red lead	100.00	sq. mt.	35.00	3500.00

18	painting two coat (excluding priming coat) on new steel and other metal surface with synthetic enemal paint, brushing to give an even shade including cleaning the surface of all dirt, dust and other foreign matters	100.00	sq. mt.	65.31	6531.00
19	Providing & applying two coats of weather shield max paint (3 coats may be required in case of darker colours.)of ICI Dulux or Apex Ultima of Asian Paint including applying exterior acrylic primer coat as per manufacturers specification and directions in shade and colour approved by architects, on exterior surfaces of the building including scaffolding, preparing the surface, watering, curing etc. complete and as directed by the architects and manufacturers. Surface Preparation :surface is thoroughly clean, dry and free from all loose dirt, chalk, grease, fungi, algae and flaking paint. This can be achieved by brushing with a wire/ stiff coir brush, followed by water jetting if required. Fill up all minor cracks and defects with white cement and sand mixture in the ratio 1:3. For application on previously painted wall, previous coatings of paint must be thoroughly scraped off and Clean the surface thoroughly using wire brushes. Priming:Apply a liberal coat of exterior acrylic primer and allow it to dry for 4-5 hours. Application of putty is not recommended. Minimum 4-6 hours duration is required between each coat of weather shield max paint	50.00	sq. mt.	82.00	4100.00
20	RCC Core Cutting is about making precise, circular cuts for creating holes of required diameters for Rehabilitation in civil works. The core drilling rod is fitted with diamond pieces at the drilling end. The core cutting machine can be used for both horizontal and vertical hole making purposes.				
	150mm	5.00	Nos	428.00	2140.00
21	Providing and fixing approved make Perforated C type cable tray. Made from sheet steel. The cable tray should be single or double bended as per required and as per IS 2062/1079 and shall be coated with hot dip galvanizing as per IS 2629/4759. with max 17.5% perforation with coupler plate / Fish plate and GI hardware like nut - bolt and washers etc. erection with necessary support(included) as per Specification and as per instruction of engineer in charge.				
	300 X 50 X 2.0 mm Thick	20.00	Rmt.	616.00	12320.00
				Total Amount	**197095.59**
				% Above/Below	
				Net Amount (Excluding GST)	

- SD-
Executive Engineer
Heritage Cell
Surat Municipal Corporation

SEAL & SIGNATURE OF THE BIDDER:

Detail Specification

Name of Work:- Construction of D.G. Set Platform Near Stall Area at Surat Castle ,Chowk Bazaar ,Surat. (3rd Attempt)

SURAT MUNICIPAL CORPORATION

NAME OF WORK:-Construction of D.G. Set Platform Near Stall Area at Surat Castle ,Chowk Bazaar ,Surat. (3rd Attempt)

I N D E X

01- SPECIFICATIONS OF MATERIALS

Note:-*Consider latest revision of the said I.S. wherever its applicable.*

M-1 Water

- Water shall not be salty or brackish and shall be clean, reasonably clear and free from objectionable quantities of silt and traces ofoil andinjurious alkalies, salts, organicmatter and other deleterious material which will either weaken the mortar or concrete or cause ejections or attack the steel in R.C.C. Container for transport, storage and handling of water shall be clean. Water shall conform to the standards specified in I.S.456-2000.
- If required by the Engineer-in-charge it shall be tested by comparison with distilled water. Comparison shall be made by means of standard cement tests for soundness, timeof settingandmortarstrengthasspecifiedinI.S.1269-1976.Anyindicationofunsoundness,changein time of setting by 30 minutes or more or decrease of more than 10 percent in strength of mortar prepared withwater samplewhen comparedwith theresults obtained with mortar prepared with distilled water shall be ejection cause for ejection of water under test.
- Water for curing mortar, concrete or masonry should not be too acidic or too alkaline. It shall be free ofelements whichsignificantly affectthe hydration reaction or otherwise interfere with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortarsurfaces.
- Hard and bitter water shall not be used forcuring.
- Portable water shall generally be found suitable forcuring mortar or concrete.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-2 Lime

- Lime shall be hydraulic lime as per I.S. 712-1973. Necessary tests shall be carried out as per I.S. 6932 (Parts I to X)1973.
- The following field tests for limes are to carried out
    1. A very rough idea can be formed about the type of lime by its visual examination i.e. fat lime bears pure whitecolour, limein form of porous lumpsof dirty white colour, indicates quick lime, and solid lumps the unbrunt limestone.
    2. Acid tests for determining the carbonate content in lime. Excessive amountof impurities and rough determination of class oflime.
- Storage shall comply with I.S. 712-1973. The slaked lime, ifstored, shall be kept in a weather proof and dampproof shedwith imperviousfloor and sides to protect it against rain, moisture, weather and extraneous materials mixing with it. All limethat has been damaged in any way shall be rejected and all rejected materials shall be removed from site of work.
- Field testing shall be done according to I.S. 162-1974 to show the acceptability ofmaterials.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-3 Cement

- Cement shall be ordinary portland cement of 53 grade as per I.S. 12269-2013 (with latestammendment) namely Ambuja, Ultra tech, Sanghi, Hathi, Sidhdhi,J.K.Laxmi.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-4 White Cement

- The white cement shall conform to I.S.8042-1978.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-5 Coloured Cement

- Coloured cement shall be with white or grey portland cement as specified in the item of the work.
- The pigmentsused forcoloured cement shall beof approvedquality and shall not exceed 10% of cement used in the mix. The mixture of pigment and cement shall be properly ground to have a uniform colour and shade. The pigments shall have such properties as to provide for durability under exposure to sun-light and weather.
- The pigment shall have the properly such that it is neigher affected by the cement not detrimental to it.
- As per relevant I.S. Code
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-6 SAND

- Sand shall be natural sand, clean, well graded, strong, durable and gritty particles free from injurious amounts of dust, clay, kankar nodules, soft or flaky particles, shale, alkaly, salts, organic mater, loam, mica or other deleterious substances and shall be got approved from the Engineer-in-charge. The sand shall not contain more than 8% of silt as determined by field tests. If necessary the sand shall be washed to make itclean.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision
- Coarse Sand : The fineness modulus of coarse sand shall not be less than 2.5 and shall not exceed 3.0. The sieve analysis of coarse shall be as under---

I.S.Sieve Designation	% byweight Passingsieve	I.S.Sieve Designation	% byweight Passingsieve
4.75 mm	100	600 Micron	30-100
2.36 mm	90-100	300 Micron	50-70
1.18 mm	70-100	150 Micron	0-50

- Fine Sand : The finess modulus shall notexceed1.0.
- The sieve analysis of fine sand shall be as under---

I.S.Sieve Designation	% byweight Passingsieve	I.S.Sieve Designation	% byweight Passingsieve
4.75 mm	100	600 Micron	40-85
2.36 mm	100	300 Micron	5-50
1.18 mm	75-100	150 Micron	0-10

M-7 STONE DUST

- This shallbe obtained from crushing hard blacktray orequivalent, itshall not contain more than 8% of silt as determined by field test with measuring cylinder. The method of determining silt contents by field test is given asunder.
- A sample of stone dust to be tested shall be placed without drying in 200 mm measuring cylinder. The quantity of the sample shall be such that it files the cylinder upto 100 mm mark. The clean water

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

- The height of silt visible as settled layer above the stone dust shall be expressed as percentage of the height of the stone dust below. The stone dust containing more than 8% silt shall be washed so as to bring the silt content within the allowable limit.
- The fineness modulus of stone dust shall not be less than1.80.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-8 STONE GRIT

- Grit shall consist of crushed or broken stone and behard, strong, dense, durable, clean, of proper gradation and free from skin or coating likely to prevent proper adhesion ofmortar.Grit shall generally be cubical in shape and as far as possible flaky elongated pieces shall be avoided. It shall generally comply with the provisions of I.S. 383-1970. Unless a special stone of a particularly quarry is mentioned, grit shall be obtained from the best black trap or equivalent hard stone as approved by the Engineer-in-charge. The grit shall have no deleterious reaction withcement.
- The crushing strength of grit will be such as to allow the concrete inwhich it is used to build-up the specified strength ofconcrete.
- The necessary tests for grit shall be carried out asper therequirements of I.S. 2386 (Parts I to VIII)1963, as per instruction of the Engineer-in-charge. The necessityof test will be decided by theEngineering-in-charge.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision
- The grit shall conform to the following gradation as per sieve analysis:

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

M-9 CINDER

- Cinder is well brunt furnace residue which has been fused or ssintered into lumps of varying sizes.
- Cinder aggregates shall be well burnt furnace residue obtained from furnace using coal fuel only. It shall be sound clead and free from clay, dirt, ash or other deleteriousmatter.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision
- The average grading for cinder aggregates shall be as mentioned below:-

I.S.Sieve Designation	% by weight passingsieve	I.S.Sieve Designation	% by weight passingsieve
20 mm	100	4.75 mm	70
10 mm	86	2.36 mm	52

M-10 LIME MORTAR

- LIME : Lime Shall conform to specification M-2. WATER : Water shall conform to specification M-1. SAND : Sand shall conform to specificationM-6.
- PROPORTION OF MIX : Mortar shall consist of such proportions of slaked lime and sand as may be specified in the item. The slaked lime and shall shall be measured byvolume.
- PREPARATION OF MORTAR : Lime mortar shall be prepared by wet process as per I.S. 1625-1971. Power driven mill shall be used for preparation of lime mortar. The slakedlimeshall be placed

in the mill in an even layer and ground for180 revolutions with sufficient water. Water shall be added as required during grinding (care being taken not to add more water) that will bring the mixed material to a consistency of stiff paste. Thoroughly wetted sand shall then be added evenly and the mixture ground for another 180revolutions.

- STORAGE: Mortar shall always be kept damp, protected from sun and ram till used up, covering it by tarpaulin or open sheds.
- USE: All mortar shall be used as soon as possible after grinding. It should be used on the day on which it prepared, But in no case mortar made earlier than 36 hours shall be permitted for use.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-11 CEMENT MORTAR

- Water shall conform to specification M-1. Cement shall conform to specification M-3. Sand shall conform toM-6.
- PROPORTION OF MIX :

  11.2.1 Cement and sand shall be mixed tospecified proportions, sand being measured by measuring boxes. The proportion of cement shall be by volume on the basis of 50 Kg./Bag of cement being equal to 0.0342 cu.m. The mortar may be hand mixed or machine mixed asdirected.

- PREPARATION OF MORTAR :

  11.3.1 In hand mixed mortar, cement and sand in the specified proportions shall be thoroughly mixed dry on a clean impervious platform by turning over atleast 3times ormore tilla homogeneousmixture of uniform colouris obtained. Mixing platformshall beso arrangedthat nodeleterious extraneous material shall get mixed with mortar or mortar shall flow out. While mixing, thewater shall be gradually added and thoroughly mixed to form a stiff plastic mass of uniform colour so that each particle ofsand shall be completely covered with a film ofwet cement. The water cement ratio shall be adopted asdirected.

  11.3.2 The mortarso prepared shall be used within 30minutes ofadding water. Only suchquantity of mortar shall be prepared as can be used within 30minutes.

- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-11A CHEMICAL MORTAR

Ready / factory mixed mortar madeupof cement, graded sand & blended with polymers toimpart highstrength&waterretentionpropertiesevenwhenthicknessesof2-3mmlayers.

Water shall conform to specification M-1. Cement shall conform to specification M-3. Sandshall confirm toM-6.

Vendor list for chemical mortar :**Perma, Sicca, Sunanda, Magic Bond, Ultratech Fixoblock,K- 95 Block Fix.**

If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-12 STONE COASE AGGREGATE FOR NOMINAL MIX CONCRETE

- Coarse aggregate shall be of machine crushed stone of black trap or equivalent and be hard, strong, dense, durable, clean and free from skin andcoating likelyto prevent proper adhesion ofmortar.
- The aggregate shall generally be cubical inshape. Unless special stonesofparticular quarries are mentioned aggregates shall be machine crushed from the best black trap or equivalent hard stone as approved. Aggregate shallhave nodeleterious reaction with cement. The sizeof thecoarse

aggregatefor plaincement concreteand ordinary reinforced cement concreteshall generally be as per thetable given below. However, in case of reinforced cement concrete the maximum limit may be restricted to 6 mm. less than the minimum lateral clear distance between bars or 6mm. less than the coverwhichever is smaller.

TABLE

I.S. Sieve Designation	Percentage passing for single sized aggregates of nominal size			I.S. Sieve Designation	Percentage passing for single sized aggregates of nominal size		
	40 mm	20 mm	16 mm		40 mm	20 mm	16 mm
80 MM	--	--	--	12.5 MM	---	--	---
63 MM	100	--	--	10MM	05	0.20	0.30
40 MM	85-100	100	--	4.75 MM	--	0.50	0.50
20 MM	0-20	85-100	100	2.35 MM	--	--	--
16 MM	--	--	85-100				

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

- The grading test shall be taken in the beginning andatthe change ofsource ofmaterials. The necessary tests indicated in I.S. 383-1970and I.S. 456-1978 shall have to be carried out to ensure the acceptability. The aggregates shall be stored separately and handled in such a manner as to prevent the inter mixing of different aggregates. If the aggregates are covered with dust, they shall be washed with water to make, themclean.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-13 BLACK TRAP OR EQUIVALENT HARD STONE COASE STONE COASE:

- Aggregate for Design Mix Concrete : Coarse aggregate shall be of machine crushed stone of black trap or equivalent hard stone and behard, strong, dense, durable,clean and free from skin and coating likely to prevent proper adhesionof mortar.
- The aggregates shall generally be cubical inshape, unlessspecial stonesof particular quarries are mentioned, aggregates shall be machine crushed from the best, black trap or equivalent hard stones as approved. Aggregate shall have no deleterious reaction withcement.

  The necessary tests indicated in I.S. 383-1970, I.S. 2386 (Part I to part VIII) and I.S. 456-2000 shall have to be carried out to ensure the acceptability of thematerial.
- If aggregate is covered with dust it shall be washed with water to make itclean.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-14 BRICK BATS AGGREGATE

Brick bataggregate shall be broken from wellburnt orslightly over burnt and dense bricks. It shall be homogeneous in texture, roughly cubical in shape, clean andfree from dirt of any other foreign material. The brick bats shall be of 40 mm to 50 mm size unless otherwise specified in the item. The underburnt or overburnt brick bats shallnot be allowed.

- The brick bats shall be measured by volume by suitable boxes asdirected.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-15 BRICKS

- The bricks shall be hand or machine moulded and made from suitable soils and kiln burnt. They shall be free from cracks and flaws not nodules of free lime. They shall have smooth rectangular faces

with sharp corners and shall be of uniform colour. The bricks shall be moulded with a frog of 100mm x 40 mm and 10mm to 20mm deep on one of its flat sides. The bricks shall not break when dropped on the ground from a height of 600 mm.

- The size of modular bricks shall be 190mm x 90mm x90mm.
- The size of conventional bricks shall be as under -- 225 x 110 x75mm.
- Only bricks of one standard size shall be used on one work. The following tolerances shall be permitted in the conventional size adopted in a particularwork.

  Length : ± 3.00mm
  Width : ± 1.50mm
  Height : ± 1.50mm

- The crushing strength of the bricks shall not be less then 35 Kg./Sq.Cm. The average water absorption shall notbe morethan 20% by weight. Necessary tests for crushing strength and water absorption etc. shall be carried out as per I.S. 3495 (Part I toIV)-1976.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-15A FLYASH BUILDING BRICKS :

The Fly-ash building bricks shall conform to Grade-5 of IS-13757. The frog of the 80 to 100 mm x 40 mm x 10 to 20 mm size.

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

The size of conventional brick shall be 230 mm x 110 mm x 70 mm.

Only bricks of one standard size shall used on one work. The followingtolerances shall permittedin the conventional size adopted in a particular work:

Length : ± 4 mm
Width : ± 2 mm
Height : ± 2 mm

The physical characteristic of bricks shall be as follows.

The minimum compressive strength of Flyash building bricks shall not be less than 70 Kg/Sq.Cm. and the test shall be conform to IS-3495 (Part-I).

The averages water absorption not more than 20 percentage by weight and the test shall conform toIS-3495(Part-3).SamplingofFlyashbuildingbricksandcriteriaforconformity shall be as per I.S.:5454.
If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-15B AUTOCLAVEDAIRATED (CELLULAR) CONCRETE BLOCK (AAC BLOCK) :

Vendors : Utratechxtra lite, Aerocon, Ecolite, Biltech, Magicrete,Litecon, ascolite, wonder block

The AACBlocks shall be machine moulded and shall be sound & free of cracks or others defectswhichinterferewiththeproperplacingofunitorimpairthestrengthor performanceof the construction.

Dimensions :

Length : 600/625mm
Width : 225 / 100 mm
Height : 200 / 240 mm

The crushing strength of the AAC Block shall not be less then 40 Kg./Sq.Cm. Necessary tests forcrushing strength and block density etc. shall be carried out as per I.S. 2185 (Part III) &I.S.6441 if any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-16 STONE

- The stone shall be of the specificiedvariety such as Granite/Trap stone/Quarziteorany other type of good hard stones. The stones shall be obtained only from the approved quarry and shall be hard, sound, durable and freefrom defectslike cavities, cracks, sand holes, flaws, injuriousviens, patchesof loose or soft materials etc. and weathered portions and otherstructuraldefects orimperfections tendingto affecttheir soundness and strength. The stone with round surface shall not be more than 5% of dry weight. Whentested in accordance with I.S. 1134-1974. The minimum crushing strength of the stone shall be 200 Kg./Sq.Cm. unless otherwise specified.
- The samples of the stone to be used shall be gotapproved before the work is started.
- The khankifacing stone shall be dressed bychisel as specified in the item for khanki facing in requiredshape and size. The face of the stone shall be sodressed that the bushing on the exposed face shall not project by more than 40 mm.from the general wall surface and on face to beplastered itshall notproject bymore than19 mmnor shallit have depressions more than 10 mm from the averagewall surface.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-17 LATERITE SONE

- Late rite stone shall be obtained from the approvedquarry. It shall compacted in texture, sound, durable and free from soft patches. It shall have a minimum crushing strength of 100 Kg/Sq.Cm. in its dry condition. It shall not absorb water more 20% of its own weight, when immersed for 25 hours in water. After quarrying, the stone shall be allowed to weatherfor some time before using inwork.
- The stone shall be dressed into rectangular blocks sothat all faces are from waviness and unevenness and the edges true andsquare.
- Those type of stone in which white clay occurs should not beused.
- Special corner stones shall be provided wheresodirected.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-18 MILD STEEL BARS / TMT / CRS BARS :

- Mild steel bars reinforcement for R.C C. work shall conform to I.S. 432 (Part -II) 1966 and shall be of testedquality. It shall also comply with relevant part of I.S. 456-1978.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision.
- All the reinforcement shall be clean and free form dirt,paint,grease,millscaleorloose or thick rust at the time ofplacing.
- For the purpose of payment the bar shall be measured correct upto 10 mm length and weight payable worked out as per the rate specified below:

1.	6mm	0.22 Kg/Rmt.	8.	20mm	2.47 Kg/Rmt.
2.	8mm	0.39 kg/Rmt.	9.	22mm	2.98 kg/Rmt.
3.	10mm	0.62 kg/Rmt.	10.	25mm	3.85 kg/Rmt.
4.	12mm	0.89 kg/Rmt.	11.	28mm	4.83 kg/Rmt.
5.	14mm	1.21 kg/Rmt.	12.	32mm	6.31 kg/Rmt.
6.	16mm	1.58 kg/Rmt.	13.	36mm	7.31 Kg/Rmt.
7.	18mm	2.00 Kg/Rmt.	14.	40mm	9.86 Kg/Rmt.

M-19 HIGHYIELD STRENGTH STEEL DEFORMED BARS / TMT FE-500

- High yield strength steel deformed bars shall be either cold twisted or hot rolled and shall conform to I.S. 1786-1966 and I.S. 1139-1966 respectively (with latest ammendment) and following makes TATA, SAIL, RINL, Electrotherm,Ramasroop,National,JSW.

- Other provisionandrequirementsshallconform to specification No.M-18 for Mild SteelBars.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-20 HIGH TENSILE STEEL WIRS

- The high tensile wires for use in pre-stressed concrete shall conform to I.S.2090-1983.
- The tensile strength of the high tensile steel bars shall be as specified in the item. In absence of the given strength and minimum strengthshall be taken as per para 6-1 ofthe I.S. 1785- 1962. Testing shall be done as per I.S.requirements.
- The high tensile steel shall be free from loose mill scale, rust, oil, grease or any other harmful matter. Cleaning of steel bars may be carried out by immersion in solvent solution, wire brushing or passing through a pressure boxcontaining carborundum.
- The high tensile wire shall be obtained from manufactures in coils having diameter not less than 350 times the diameter of wire itself so that wire springs back straight on beinguncoiled.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-21 MILD STEEL BINDING WIRE

- The mild steel wire shall be of 1.63mm or 1.22mm (16 or 18 guage) diameter and shall conform to I.S.280-1978.
- The use of blackwire willbe permittedfor bindingreinforcement bars. It shall be free from rust, oil, paint, grease, loose mill scale or any other undesirable coating which may prevent adhesion of cementmortar.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-22 STRUCTURAL STEEL

- All structural steel shall conform to I.S. 226-1965. The steel shall be free from the defects mentioned in I.S. 226- 1975 and shall have a smooth finish. The material shall befree from loose mill scale, rust pits or other defectsaffecting the strength and durability. Rivet bars shall conform to I.S.1148-1973.
- When the steel is supplied by the contractor test certificates of the manufacturers shall be obtained according to I.S. 226-1975 and other relevant IndiandStandards.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-23 GALANISHED IRON SHEETS

- The galvanised iron sheets shall be plain or corrugated sheets of gauges as specified in item. The G.I. Sheets shall conform to I.S.277-1977. The sheets shall be undamaged in carnage and handling either by rubbing off of zinc coating or otherwise. They shall have clean and bright surface and shall be free from dents, bends, holes, rust or white powdery deposit.
- The length and width of G.I. sheets shall be as directed as per site condition.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-23A G.I.VALLEYS GUTTER, RIDGES

- The G.I. ridges and hips shall be of plain galvanised sheets class-3 of the thickness as specified in item. These shall be 600 mm width and properly bent up to shape without damage to the sheets in process ofbending.
- Valleys gutters and flashings shall be also ofgalvanisedsheet ofthickness as specified in item. Valleys shall be 900 mm. wide over alland flashing shall be 380 mm wide over all. They shall be bent to the required shape without damage to the sheet in the process of bending.

M-24 ASBESTOS CEMENT SHEETS

- Asbests cement sheets plain, corrugated or semi-corrugated shall conform to I.S. 459-1970. The thickness of the sheets shall be as specified in the item. The sheet shall be free from all defects such as cracks, holes, deformities, chipped edges or otherwisedamaged.
- Ridges and Hips
  - Ridges and hips shall be of same thickness as that of A. C. sheets. The types of ridges shall be suitable for the type of sheets andlocations.
  - Other accessories to be used in roof such as flashing pieces, eaves filler pieces, valley gutters, north light and ventilator curves, barge boards etc. shall be of standardmanufacture and shall be suitable for the type of sheets andlocation.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-25 MANAGALORE PATTERN ROOF TILES

- The Mangalore pattern tiles shall conform to I.S. 654-1972 for Class `AA' or`A'type as specified in item. Samples of the tiles to be provided shall got approved from the Engineer-in-charge. Necessary tests shall be carried out asdirected.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-26 SHUTTERING

- The shuttering shall be either of wooden planking of 30mm minimum thicknesswithorwithout steel liningorofsteelplatesstiffenedbysteelangles.Theshutteringshallbesupportedonbattens and beams and props of vertical ballies properly cross bracked together so as to make the cantering rigid. In places of ballie props, bricks pillar of adequate section built in mud mortar may beused.
- The form work shall be sufficiently strong and shall have camber, so that it assumes correct shape after deposition of the concrete and shall be able to resist forces caused by vibration of concrete, live load of men working with it and other incidental loads associated with it. The shuttering shall have smooth and even surface and its joints shall not permit leakage of cement grout.
- If at any stage of work during or after placing concrete in the structure, the form work sags or bulges out beyond the required shape of the structure, the concrete shall be removed and work redone with fresh concrete and adequately rigid form work.The complete form work shall be got inspected by and approved from the Engineer-in-charge, before the reinforcement bars are placed in position.
- The props shall consists of bullies having 100mm minimum diameter measured at mid length and 80mm at thin end and shall be placed as per design requirement. These shallrest squarely on wooden sole plates 40 mm. thick and minimum bearing area of 0-10 sq.m. laid on sufficiently hard base.
- Double wedges shall further be provided between the sole plate and wooden props so as to facilitate tightening and easing of shuttering without jerking theconcrete.
- The timber used in shuttering shall not be so dry soas toabsorb water from concrete and swell or bulge nor so green or wet so as to shrink after erection. The timber shall be properly sawn and planed on the sides and the surface coming in contact with concrete. Wooden form work with metal sheet lining or steel plates stiffened by steel angles shallbe permitted.
- As far as practicable, clamps shall be used tohold the forms together and use of nails and spikes avoided.
- The surface of timber shuttering that would come in contact with concrete shall be well wetted and coatedwith soap solution before the concreting is done. Alternatively coatofraw linseedoil or oil of approvedmanufacture maybe appliedin placeof soap solution. In case of steel shuttering either soap solution or raw linseed oil shall be applied after thoroughly cleaning the surface. Under no circumstances black or burnt oil shall bepermitted.

- The shuttering for beams and slabs shall have camber of 4mm per metre (1 in 250) or as directed by the Engineer-in-charge so as to offset the subsequent deflection.For cantilevers, the camber at free end shall be 1/50 of the projected length or as directed by the Engineer-in-charge.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision.

M-27 EXPANSION JOINTS

- The item provided for expansion joints in R.C.C. frame structures for internal joints, as well as exposed joints, with the use of premoulded bituminous jointfiller.
- Pre-moulded bituminous joint filler, i.e. performed strip of expansion joint filler shall not get deformed or broken by twisting, bending or other handing when exposed to atmospheric condition. Pieces of joint filler that have been damaged shall berejected.
- Thickness of the pre moulded joint filler shall be 25 mm unless otherwisespecified.
- Pre-moulded bituminous joint filler shall conform to I.S. 1838-1961.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-28 EXPANSION JOINTS-COPPERS AND HOLD FASTS

- The item provides forexpansion joints in R.C.C. frame structure for internal joints as well as for exposed joints with the use of necessary copper strip andholdfasts.
- Copper sheet shall be 1.25 mm thick and of 1.25 mm with `U' shape in the middle, copper strip shall have holdfast of 3 mm diameter copper rod fixed to the plate soldered on strip at intervals of about 30 cm. or as shown in the drawing or as directed. The width of each flange (horizontal side) of the copper plate to be embedded in the concrete work shall be 25mm Depth of `U' to be provided in the expansion joint, inthecopperplate shall be of 25 mm.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-29 TEAK WOOD

- The teak wood shall be of good quality as required for the item tobe executed. When the kind of woodis notspecifically mentioned, good Indian teak wood as approved shall be used.
- Teak wood shall generally be free from large, loose, dead or cluster knots, flaws, warps, twists, shakes, bends or any other defects. It shall generally be uniform in substance and of straight fibres as far as possible. It shall be free from rot, decay, harmful fungi and other defects of harmful nature, which will affect the strength, durability or its usefullness for the purpose for which it is required. The colour shall be uniform as far as possible. Any effort like painting, using any adhesive or resinous materials madeto hide the defects shall render the pieces liable to rejection by theEngineer-in-charge.
- Allscantlings, planks etc. shall be sawn in straight linesand planes in the direction of grainsand of uniformthickness.
- The tolerances in the dimensions shall be allowed at the rate of 1.5mm per face to beplaned.
- First Class Teak Wood:

  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.
- Second Class Teak Wood:

  No individual hard and sound knots shall be more than 15 sq.cm. in size and aggregate area of such knots shall not exceed 2% of the area ofpiece.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-29A NON TEAK WOOD

The non-teak wood shall be chemically treated, seasoned as per I.S. Specifications and of good quality. The type ofwood shall be got approved before collecting the same on site Fabrication of wooden members shall be started onlyafterapproval.For this purpose wood of Bio, Kalai, Sires, Saded, Behda, Jamun, Sisoo will be used for door frames 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 isrequired. 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.

If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-30 WOODEN FLUSH DOOR SHUTTERS (SOILD CORE)

- The solid core type flush door shutters shall be of decorative or non-decorative type as specified in the drawing. The size and thickness of the shutter shall be as specified in drawings or as directed. The timber species for core shall be used as per I.S. 2202-(Part-I)- 1991. The timber shall be free from decay and insect attack. Knots and knot holes less than halfthewidth of cross-section of the members, pitch streaks and harmless pin holes shall be permissible except in the exposed edges of the core members. The commercial plywood, cross bands shall conform to I.S. 303-1989.
- The face panel of the shutters shall be formed by gluing by the hot press process on both faces of the core with either plywood orcorss bands, and face veneers. The lipping, rebating, opening of glazing, venation etc. shall be provided if specified in thedrawing.
- All edgesof the door shutters shallbe square. The shutters shallbefree form twist or warp in its plane. Both faces of the shutters shall be sand papered to smoot eventexture.
- The shutters shall be tested for---

  (1) End Immersion Test : The test shall be carried out as per I.S.2202(Part-I) 1991. There shall be no delamination at the end of thetest.

  (2) Knife Test : The face panel when tested in accordance with I.S. 1659-1990 shall pass the test.

  (3) Glue Adhesion Test : The flush door shall be tested forglue adhesive test in accordance with I.S. 2202(Part-I)-1991. The shutters shall be considered to have passed the test if no delaminating occurs in the glue lines in the plywood and if no single delamination more than 80 mm in length and more than 3 mmin depth has occured in the assembly glue lines between the plywood face and the style and rail. Delamination at the corner shall be measured continuously around the corner. Delamination at the knots, knot hole and other permissible wood defects shall not be considered in assessing the sample.
- The tolerance in size of scud core type flush door shall-be as under :

  In Nominal thickness ± 1.2 mm. In Nominal height ± 3mm.
- The thickness of the shutter shall be uniform throughout with a permissible variation of not more than 0.8 mmwhen measured at any points.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-31 ALUMINIUM DOOR,WINDOWS, VENTILATORS

- Aluminium alloy used in the manufacture of extruded window sections shall conform to I.S. designation HEA-WP of I.S. : 733-1975 and also to I.S. Designation WVG - WP OF I.S.: 1285-1975. The sections shall be as specified the drawing and design. The fabrication shall be done asdirected.
- The hinges shall be cast or excluded aluminium hinges of same type as in window but or large size.
- The hinges shall normally be of 50 mm projecting type non projecting type of hinges may also be used if directed. The handles of door shall be of specified design.A suitable lock for the door operable either from outside shall be provided. In doubleshutterdoor,the first closing shall have a concealed aluminium alloy bolt at top andbottom.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-32 ROLLING SHUTTERS

- The rolling shutters shall conform to I.S.6248-1979 Rolling shutters shall be supplied of specified type withaccessories. The size of the rolling shutters shall be specified in the drawings. The shutters shall be specified in thedrawings. The shutters shall be constructed with interlocking lath sections formed from cold rolled steel strips not lessthan 0.9 mm. thick and 80 mm. wide for shutters up to 3.5 m.width not less than 1.25 mm. thick and 80 mm wide forshutters 3.5 m. in width and above unless otherwise specified.
- Guide channels shall be of mild steel deep channel section and of rolled pressed or built up (fabricated) jointless construction. The thickness of sheet used shall not be less than 3.15 mm.
- Hood covers shall be made of M.S. sheets not less than 0.92 mm. thick. For shutters having width 3.5 mts. and above, the thickness of M.S. sheet for the hood covers shall be not lessthan1.25 mm.
- The spring shallbe ofbest qualityand shallbe manufactured from tested high tensile spring steel wire orstrip ofadequate strength to balance the shutters in position. The spring pipe shaft etc. shall be supported on strong M.S. or malleable C.I. brackets. The brackets shall be fixed on the or under the lintel as specified with rawl plugs and screws boltsetc.
- The rolling shutters shall be of self rolling type upto 8 sq.m. clear area without ball bearing and upto 12sq.m. clear area with ball bearing.If the rolling shutters are oflargerthen gear operated type shutters shall beused.
- The locking arrangement shall be provided at the bottom of shutter at bothends.The shutters shall be opened fromoutside.
- The shutters shall be completed with door suspension,shafts,lockingarrangements,pulling hooks, handles and otheraccessories.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-33 COLLAPSIBLE STEEL GATE

- The collapsible steel gate shall be in one or two leaves and size as per approved drawings or as specified. The gate shall be fabricated from best quality mild steel channels, flates etc. Either steel pulleysorball bearings shallbe provided in every double channel. Unless otherwise specified the particulars of collapsible gate shall be as under---

  (a) Pickets : These shall be of 20 mm. M.S. channels of heavy sections unless otherwise shown on drawings. The distance centre to centre of pickets shall be 12 cms. with an opening of 10cms.

  (b) Pivoted M.S. flats shall be 20 mm. x 6mm.

  (c) Top and bottom guides shall be from tee or flat iron of approvedsize.

  (d) The fittings like stoppers, fixinghold fasts, locking cleats, brass handles and cast iron rollersshall be of approved design andsize.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-34 WELDED STEEL WIRE FABRIC

- Welded steelwire fabric for general purpose shall be manufactured from cold drawnsteel `as drawn' or galvanised 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 a workman like 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 of wire for square as well as oblong welded steel wire fabric shall be as directed. The steel wire fabric in panels shall be in one whole piece in each panel as far as stock sizespermit.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-35 EXPANDED METAL SHEETS

- The expanded metal sheets shall befree fromflaws, joints, welds, broken, stands, laminations and other harmful surface defects Expanded metal steel sheet shall conform to I.S. 412 -1975 except that blank sheetsneed notbe with guaranteedmechanical properties. The size of the diamond mesh of expanded metal and dimensions of strands (width and thickness) shall be as specified. The tolerance on nominal weight of expanded metal sheets shall be of + 10 percent.
- Expanded metal in panels shall be in one whole piece in each panel as far as stock sizes permit.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-36 MILD STEEL WIRE (Wire Gauze Jail)

- Mild steelwiremay begalvanised, as indicated. All finished steel wire shall bewellcleanly drawn to the dimensions and size of wire as specified in item. The wire shall be sound, free from slits, surface flaws, rough jagged and imperfect edges and other harmful surface defects and shall conform to I.S.280-1992.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-37 PLYWOOD

- The Plywood for general purpose shall conform I.S. 303-1975. Plywood is made by cementing together thin boards or sheets of woodinto panels. There are always an old number of layers3, 5, 7, 9 ply etc. The plies are placed so that the grain of each layer is at right angles to the grain in the adjacent layers.
- The chief advantage of plywood over a single board of the same thickness is the more uniform strength of the plywood along the length and width of the plywood and greater resistance to cracking and slitting with change in moisture content.
- Usually synthetic resins are used forgluieg. Phenolic resins are usually cured in a hot press which compresses and simultaneously heatsthe pliesbetween hotplates which maintain a temperature of 90 degree C. to 140 degree C. and a pressure of 11 to 14 Kg./Sq.cm. on the wood. The time of heating may be any thing from 2 to 60 minutes depending upon thickness.
- When water glue are used the wood absorbs so much Water that the finished plywood must be dried carefully, When synthetic resins are used asadhesive the finished plywood must be exposed to atmosphere of controlled humidity until the proper amount of moisture has been absorbed.
- According to I.S. : 303-1975 the plywood for general purpose shall be of three grades namely BWR.WWR and CWR depending upon the adhesives used for bonding the veneers and it will be further classified into six types namely AA, AB, AC, BB, BC and CC basedon the quality of the two faces, each face being of three kinds namely A, B and C. After pressing, the finished plywood shouldbe reconditioned to a moisture content notless than8 percent and not more than 16percent.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision
- THICKNESS OF PLYWOODBOARDS

Board	Thickness
3 Ply	3 mm
	4 mm
	5 mm
	6 mm
5 Ply	5 mm
	6 mm
	7 mm
	8 mm
7 Ply	9 mm
	13 mm
	16 mm
9 Ply	13 mm
	16 mm
	19 mm
11 Ply	19 mm
	22 mm
	25 mm

M-38 GLASS

- All glass shall be of the best quality, free from specks, bubbles, smokes, veins, air holes blisters and other defects. The kind of glass to be used shall be as mentioned in the item or specification or in the special provisions or as shown in detailed drawings. Thickness of glass panes shall be uniform. The specifications for different kinds of glass shall be as under
- Sheet Glass :
- In absence of any specified thickness or weight in the item or detailed specifications of the item of work, sheetglass shall be weighing 7.5 Kg/Sq. m for panes up to 600 mm x 600 mm.
- For panes larger than 600 mm. x 600 mm. and upto 800 mm. x 800 mm.glass weighing not less than 8.75 Kg./Sq.m. shall be used. For bigger panes upto 900 mm. x 900 mm. glass weighing not less than 11.25 Kg./Sq.mt. shall be used.
- Sheet glass shall be patent flattened glass of best quality and for glassing and framing purposes shall conform to I.S. 761-1960. Sheet glass of the specified colours shallbe used, ifso shown on detailed drawings or so specified. For important buildings and for panes with any dimensions over 900 mm. plate glass of specified thickness shall be used.
- Plate Glass:
- When plate glass is specified it shall be "Polished Patent Plate Glass" of best quality. It shallhave both the surface groundflateand parallel and polished to obtain clear undistured vision and reflection. The plate glass shall be of the thickness mentioned in the item or as shown in the detailed drawing or as specified. In the absence of any specified thickness, the thickness of plate glass to be supplied shall be 6 mm. and a tolerance of 0.20 mm. shall be admissible.
- Obscured Glass
- This type of glass transmits light so that vision is partially or almost completely obscured. Glass shall be plain rolled, figured, ribbed or fluted, or frosted glass as may be specified as required. The thickness and type ofglass shallbe as per details on drawings or as specified or asdirected.
- Wired Glass:
- Glass shall be with wire netting embedded in a sheet of planet glass. Electrically welded 13 mm Georgiansquare mesh shall be used Thickness of glass shall not be less than 6 mm Wired glass shall be of type and thickness asspecified
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-39 ACRYLIC SHEETS

- Acrylic sheets shall be of thickness as specified inthe itemand of a specified shape and size as the case may be Penelsmay be flat or curved. It should be light in weight. It shall be colourless or colouredoropaque as specified in the item. Colourlesssheetshallbe astransparent as the finest optical glass. Its light transmission rate shall be about95%. Transparency shall not be affected for the sheets of larger thickness. It shall be extremely resistant to sunlight, weather and low temperatures. It shallnotshow any significant yellowing or change in physical properties or loss of light transmission over a longer period of use.

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

- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-40 PARTICLE BOARD

- The particle boards used for face panels shall of best quality free from any defects. The particle boards shall be made withphenolmaldehydeadhesive.The particle boards shall conform to I.S. 3087-1965. "Specification for wood particle boardforgeneralpurpose.The size and the thickness of the particle board shall be asspecified.

- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-40A CEMENT BONDED PARTICLE BOARD

- The particle boards should confirm to is -14276-1995 or lastest.It should be free from any cracks andflacks.

- Cement bonded Particle board may be replaced by any other equivalent material as suggested Engineer-In-Charge

- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-41 EXPANED POLYSTYRENE OR FRAMES STYROPER SLEBS

- The expanded polystyrene ceiling boards and tiles shall be of approved make and shall be of size thickness, finish and colour and indicated. It shall be of high density and suitable for use as insulting material. The insulting material shall be like slab of thermocoleetc.

- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-42 RESIN BONDED FIBRE GLASS

- The resin bonded fibre glass tiles or rools shall be of approved make and shall be sizes, thickness and finish asindicated.

- For test of Mineral wood thermal insulation Blanket I.S. 3144-1965followed.

- Insulation wool blanket shall be with the following coverings on one or both sides asindicated.

  (1) Bituminisedbessian kraft paper suitable for use in position where moisture has to beexcluded.

  (2) Hessain cloth or Kraft paper for keeping outdust.

  (3) G. I. wire netting, suitable or surfaces to be plasteredover.

- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-43 FIXTUEES & FASTININGS

- **GENERAL**
- The fixturesand fastenings, that is, butt, hinges, tee and strap hinges, sliding door bolts, towerbolts, doorlatch,bath-room latch,handles,doorstoppers, casement window fasteners, casement stays and ventilator catch shall be made of the metal as specified in the item or itsspecifications.
- Theyshallbe of iron,brass,aluminium,chromium plated iron, chromium plated brass, copper oxidised iron, copperoxidised brass or anodisedaluminiumasspecified.
- Thefixturesshall be heavy,medium or light type.The fixtures and fastenings shall be smooth finished and shall be such as will ensure ease ofoperation.
- The samples of fixtures and fastenings shall begotapproved as regards quality and shape before providing them in position.
- Brass and anodisedaluminium fixtures and fastenings shall be brightfinished.
- **Holdfasts**
- Holdfasts shall be made from mild steel flat 30 cm. length and one of the holdfasts shall be bent at right angle and two nos. of 6 mm. dia. holes shall be made in it for fixing it to the frame with screws. At the other end, the holdfast shall be forked and bent at right angles in oppositedirections.
- **Butt Hinges**
- Railway standard heavy type butt hinges shall be used when so specified.
- Tee and strap hinges shall be manufactured from M.S.sheet.
- **Sliding Door Bolts (Aldrops)**
- The aldrops as specified in the item shall be used and shallbe got approved.
- **Tower Bolts (Barrel Type) :**
- Tower bolts as specified in the item shall be used and shallbe got approved.
- **Door latch**
- The size of door latch shall be taken as the length oflatch.
- **Bathroom Latch :**
- Bathroom latch shall be similar to to we bolt.
- **Handle**

  The size of thehandlesshall be determined by the inside grip length of thehandles.Handles shall have a base plate of length 50 mm. more than the size of the handle.
- **Door Catch**
- Door stoppers shall be either floor door stopper type or door catch type. Floor stopper shall be of overall size as specified and shall have a rubbercushion.
- **Door Stoppers**
- Door catch shall be fixed at a height of about 900 mm. from the floor level such that one part of the catch is fitted on the inside of the shutter andother partis fixedin thewall with necessary wooden plug arrangements for appropriate fixity. The catch shall be fixed 20 mm. inside the face of the door for easy operation ofcatch.
- **Wooden Door Stop With Hinge**
- Wooden door stop of size 100 mm. x 60 mm. x 40 mm. shall be fixed on the door frame with a hinge of 75 mm. size and at a height of 900 mm. from the floor level. The wooden door stop shall be provided with 3 coats of approved oilpaint.

- **Casement Window Fastner**
- Casementwindowfastenerforsingleleadwindowshuttershallbeleftorrighthandedasdirected.
- **Casement Stays (StraigotPeg.Stay)**
- The stays shall be made from a channel section having three holesat appropriate position so that the window can be opened either fully or partially asdirected.Size of the stay shall be 250 mm. to 300 mm. as directed.
- **Ventilator Catch**
- The pattern and shape of the catch shall be asapproved.
- **Pivot**
- The base and socket plate shall be made from minimum 3 mm. thick plate, and projected pivot shall not be less than 12 mm. dia. and 12 mm. length and shall be firmlyriveted to the base plate case of iron pivot and in single piece base in the case of brasspivot.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-44 PAINTS

- **Oil Paints:**
- Oilpaintsshallbeofthespecifiedcolourand shade andshallbeofAsian,ICI,Nerolac,Duluxorequivalentasapproved by Engineer-In-Charge. The ready mixed paints shall only be used. However, if ready mixed paint or specified shade or tint is not available white ready mixed paint with approved stainer will be allowed. In such a case, the contractor shall ensure that the shade of the paint so allowed shall be uniform.
- Allthepaintsshallmeetwiththe following general requirements.

  (i) Paint shall not show excessive setting in a freshly opened full can and shall easily be redispressed with paddle to a smooth homogeneous state. The paint shall show no curdling, livering, caking or colour separation and shall be free from lumps andskins.

  (ii) The paintasreceived shall brush easily, possess good levelling propertiesandshow no running or saggingtendencies.

  (iii) The paint shall not skin within 48 hours in a three quarters filled closedcontainer.

  (iv) The paint shall dry to a smooth uniform finish free from roughness, grit uneveness and other imperfections.
- Ready mixed paint shall be used exactlyasreceivedfrom the manufacturers and generally according to their instructions and without any admixtureswhatsoever.
- **Enamel Paints:**
- The enamel paint shall satisfy in general requirements as mentioned in specification of oil paints. Enamel paints shall conform to I.S.2933-1975.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-45 FRENCH POLISH

- The French polishofrequiredtintandshadeshallbeprepared with the below mentioned ingredients and other necessary materials

  (i) Denatured spirit of approved quality

  (ii) Shellac.

  (iii) Chandras

(iv) Pigment.

- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-46 MARBLE CHIPS FOR MARBLE MOSAIC TERRAZZO

- The marble chips shall be of approved quality and shades. It shall be hard, sound, dense and homogeneous in texture with crystalline and coarse grains. It shall be uniform incolourand free from stains, cracks, decay andweathering.
- The size of various colours of marble chips ranging from thesmallest upto 20 mm. shall be used where the thickness of top wearing layers is 6 mm. in size. The marblechips of approved quality and colours only as per grading asdecided by the Engineer-in-charge shall be used for marble mosaic tiles orworks.
- The marble chips shall be machine crushed. They shall be free from foreign matter, dust etc. Except as above the chips shall conform to I.S.2114-1962.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-47 FLOORING TILES

- **(A) Plain Cement Tiles**
- The plain cement tiles shall be of general purpose type. These are the tiles in the manufacture of which no pigments are used. Cement used in the manufacture of tiles shall be as per Indian Standards.
- The tiles shall be manufactured from a mixture of cement and natural aggregates by pressure process. During manufacture, the tiles shall be subjected to a pressure of not less than 140 Kg./Sq.cm. The proportion of cement to aggregate in the backing of the tiles shall be notleaner than 1:3 by weight. The wearing face, though the tiles are of plain cement,shall be rpovided with stone chips of 1 to 2 mm size. The proportion of cement to the marble chips aggregate in the wearing layer of the tiles shall be three parts of cement to one part of chips by weight. The minimum thickness of wearing layer shall be 3 mm. The colour and texture of wearing layer shall be uniform throughout its face and thickness. On removal from mould, the tiles shall be kept in moist condition continuously atleast for seven days and subsequently, if necessary, for such long period as would ensure their conformity to requirements of I.S. 1237- 1980 requiring resistance to wear and waterabsorption.
- The wearing face of the tiles shall be plain, free from projections, depressions and cracks and shall be reasonably parallel to the back face of the tile. All angles shall be right angle and all edges shall be sharp and true.
- The tile sizes shall generally be square shape 24.85cm. x 24.85cm. or 25cm. x 25cm. The thickness of the tiles shall be 20mm.
- The tolerance of length and breadth shall be plus orminus 5 mm. The tolerance on thickness shall be plus 1mm.
- The tiles shall satisfy the tests as regards transverse strength, resistance to wear and water absorption as per I.S.1237-1980.
- **(B) PLAIN COLOURED TILES**
- These tiles shall have the same specifications as for plain cement tiles as per (A) above except that they shall havea plain wearing surface wherein pigmentsare used. They shall conform to I.S.1237-1980.

- The pigment used for colouringcementshall not exceed 10% by weight of cement used in the mix. The pigments, synthetic orotherwise, used for colouringtiles shall have permanent colour and shall not contain materials detrimental toconcrete.
- The colour of the tiles shall be specified in the item or asdirected.
- **(C) MARBLE MOSAIC TILES**
- These tiles have the same specifications as per plain cement tiles except the requirements as stated below
- Themarblemosaictilesshallconformto I.S.1237-1980.Thewearingfaceofthetilesshallbemechanicallygroundandfilled.Thewearingfaceoftiles shall be free of projections, depressions andcracksandshallbereasonablyparalleltothebackfaceofthetiles.Allanglesshallberight angles and all edges shall be sharp andtrue.
- Chips used in thetiles be from smallest upto20 mm. size. The minimum thickness of wearing layer of tiles shall be 6 mm. For pattern of chips to be bad on the wearing face, a few samples with or without their full size photographs as directed shall be presented to the Engineer-in-charge forapproval.
- Any particular samples, if foundsuitable shall be approved bythe Engineer-in-charge, of he may ask for particular sized chips to be more or less inthe sample presented. The samplesshall haveto bemade bythe contractor till a suitable sample finally approved for use in the work. The contractor shall ensure that the tiles supplied for the work shall be in conformity with the approved sample only, in terms of its dimensions, thicknessof backing layer and wearing surface, materials, ingredients, colour shade, chips, distributionetc. required.
- The tiles shall be prepared from cementconforming toIndian Standardsor colouredportland cement generally depending upon the colour of tiles to be used or asdirected.
- **(D) Chequered Tiles**
- Chequered tiles shall be plain cement tiles or marble mosaic tiles. The former shall have the same specification as per (A) above and the latter as per marble mosaic tiles as per (C) except as mentionedbelow.
- The tiles shall be of nominal size of 250mm. x 250mm. or as specified. The centre to centre distance of the chequer shall not less than 25mm. and not more than 50mm. The overall thickness of the tile shall be 22mm.
- The grooves in the chequers shall be uniform and straight. The depth of the grooves shall not be less than 3mm. The chequered tiles shall be plain, coloured or mosaic as specified. The thickness of the upper layer measured from the top of the chequers shall not be less than 6mm. The tiles shall be given the first grinding with machine before delivery tosite.
- Tiles shall conform to relevant I.S.1237-1980.
- **(E) Chequered Tiles for Staircases**
- The requirements of these tiles shall be the same as chequered tiles as per (D) above except in followingrespects :

  (1) The length of a tile including nose shall be 330mm.

  (2) The minimum thickness shall be 28mm

  (3) The nosing shall have also the same wearing layer atthe top.

  (4) The nosing edge shall be rounded.

  (5) The front portion of the tile for a minimum length of 75mm. from and including the nosing shall have grooves running parallel to nosing and at centres not exceeding 25mm. Beyond that the tiles shall have normal chequer pattern.

- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-48 ROUGH KOTAH STONE

- The kotahstones shall be hard, even, sound and regular in shape and generally uniform in colour. The colour of the stone shall generally be green. Brown colouredstonesshallnotbe allowed for use. They shall be without any soft veins, cracks orflaws.
- The size of the stones to be used for flooring shall be size 600mm. x 60mm. and/or size 600mm. x 450mm. as directed. However, smaller sizes will be allowed to be used to the extent of maintaining the required pattern. Thickness shall be asspecified.
- Tolerance of minus 30 mm on account of chisel dressing of edges shall be permitted for length as well as breadth. Tolerance in thickness shall be plus3mm.
- The edges of stones shall be truly chiselled andtable rubbedwith coarse sand before paving. All anglesand edgesof the stone shall be true, square andfree from chipping and the surface shall be true andplain.
- When machine cut edges are specified, the exposed edges and the edges at joints shall be machine cut. The thickness of the exposed machine cut edges shall beuniform.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-49 POLISHE KOTAN STONE

- Polish kotah stone shall have the same specifications asper rough kotah stone except as mentioned below.
- The stone shall have machine polished smooth surface. When brought on site, the stones shall be single polished or double polished depending upon its use. The stones for paving shall generally be single polished. the stones to be used for dedo, skirting, platforms sink, veneering, sills, steps etc. where machine polishing after the stones are fixed in situ is not possible shall be doublepolished.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-50 DHOLPUR STONE SLAB

- Dholpur stone slab shall be of best quality as approved by the Engineer-in-charge. The stone slab shall be without any veins, cracks,and flaws. The stone slab shall be even, sound and durable, regular in shape and uniformcolour.
- The size of the stone shall be as specified in the item or detailed drawing or as approved by the Engineer-in-charge. The thickness of the stone shall be as specified in the item of work with the permissible tolerance of plus of minus 2 mm. The provisions in respect of polishing as for polished kotah stone shall apply to plishedDholpur stone also. All angles andedgesof the face of stone slab shall be fine chiselled or polished as specified in the item of work and all the four edges shall be machine cut. All englesand edges of the stone slab shall be true andplane.
- The sample of stone shall be got approved from the Engineer- in-charge for shade and tint for a particular work. It shall be ensured the stones to be used in a particular work shall not differ much in shade or tint from the approvedsample.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-51 MARBLE SLAB

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

- Slab shall be hard, close, uniform and in texture. They shall also be free defects and cracks. The surface shall be machine polished to an even and perfectly plane surface and the edges, machine cut true and square. The rear face shall be rough enough to provide key for themortar.
- Marble slabs with natural veins, if selected shallhave tobe laid as per the pattern given bythe Engineer-in-charge. Size of the slabs shall be minimum 450mm. x 450mm. and preferably 600mm. x 600mm. However, smaller sizes will beallowed tobe usedto the extent of maintaining requiredpattern.
- The slab shall not be thinner than the specified thickness at its thinest part. A few specimen of finished slab to be used shall be deposited by the contractor in the office for reference.
- Except as above, the marble slabs shall conform to I.S. 1130-1969 or as revised from time to time.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-52 GRANITE SLAB

- Granite shall be of approved any colour and quality, The stone shall be hard even, sound and regular in shape and generally uniform in colour. It shall be without and soft veins, cracks ,waterline .
- The thickness of the stone shall be specified in theitem.
- All exposed faces shall be double polished to tender truly smooth and even relecting surface. The exposed edges and corners shall be rounded off as directed. The exposed edges shall be machine cut and shall have uniformthickness.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-53 P.V.C. FLOORING

- P.V.C. sheets for P.V.C. floor covering shall be homogenous flexible type, conformint to I.S. 3462-1966. The P.V.C. covering shall neither develop any toxic effect while put to use not shall give off any disagreeableodour.
- Thickness of flexible type covering or tiles shall be as specified in the description of theitem.
- The flexible type shall be backed with hessain or other woven fabric. The following tolerance shall be applicable on the nominal dimensions of the sheet rolls or tiles:

  (a) Thickness +/- 0.15 mm

  (b) Length or width

  (1) 300 mm Square tiles +/- 0.20 mm (2) 600 mm Square tiles. +/- 0.40 mm

  (3) 900 mm Square tiles. +/- 0.60 mm (4) Sheets and rolls. +/- 0.10 percent.

- Adhesive
- The adhesive for PVC flooring shall be of the type and makerecommendedbythe manufacturers of PVC sheets / tiles.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-54 FACING TILES

- The facing tiles (burnt clay facing bricks) shall be free from cracks, flaws, and nodules of free lime. They shall be thoroughly burnt and shall have plane rectangular faces with parallel sides and sharp stright right angled faces. The texture of the finished surface that will be exposed when in place, shall conform to an approved sample consisting not less than four stretcher bricks each representing resistance to penetration by rain and greater durability than common bricks. The tiles shall conform to I.S.2691-1972.
- The standard size of facing brick tiles shall be 19 x 9 x 4 cms. The facing brick tiles shall be provided with frog which shall conform to I.S.1077-1976.

- The permissible tolerance in dimensions specified above shall be asfollows.

Size	Tolerance for	
	1st class Bricks	2nd class Bricks
19 cm	+/- 6 mm	+/- 10 mm
9 cm	+/- 3 mm	+/- 7 mm
4 cm	+/- 1.5 mm	+/- 3 mm

- The tolerance for distortion or war page of face or edges of individual brick from a plane surface and from a straight line respectively shall be as follows:

Facing dimensions.	Permissible tolerance.
Max. below 19 cms.	Max. 2.5 mm.
Max. above 19 cms.	Max. 3.0 mm

- The average compressive strength obtained as a sample of five tiles when tested in accordances with the produre aid as per I.S. 1077-1976 shall be not less than 175 Kg/Sq.cm. The average compressive strength of any individual brick shall not less than 160 Kg/Sq.cm.
- The average water absorption for five brick tiles shall not be exceed 12percent of average weight of brick before testing. The absorption for each individual brick shall not exceed 25 percent.
- The brick tiles when tested in accordance with I.S. 1077-1976 therate ofefflоresence shall not be more than "Slightlyefflоresced".
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-55 WHITE GLAZED TILES

- The tiles shall be of best quality asapproved by the Engineer-in-charge. They shall be flat and true to shape. They shall be free from cracks, crazing, spots, chipped edges and corners. The glassing shall be of uniform shade.
- The tiles shall be of nominal size of 200mm. x 300mm. unless otherwise specified. The maximum variation from the stated sizes, other than the thickness oftile, shallbe plusor minus 1.5mm. The thickness of the tile shall be 6mm. except as above the tiles shall conform to I.S.777-1970.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-56 GALVANISHED IRON PIPES AND FITTINGS

- Galvanized iron pipe shall be of the C-class and of required diameter and shall comply withI.S. 1239-1979. The specified diameter of the pipes shall refer to the inside diameterof the bore. Clamps, screw andall glavanisediron fittingsshall be of the standard 'R'or equivalent make.

M-56A U- P.V.C. PIPES & FITTING

1. All soil, waste and vent pipes & fittings shall conform to I.S. 4985-1988 & I.S. 13592:1992. The pipes are provided with an integral rubber ring type socket at one end while the other end in kept plain, smooth & free from burrs. The pipes and fittings shall be true to shape,smooth&cylidical. Theyshallbefreefromcrackes,laps,pinholesorotherimperfectionandshallbenearlydressedand carefully fettled.
2. The P.V.C. Pipes shall be of the diameter as specified in the description and shall be in length of 6.0,3.0 & 1.8 m including socket ends of the pipe unless shorter lenght are either specified or requiredatjunctionetc.Tolerancesonspecifiedlengthshallbe+10mmand-0mm.

3. Rubber real rings for joints and Access Doors shall be manufactured in accordance with IS: 5382. Therearemadeoutornaturalrubberwithashore'A'hardnessof40+5.

4.1 The mean outside diameter, outside diameter at any point and wall thickness manufactured plain or with socket shall be as shown in the following table:-

* All dimensions in millimetres.

Sr. No.	Nominal/Outside dia	Mean outside Diameter		Outside diameter at		Wall thickness	
		Min.	Max.	Min.	Max.	Min.	Max
1.	75	70.0	75.3	74.1	75.9	3.2	3.8
2.	100.	110.00	100.4	108.6	111.4	3.2	3.8

4.2 Minimum Wall thickness of sockets on pipes & Dimensions of sliding socket of pipes shall be as shown in following table.

* All dimensions in millimetres.

Sr. No.	Nominal outside diameter	Minimum wall thick of sockets on pipes.		Socket Depth min.	Mean inside diameter of socket at mil point	
		S2, Min	S3, Min		Min	Max
1.	75	2.9	2.4	40.00	75.1	75.3
2.	110	2.9	2.4	48.0	110.1	110.4

*The outside diameter of pipe shall be obtained by the method given in IS: 12235(Part-1)-1998, wall thickness shall be measured by the method given in IS:12235(Part-2)1998.

4.3 The permissible variation between the mean outside diameter & the nominal outside diameter of a pipe shall be positive in the form + x, where is less than or equal to greater of the following two values.

a) 0.03 mm, and

b) 0.003 x nominal outside diameter- rounded off to the next higher 0.1 mm.

4.4 The permissible variation between the outside diameter at any point (d1) & the nominal outside diameter (de)of a pipe shall not exceed the greater of the following two values.

a) 0.5mm, and

b) 0.012 de round off to the next higher 0.1

4.5 The thickness of fittings and their socket & spigot dimensions shall conform to the thickness and dimensions specified for the corresponding sizes of straightpipes.

If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decisi

M-56B C.P.V.C. PIPES & FITTINGS

C-PVC (Chlorinated Poly Vinyl Chloride) SDR II should confirm to ASTM F 442, specific to C- PVC in Iron Pipe size (IPS) dimension, which also can be applied to C-PVC pipe in Coper Tube Size (CTS) dimension. Fitting should confirm to ASTM D 2846. Pipes and Fittings should be of ASTRAL make or as approved by Engineer-In-Charge.

If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-57 BIB COCK AND STOP COCK

- A bib cock is a draw off tap with a horizontal inlet and a free outlet. A stop cock is a valve with a suitable means of connection for insertion in a pipe line for controlling or stopping theflow.
- They shall be of screw down type andor brasschromium plated and of diameter as specified in the description of the item. They shall conform to I.S. 781-1977 andthey shallbe of best Indian make. They shall be polishedbright.

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

Dia.	Bib Cock	Stop Cock	Dia.	Bib Cock	Stop Cock
8 mm.	0.25 Kg.	0.25 Kg.	15 mm.	0.40 Kg.	0.40 Kg.
10 mm.	0.30 Kg.	0.35 Kg.	20 mm.	0.75 Kg.	0.75 Kg.

- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-58 GUN METAL WHEEL VALVE

- The gun metal wheel valve shall be of approved quality. These shall be of gun metal fitted with wheel and shall be of gate valve opening full way and of the size as specified. These shall conform to I.S. 778-1971.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-58A P.V.C. VALVE

The P.V.C. handle valve shall be of approved quality. These shall be of P.V.C. fitted with handle and shall be of gate valve opening full way and of the size as specified. These shall conform to relevant I.S.

If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-59 WHITE GLAZED PORCELAIN WASH BASIN

- Wash basin shall be of white porcelain first quality best Indian make and it shall conform to I.S. 2556-(Part-IV)-1972 and I.S. 771-1979. The size of the wash basin shall be as specified in the item. The wash basin shall be of one piece construction with continued over-flow arrangements. All internal angles shall be designed soas to facilitate cleaning. Wash basin shall have single tap hole or two holes as specified. Each basin shall have a circular waste hole which is either rebated or bevelled internally with 65 mm. dia. at top and 10 mm. depth to suit the waste fitting. The necessary stud slot to receive the bracket on the under side of the basin shall be provided. Basin shall have an internal soap holder recess which shall fully drain into the bowl.
- White glazed pedestal of the quality and colour as that of the basin shall be provided where specified in the item. It shall be completely recessed at the back for reception of supply and wash pipe. It shall be capable of supporting the basin rigidly and adequately and shall be so designed as tomake the height from the floor to top of the rim of basin 750 mm. to 800 mm. as directed.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-60 EUROPEAN TYPE WATER CLOSET/WITH LOW LEVEL FLUSHING

- The European type water closet shall be white glazed conforming to I.S. 2556-1994 and I.S. 771-1979.
- 'S' trap shall be provided as required with water seal not leal not less than 50 mm.The solid plastic seat and cover shall be of the best Indian make conforming to I.S. 2548-1980. They shall be made of moulded synthetic materials which shall be tough and hard with high resistance to solvents and shall be free from blisters and other surface defects and shall have chromium plated brass hinges and rubber butter of suitable size.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-61 ORISSA TYPE WATER CLOSET

- The specification of Orissa type white glazed water closet of first quality shall conform to I.S. 2556 (Part-III) 1981 and relevant specification of Indian type water closet except that pan will be with the integral squarring pan of size 580 mm x 440 mm. with raised footrest.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-62 INDIAN WATER CLOSET

- The Indian type white glazed water closet of first quality shall be of size as specified in the item and conforming to I.S. 771-1979 and I.S. 2556-(Part-II) 1981. Each pan shall have integral flushing. It shall 26 also have an inlet at black an or front for connecting flush pipes as directed. The inside of the bottom of the pan shall also have an inlet at black an or front for connecting flush pipes as directed. The inside of the bottom of the pan shall have sufficient slope from the front towards the outlet and surface shall be uniform and smooth. Pan shall be provided with 100 mm. diameter 'P' or 's' trap with approximately 50 mm. Water seal and 50 mm. diameter vent horn.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-62A FOOT RESTS

A pair of white glazed earthen ware rectangular foot to minimum size 250 mm.x 130 mm. x 20 mm shall be provided with the water closet.

If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-63 GLAZED EARTHEN WARE SINK

- The glazed earthenware sink shall be of specified size, colour and quality. The sink shall conform to I.S. 771- Part-II-1979. The brackets for sinks shall conform toI.S. 775-1970.
- The pipes shall conform to I.S. 1239-Part-I-1973 and I.S. 404-1962 for steel and lead pipes respectively. 32 mm. brass waste coupling of standard pattern with brass chain and rubber plug shall be provided with sink.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-64 GLAZED EARTHEN WARE LIPPED TYPE FLATBACK URINAL / CORNER TYPE URINAL

- The lipped type urinal shall be flat back or corner type as specified in the item and shall conform to I.S. 771-1979. It shall be of best Indian make and size as specified and approved by the Engineer-in-charge. The flat back or corner type urinal must be of first class quality, free from any defects, cracksetc.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-65 LOW LEVEL ENAMEL FLUSHING TANK

- The low level enamel flushing tank shall be of 15 litres capacity. It shall conform to I.S. 774- 1971. The flushing cistern shall be of best quality and free from any defects. The flushing tank shall have outlet 32 mm diameter. The outlet shallbe connectedwith W.C. Pan by lead pipe of P.V.C. pipe as specified. The flushingtank shall be provided with inlet and outlet for fixing G.I. inlet pipes and over flow pipes. The flushing cistern shall be provided with chromium plated handle for flushing. The flushing tank shall be provided with bracket of cast iron so that it can be fixed on wall at specified height. The brackets shall conform to I.S. 775- 1970.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-66 CAST IRON FLUSHING CISTERN

- The cast iron flushing cistern shall be of 15 litres capacity. It shall conform to I.S. 774-1971. The flushing cistern shall be of best quality free from anydefects.Theflushing cistern shall have outlet of 32 mm diameter. The outletshall beconnected to lead pipe of 32 mm diameter. The lead pipe shall conform to I.S. 404 (Part-I) 1962. ForfixingG.I. inlet pipes and overflow pipe 20 mm dia. inlet and outlet shall be provided. The flushing cistern shall be provided withgalvanised iron chain and pull of

sufficient length and shall be got approved from the Engineer-in-charge. The cast iron flushing cistern shall be painted with one coat of anticorrosive paint and two coats of paints. The flushing cistern shall be fixed ontoC.I. brackets. The brackets shall conform to I.S. 775-1970.

- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-67 FLUSH COCK

- Push type flush cock (heavy weight) shall be of gun metal chromium plated of diameter as specified in the description of the item. The flush cock shall conform to relevant Indian Standards.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-68 CAST IRON PIPES AND FITTINGS

- All soil, waste, vent and antisyphonage pipes and fittings shall conform to I.S. 1729-1964. The pipes shall have spigot and socket ends with head on spigot end. The pipesand fittings shall be true to shape, smooth, cylindrical their inner and outer surfaces beingas nearly as practicable concentric. They shall be sound and nicely cast and shall be free from cracks, laps, pin holes or other imperfections and shall be neatly dressed and carefullyfettled.
- The end of pipes and fittings shall be reasonably square to theiraxis.
- The sand cast iron pipes shall be of the diameter as specified in the description and shall be in length of 1.5 M., 1.8 M. & 2.0 M. including socket ends of the pipe unless shorter length are either specified or required at junction etc. The pipes and fittings shall be supplied without ears unless specified or directedotherwise.
- Tolerances :
- The standard weights and thickness of pipes shall be as shown in the table below. A tolerance upto minus 10% may however be allowed against these standardweights.

Sr.No.	Nominal Dia. of bore	Overall thickness	Weight of pipes excluding Ears		
			1.5 M.long	1.8 M.long	2 M.long
1.	75 mm	5.0 mm.	12.83 Kg.	16.52 Kg.	18.37 Kg.
2.	100 mm	5.0 mm	18.14 Kg.	21.67 Kg.	24.15 Kg.

- A tolerance upto minus 15% in thickness and 20 mm. in length will be allowed. For fittings tolerance in lengths shall be plus 25 mm. and minus 10 mm.
- The thickness of fittings and their socket and spigot dimensions shall conform to the thickness and dimensions specified for the corresponding sizes of straight pipes. The tolerance in weights and thickness shall be the same as for straightpipes.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-69 NAHNI TRAP

- Nahni trap shall be of cast iron and shall be sound and free from porosity or other defects which affect serviceability. The thickness of the base metal shall not be less than 6.5 mm. The surface shall be smooth and free form crack, chips and other flaws or any other kind of defects which affect serviceability. The size of nahni trap shall be as specified and shall be of self cleansing design.
- The nahni trap shall be of quality approved by the Engineer- in-charge and shall generally conform to the relevant Indian Standards.
- The nahni trap provided shall be with deep seal, minimum 50 mm. except at places where trap with deep seal can notbeaccomm dated. The cover shall becastiron.Perforated cover shall be provided on the trap of appropriatesize.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-70 GULLY TRAP

- Gully trap shall conform to I.S. 651-1960. It shall be sound, free from defects such as fire cracks or hair cracks. The glaze of the trap shall be free from crazing. They shall give a sharp clear note when struck with light hammer. There shall be no broken blisters.
- The size of the gully trap shall be as specified in the item.
- Each gully trap shall have one R.C.C. grating of square size corresponding to the dimensions, of inlet of gully trap. It will also have a water tight R.C.C. cover with frame inside dimensions 300mm. x 300mm. The grating cover and frame shall be of sound and heavy duty and shall have truly square machined seating Faces.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-71 GLAZES STONE WARE PIPE AND FITTNGS

- The pipes and fittings shall be of best quality as approved by the Engineer-in-charge. The pipe shall be of best quality manufactured from stone-ware of fireclay, saltglazed thoroughly burnt throught the whole thickness, of a close even texture, free from air blows, fire blisters, cracks andother imperfections, whichaffect the serviceability. Theinnerandouter surfaces shall be smooth and perfectly glazed. The pipe shall be capable to withstand pressure of 1.5 m. lead without showing signs of leakage. The thickness of the wall shall not be less than (1/12)th of the internal dia. The depth of socket shall not be less than 38 mm. The socket shall be sufficiently large to allow a joint of 6 mm. around the pipe.
- The pipes shall generally conform to revelant I.S.651-1980.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-72 WALL PEG SAIL

- The aluminium wall peg rail shall have three aluminium pegs of approved quality and size. It shall be fixed on teakwood plank of size 450 mm x 75 mm x 20 mm. The teak wood shall be french polished or oil painted asspecified.

M-73 G.I. WATER SPOUT

- The G.I. pipes of 40 mm dia shall be of medium quality and specials shall be of 'R' brand or equivalent brand of bestapproved quality.
- The pipe shall have length as required for the thickness of will in which it is fixed and at outside end tee bend cut at half the length shall be provided and at other end coupling shall be provided to have better fixing. The water spout shall be provided as per detailed drawing or as directed.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-74 ASBESTOS CEMENT PIPE (A.C.PIPE)

- The asbestos cement pipe of diameter as specified in the description of the item shall conform to I.S. 1926-1980. Special like bends,shoescowls,etc.shall conform to relevant Indian Standards. The interior of pipe shall have a zsmooth finish, regular, surfaceand regular internal diameter. The tolerance in all dimensions shall be as per I.S.1926-Part-I-1980.

M-75 CRYDON BALL COCK

- Ball cock of screwed type including polythene/ abonite float and necessary lever etc. shall be of the size as mentioned in the description of item and shall conform to I.S. 1703-1977.

M-76 BITUMEN FELT FOR WATER PROOFING AND DAMP PROOFING

- Bitumen felt shall be on the fibre bases and shall be of type 2, self finished felt grade-2 and shall confor to I.S. 1322-1970.
- If any Discrepancies found in material then relevant I.S. Code shall be referred for final Decision

M-77SELECTED EARTH

- The selected earth shall be that obtained from excavated material orshall have to be broughtfrom outside as indicated in the item. If item does not indicate anything, the selected earth shall have to be brought from outside.
- The selected earth shall be good yellow soil and shall be got approved from the Engineer-in-charge. In no case blackcotton soil or similar expansive and shrinkable soil shallbe 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 shallmake his own arrangements at his own costs forland forborrowing selected earth. The stacking of materials shall be done as directed by the Engineer-in-charge in such a wayas not to interfere with any constructional activities and in proper stacks.
- When excavated material is to be used, only selected stuff got approved from the Engineer-in-charge shall be used. It shall be stacked separately and shall comply with all the requirements of selected earth mentioned above.

M-78 CRACKSEAL :

Crack seal manufactured by Chemist/Chemisol Indian Ltd., is an acrylic base ready application compound.

M-79 CAST IRON STEPS :

- The cast iron steps shall be clean, well-cast and they shall be free from air and sand holes, cold shuts and warping which are likely to impair the utility of the castings. The portion of the step which projects from walls of the manhole shall have a raised required designed above the general plane of the top surface of the step along the edges of the tread to provide adequate non-slip grip. The steps shall be of dimensions 375 mm x 150 mm x 25 mm with necessary holding arrangement and carting minimum weight of 4.5 Kg. confirming to I.S. 5455-1969 or its latest version.
- The cast iron steps shall be coated with a material having tar base or a place bituminorus composition of cashew-nut shall liquid. The coating shall be smooth and tenacious. It shall not flow when exposed to a temperature of 63 degree C and shall not be brittle as to chip off at temperature of 0 degree C.

M-80 Medium duty black Polyethylene sheet : As per relevant IS Code of Material.

M-81 CERAMICTILES:

- Ceramic tiles shall be of 1st quality from manufacturers such as H. & R. Johnson,Nitco, Siddharth, Naveen, Euro, Endura, as approved. by the Architect.
- Ceramic tiles shall be lightweight, with 8 mm. thickness with +- 5.0 % deviation. Therefore, they require thinner floor bedding compare to mosaic/stone flooring. On laying, they require no further polishing making the floor ready to live and use.
- Ceramic tiles shall be of dimensions of 300 mm. x 300 mm. with +- 0.50 % deviation. All the sides shall be straight & square and the deviation allowed shall be maximum + - 0.40 %.
- Ceramic tiles shall have plain and smooth surface quality, free of visual defects to the extent of minimum 95 % of tiles.
- Ceramic tiles shall have no warping; their surface shall be flat, with maximum +- 0.5% deviation allowed.
- Ceramic tiles shall have water absorption of no more than 4.0 %.

- The bending strength of the ceramic tiles above 300 Kgs./Cm2.
- The scratch resistant as per Moh's scale shall be minimum 5. The tiles shall be of group III quality abrasion resistant.
- The crazing resistance of the ceramic tiles shall be in confirmity with norms.
- The resistance to staining of the ceramic tiles shall be minimum class II.
- Ceramic tiles shall be resistant to all acids and alkalis except hydrofluoric acid and its compounds.
- The thermal shock resistance shall be up to 10 cycles.

- **M-82 VITRIFIED FLOOR TILES :**

- Vitrified floor tiles shall be of the best quality from manufacturers such as Mozart Make as approved by the Architect and Engineer-in-Charge. They shall confirm to the IS 4457.
- They shall be monolithic and available in anti-skid finish, having the size of 1200 mm x600 mm x 10 mm. thick.
- They shall be rectified, which is the process of sizing & squaring, leading to almost perfect edges and enabling tile installation with very minorr joints, giving the installed tiles a joint-free look. They shall be pre-sized and pre-polished.
- Maximum deviation in length +- 0.3 %, maximum deviation in thickness +- 2.0 %, maximum wedging allowed +- 0.2%, maximum surface flatness shall be +- 0.2 %, water absorption capacity < 0.5 %, maximum Mhos hardness 8.0, flexural strength shall be of > 45 N/mm2, maximum Abrasion resistance < 144 mm3, maximum thermal expansion < 6 x 10-6 , maximum thermal shock resistance shall be of no damage, resistance to acid (wt. loss) < 0.4 %, Skid resistance (friction coefficient) > 0.6, breaking strength shall be 2600 N, density of (g/cm3) shall be 2.4 & no moisture expansion.

- **M-83 ACRYLIC EMULSION PAINTS :**

- It shall be from ICI, Asian Paints, Berger as approved by the Architect and Engineer-in-Charge. It shall confirm to the relevant IS codes.
- It shall be used on both interiors and exteriors, on all different types of plaster, wooden surfaces, stone, brickwork, asbestos cement sheets, hard and soft boards, etc. It shall render rich smooth finish and shall provide a tough film that forms a suitable protection against all elements.
- It shall be water thinnable. It shall require no primer. On a well prepared surface, it shall be applied, after one coat of cement primer, in case it is an interior surface and waterproof cement coating, in case it is an exterior surface. On a new but highly absorbent surface, a thin coat of the same shall be applied by adding two parts of water by volume to two parts of acrylic emulsion by volume. On previously painted surfaces, one coat of the same shall be applied by thinning four parts of the emulsion with one or two parts of water. It shall be applied by brush, roller or spray. It shall have a covering capacity of 25 – 30 S.Mts./Liter, depending on the surface and shade used. It can be washed to remove the day-to-day dirt, after the surface has been painted, minimum for a month.

- **M-84 OIL PAINTS** :

- It shall be from ICI, Asian Paints, Berger or equivalent, as approved by the Architect and Engineer-in-Charge. It shall confirm to the relevant IS codes.
- It shall be used on both interiors and exteriors, on all different types of plaster, wooden surfaces, stone, brickwork, asbestos cement sheets, metal surfaces, hard and soft boards, etc. It shall render rich smooth finish and shall provide a tough film that forms a suitable protection against all elements.

- It shall be water repellent. It shall require no primer. On a well prepared surface, it shall be applied, after one coat of rust repellent, primer, in case it is an exterior surface. It shall be applied by brush, roller or spray. It shall have a covering capacity of 15 – 20 S.Mts./Liter, depending on the surface and shade used. It can be washed to remove the day-to-day dirt, after the surface has been painted, minimum for a year.

Signature of the Contractor :

Name and Address :-**Executive Engineer**

Heritage Cell
Surat Municipal Corporation

SCHEDULE FOR TESTING OF MATERIALS

Sr.No.	Briefed subscription of materials to be tested	Prescription of test which shall be carried out	Frequency @which test shall be carried out(As per GERIQ.C. Vol-12002)
1.	Sand	(1) Gradation (2) Fineness Modulus (3) Specific Gravity (4) Water Absorption (5) Silt Content	1/150 Cu.mt for concrete or as per requirement of relevant specification.
2.	Coarse Aggregate	(1) Gradation (2) Impact Value (3) Flakiness Index (4) Water Absorption (5) Stripping Value	1/150 Cu.mt for concreteor as per requirement of relevant specification.
3.	C.C.Cube	(1) Compressive Strength	1-5 Cmt. 1-Test 6-15 Cmt. 2-Test 16-30 Cmt.3-Test 31-50 Cmt.4-Test 51 & above 4 + 1 for eachaddl.50 Cmt or part of thereof.
4.	Flush Door	(1) End Immersion Test (2)Glue Adhesion Test	Randomly as per IS:7638: 1975
5.	Tiles	• Wet Transverse Strength • Water Absorption	RandamlyasperStrengthIS:4905:1968
6.	Flyash Brick	• Compressive Strength • Water Absorption	As per IS:5454:1978
7.	AAC Block	• Compressive Strength • Dry Density • Drying Shrinkage • Thermal conductivity • Ascolife • Wonder block, etc.	As per IS 2185 Part-3 As per IS 6441
8.	Cement	• Consistencytest • Initial Settingtime • Final settingtime • Compressive Strength • FinenessbyDrySieving • Fineness by Specific Surface • Soundness by Le-Chatelier • SpecificGravity	Every 50 Tons or part thereof

9.	Steel	• Weight permeter • Yeild Stress / 0.2% Proofstress • %Elongation • TensileStrength	**(a) For Consignment below 100 tons** • Under 10 mm dia One sample for each 25 tons or partthereof • 10 mm to 16 mm dia One Sample for each 35 tones or partthereof • Over 16 mm dia One Sample for each 45 tons or part thereof. **(b) For Consignment over 100 tons** • Under 10 mm dia One sample for each 40 tons or partthereof • 10 mm to 16 mm dia One Sample for each 45 tones or partthereof

Note:-

- For Sand and Coarse aggregate two Nos. offullbagforonesample shall be supplied by agency.
- Forwatertest5:00 litters of water shall be supplied by agency in plastic container for each sources.
- Sample from the lot shall be selected by authorized representative long with representative of SMC or TPI or PMC.
- Selected sample shall be handed over personally by representative of S.M.C. or TPI or PMC in sealed condition with letter containing sample No. And sampling date.
- Testreportshouldbereceivedbythedepartmentcontainingreferenceofdepartment's letter, sample No. Sampling date and date of testing.
- As per City Engineer Note No.797, dtd.30/9/2021 Material must be tested atCentral or state goverementInstitue / Engineering Collage

  and

  NABL (National Accreditation Board for Testing and Calibration Laboratories)

  Certified Privet Laboratory Note :- Before material tested in NABL certified private laboratory, Contractor have to Submit NABL Certificate with Scope of Accreditation and Validity date of

  that laboratory to SMC

Note : During course of the execution if any other laboratory is approved by SMC, the contractor can send the material in that laboratory also. The frequency for testing of samples (in either of the laboratories) shall be decided by SMC/E.I.C.

EXECUTIVE ENGINEER,
HERITAGE CELL
SURAT MUNICIPAL CORPORATION

SIGNATURE OF THE CONTRACTOR

03- GENERAL TECHNICAL SPECIFICATION FOR BUILDING WORKS

GENERAL :

- In the specification "as directed"/"Approved" shall be taken to mean "as directed"/approved by theEngineer-in-charge.
- Wherever a reference to any Indian Standard appears in the specifications, it shall be taken to mean as a reference to the latest edition of the same in force on the date ofagreement.
- In "Mode of Measurement" in the specification wherever a dispute arises in the absence of specific mention of a particular point oraspect, the provisions on these particular point or aspects in the relevant Indian Standards shall be referent.
- All measurements and computations, unless otherwise specified, shall be carried out nearest to the following limits:

  (i) Length,widthanddepth(height) ..... 0.01Mt.

  (ii) Areas ..... 0.01Sq.Mt.

  (iii) CubicContents ..... 0.01Cu.Mt.

  In recording dimensions of work the sequence of length, width and height (depth) or thickness shall be followed.
- The distance which constitutes lead shall be determined along the shortest partical route and not necessarily the route actually taken. The decision of the Engineer-in-charge in this regard shall be taken asfinal.
- Where no lead is specified, it shall mean "all leads".
- Lift shall be measured from plinth level.
- Definite particulars covered in the items of work, though not mentioned or elucidated in its specifications shall be deemed to be included the rein.
- Reference to specifications of materials as made in the detailed specification the items of works is in the form of a designation containing the number of the specification of the material and perfix `M' e.g.`M-s'.
- Approval of the samples of various materials given by the Engineer-in-charge shall not absolve the contractor from the responsibility of replacing defective material brought on site or materials used in the work found defective at a later date. The contractor shall have no claim to any payment or compensation whatsoever on account of any such materials being rejected by the Engineer-in-charge.
- The contract rate of the item of work shall be for the work completed in all respects.
- NocollectionofmaterialsshallbemadebeforeitisgotapprovedfromtheEngineer-in-charge.
- Collection of approved materials shall be done at site of work in a systematic manner. Materials shall be stored in such a manner as to prevent damage, deterioration or intrusion of foreign matter and to ensure the preservation of their quality and fitness for thework.
- Materials, if and when rejected by the Engineer-in-charge, shall be immediately removed from the site of work.
- No materials shall be stored prior to, during and after execution of a structure in such a way as to cause or lead to damage on overloading of the various components of the structure.
- All work shall be carried out in a workmanlike manner as per the best techniques for the particular item.
- All tools, templates, machineryand equipmentfor correctexecution of the work as well as for checking lines, levels, alignment of the works duringexecution shallbe kept in sufficient numbers and in good working condition on the site of the work.

- The mode procedure and manner of, execution shall be such that it does not cause damage or over-loading of the various components of the structure during execution of after completion of the structure.
- Special modes of construction not adopted in general Engineering practice, if proposed to be adopted by the Contractor, shall be considered only if the contractor provides satisfactory evidence that such special mode of construction is safe, sound and helps in speedy construction and completion of work to the required strength and quality. Acceptance of the same by the Engineer-in-charge shall not, however, absolve the contractor of the responsibility of any adverse effects and consequences of adopting the same in the course of execution of completion of the work.
- All installations pertaining to water supply and fixtures thereof as well as drainage lines and sanitary fittings shall be deemed to be completed only after giving satisfactory tests by the Contractor.
- The contractor shall be responsible for observing the rules and regulations imposed under the "Minor Minerals Act", and such other laws and rules prescribed by Government from time to time.
- All necessary safety measures and precautions (including those laiddown inthe various relevant Indian Standards) shall be taken to ensure the safety of men, materials and machinery on the works as also of the work itself.
- The testing charges of all materials shall be borne by the Contractor.
- Approval to any or the executed items for the work dose not in any way releivethe contractor of his responsibility for the correctness, soundness and strength of the structure as per the drawings and specifications.
- If any Discrepancies found in any B.O.Q. item/ Material quantity/ workmanship, etc. then relevant I.S. Code shall be referred for final Decision

Signature of the Contractor :

Name and Address :-

Executive Engineer
Heritage Cell
Surat Municipal Corporation

4. ITEMWISE DETAILED TECHNICAL SPECIFICATIONS

ITEM NO 01: Boring holes 3.5mt deep in ordinary soil (for cast in situ piles) and getting out the Soiland disposal of the surplus excavated soil as directed within a leadof 50 metre following diameter of piles. (i) 250 mm (ii) 300 mm

1.0. Workmanship

The ground shall be roughly leveled and after making the position of piles, the holes shall be boredwith a spiral angle to the 3.5 M. depth and specified diameter using boring guide.
The bore holes shall be truly vertical and uniform bore through out of specified diameter, Afterboringto the required depth, the bore shall be cleared off the loose soil and disposal of surplus excavatedstuff as directed within a lead of 50 M.

2.0 Mode of Measurement & Payment

The rate for boring holes shall include :
(a) roughly leveling the ground in positions where piles are to be provided (b) Making the position ofpiles by pegs and boring guide and also for shifting of boring guide. (c) Bailing out water, if any metwith during boring, (d) Disposal or surplus excavated soil within a lead of 50 M and'(e) All tools, plants,equipments and labour required for satisfactory completion or. work.
The rate shall be for a unit of R.mt.

ITEM NO.2(A):- Excavation of soil up to 1.5 M. depth including sorting out andstackingofuseful materials and disposing of the excavated stuff up to 50meter lead in loose or soft soil.

1.0. General

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

2.0. Clearing the site

The site on which the structure is to be built shall be cleared, and all obstructions loose stone, materials and rubbish of all kind bush wood and 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.

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

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

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

6.0. Mode of measurements & payment

The measurement of excavation in trenches for foundation shall be made according to the sections of trenches shown on the drawing or as per sections given by the Engineer-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.
The rate shall be for a unit of one cubic meter.

ITEM NO 2 (B): Excavation of soil up to 1.5 M. depth including sorting out andstacking of useful materials and disposing of the excavated stuff up to 50 meterlead in dense or hard soil.

1.0. Dense or Hard Soil

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

2.0. Workmanship

The relevant specifications of item No. 1 shall be followed except that the excavation work shall be carried out in dense or hard soil.

3.0. Mode of measurements & payment

The relevant specifications of item No. 1 shall be followed
The rate shall be for unit of one cubic meter

ITEM NO 03: Filling in foundation and plinth with murrum or selected soil in layers of 20cm. thickness including watering, ramming and consolidating etc. complete

1.0. Workmanship

As Per Item Description

2.0 Mode of Measurement & Payment

The rate shall be for a unit of Cu.mt.

ITEM NO 4:Demolition including of serviceable materials and disposal of unserviceable materials with ail leads and lifts : R.C.C. work.

1.0. Workmanship

The relevant specifications of item shall be followed except that demolition of R.C.C. work is to be done.

2.0. Mode of measurements and payment

The relevant specifications of item shall be followed except that the demolition of reinforced concrete structure is to be clone. The unserviceable materials shall be disposed of at all

leads and lifts. The rate excludes scraping straightening of reinforcement but includes cutting of reinforcement.

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

ITEM NO 5 :Dismentaling tiled of stone floors laid in mortar including stacking of serviceable materilas and disposal of unserviceable materials with all lead and lift.

1.0. Materials and Workmanship

The relevant specifications of item shall be followed except that the country tile roof or Mangalore roof shall be dismantled.

2.0. Mode of measurements and payment

The relevant specifications of item The supporting members shall be measured separate item.
The rate includes labour required for disposal of unserviceable item with ail leads and lifts.
The rate shall be for a unit of one sq. meter.

ITEM NO06:Providing form work of ordinary timber planking so as to give a rough finish including centering strutting and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 m. and removal of the same for in situ reinforced concrete and plain concrete work in foundation, footings, bases of columns, and mass concrete.

1.0. Materials

The shuttering to be provided shall be of ordinary timber plank and shall conform to respective material specification.
The dimensions of scantlings and battens shall conform to the design. The strength of the wood shall not be less than that assumed in the design.

2.0. Workmanship

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

3.0. Clearing and Treatment of forms:

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

4.0. Stripping time:

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

(a) Sides of walls columns and vertical faces of beams……24 to 48 hours.
(b) Beam soffits, (props, left under)…… 7 days.
(c) Removal of props slabs:
(i) Slabs spanning up to 4.5. m……7 days.
(ii) Spanning over 4.5 mm……14 days.
(d) Removal of props t beams and Arches:

(i) Spanning up to 6 mm……14 days.
(ii) Spanning over 6 m……21 days.

5.0. Procedure when removing the form work:

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

6.0. Centering:

The centering to be provided shall be got approved. It shall be sufficiently strong to ensure absolute safety of the form work and concrete work before, during and after pouring concrete. Watch should be kept to see that behavior or centering and form work is satisfactory during concreting. Erection should also he such that it would allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed.
The props of centering shall be provided on firm foundation or base of sufficient strength to carry the loads without any settlement.
The centering and form work shall, be inspected and approved by the Engineer-in-charge before concreting. But this will not relieve the contractor of his responsibility for strength,-adequacy and safety of form work and centering. If there is a failure of form work or centering, contractor shall be responsible for the damages to property.

7.0. Scaffolding:

All scaffolding, hoisting arrangements and ladders etc., required for the facilitating of conceding shall be provided and removed on completion of work by contractor at his own expense. The scaffolding.
arrangements and ladders etc. shall be strong enough to with sand all live, dead and impact loads expected to act and shall be subject to the approval of the Engineer-in-charge. However contractor shall be solely responsible for the safety of the scaffolding, hoisting arrangement, ladders, work and workman etc. The scaffolding, hoisting arrangements and ladder shall allow easy approach to the work spot and afford easy inspection.

The rate is applicable to all condition of working and height up to 4 mts. The rate shall include the cost of materials and labour for various operations involved such as:
(a)Splayed edges, notching, allowance for overlaps and passing at angles, battens centering, shuttering propping, bolting, wedging easing, striking and removal.
(b)Filleting to form stop chamfered edges or splayed external angles not exceeding 20 mm: width to beams, columns and the like.
(c)Temporary openings in the forms for pouring concrete, if required removing rubbish etc.
(d)Dressing with oil to prevent adhesion of concrete with shuttering and.
(e)Raking or circular cutting.

8.0. Re-Use:

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

9.0. Mode of Measurements & Payment

From work shall be measured as the area in square meters to shuttering in contract with concrete except in the case of inclined member and portion of curved profile and upper side in which case on area of underside shall be measured for payment.
From work to secondary beams shall be measured up to the sides of main beams but no deduction shall be made form the form work of the main beam at the inter section point. No deduction shall be made form the form work of a column at inter section of beams.
The rate is for the completed item.
The rate shall be for a unit of one sq. meter.

ITEM NO 07:Brick work using common burnt clay building bricks having crushing strength not less than 35 Kg/Sq. Cm. in foundations and plinth in cement mortar 1:5 (1 cement : 5 fine sand) conventional bricks.

1.0. Materials

Cement mortar of proportion 1:5 shall conform to M-11. Conventional bricks shall conform to M-15.

2.0. Workmanship

The relevant specification of item shall be followed except that the bricks to beused shall be modular bricks and the proportion of cement mortar is 1:6.

3.0. Mode of measurements & payment

The relevant specifications of item& material shall be followed.
The rate shall be a unit of one cubic meter.

ITEM NO 08 :Uncoursed rubble masonry with hard stone of approved quality in super structure in floor two level in cement mortar 1:5 (1 cement : 5 coarse sand) including leveling up etc. complete.

1.0. Materials and workmanship

The relevant specification of item No. 40 shall be followed except that the proportion of cement mortar shall be in C.M. 1.5 (1 cement : 5 coarse sand)

2.0. Mode of measurements and payments

The relevant specifications of item No. 40 shall followed.
The rate shall be a unit of one cubic meter.

ITEM NO 09: Providing & laying cement concrete 1:1.5:3 (1 cement: 1.5sand:3 graded stone agg. 20mm nominal size) & curing comp. include cost of form work but exclu. Cost of reinforcement for reinforced concrete work in :(A) foundation, footing, base of columns and mass concrete.

1.0. Materials & Workmanship

Cement concrete in 1:1.5:3 (1 cement:1.5 sand :3 graded stone aggregates 20 mm nominal size) waterRelevant Specifications of item No. 61 shall be followed except that cement concrete shall be mixed in thepreparation of 1:1.5:3 by volume.

2.0. Mode of Measurement & Payment

The relevant specifications of item No. 49 shall be followed.
The volume Occupied by reinforcement shall not be deducted from R.C.C. work.
The rate shall be for a unit of one cubic meter.

ITEM NO 10: Providing and laying cement concrete 1:1.5:3 (1 cement : 1.5 coarse sand :3 graded Stone aggregate 20 mm. nominal size) and curing complete excluding cost of form work and reinforcement for reinforced work in : (C) Slabs, landings, shelves, balconies, lintels, beams, girders and cantilever up to floor two level. (D) Columns, pillars, pots, and struts up to floor up to floor two level (E) Staircase up to floor two level (K) Vertical and horizontal fins up to floor two level.

1.0. Materials

Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Graded stone aggregate 20 mm nominal size *shall* conform to M-12.

2.0. General

The concrete mix is not required to be designed by preliminary tests. The proportion of the

concrete mix shall be 1:1.5:3 (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm. nominal size) by volume concrete work shall have exposed concrete surface or as specified in the itemThe 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

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:

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 thetable is not exceeded.

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.

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.

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

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.

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.

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.

3.0. Workmanship

Proportioning : Proportioning shall be done by volume, except which shall be measured in terms of bags of 50 kg. weight, the volume of one such bag being taken as 0.0342 cu. meter Boxes of suitable size shall be used for measuring sand aggregate. The size of boxes (internal) shall be 35 x 25 cms. and 40 cms deep while measuring the aggregate and sand the boxes shall be filled without shaking ramming or hammering. The proportioning of sand shall be on the basis of its dry volume and in case of damp saner, allowances for bulk age shall be made.

Mixing :

For all work, concrete shall be mixed in a mechanical mixed which along with other accessories shall be. kept in first class working condition and so maintained throughout the construction Measured quantity of aggregate, sand and cement required for each batch shall be poured into the claim of the mechanical mixer while it is continuously running. After half a minute of dry mixing measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and a half minute Mixing shall be continued till materials are uniformly distributed and uniform colour of the entire

mass is obtained and each individual particle of the coarse aggregate shows complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing he done for less than 2 minutes after-oil ingredients have been put into the mixer.

When hand mixing is permitted by the Engineer-in-charge for small jobs or for certain other reasons, it shall be done on the smooth watertight platform large enough to allow efficient tuning over the ingredients of concrete before and after adding water Mixing platform shall be so arranged that no foreign malarial gets mixed with concrete nor does the mixing water flow out. Cement in required number of bags shall be spread in n layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly be turning over to get a mixture to uniform colour. Specified quantity water shall then be added gradually through a rose can and the mass turned over till a mix of required consistency is obtained. In hand mixing quantity of cement shall be increased by 10 percent above that specified

Mixers which has been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed to by the Engineer in-charge the first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate Mixing plant shall be thoroughly cleaned before changing from one type of cement to another

Consistency:

The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete, shall be determined by regular slump tests in accordance with I.S. 1199-193. The skimp of 10 mm. to 25 mm shall be adopted when vibrators are used and 80 mm. when vibrators are not used.

Inspection:

Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit him to inspect and accept the false work and forms as to their strength, alignment and general fitness but such inspection shall not relieve the contractor of his responsibility for the safely of men machinery materials and for results obtained immediately before concreting all forms shall be thoroughly cleaned.

Centering design and its erection shall be got approved from the engineer-in-charge. One carpenter with helper shall invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited for reinforcement laid in position. For access to different parts suitable mobile platforms shall be provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shall be cast and tied to the reinforcement. Timber kapachi or metal pieces shall not be used for this purpose.

Transporting and laying:

The method of transporting and placing concrete shall be as approved. Concrete shall be so transported and placed that no contamination, segregation or loss of its constituent material takes place. All from work shall be cleaned and made free from standing water dust, show or ice immediately before placing of concrete. No concrete shall be placed in any part of the structure until the approval of the engineer-in-charge has been obtained.

Concreting shall proceed continuously over the area between construction joints. Fresh concrete proper contraction joint is formed. Concrete shall be compacted in its final position within 30 minutes of its discharge from the mixer. Except where otherwise agreed to by the engineer-in-charge, concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 meter when internal vibrators are used and not exceeding 0.30 meter in all other cases.

Unless otherwise agreed to by the Engineer-in-charge concrete shall be dropped in to place from a height exceeding 2 meters. When trucking or chutes are used they shall be kept close and used in such a way as to avoid segregation. When concreting has to be resumed on a surface which has hardened, it shall be roughened, swept clean, thoroughly wetted and covered with a 13 mm. thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself. This 13 mm. layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has not fully hardened, all

lateness shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken to avoid dislodgement of any particles of coarse aggregate. The surface shall then be thoroughly wetted, all free water removed and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150 mm. in thickness and shall be well rammed against old work, particular attention being given to corners and close spots.

All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators, unless otherwise permitted by the Engineer-in-charge for exceptional cases, such as concreting under water, where vibrators cannot be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the even of breakdowns. Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream up to form an even surface. Compaction shall be completed before the initial setting stats i.e. within 30 minutes of addition of water to dry mixture. During compaction, it shall be observed that needle vibrators are not applied on reinforcement which is likely to destroy the bond between concrete and reinforcement.

Curing:

Immediately after compaction, concrete weather including rain, running water, shocks, vibration,traffic, rapid temperature charges, frost and drying out process. It shall be covered with wet sacking has Sian or other similar absorbent material approved, soon after the initial set, and shall be kept continuously wet for a period of not less than 14 days from the date of placement. Masonry work over foundation concrete may be started after 48 hours of its laying but curing of concrete shall be continued for a minimum period of 14 days.

Sampling and testing of concrete:

Samples from fresh concrete shall betaken as per I.S. 1199-1959 and cubes shall be made, cure and tested at 7 days of 28 days as per requirements in accordance with I.S. 526-1959. A random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following:

Quantity of concrete in the work.	No of samples	Quantity of concrete in the works	No of samples
1-5 cmt.	1	16-30 cmt.	3
6.15 cmt.	2	31-50 cmt.	4
51 and above	4± one additional for each additional 50 mm. or part thereof.		

Note : At least one simple shall be taken from each shift, Ten test specimens shall be made from each sample, five for testing at 7 days and the remaining five at 28 days. The samples of concreteshall be taken on each day of concreting as per above frequency. The number of specimens may be suitably increased as deemed necessary by the Engineer-in-charge when procedure of tests given above reveals a poor quality of concrete and in other special cases.

The average of the group of cubes cast for each day shall not be less than the specified cube strength of 150 K/g Cm 2 at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85% of the specified strength. If the concrete made in accordance with the proportions given for a particular grade does not yield the specified strength, such concrete shall be classified as belonging to the appropriate lower grade.Concrete made in accordance with the Proportions given for a particular grade shall not, however beplaced in a higher grade on the ground that the test strength are higher then the minimum specified.

Stripping:

The Engineer-in-charge shall be informed in advance by the contractor for intention to

stripetheform work. While fixing the time of removal of form work, due consideration shall be given to local conditions, character of the structure, the weather and other conditions that influence the setting of concrete and of the materials used in the mix. In normal circumstances (generally where temperatures are above 20.C) and where ordinary concrete is used, forms may be struck after expire or periods specified for respective item of form work.

All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soft and struts are removed, the concrete surface shall be gradually exposed, where necessary in order to ascertain that concrete has sufficiently hardened. Centering shall be gradually and uniformly lowered in such a manner as to permit the concrete to take stresses due to its own weight uniformly and gradually. Where internal metal tiles are permitted, they or their removable parts shall be extracted without causing any damage to the concrete and remaining holes filled with mortar.No permanently embedded metal part shall have less than 25 mm. cover to the finished concrete surface. Where it is intended to re-use the form work, it shall be cleaned and made good to the satisfaction of the Engineer-in-charge. After removal of form work and shutting, the ExecutiveEngineer shall inspect the work and satisfy by random checks that concrete produced is of good quality.

Immediately after the removal of forms, all exposed bolts etc. passing through the cement concrete member and used for stuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25 m. below the surface of the concrete and the resulting holes be filled by cement mortar, all fins, caused by form joints, all cavities produced by the removal of form tiles and all other holes and depressions, honeycomb spots, broken edges or comers and other defects, shall be thoroughly cleaned", saturated with water and carefully pointed an rendered true with mortar of cement and fine aggregate mixed in proportions used in the grade of concrete that is being furnished and of as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure through filling in all voids. Surface which are pointed shall be kept moist for a period of 24 hours. If rock pockets/honeycombs in the opinion of the Engineer-in-charge are of such an extent or character as to effect the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare the concrete defective and require the removal and replacement of the portions of structure affected.

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 1:1.5 (1 cement : 1.5 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 beamsor 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 be means of timber temphtes with slots accurately out in them, the tamphthes 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.

AH bars projecting form pillars, columns, beams, slabs etc, to which other bars and concrete are to be attached of 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.

4.0. Mode of Measurement & Payment

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.

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

ITEM NO 11: Providing and laying cement concrete 1:1.5:3 (1 cement : 1.5 coarse sand :3 graded Stone aggregate 20 mm. nominal size) and curing complete excluding cost of form work and reinforcement for reinforced work in : (C) Slabs, landings, shelves, balconies, lintels, beams, girders and cantilever up to floor two level. (D) Columns, pillars, pots, and struts up to floor up to floor two level (E) Staircase up to floor two level (K) Vertical and horizontal fins up to floor two level.

1.0. Materials

Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Graded stone aggregate 20 mm nominal size *shall* conform to M-12.

2.0. General

The concrete mix is not required to be designed by preliminary tests. The proportion of the concrete mix shall be 1:1.5:3 (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm. nominal size) by volume concrete work shall have exposed concrete surface or as specified in the item.

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

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	Total quantity of dry aggregate by volume per 50 kgs. of cement to be taken as the sum of individual volume of fine and coarse aggregates, maximum	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 Kegs. of cement maximum
1	2	3	4
M-100 (1:3:6) M-150 (1:2:4) M-200 (1:1.1/2:3) M-250 (1:1:2)	300 Liters 220 Liters 100 Liters	Generally 1:2 for line aggregate to coarse aggregate by volume 160 but subject to an upper limit of 1:1.1/2 and lower limit	34 Liters 32 Liters 30 Liters 1:3 27 Liters

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.

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.

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.

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

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.

Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate maynot be so important, and the nominal maximum size may some times be as great as or greater than the minimum cover.

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.

3.0. Workmanship

Proportioning : Proportioning shall be done by volume, except which shall be measured in terms of bags of 50 kg. weight, the volume of one such bag being taken as 0.0342 cu. meter Boxes of suitable size shall be used for measuring sand aggregate. The size of boxes (internal) shall be 35 x 25 cms. and 40 cms deep while measuring the aggregate and sand the boxes shall be filled without shaking ramming or hammering. The proportioning of sand shall be on the basis of its dry volume and in caseof damp saner, allowances for bulk age shall be made.

Mixing :

For all work, concrete shall be mixed in a mechanical mixed which along with other accessories shall be. kept in first class working condition and so maintained throughout the construction Measured quantity of aggregate, sand and cement required for each batch shall be poured into the claim of the mechanical mixer while it is continuously running. After half a minute of dry mixing measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and a half minute Mixing shall be continued till materials are uniformly distributed and uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shows complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing he done for less than 2 minutes after-oil ingredients have been put into the mixer.

When hand mixing is permitted by the Engineer-in-charge for small jobs or for certain other reasons, it shall be done on the smooth watertight platform large enough to allow efficient tuning over the ingredients of concrete before and after adding water Mixing platform shall be so arranged that no foreign malarial gets mixed with concrete nor does the mixing water flow out. Cement in required number of bags shall be spread in n layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly be turning over to get a mixture to uniform colour. Specified quantity water shall then be added gradually through a rose can and the mass turned over till a mix of required consistency is obtained. In hand mixing quantity of cement shall be increased by 10 percent above that specified

Mixers which haw been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed to by the Engineer in-charge the first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate Mixing plant shall be thoroughly cleaned before changing from one type of cement to another

Consistency:

The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete, shall be determined by regular slump tests in accordance with I.S. 1199-193. The skimp of 10 mm. to 25 mm shall be adopted when vibrators are used and 80 mm. when vibrators are not used.

Inspection:

Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit him to inspect and accept the false work and forms as to their strength,

alignment and general fitness but such inspection shall not relieve the contractor of his responsibility for the safely of men machinery materials and for results obtained immediately before concreting all forms shall be thoroughly cleaned.

Centering design and its erection shall be got approved from the engineer-in-charge. One carpenter with helper shall invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited for reinforcement laid in position. For access to different parts suitable mobile platforms shall be provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shall be cast and tied to the reinforcement. Timber kapachi or metal pieces shall not be used for this purpose.

Transporting and laying:

The method of transporting and placing concrete shall be as approved. Concrete shall be so transported and placed that no contamination, segregation or loss of its constituent material takes place. All from work shall be cleaned and made free from standing water dust, show or ice immediately before placing of concrete. No concrete shall be placed in any part of the structure until the approval of the engineer-in-charge has been obtained.

Concreting shall proceed continuously over the area between construction joints. Fresh concrete proper contraction joint is formed. Concrete shall be compacted in its final position within 30 minutes of its discharge from the mixer. Except where otherwise agreed to by the engineer-in-charge, concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 meter when internal vibrators are used and not exceeding 0.30 meter in all other cases.

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

All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators, unless otherwise permitted by the Engineer-in-charge for exceptional cases, such as concreting under water, where vibrators cannot be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the even of breakdowns. Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream up to form an even surface. Compaction shall be completed before the initial setting stats i.e. within 30 minutes of addition of water to dry mixture. During compaction, it shall be observed that needle vibrators are not applied on reinforcement which is likely to destroy the bond between concrete and reinforcement.

Curing:

Immediately after compaction, concrete weather including rain, running water, shocks, vibration, traffic, rapid temperature charges, frost and drying out process. It shall be covered with wet sacking has Sian or other similar absorbent material approved, soon after the initial set, and shall be kept continuously wet for a period of not less than 14 days from the date of placement. Masonry work over foundation concrete may be started after 48 hours of its laying but curing of concrete shall be continued for a minimum period of 14 days.

Sampling and testing of concrete:

Samples from fresh concrete shall betaken as per I.S. 1199-1959 and cubes shall be made, cured and tested at 7 days of 28 days as per requirements in accordance with I.S. 526-1959.

A random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following:

Quantity of concrete in the work.	No of samples	Quantity of concrete in the works	No of samples
1-5 cmt.	1	16-30 cmt.	3
6.15 cmt.	2	31-50 cmt.	4
51 and above	4± one additional for each additional 50 mm. or part thereof.		

Note : At least one simple shall be taken from each shift, Ten test specimens shall be made from each sample, five for testing at 7 days and the remaining five at 28 days. The samples of concrete shall be taken on each day of concreting as per above frequency. The number of specimens may be suitably increased as deemed necessary by the Engineer-in-charge when procedure of tests given above reveals a poor quality of concrete and in other special cases.

The average of the group of cubes cast for each day shall not be less than the specified cube strength of 150 K/g Cm 2 at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85% of the specified strength. If the concrete made in accordance with the proportions given for a particular grade does not yield the specified strength, such concrete shall be classified as belonging to the appropriate lower grade. Concrete made in accordance with the Proportions given for a particular grade shall not, however be placed in a higher grade on the ground that the test strength are higher then the minimum specified.

Stripping:

The Engineer-in-charge shall be informed in advance by the contractor for intention to stripe the form work. While fixing the time of removal of form work, due consideration shall be given to local conditions, character of the structure, the weather and other conditions that influence the setting of concrete and of the materials used in the mix. In normal circumstances (generally where temperatures are above 20.C) and where ordinary concrete is used, forms may be struck after expire or periods specified for respective item of form work.

All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soft and struts are removed, the concrete surface shall be gradually exposed, wherenecessary in order to ascertain that concrete has sufficiently hardened. Centering shall be gradually and uniformly lowered in such a manner as to permit the concrete to take stresses due to its own weight uniformly and gradually. Where internal metal tiles are permitted, they or their removable parts shall be extracted without causing any damage to the concrete and remaining holes filled with mortar.No permanently embedded metal part shall have less than 25 mm. cover to the finished concrete surface. Where it is intended to re-use the form work, it shall be cleaned and made good to the satisfaction of the Engineer-in-charge. After removal of form work and shutting, the Executive Engineer shall inspect the work and satisfy by random checks that concrete produced is of good quality.

Immediately after the removal of forms, all exposed bolts etc. passing through the cement concrete member and used for stuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25 m. below the surface of the concrete and the resulting holes be filled by cement mortar, all fins, caused by form joints, all cavities produced by the removal of form tiles and all other holes and depressions, honeycomb spots, broken edges or comers and other defects, shall be thoroughly cleaned", saturated with water and carefully pointed an rendered true with mortar of cement and fine aggregate mixed in proportions used in the grade of concrete that is being furnished and of as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure through filling in all voids. Surface which are pointed shall be kept moist

for a period of 24 hours. If rock pockets/honeycombs in the opinion of the Engineer-in-charge are of such `an extent or character as to effect the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare the concrete defective and require the removal and replacement of the portions of structure affected. 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 1:1.5 (1 cement : 1.5 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 therequisite 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 be means of timber temphtes with slots accurately out in them, the tamphthes 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.

AH bars projecting form pillars, columns, beams, slabs etc, to which other bars and concrete are to be attached of 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.

4.0. Mode of Measurement & Payment

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.

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

ITEM NO 12 Providing & laying cement concrete 1:2:4 (1 cement:2 sand:4 graded stone agg. 20 mm nominal size)& curing comp. Includ.cost of form work but exclu. Cost of reinforcement for reinforced concrete work in: (A)Foundation, footing, Base of columns and Mass concrete.

1.0. Workmanship

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

2.0 Proportion of Mix:

The proportion of cement, sand and coarse aggregate shall be one part of cement. 2 parts of sand and 4 parts of stone aggregates and shall be measured by volume**.**

Mixing:

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

Transporting & Placing the Concrete:

The concrete shall be handed from the place, of mixing to the final position in not more

than 15 minutes by the method as directed and shall be placed into its final-position, compacted and finished within 30 minutes of mixing with water i.e. before the setting commences.
The concrete shall be laid in layers of 15 cms. to 20 cms.
The concrete shall be rammed with heavy iron rammers and rapidly to get the required Compactionand to allow ail the interstices to be filled with mortar.

Curing:

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

3.0. Mode of Measurement & Payment:

The concrete shall be measured for its length, breadth and depth, limiting dimensions to Thosespecified on plan or as directed.
The rate shall be for a unit of one cubic meter

ITEM NO 13 Providing & laying cement concrete 1:3:6 (1 cement: 3 coarse sand:6 crushed stoneagg. 20mm nominal size) & curing comp. include cost of form work in : (A) foundation & plinth.

1.0. Workmanship

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

2.0 Proportion of Mix:

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

Mixing:

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

Transporting & Placing the Concrete:

The concrete shall be handed from the place, of mixing to the final position in not more than 15minutes by the method as directed and shall be placed into its final-position, compacted and finished within 30 minutes of mixing with water i.e. before the setting commences.
The concrete shall be laid in layers of 15 cms. to 20 cms.
The concrete shall be rammed with heavy iron rammers and rapidly to get the required Compactionand to allow ail the interstices to be filled with mortar.

Curing:

After the final set, the concrete-shall be kept continuously wet if required by pounding for a period ofnot less then 7 days form the date of placement.

3.0.0 Mode of Measurement & Payment:

The concrete shall be measured for its length, breadth and depth, limiting dimensions to Thosespecified on plan or as directed.
The rate shall be for a unit of one cubic meter

ITEM NO.14 :- Providing & fixing IS Mark FE 500/500D TMT/CRS bar reinforcement for R.C.C. work incl. bending, binding, & placing in position etc. comp. upto two floor level

1. MATERIALS

Mild steel bars shall confirm to M-18 Thermo Mechanically Treated steel bars (high yield strength steel deformed bars) shall conform to M-18, Mild steel binding wires shall conform to M-21.

2. WORKMANSHIP

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

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

Reinforcing steel shall conform accurately to the dimensions given in thebar bendingschedules shownon relevant drawings. Bars shall be bent cold to specified shape and dimensions oras directed, using aproper 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 transportation or handling shall be straightened before being usedon the work. They shall not be heated tofacilitate bending. Unless otherwise specified for mild steel a "U" type hook at the end of each bar shall invariably be provided to mainreinforcement.The radius of the bend shall not be less than straight part of the bar beyond the end of the curve shall be at least four times the diameter of the bar. In case which are not round and in case of deformed bars, the diameter shall be taken as the diameter of the circle having an equivalent effective area. The hooks shall be suitably encased to prevent any splitting of the concrete. The cold twisted steel bears shall be used without hooks at the ends. Deformed bars without hooks shall, however, comply with relevant anchorage requirements.

All the reinforcement bars shall be accurately placed in exactly the same position as shown on thedrawings, and shall be securelyheld inposition duringplacing ofconcrete by annealed binding wire not less than 1 mm. in size, and by using stay blocks or metalchair spacers, metal handers, supporting wires or other approved devices at sufficiently close intervals. Bars shall not be allowed to sag between supports nor displaced during concreting or anyother operationsof the work. All devices used for positioning shall be of non-corrodible material. Wooden and metal supports shall not extend to thesurface of the concrete, except where shown on the drawings. Placing barson layers of freshly laid concrete as the work progresses for adjusting bar spacing shall not be allowed. Pieces of broken stone or brick wooden blocks shall notbe used. Layers of bars shall be separated by spacer bars, precastmortar blocks or other approved devices. Reinforcement after being placed in position shall be maintainedin a clean condition untilcompletely embeddedinconcrete.Special care shall be exercised to prevent any displacementof reinforcement in concrete already placed. To preventreinforcement fromcorrosion, concretecover shall be provided as indicated on drawings. All the bars are to bespliced and which are likely to be exceeding 10 days shall be protected by a thick coat of neat cement grout.

Bars crossing each other where required shall be secured by binding wires (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.

As far as possible, bars of full length shall be used, in case this is not possible, overlapping of bars shall be done as directed. when practicable, overlapping bars shall not touch each other, but be kept apart by 25 mm. or 125 timesthe maximumsize ofthe coarseaggregate whichever is greater between them. Where not feasible, overlapping bars shall be bound with annealed wires, not less than 1 mm. thick twisted tight. The overlaps shall bestaggered for different bars and located at points, alongthe spanwhere neithershear norbending moment is maximum.

Whereever indicatedon thedrawings ordesired bythe Engineer-in-charge, bars shall be joined by couplings which shall have a cross section sufficient to transmit the fullstresses

of bars. The ends of the bars that are joined bycoupling 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.

When permittedor specified on the drawings, joints of reinforcement bars shall be welded so as to transmit theirfull stresses. Welded joints shall preferably be located at points when steel will not be subjected to more than 75% of the maximum permissible stresses and welds so staggeredthat at any one section not more than 20% of the rods are welded. Only electricwelding using a process whichexcludes air from molten and conforms to any or all other special provisions for the work shall be accepted. Suitable means shall be provided for holdingbars securely in postion during welding. It shall be ensured that no voids are left in welding and when welding is done in two or three stages, previous surface shall be cleaned properly. Ends of the bars shall be cleaned of all loose scale, rust, grease, paint andother foreignmatter before welding. Only competent welders shall be employed on the work. The M.S.electrodes usedfor 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. MODE OF MEASUREMENT & PAYMENT

For the purpose of calculating consumption, wastage shall not be permitted beyond 7.5%. Excess consumption over 7.5% will be charged at penalty rate.

Reinforcement shall bemeasured in length including overlaps, separately for different diameters as actually used in the work. Where welding or coupling is resorted to, in place do lap joints, such joints shall bemeasured forpayment asequivalent lengthof overlapas per design requirement. From the length so measured, the weight of reinforcement shall be calculated in tonnes onthe same basis of as per M-14 even though steel is supplied to the contractor by thedepartment on actual weight. Length shall include hooks at the ends. Wastage and annealed steel wirefor binding shall not be measured and the costof these items shall bedeemed to be included inthe rate for reinforcement.

The rate for reinforcement includes cost of steelbinding wires, its transporting from departmental store to work site, cutting, bending, placing 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. The rate shall be for unit of one Kg.

ITEM NO.15(A): Providing and fixing M.S. Grills of required pattern to wooden frames of windows etc., with M.S. flats at required spacing and frame around, square, or round bars with round headed bolts and nuts or by screws : plain Grill.

1.0. Materials

The structural steel shall conform to M-22.

2.0. Workmanship

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

The grill shall be fabricated to the designs and patterns shown in the drawings and the weight shall be as directed, and the joints shall be reverted or welded as shown in the plan or as directed. The grill so formed shall be fixed into the frames of the windows etc. before they are erected in position. The outside strip frame of the grill shall be housed to its full thickness into the recess cut into the frame of the windows etc. The grill shall be fixed to the frame with number of bolts and nuts or screws viz. bolt nut/screw per 30 cm. of the length of outer strip subject to minimum of 2 Nos. on each side of the frame or as indicated in the drawing or as directed.

The bolts and nuts or screws shall be counter sunk and shall be fixed with the top of their heads flush with the face of the frame strips.

3.0. Mode of measurements & payment

No payment shall be made for weight of screws, bolts nuts etc. only weight of grill shall be paid.

The rate shall be for a unit of one kg.

ITEM NO. 15(B):Providing and fixing M.S. Grill of required pattern to wooden frames of windows etc. with" M.S. plates, at required spacing and frame around, square or round bars with round headed bolts and nuts or by screws and with ornamental grill.

1.0. Materials & Workmanship

The relevant specification of item no. 81(A) shall be followed except that the work is for of ornamental grill.

2.0. Mode of measurements & payment

The relevant specifications of item No. 81(A) shall be followed.
The rate shall be for a unit of one Kg.

ITEM NO 16: Providing 20 mm thick double coat mala cement plaster on brick/concrete work for plastering comprising of base coat 12mm thick cement plaster in cement mortar (1Cement :4 coarse sand) in rough finishing and 8mm thick top coat of cement mortar 1:2 (1Cement :2 Coarse sand) finished with trovel including scaffolding curing etc. complete.

1.0. Workmanship

As Per Item Description

2.0 Mode of Measurement & Payment

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

ITEM NO 17: Applying priming coat over new steel and other metal surfaces after and includingpreparing the surface by thoroughly cleaning oil, grease, dirt and other foreignmatterand secured with brushes, fine steel, wool scrapers and sand paper, with ready mixedpriming paint, brushing red lead.

1.0. Materials

The ready mixed primer, brushing red shall conform to I.S. 102-1962.
The thinner (linseed oil) shall conform to I.S. 75-1973. If for any reason, thinning is necessary incaseof ready mix paint the brand of thinner recommended by manufacture shall be used.

2.0 Preparation of surfaces :

The surfaces painting shall be cleaned of all rust, scale, dirt and other foreign matter sticking to it withwire brushes, steel wool, scrapers, sand paper etc. This surface shall then be wiped finally withmineral turpentine which shall also remove grease and perspiration of hand marks. The surface shallthen be allowed to dry.

3.0 Application of primer :

After the preparation of the surface, the priming coat shall be applied immediately. The brushingoperations are to be adjusted to the spreading capacity advised by the manufacturer of the particularprimer. The paint shall be applied evenly and smoothly by means of crossing and laying off. Thecrossing and laying off consists of covering the area

over with paint, brushing alternately in oppositedirections, two or three times and then finally brushing lightly in a direction at right angles to the same.
In this process, no brush marks shall be left after the laying off is finished. The full process of crossingand laying off wall constitute one coat.
During painting, every time, after the priming coat has been worked out of the brush bristles or afterthe brush has been unloaded, the bristles of the brush shall be opened up by striking the brushagainst portion of the unpainted surface with the end of the bristles, held at right angles to the surface,so that bristles thereafter will collect the correct amount of paint when dipped again in to a paintcontainer The prima/y coat shall be allowed to dry completely before painting is started.
No hair marks from the brush or clogging at pain puddles in the corner of panels angles of moldingetc. shall be left on the work
Special care shall be taken while painting over bolts, nuts, rivets, overlaps etc.
The container when not in use shall be kept close and free from air so that paint does not thicknessand also shall be kept guarded from dust.

4.0 Mode of measurements & payment

The new steel and other metal surface shall be measured under this item.
All the work shall be measured net in the decimal system, as executed subject to the following limitsunless otherwise stated hereinafter.
Dimensions shall be measured to the nearest 0.01 meter.
Areas shall be worked out to the nearest 0.01 sq. meter.
No deductions shall be made for openings not exceeding 0.5 sq. mt. each and no addition shall bemade for painting to beddings, moldings, edges, jambs, soffits, sills etc. of such opening.
In case of fabricated structural steel and iron work, priming coat of paint shall be included withfabrication. In case of trusses if measured in sq. m. compound girders, stanchions, lattices, graderand similar work, actual area shall be measured in sq. m. and no extra shall be paid for painting onbolts heads, nuts, washers etc. No addition shall be made to 1 he weight calculated for the purpose ofmeasurements of steel and iron works for paint applied on shop or at site.The different surfaces shall be grouped into one general item, areas of uneven surfaces beingconverted into equivalent plain areas in accordance with the table given as per Annexure-llforpayment.
The rate shall be for a unit of One sq. meter.

ITEM NO 18:Painting two coat (excluding priming coat) on new steel and other metal surface withsyntheticenemal paint, brushing to give an even shade including cleaning the surface of all dirt, dust and other foreign matters.

1.0. Materials

Synthetic enamel paint shall conform to I.S. 1932-1964.

2.0. Workmanship

The relevant specifications of item No. 81shall be followed except that the painting shall be carriedout with synthetic enamel paint.

3.0. Mode of measurements &payment

The relevant specifications of item No. 81shall be followed.
The rate shall be for a unit of One sq. meter.

ITEM NO.19: Providing and applying two coats of weathershield max paint (3 coats may berequired in case of darker colours) of ICI Dulux or Apex Ultima of Asian paintincluding applying exterior acrylic primer coat as per manufacturers specification anddirections in shade and colour approved by architects, on exterior surfaces of thebuilding including

scaffolding, preparing the surface, watering, curing etc. complete and as directed by the architects and manufacturers.

Surface preparation:

Surface is thoroughly clean, dry and free from all loose dirt, chalk, grease, funfi, algaeand flaking paint. This can be achieved by brushing with a wire / stiff coir brush,followed by water jetting if required. Fill up all minor cracks and defects with whitecement and sand mixture in the ratio 1:3. For application on previously painted wall,previous coatings of paint must be thoroughly scraped off and clean the surfacethoroughly using wire brushes.

Priming:

Apply a liberal coat of exterior acrylic primer and allow it to dry for 4-5 hours.
application of putty is not recommended. Minimum 4-6 hours duration is requiredbetween each coat of weather shield max paint.
Details specification same as per item description and as directed by Engineer-in-charge.
Measurement shall be paid in Sq.mt.

ITEM NO 20: RCC Core Cutting is about making precise, circular cuts for creating holes of required diameters for Rehabilitation in civil works. The core drilling rod is fitted with diamond pieces at the drilling end. The core cutting machine can be used for both horizontal and vertical hole making purposes.) 150mm

1.0. Materials

Core Cutting machine

2.0. Workmanship: Preparation of Surfaces:

The center of hole should be maintain as per the concerned agency,The core drilling rod should be fitted with diamondpieces at the drilling end. The core cutting machine should be used for both horizontal and vertical hole making purposes. 1) 75mm -110mm, 2) 150mm, the dust has to be cleaned properly by the agency so that other material cannot be disturbed which are displayed in museum.

3.0. Mode of measurements and payment

The rate shall be for a unit of 1 nos.

ITEM NO 21: Providing and fixing approved make Perforated C type cable tray. Made from sheet steel. The cable tray should be single or double bended as per required and as per IS 2062/1079 and shall be coated with hot dip galvanizing as per IS 2629/4759. with max 17.5% perforation with coupler plate / Fish plate and GI hardware like nut - bolt and washers etc. erection with necessary support(included) as per Specification and as per instruction of engineer in charge..

1.0. Workmanship

As Per Item Description

2.0 Mode of Measurement & Payment

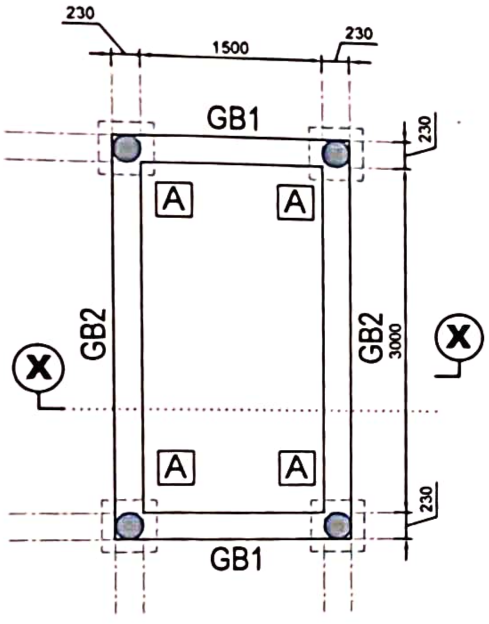
The rate shall be for a unit of R.mt.

-SD-

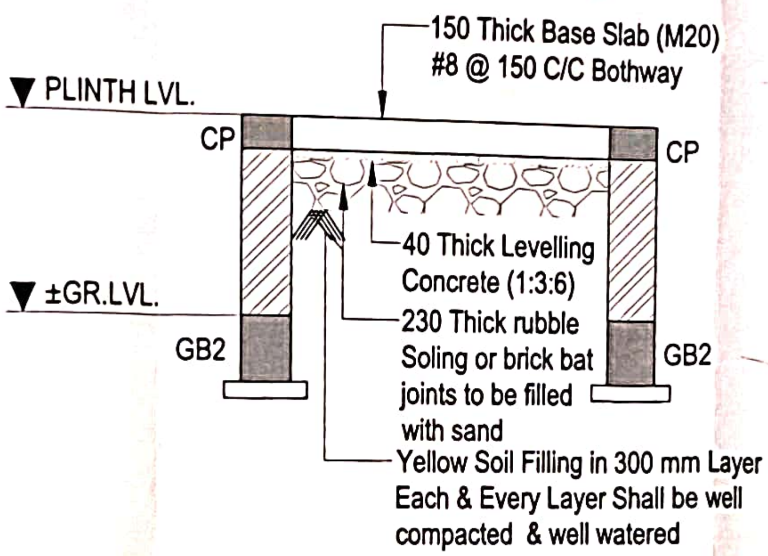
Executive Engineer
Heritage Cell
Surat Municipal Corporation

Seal & Signature of the Bidder

PROJECT NAME :-
FORT AT CHOWK
D.G.SET.



D.G. SET PLAN



SECTION-XX

SCHEDULE OF AUGER (M25,Fe500)

AUGER	SIZE	DEPTH	MAIN BARS	RING	PILE CAP	REMARK
A	230 Ø	3000mm	4-12 mm	#8 @ 150 C/C	450 X 450 X 300 with #8 @ 150 C/C Bothway	

SCHEDULE OF BEAM (M25,Fe500)

BEAM NO.	SIZE		BOTTOM REINFORCEMENT						TOP REINFORCEMENT					SIDE FACE		STIRRUPS 8mm # if not specified			REMARKS
	b	D	STRAIGHT		BENT		AT		ANCHOR		EXTRA REINFORCEMENT								
	mm	mm	NO.	DIA	NO.	DIA	L	R	NO.	DIA	NO.	DIA	LENGTH	NO.	DIA.	L	M	R	
GB1	230	300	2	12					2	12						150	150	150	
GB2	230	300	4	12					2	12						125	150	125	
CP	230	150	2	10					2	10						150	150	150	

On behalf of Sumeshmodi
Rachna A. Gajwala.

PEOPLE FOR HERITAGE CONCERN
CONSERVATION ARCHITECTS & PLANNERS
GST No: 24AA...M8347E1ZD
201, ANCHAN APARTMENTS,
OPP. OLD R.T.O. ... ROAD, SURAT-395001
TEL NO. +91 261 ...
Email: sumesh...@yahoo.co.in

DATE	REVISION	DESCRIPTION
30-04-25	R0	G.F.C.
DRG NO	STR001-001-R0	
CLIENT	PEOPLE FOR HERITAGE CONCERN	
TITLE	D.G. SET FOUNDATION AND GB LAYOUT & DETAIL	