GOVERNMENT OF MADHYA PRADESH

URBAN DEVELOPMENT & HOUSING DEPARTMENT

INTEGRATED STANDARD SCHEDULE OF RATES

[VOLUME – 2]
BUILDING WORKS

EFFECTIVE FROM - 2nd August 2021

DIRECTORATE
URBAN ADMINISTRATION AND DEVELOPMENT
PALIKA BHAWAN, SHIVAJI NAGAR, NEAR 6 No. STOP
BHOPAL, MADHYA PRADESH 462016

PREFACE

Directorate, Urban Administration and Development under Urban Development and Housing Department, Government of Madhya Pradesh is the State Headquarter for the Urban Local Bodies of the state. Urban Local Bodies undertake various Infrastructure Works such as Water Supply, Sewerage, Tube Well, Building Works, Road Construction, Bridge, Culvert Construction and Electrical works from time to time. An Integrated Standard Schedule of Rates (ISSR) in 4 volumes for (i) Water Supply, Sewerage and Tube well works (ii) Building Works (iii) Road and Bridge Works (iv) Electrical works was issued by the Directorate, Urban Administration and Development, Bhopal on 01st June 2011 and the same was revised on 10th May 2012.

With the increase in Labour and Commodity Rates, implementation of Integrated Taxation, Goods and Services Tax (GST) and prevalence of new useful products in the market, it has become important to revise the Integrated Standard Schedule of Rates.

Due care has been taken to frame this Integrated Standard Schedule of Rates as correctly as possible. It is, however, possible that some errors might have crept in. In case any error or omission is noticed, the same may be brought to the notice of this office.

Effective suggestion for any correction, addition & alteration is always welcome for any further betterment to this schedule of Rates for Water Supply, Sewerage and Tube well works, Building works, Road and Bridge works and Electrical works.

This Integrated Standard Schedule of Rates is available on the departmental website www.mpurban.gov.in and shall be effective from 02-08-2021.

Bhopal, 02nd August 2021

(G.P. Katare)
Engineer-in-chief
Urban Administration & Development
Madhya Pradesh, Bhopal

MEMBERS OF WORKING COMMITTEE

1.	Mr. G.P. Katare, Engineer-in-Chief, Directorate Urban Administration and Development.	Chairman
2.	Mr. Deepak Ratnawat, Engineer-in-Chief, Madhya Pradesh Urban Development Company Ltd.	Guest Member
3.	Mr. Hans Kumar Jain, Chief Engineer, Directorate Urban Administration and Development.	Vice Chairman
4.	Mr. Suresh Sejkar, Superintending Engineer, Directorate Urban Administration and Development.	Member Secretary
5.	Mr. Rajeev Goswami, Superintending Engineer, Directorate Urban Administration and Development.	Member
6.	Mr. Gajanand Chauhan, Superintending Engineer, UADD, Indore.	Member
7.	Mr. G.S. Saluja, Superintending Engineer, Directorate Urban Administration and Development.	Member
8.	Mr. J.P. Para, Superintending Engineer, Municipal Corporation, Gwalior.	Member
9.	Mr. Anand Singh, Superintending Engineer, Madhya Pradesh Urban Development Company Ltd.	Member
10.	Mr. Alok Chouksey, Superintending Engineer, UADD, Bhopal.	Member
11.	Mr. Pradeep Mishra, Superintending Engineer, UADD, Jabalpur.	Member
12.	Mr. Brajesh Karriya, Superintending Engineer, UADD, Gwalior.	Member
13.	Mr. Pradeep Nigam, Superintending Engineer, UADD, Ujjain.	Member
14.	Mr. Anoop Goyal, Executive Engineer, Municipal Corporation, Indore.	Member
15.	Mr. R.R. Jaroliya, Executive Engineer, UADD, Ujjain.	Member
16.	Mr. Harishankar Mishra, Executive Engineer, UADD, Rewa.	Member
17.	Mr. L.L. Tiwari, Executive Engineer, UADD, Sagar.	Member
18.	Mr. Rakesh Rawat, Executive Engineer, Directorate Urban Administration and Development.	Member
19.	Mr. Ravi Chaturvedi, Executive Engineer, Directorate Urban Administration and Development.	Member
20.	Mr. Jeevendra Singh, Executive Engineer, Directorate Urban Administration and Development.	Member

Special Thanks to:

- Mr. Nikhil Singh, Assistant Engineer, Directorate Urban Administration and Development.
- Ms. Gazal Khanna, Assistant Engineer, Municipal Corporation, Indore
- Mr. Kuldeep Raghuvanshi, Assistant Engineer, Municipal Council, Khurai
- Mr. Avinash Agrawal, Sub Engineer, Directorate Urban Administration and Development.
- Mr. Chandrakishor Suryawanshi, Sub Engineer, Directorate Urban Administration and Development.

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GENERAL NOTES

1 **The SOR of UADD Department consists of 4 Volumes :-**

VOLUME - I Water Supply, Sewerage & Tube Well Works
VOLUME - II Building Works
VOLUME - III Road & Bridge Works
VOLUME - IV Electrical Works

2 The contents of each Volume are as given below

VOLUME - I
WATER SUPPLY, SEWERAGE AND TUBE WELL WORKS

1	Cast Iron Socket & Spigot Pipes and Specials with lead joints.
2	Cast Iron Socket & Spigot Pipes and Specials with Tyton Joints.
3	Cast Iron Pipes and Specials with flanged joints.
4	Ductile Iron Pressure Pipes and Specials with Tyton joints
5	Unplasticized PVC Pipes, PVC-O Pipes & Fittings for potable water supply.
6	Galvanised Iron Pipes, Specials and Gun Metal/Brass Metal Fittings.
7	HDPE Pipes, MDPE Pipe & Specials
8	M.S. Pipes & Specials
9	Asbestos Cement Pressure Pipe and Cast Iron Fittings.
10	Salt Glazed Stoneware Pipes.
11	Unplasticized Non-Pressure Polyvinyl Chloride (PVC-U) Pipes, DWC Pipes.
12	Reinforced Cement concrete Pipes.
13	Bar Wrapped Steel Cylinder Pipes (BWSC)
14	Sluice Gate & Valves
15	Water Hammer Devices
16	Pumps
17	Sewer Appurtenances.
18	Civil Works for Water Supply & Sewerage works.
19	Miscellaneous.
20	Construction of Tube Wells, Chlorination system & Trenchless work
21	Intake Well
22	Water Treatment Plant, Sewage Treatment Plant & Chlorination System
23	Ground Service Reservoir & Sumps Tanks
24	Reinforced Cement Concrete Elevated Service Reservoir (ESR)
25	List of IS Codes for Water Supply & Sanitary Engineering
26	Drawings for Water Supply & Sewerage.

VOLUME - II
BUILDING WORKS

1	Carriage of Material
2	Earth work
3	Mortars
4	Concrete work
5	Reinforced Cement Concrete
6	Brick work
7	Stone work
8	Marble work
9	Wood Work & P.V.C. Works
10	Steel work
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14	Repair to Building
15	Dismantling & Demolishing
16	Pile work
17	Aluminium work
18	Water proofing Work
19	Form Work
20	Rainwater Harvesting, Recycle and Reuse Waste Water
21	Building Water Supply
22	Building Drainage
23	Sanitary Installation

VOLUME - III
ROAD & BRIDGES WORKS

ROAD	
1	Carriage of Material
2	Site Clearance
3	Earth work, Erosion control and Drainage
4	Sub-Bases, Bases (Non-Bituminous) and Shoulders
5	Bases and Surface courses (Bituminous)
6	Cement Concrete Pavements
7	Geosynthetics and Reinforced Earth
8	Traffic Signs, Marking & other Road Appurtenances
9	Supply of Material
10	Maintenance of Roads
11	Horticulture & Landscaping

BRIDGE	
12	Foundations
13	Sub-Structure
14	Super-Structure
15	River Training and Protection works
16	Repair and Rehabilitation

VOLUME - IV
ELECTRICAL WORKS

PART – 1 – INTERNAL ELECTRIFICATION	
1	Wiring in surface /concealed rigid P.V.C. conduit system.
2	Wiring in surface /concealed rigid Steel conduit system.
3	Wiring in surface rigid P.V.C. casing capping system
4	Wiring in existing/conduit/P.V.C. casing capping system
5	Sub Mains in surface/concealed rigid steel conduit system.
6	Rewiring in existing conduit.
7	Control switch gear/Bus bar.
8	MCCB's, Isolators, MCB's, MCB-DB and fixing.
9	Accessories/Pannel/Lamp/Telephone wires/Fans/Luminaries.
10	Miscellaneous
11	Earthing
12	Dismantiling of Civil and Electrical Works
PART – 2 – EXTERNAL ELECTRIFICATION	
13	External Electrification and over head lines
14	Power Cable & laying.
15	Transformers. & Fire Extinguishers.
16	High Mast
17	G.I. Pipe and Pump Sets
18	Solar Street Light System
19	Supply & Fixing of LED Lights
20	Energy Savings and Protection Solutions for Buildings
21	Diesel Generator Set

3 Rate for completed items include the cost of followings: -

3.1 Material,labour, templates, tools, hire and running charges of plant/machinery required to complete the work,unless specified otherwise.

3.2 All lead & lift of all material required for execution of work & inclusive of charges like duties, royalty, insurance etc.

3.3 Provision for erection and removal of centering, form works, scaffolding, streching, benching ladders and all other applications etc.,required for the proper execution of the work unless otherwise specified.

3.4 Provision for necessary protection for the covering of work/structure from inclement weather etc.and damage arising from falling materials, rain,fire etc shall be the responsibility of contractor.

3.5 Curing wherever required including arrangement of water with its lead or lift and labour whatsoever.

4 The rates for completed items in the schedule of rates also include the following.

1 10% for contractor profit

2 5% for T&P & overhead charges

5 The mode of measurements shall be as per provisions in the relevant items and as per specifications/ relevant IS codes.

6 All materials shall conform to the relevant prevailing Indian Standard Specifications. All material before use in works shall require approval of the Engineer in charge, who will get them sampled, tested as per relevant IS code at contractor's cost and samples so approved shall be kept in the office of the concerned Engineer-in-charge till finalization of the work.

7 Material obtained from excavation shall be the property of the Local body (Municipal Corporation, Municipal Council & Nagar Parishad) and shall be disposed of as per direction of Engineer-in-charge.

8 Sand : Nothing extra shall be payable on account of used of Narmada sand or sand brought from any other quarry/river. Sand should conform to the requirements of IS : 1542 and IS 2166 for using it in construction work.

9 Rubble available from excavation of hard rock shall be the property of the contractor subject to recovery of Rs. 75/- per cum of the quality of the rock excavated.

10 **Cement :-**

10.1 Where contract provides for cement to be arranged by the Contractor himself, only I.S.I. Marked cement as per IS 269 for 33 grade cement, IS 8112 for 43 grade cement, IS 12269 for 53 grade cement, IS 1489 for Portland Pozzolana cement, shall be allowed to be used in the work subject to the prescribed tests.

10.2 Make of cement shall be got approved by the Engineer-in-charge. The engineer in charge shall get cement tested as per relevant IS codes, at the cost of the contractor, before use in work.

10.3 Pozzolona cement is now being widely produced all over the country. This may be used in structures as per provisions of IS code.

10.4 When the strength of concrete required upto M-30, then O.P.C. 33 grade conforming to IS 269-1989 or P.P.C. conforming to IS : 1489-1991 may be used.

10.5 When the strength of concrete required is more than M-30, the O.P.C. 43 grade conforming to IS : 8112-1989 shall be used.

10.6 In specific cases requiring higher grade of strength, use of Ordinary Portland Cement (OPC) should be invariably ensured.

10.7 The arrangement for necessary equipment and testing shall have to be made by the contractor himself at site, as decided by the Engineer-in-Charge. All expenses shall be borne by the contractor.

10.8 Any lot of cement brought to site by the contractor, would be permitted to be used in the work only after the satisfactory results of the tests, under the supervision of the Engineer-in-Charge or his authorised representative. The record of the test results shall be maintained in register mentioned in subsequent para.

10.9 Cement at Site : A duplicate cement register as per format here under shall be maintained at site of work. Extract certified copies of the entries for each month/each running bill shall be submitted to the Engineer-in-Charge by the Contractor. The original register shall also be submitted to the Engineer-in-Charge on completion of the work by the Contractor.

S.No.	Date of receipt of cement	No. of bags	Name and address of firm, from whom purchased	Signature of contractor or his authorised representat	Signature of authorized representative of Engineer-in-charge	Result of test for initial and final setting time	Result of tests for compressive strength of cement	Remarks

10.10 The original cement register shall also be submitted to the Engineer-in-Charge on completion of the work by the Contractor.

11 **Steel :-**

11.1 Steel used for reinforcement shall conform as per under :-

(a) Mild Steel and medium tensile steel bars shall conform to IS : 432 (Part-I),
(b) Hot rolled deformed bars shall conform to IS : 1139,
(c) Cold twisted bars shall conform to IS : 1786,
(d) Hard drawn steel wire fabric shall conform to IS : 1566 and
(e) Thermo mechanically treated bars of Grade Fe 500D

11.2 All reinforcement shall be free from loose mill scales, loose rust and coats of paints, oil, mud or other coatings which may destroy or reduce bond.

11.3 Only such steel obtained from main producers of steel as having licence from the B.I.S. to manufacture such steel for reinforcements, shall be allowed to be used in the work. The make of the steel shall be approved by engineer-in-charge.

11.4 The Contractor shall have to produce Test Certificate in the proforma prescribed approved by B.I.S. from the manufacturer for every batch of steel brought to the site of work.

11.5 Before commencement of use of steel, from any batch brought to site the of the work by the contractor, the Engineer-in-Charge shall arrange to get samples tested for nominal mass, tensile strength, bend test and rebend test from any Laboratory of his choice at the cost of Contractor. The selection of test specimens and frequency shall be as per relevant I.S. specification of the steel used.

11.6 The Site Order Book : The "Site Order Book" shall be in custody of departmental supervisory staff. In case of a work for which a saperate agency for supervision of work has been engaged by the department, the site order book shall be in possession of the field staff of SQC/PMC agency. The Engineer-in-Charge or his authorised representative may record his instruction is this book, which shall be noted by the contractor or his authorised representative for compliance.

12 Interpretations :-

12.1 Wherever any reference is made to any Indian Stnadard, it shall be taken as reference to the latest edition with all amendments issued thereto.

12.2 In the event of any variation between the CPWD specifications (adopted) and the Indian Standard, the former shall taken precedence over the later.

12.3 Precedence of specification in SOR : In case of any contradiction in the provisions to the CPWD Specifications (adopted) and this document the provisions of this document would take precedence.

12.4 Type error in BOQ : In case of any discrepencies (Typo Error) in rates of any SOR item included in BOQ and that provided in this SOR, provision of SOR shall taken precedence.

12.5 The Engineer - in- Chief , UADD, Bhopal shall be the sole deciding Authority as to the meaning, interpretation and implications of various provisions in this schedule of rates. His decision shall be final and binding on all concerned.

13 Safety :- The contractor shall be fully and solely responsible for making all the safety arrangements pertaining to the work. The contractor shall be fully responsible and liable in all respects for any accidents and subsequent legal action initiated by any party including the department.

14 Concrete Work : - (Other than Road works)

14.1 Testing of Concrete :- The concrete shall be sampled in accordance with the norms specified in IS 456. The frequency of sampling is given below.

Quantity of Concrete in the Work m^3	Number of Samples
1 - 5	1
6 - 15	2
16 - 30	3
31 - 50	4
51 and above	4 plus one additional sample for each additional $50m^3$ of part thereof.

Note:

(i) At least one sample shall be taken from each shift.

(ii) Where concrete is produce as continuous production unit, such as ready mix concrete plant. The frequency of sampling may be agreed upon mutually by suppliers and purchasers.

14.2 **Test specimen**

Three test specimen shall be made for each sample for testing at 28 days. Additional samples may be required for various purposes such as to determine the strength of concrete at 7 days or at the time of striking the formwork, or to determine the duration of curing, or to check the testing error. Additional samples may also be required for testing samples cured by accelerated methods as described in IS 9103. The specimen shall be tested as described in IS 516.

14.3 Nominal mix concrete may be used for concrete for M-20 or lower. The proportions of material for nominal mix concrete shall be in accordance with the table given below: -

Grade of Concrete	Total Quantity of Dry Aggregates by Mess Per 50 Kg of cement, to be taken as the Sum of the Individual Masses of Fine and Coarse Aggregates, Kg. Max	Proportion of Fine Aggregate to Coarse Aggregate (by Mass)	Quantity of Water per 50 Kg of Cement, max Ltr.
1	**2**	**3**	**4**
M5	800	Generally 1:2 but subject to an upper limite of 1:1½ and a lower limit of 1:2 V2	60
M 7.5	625		45
M 10	480		34
M 15	330		32
M 20	250		30

Note:-

The proportions of the fine to coarse aggregate should be adjusted from upper limit to lower limit progressively as the grading of fine aggregate become finer and the maximum size of coarse aggregate becomes lower. Granded coarse aggregate shall be used.

15 Testing

15.1 Testing in Laboratory other than field Laboratory : In other cases, testing of construction materials should be got done from any of the testing laboratories of the government works departments, and technical institutes, engineering college, etc. for the concrete mix of M-25, M-30 or higher mix the design mix is necessary and should be got approved by Engineer-in-Charge. However if testing it is mandatory to get done certain percentage of each type of test done through any NABL accredited testing laboratory, contractor shall bear the cost of such testing charges.

15.2 Payment only after testing :- The work should not be accepted in any case, if the contractor fails to observe the instruction of the department, regarding testing of materials. Before making any payment, it will be responsiability of the officers making payment to assure that all testing as per prescribed frequencies, have been carried out, and shall certify that the test results are in conformity with the requirement. If tests are not conducted to the prescribed frequency, the engineer-in-charge should reject that part of the work. Duly certified (by the representative of engineer-in-charge) copies of registers, containing records of tests shall have to be presented alongwith running account bills. Register (in original) shall have to be submitted along with the final bill. Tests shall have to be conducted by the contractor's engineer under the supervision of the engineer-in-charge or his authorised representative.

16 Design mix concrete is preferred to nominal mix. If design mix concrete can not be used for any reason on the work for grades of M-20 or lower. Nominal mixes may be used with the permission of Engineer in charge, which, however, is likely to involve a higher cement content.

17 With reference to quality of materials and workmanship the word **"Best"** When used shall mean that in the opinion of the Engineer-in-Charge, there is no superior material or article or class of workmanship obtainable in the market.

18 The labour only provided in the Schedule of Rates includes the cost of all labour including necessary handling of the materials at site of work and all workmanship.

19 This GST Rate may change according to the Govt. of India, Govt. Madhya Pradesh, Finance Department Revision from time to time but it will be inforce after due sanctioned of the Commissioner Urban Administration Development Department.

The Rate of all items of ISSR are exclusive of GST but including all other levies and taxes.

At present for works GST Rate is payable to the contractor @ 12% of the bill amount and whenever any changed in GST is applied by the Govt. of India, M.P. State Govt. same shall be applied and payable to the contractor for his bill amount after taking permission from Commissioner Urban Administration and Development Department.

20 Non SOR item in on-going agreement : If any Non S.O.R. Item is to be executed in any proposed project, rate analysis with full justification thereof must be approved by the Superintending Engineer/ Executive Engineer of the Divisional Office of Urban Administration and Development in case of Municipal Council/ Nagar Parishad & Executive Engineer of the concernered project of Corporation in case of Municipal Corporation and shall be included in BOQ under sub head of non SOR items at the last. Tender shall be invited on amount inclusive of SOR and Non SOR items and in such cases non SOR items shall become schedule (BOQ) items for that particulars tender only. However it is made clear that such non SOR items shall not be assumed as sanctioned rates for other agreements.

21 All aplicability of amendments : Future amendments in the SOR til one calender day prior to the last date (Orignal or amended) of financial bid submission, shall be applicable in the bid document prepared on the basis of this SOR uncles a contrary condition is provided in the bid document.

22 The girth of trees shall be measured at 1.00 meter (One meter) above ground level. All wood obtained from the tree cutting shall be property of the Urban Local body and shall be handed over to Engineer in charge.

In any item of work is found not upto the prescribed standard but the Engineer-in-charge is of the opinion that the same is structurally adequate and can be accrepted at a reduced rate, then in such case, the Engineer-in-charge shall submit proposal for the same, supported by an analysis in justification thereof, through proper channel to the Superintending Engineer UADD to obtain his approval expeditiously (ordinarily within 15 days). The approved analysis along with orders of the Superintending Engineer should be appended to the final bill of the contractor.

23 The contractor shall have to establish a field laboratory at the site of work, if the amount of contract exceeds Rs. 2.00 crores. In other cases, testing of construction materials/samples should be got done from any of the testing laboratories of the Government Works Departments, Technical Institutes, or NABL accrediated testing laboratory. Contractor shal bear the cost of such testing charges.

24 The work should not be accepted in any case, if the contractor fails to observe the instructions of the department, regarding testing of materials. Before making any payment, it will be the responsibility of the officers making payment to assure that all tests as per prescribed frequencies, have been carried out, and found as per requirement.

25 The Engineer-in-charge (EIC) for Nagar Parishad shall be Divisional Executive Engineer, UADD of the concerned division, incase of Municipal Council, EIC Shall be Executive Engineer of the ULB. In case no executive engineer is posted in the concerned ULB, Divisional Executive Engineer, UADD of the concerned division shall be the EIC of the Project. In case of Municipal Corporation, Executive Engineer of the concerned project shall be the EIC.

Extra Notes for Building Works

1 If there is any sources of water like tube well,hand pump,well etc.under Govt./ local body custody and if water from this source is used for construction activity by the contractor then water charge shall be deducted at the rate of 1% of the amount paid to the contractor from the item involving the use of water.

2 The rates also include the element of testing of samples of various materials brought by the contractor for use on the work, as well as other necessary tests for items of work as stipulated in the specifications. Frequency of such tests to be carried out must not be less than the prescribed frequencies. Copies of registers, containing records of tests shall have to be presented along with running account bills. Register (original) shall have to be submitted along with the final bill. Tests shall have to be conducted by the contractor's Engineer under the supervision of the Engineer-in- Charge or his authorised representatives. The contractor shall have to establish a field laboratory at the site of work, if the amount of contract exceeds Rs.2.00 Cr. In other cases, testing of construction materials should be got done from any of the tests laboratories of the various Government Departments, Government/Semi Govt. under takings and Technical Institutes, Engineering College, Polytechnic, I.T.I. recognized and authorized lab.

2.1 The work should not be accepted in any case, if the contractor fails to observe the instructions of the department, regarding testing of materials.

2.2 Before making any payment, it will be the responsibility of the officers making payment to assure that all tests as per prescribed frequencies, have been carried out, and found as per requirement.

2.3 If tests are not conducted to the prescribed frequency, the Engineer in- Charge should reject that part of the work.

3 IS 1200 shall be referred for building measurement.

4 Latest MORTH Specification shall be applicable.

A. LIST OF UNITS USED

S.No.	Units	Abbreviation Symbol	Remarks
1	1 Length (Running Meter)	Rmt	
2	Weight (Metric Tonne)	MT	
3	Weight Kilogram	Kg	
4	Time	Shift	Shift Refers to a time duration of 8 Hrs.
5	Time (Hour)	Hr.	
6	Quantity (Numbers)	Each/ No	Each refers to a single quantity as per entity
7	Quantity (Lump Sum)	LS	
8	Volume	Cum	
8	Area (Square Meter)	Sqm	
9	Litre	Ltr.	
10	Cubic Centimeter	Cucm	

CHAPTER-1 CARRIAGE OF MATERIALS

1.0 Transportation By Mechanical means including loading, unloading and stacking where ever necessary

S.No.	Material	Unit	Rates (in Rs.)								Remarks
			Cost per Trip per unit								
			1km or Part thereof	2km or Part thereof	3km or Part thereof	4km or Part thereof	5km or Part thereof	Beyond 5 km upto 10 Km Per Km	Beyond 10 km upto 20 Km Per Km	Beyond 20 km per add. Km	
1	2	3	4	5	6	7	8	9	10	11	12
1.1	Excavated Earth	cum	92.87	107.35	121.62	135.42	148.81	12.32	10.49	8.31	The rates are inclusive of voids for different types of materials no further deduction shall be made for voids
1.2	Excavated rock	cum	148.59	171.76	194.59	216.68	238.09	19.71	16.78	13.29	
1.3	Sand, stone aggregate below 40 mm	cum	74.30	85.88	97.29	108.34	119.04	9.86	8.39	6.64	
1.4	Stone aggregate 40 mm and above	cum	80.76	93.35	105.75	117.76	129.40	10.71	9.12	7.22	
1.5	Boulder	cum	87.41	101.03	114.46	127.46	140.05	11.60	9.87	7.82	
1.6	Lime, moorum, building, rubbish	cum	74.30	85.88	97.29	108.34	119.04	9.86	8.39	6.64	
1.7	Bricks	1000	198.12	229.01	259.45	280.11	307.79	25.49	21.69	17.18	
1.8	Steel/G.I. sheet/Pipes/Fuel wood/ Coal/ Cement/ Bitumen	tonne	66.04	76.34	86.48	96.30	105.82	8.76	7.46	5.91	
1.9	Timber	cum	84.91	98.15	111.19	123.82	136.05	11.27	9.59	7.59	
1.10	Manure or sludge	cum	80.76	93.35	105.75	117.76	129.40	10.71	9.12	7.22	

CHAPTER - 2
EARTH WORK

Notes for Specification :-

IS Codes

IS 632 : Gamma - BHC (Lindane) emulsifiable concentrates
IS 1200 (Pt1): Method of measurement of earth work
IS1200(Pt-27): Method of measurement of earth work (by Mechanical Appliances)
IS 4081: Safety code for Blasting and related drilling operation
IS 4988 (Part IV): Excavators
IS6313(pt"ll): Anti Termite measures in buildings (pre -constructional)
IS6313(pt.-lll) : Anti Termite Measures in Buildings for existing buildings
IS 6940: Methods of test for pesticides and their formulations
IS 8944 : Chiorpyrifos emulsifiable concentrates
IS 8963 : Chiorpyrifos ~ Technical specifications
IS 12138 : Earth moving Equipments

1 CLASSIFICATION OF EARTH WORK

a. All kind of soils: Generally any strata, such as sand, gravel, loam, clay, mud, black cotton moorum, shingle, river or nalla bed boulders, siding of roads, paths etc. and hard core, macadam surface of any description (water bound, grouted tarmac etc.), lime concrete mud concrete and their mixtures which for excavation yields to application of picks, showels, jumper, scarifiers, ripper and other manual digging implements. Removal of gravel or any other nodular material having dimensions in any one direction not exceeding 300mm occurring in such soil shall be deemed to be covered under this category.

b Ordinary rock: Generally any rock which can be excavated by splitting with crow bars or picks and does not require blasting, wedging or similar means for excavation such as lime stone, sand stone, hard literate, hard conglomerate and un-reinforced cement concrete below ground level.

If required light blasting may be resorted to for loosening the materials but this will not in any way entitle the material to be classified as 'Hard rock'.

Boulders which do not require blasting having maximum dimension in any direction of more than 300 mm,found laying loose on the surface or embedded in river bed, soil, talus, slope wash and terrace material of dissimilar origin.

c Hard Rock : Generally any rock or boulder for the excavation of which blasting is required such as quartzite, granite, basalt, reinforced cement concrete (reinforcement to be cut through but not separated from concrete) below ground level and the like.

d. Excavation in Rocks, where blasting is prohibited : Hard rock requiring blasting but where blasting is prohibited for any reason and excavation has to be carried out by chiseling, wedging or any other agreed method.

2 BLASTING OPERATIONS

Blasting shall be carried out in a manner that completes the excavation to the lines and levels as indicated in the drawings with the least disturbance to adjacent material. It shall be done only with the written permission of the Engineer-in-Charge. All statutory laws, regulations, rules etc. pertaining to the acquisition, transport, storage, handling and use of explosives shall be strictly followed. The contractor may adopt any method or methods of blasting consistent with the safety and job requirements. Prior to starting any phase of the operation, the contractor shall provide information describing pertinent blasting procedures, dimensions and notes. The magazine for storage of explosives shall be limited to the designs and specifications of the explosive department concerned and located at the approved site. No unauthorised person shall be admitted in to the magazine, which when not in use, shall be kept security locked. No matches or inflamable material shall be allowed in the magazine. Materials, tools, plants, equipments and personnel, deputed on blasting operation, should be approved by Engineer-in-Charge.

3 EXCAVATION IN WATER. MUD OR FOUL POSITION

3 (a) All water that may accumulate in excavations during the progress of the work from springs, or river seepage, broken water mains or drains (not due to the negligence of the contractor), and seepage from subsoil aquifer shall be bailed, pumped out or otherwise removed. The contractor shall take adequate measures for bailing and/or pumping out water from excavations and/or pumping out water from excavations and construct diversion channels, bunds, sumps, coffer dams etc. as may be required. Pumping shall be done directly from the foundation trenches or from a sump out side the excavation in such a manner as to preclude the possibility of movement of water through any fresh concrete or masonry and washing away parts of concrete or mortar. During laying of concrete or masonry and for a period of at least 24 hours thereafter, pumping shall be done from a suitable sump separated from concrete or masonry by effective means.

Capacity and number of pumps, location at which the pumps are to be installed, pumping hours etc. shall be decided from time to time in consultation with the Engineer-in-Charge.Pumping shall be done In such a way as not to cause damage to the work or adjoining property by subsidence etc. Disposal of water shall not cause inconvenience or nuisance in the area or cause damage to the property and structure nearby.To prevent slipping of sides, planking and strutting may also be done with the approval of the Engineer-in-Charge.

3 (b) Classification

The earth work for various classification of soil shall be categorized as under:

3(b) 1 Work in or under water and/or liquid mud: Excavation, where water is met with from any of the sources specified in 3(a) shall fall in this category. Steady water level in the trial pits before the commencement of bailing or pumping operations shall be the sub-soil wafer level in that area.

3(b) 2 Work in or under foul position: Excavation, where sewage, sewage gases or foul conditions are met with from any source, shall fall in this category. Decision of the. Engineer-in-Charge whether the work is in foul position or not shall be final.

3 (c) Measurements

3(c) 1 The unit, namely, meter depth shall be the depth measured from the level of foul position/ sub-soil water level and up to the centre of gravity of the cross sectional area of excavation actually done in the conditions classified in 3(b). Meter depth shall be reckoned correct to 0.1 m, 0.05 m or more shall be taken as 0.1 m and less than 0.05 m ignored. The extra percentage rate is applicable in respect of each item but the measurements shall be limited only to the quantities of earth work actually executed in the conditions classified in 3(b).

3(c) 2 In case earth work in or under foul position is also in or under water and/or liquid mud, extra payment shall be admissible only for the earth work actually executed in or under foul position.

3(c) 3 Pumping or bailing out water met within excavations from the sources specified in 3 (b) where envisaged and specifically ordered in writing by the Engineer-in-Charge shall be measured separately and paid. Quantity of water shall be recorded in kilolitres correct to two places of decimal. This-payment shall be in addition to the payment under respective items of earthwork and shall be admissible only when pumping or bailing out water has been specifically ordered by the Engineer-in-Charge in writing.

3(c) 4 Planking and strutting or any other protection work done with the approval of the Engineer-in-Charge to keep the trenches dry and/or to save the foundations against damage by corrosion of rise in water levels shall be measured and paid for separately.

4 Lift is to be calculated on the height of Center of Gravity of lifted materials above Center of Gravity of borrow pit. In measuring lifts no notice will be taken of lifts less than 0.5 M.

5 In measuring lead, distance less than 25 meters will be ignored and 25 meters or above shall taken as 50 meters.

6 Surface dressing comprises training the uneven surface of ground to uniform surface (either horizontal or slopping) by scraping off high patches and filling in low patches with the scraped soil. The Maximum depth of cutting or filling not exceeding 15cm.

7 Dry vegetation earth sand gravel, stone, deserts or brickwork, concrete, masonry etc. obtained from the excavation shall be property of Govt. of M.P. The rates of excavation include the separation of serviceable and unserviceable materials and depositing the serviceable ones in regular heaps.

8 Shoring in wells, foundations and trenches will not be payable without obtaining prior approval of the not below ther rank Executive Engineer.

9 The excavations shall conform to the lines & levels shown in the drawings and as directed by the Engineer-in-Charge. The contractor shall not excavate outside the limits of excavation. Any excess depth/width, excavated beyond the specified levels/dimensions on the drawing shall be made good at the cost of the contractor with the concrete as specified for the foundation.

10 The Contractor shall take adequate protective measures to see that the excavation operation do not damage the adjoining structures or dislocate the services. Water Supply pipes, sluice valve chambers, sewerage pipes, manholes, drainage pipes and chambers, communication cable, power supply cables etc. met within the course of excavation shall be properly supported and adequately protected, so that these services remain functional. However, if any service is damaged during excavation shall be restored in reasonable time, for which no extra payment shall be admissible.

11 Any damages done by the contractor to any existing work shall be made good by him at his own cost. Existing drains pipes, culverts, over head wires, water supply lime and similar services encountered during the course of execution shall be protected against damage by the contractor. The contractor shall not store material or otherwise accupy any part of the site in manner likely to hinder the operations of such services.

12 Measurement :-

The length and breadth of excavation or filling shall be measured with a steel tape correct to the nearest cm. The depth of cutting or height of filling shall be measured, correct to 5 mm, by recording levels before the start of the work and after the completion of the work. The cubical contents shall be worked out to the nearest two places of decimal in cubic meters.

In case of open footings up to the depth of 1.5 meters, alround excavation of 30 cm. beyond the outer dimension of footing shall be measured for payment to make allowances for centering and shuttering. Any additional excavation beyond this limit shall be at the risk and cost of the contractor and shall not be measured for payment.

Where it is not possible or convenient to measure the depth of cutting by recording levels ,quantity of excavation shall be worked out from filling. The actual measurements of the fill shall be calculated by taking levels of the original ground before start of the work after site clearance and after compaction of the fill as specified and the quantity of earth work so computed shall be reduced by 10% in case of consolidated fills and by 5% in case the consolidation is done by heavy mechanical machinery to arrive at the net quantity of excavation for payment. No such deduction shall, however, be made in case of consolidation by heavy mechanical machinery at optimum moisture content, or when the consolidated filling is in confined situations such as under floors.

13 Recording Measurements for Earth Levelling Work

Level Books: in case of levelling operations and earthwork, measurements are required to be recorded in level books in addition to Measurement Books. The Level Books should be numbered, accounted for and handled like Measurement Books.

Preparatory Works: Before starting the earth work, following steps should be taken ;

(1) Original ground levels should be recorded in the Level Book in the presence of the contractor or his authorized representative, and should be signed by him and the Department's Officer who records the levels. All the local mounds and depressions should be indicated clearly in the drawing and the field Level Book and should be checked by the Assistant Engineer/Executive Engineer before the levelling work is started.

(2) A suitable baseline should be fixed with permanent masonry pillars at distances not exceeding 150 meters to provide a permanent reference line for facilitating check work. The base line (s) should be entered in the Level Book with co-ordinates.. These baselines should be maintained till the final payment for the work has been made.

(3) While recording the levels, it should be ensured that the circuit is closed by taking final levels of the starting point or any other point, the R.L. of which was previously determined.

(4) Plans showing initial levels, location of bench marks and reduced levels, should be prepared and signed by both the parties and attached to the agreement before commencement of the work.

Test Check of the Levels

(1) The Assistant Engineer should exercise test check at least to the extent of 100%, and the Executive Engineer at least to the extent of 10% where the value of this item of work exceeds 10% of the tender acceptance power of the Assistant Engineer.

(2) The test check of the levels should be carried out independently by each officer, and the readings should be recorded in the prescribed Level Book in red ink against the old levels which should be neatly scored out wherever necessary. If the test check carried out reveals serious mistakes in the original levels, these should be taken or re-taken and re-checked.

(3) The test check carried out by an officer should be as representative as possible for the entire work done.

(4) On completion of work, the levels should again be recorded in the Level Book and the contractor's signatures obtained. These levels should also be test checked by the Assistant Engineer/Executive Engineer to the same extent as indicated in (1) within one month of the date of completion of the earth work, and according to the procedure as laid down in the case of initial levels as indicated above.

(5) The formation levels as per final execution of the work should be compared with the proposed formation levels and the work got rectified within permissible tolerance.

14 Rate includes dressing the pits and dumping excavated materials including dressing dumping as directed by Engineer-in-Charge.

15 Rates: Rates of all items in this chapter are inclusive of the expenses of all labour, materials, T & P and all incidental and other charges required completing the item of work in full and also including hire & running expenses of all machineries required for the work, including stacking of excavated materials as directed where ever required.

16 ANTIQUITIES AND USEFUL MATERIALS

Any finds of archaeological interest such as relics of antiquity, coins, fossils or other articles of-value shall be delivered to the Engineer-in-Charge and shall be the property of the local body.

Any material obtained from the excavation which in the opinion of the Engineer-in-Charge is useful shall be stacked separately in regular stacks as directed by the Engineer-in-Charge and shall be the property of the Government.

Black cotton soil shall not be permitted for back filling and or under floors.

(For Detail Refer UADD Earth Work specification / CPWD specification)

CHAPTER - 2
EARTH WORK

S.No	Description of Items	Unit	Rate (In Rs.)
2.1	Surface dressing of the ground including removing vegetation and in-equalities not exceeding 15 cm deep and disposal of rubbish, lead upto 50 m and lift upto 1.5 m.		
2.1.1	All kinds of soil.	100Sqm	1003.00
2.2	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth upto 30 cm measured at a height of1 m above ground level and removal of rubbish upto a distance of 50 meter outside the periphery of the area cleared.	100Sqm	517.00
2.3	Clearing grass and removal of the rubbish upto a distance of 50 moutside the periphery of the area cleared.	100Sqm	267.00
2.4	Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches removing the roots and stacking of serviceable material and disposal of unserviceable material.		
2.4.1	Beyond 30 cm girth upto and including 60 cm girth	Each	157.00
2.4.2	Beyond 60 cm girth upto and including 120 cm girth	Each	706.00
2.4.3	Beyond 1200 cm girth upto and including 240 cm girth	Each	3297.00
2.4.4	above 240 cm girth	Each	6528.00
2.5	Earth work in surface excavation not exceeding 30 cm in depth but exceeding 1.5 m in width as well as 10 sqm on plan including disposal of excavated earth upto 50 m and lift upto 1.5 m, disposed soil to be levelled and neatly dressed.		
2.5.1	All kinds of soil	Sqm	38.00
2.6	Earth work in excavation for foundation, trenches for pipes / cables or drains etc. by mechanical means / manual means (exceeding 30cm in depth.) including ramming of bottom, dressing of sides, disposal of excavated earth including of all lift and lead upto 50m. Disposed earth to be levelled and neatly dressed.		
2.6.1	All kinds of soil	Cum	151.00
2.6.2	Ordinary rock	Cum	261.00
2.6.3	Hard rock (requiring blasting)	Cum	405.00
2.6.4	Hard rock (blasting prohibited)	Cum	559.00
2.7	Close timbering in trenches including strutting, shoring and packing cavities (wherever required) complete. (Measurements to be taken of the face area timbered).		
2.7.1	Depth not exceeding 1.5m	Sqm	96.00
2.7.2	Depth exceeding 1.5m but not exceeding 3 m.	Sqm	103.00
2.7.3	Depth exceeding 3m but not exceeding 4.5 m.	Sqm	112.00

S.No	Description of Items	Unit	Rate (In Rs.)
2.8	Close timbering in case of shafts, wells, cesspits, manholes and the like including strutting, shoring and packing cavities (wherever required) etc. complete. (Measurements to be taken of the face area timbered).		
2.8.1	Depth not exceeding 1.5m	Sqm	100.00
2.8.2	Depth exceeding 1.5m but not exceeding 3 m.	Sqm	111.00
2.8.3	Depth exceeding 3m but not exceeding 4.5 m.	Sqm	116.00
2.9	Close timbering over areas including strutting, shoring and packing, cavities (wherever required) etc. complete. (Measurements to be taken of the face area timbered) :		
2.9.1	Depth not exceeding 1.5m	Sqm	87.00
2.9.2	Depth exceeding 1.5m but not exceeding 3 m.	Sqm	92.00
2.9.3	Depth exceeding 3m but not exceeding 4.5 m.	Sqm	98.00
2.10	Extra for planking,strutting and packing materials for cavities (in close timbering) if required to be left permanently in position.(Face area of timber permanently left to be measured).	Sqm	1257.00
2.11	Open timbering in trenches including strutting and shoring complete(measurements to be taken of the face area timbered):		
2.11.1	Depth not exceeding 1.5m	Sqm	49.00
2.11.2	Depth exceeding 1.5m but not exceeding 3 m.	Sqm	51.00
2.11.3	Depth exceeding 3m but not exceeding 4.5 m.	Sqm	56.00
2.12	Open timbering in case of shafts, wells, cesspits, manholes and the like including strutting and shoring complete (Measurements to be taken of the face area timbered):		
2.12.1	Depth not exceeding 1.5 m.	Sqm	42.00
2.12.2	Depth exceeding 1.5m but not exceeding 3 m.	Sqm	47.00
2.12.3	Depth exceeding 3m but not exceeding 4.5 m.	Sqm	53.00
2.13	Open timbering over areas including strutting, shoring etc. complete. (Measurements to be taken of the face area timbered):		
2.13.1	Depth not exceeding 1.5 m.	Sqm	29.00
2.13.2	Depth exceeding 1.5m but not exceeding 3 m.	Sqm	32.00
2.13.3	Depth exceeding 3m but not exceeding 4.5 m.	Sqm	39.00
2.14	Extra for planking and strutting in open timbering if required to be left permanently in position. (Face area of the timber permanently left to be measured).	Sqm	636.00
2.15	Extra rates for quantities of works, executed in difficult conditions: (The extra percentage rate is applicable in respect of each item but limited to quantities of work executed in these difficult conditions).		

S.No	Description of Items	Unit	Rate (In Rs.)
2.15.1	In or under water and/or liquid mud, including pumping out water as required.(All water that may accumulate in excavations during the progress of the work from seepage, (not due to the negligence of the contractor), shall be bailed, pumped out or otherwise removed. The contractor shall take adequate measures for bailing and/or pumping out water from excavations and/or pumping out water from excavations and construct diversion channels, bunds, sumps, etc)		(20% extra of the rate of each item. The extra percentage in rate is applicable, to quantities of ,work excuted,in difficult condition.)
2.15.2	In or under foul position, including pumping out water as required.(Excavation, where sewage, sewage gases or foul conditions are met with from any source, shall fall in this category. Decision of the. Engineer-in-Charge whether the work is in foul position or not shall be final.)		(20% extra of the rate of each item. The extra percentage in rate is applicable, to quantities of ,work excuted,in difficult condition.)
2.16	Filling by available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift upto 1.5 m.	Cum	89.00
2.17	Extra for every additional lift of 1.5 m or part thereof in.		
2.17.1	All kinds of soil.	Cum	37.00
2.17.2	Ordinary or hard rock.	Cum	66.00
2.18	Supplying and filling in plinth under floors including, watering, ramming consolidating and dressing complete.		
2.18.1	Moorum/Hard copra	Cum	478.00
2.18.2	Crusher Stone Dust	Cum	687.00
2.19	Ploughing the existing ground to a depth of 15 cm to 25 cm and watering the same.		
2.19.1	All kinds of soil.	100Sqm	1000.00
2.20	Diluting and injecting chemical emulsion for POST-CONSTRUCTIONAL anti-termite treatment (including the cost of chemical emulsion .		
2.20.1	Along external wall where the apron is not provided using chemical emulsion @ 7.5 liters / sqm of the vertical surface of the substructure to a depth of 300 mm including excavation channel along the wall & rodding etc. complete. With Chlorpyriphos/ Lindane E.C. 20% with 1% concentration.	Meter	13.00
2.20.2	Along the external wall below concrete or masonry apron using chemical emulsion @ 2.25 litres per linear meter including drilling and plugging holes etc. With Chlorpyriphos/ Lindane E.C. 20% with 1% sqm concentration.	Meter	22.00

S.No	Description of Items	Unit	Rate (In Rs.)
2.21	Treatment of soil under existing floors using chemical emulsion @ one liter per hole, 300 mm apart including drilling 12 mm diameter holes and plugging with cement mortar 1 :2 (1 cement : 2 Coarse sand) to match the existing floor : With Chlorpyriphos/Lindane E.C. 20% with 1% concentration.	Sqm	96.00
2.22	Treatment of existing masonry using chemical emulsion @ one litre per hole at 300 mm interval including drilling holes at 45 degree and plugging them with cement mortar 1:2 (1 cement : 2 coarse sand) to the full depth of the hole : With Chlorpyriphos/Lindane E.C. 20% with 1% concentration.	Meter	15.00
2.23	Treatment at points of contact of wood work by chemical emulsion Chlorpyriphos/ Lindane (in oil or kerosene based solution) @ 0.5 litres per hole by drilling 6 mm dia holes at downward angle of 45 degree at 150 mm centre to centre and sealing the same.	Meter	150.00
2.24	Deduct for disposed soil not levelled and neatly dressed (against Item No. 2.6)	Cum	27.00

CHAPTER - 3
MORTARS

Notes for Specifications :-

1 Cement: - Cement to be used in the works shall be any of the following types specified to the prescribed tests and approval of the Engineer-in-charge :

(a) Ordinary portland cement, 33 Grade conforming to IS : 269.

(b) Ordinary portland cement, 43 Grade conforming to IS : 8112.

(c) Ordinary portland cement, 53 Grade conforming to IS : 12269.

(d) Sulphate resistant portland cement conforming to IS : 12330.

(e) Portland Pozzolona Cement conforming to IS : 1489.

2 Sand: Sand to be used in the work, shall conform to IS: 1542-1960 for plaster and IS: 2166-1965 for masonry work.

3 Cement Mortar: Cement and sand shall be mixed in specified proportions given in the agreement/drawings. All mortars shall be mixed with a minimum quantity of water to produce desired workability consistent with maximum density of mortar. The mix shall be clean and free from injurious type of soil/acid/alkali/organic matter or deleterious substances.

4 Water : Water used for mixing and curring shall be clean and free from injurious amount of oils, acids, alkalis, salts, sugar, organic or other substances. Potable water is generally considered satisfactory for preparing mortars.

5 The mixing shall preferably be done in a mechanical mixer operated manually or by power. Hand mixing can be resorted to as long as uniform density of the mix and its strength are assured subject to prior approval of the Engineer-in-Charge. Hand mixing operation, if permitted, shall be carried out on a clean water tight platform where cement and sand shall be first mixed dry in the required proportion by being turned over and over, backwards and forwards several times till the mixture is of uniform colour. Thereafter, minimum quantity of water shall be added to bring the mortar to the consistency of stiff paste. The mortar shall be mixed for at least two minutes after addition of water. Mortar shall be mixed only in such quantity as required for immediate use.

The mix which has developed initial set, shall not be used. Intial set of mortar with O.P.C. shall normally be considered to have taken place in 30 minutes after mixing. If the mortar has stiffened during initial setting time because of evaporation of water, same can be re-tempered by adding water as frequently as needed to restore requisite consistency shall not be permitted after 30 minutes. Mortar, unused for more than 30 minutes, shall be rejected and removed from site.

MANDATORY TESTS FOR WATER, CEMENT & SAND

	Material	Test	Field/ laboratory test	Test procedure	Min. quantity of material for carrying out the test	Frequency of testing
	Water	(i) pH Value	Lab	IS 3025	-	Water from each source shall be got tested before the commencement of work and thereafter once in every three months till the completion of the work. Water from municipal source need be tested only once in six months. Number of Tests for each source shall be 3
		(ii) Limits of Acidity	Lab			
		(iii) Limits of Alkality	Lab			
		(iv) Percentage of solids				
		(a) Chlorides	Lab			
		(b) Suspended matter	Lab			
		(c) Sulphates	Lab			
		(d) Inorganic solids	Lab			
		(e) Organic solids	Lab			

	Material	Test	Field/ laboratory test	Test procedure	Min. quantity of material for carrying out the test	Frequency of testing
	Cement	(a) Physical requirement				
		(i) Fineness	Lab	IS 4031 (Part II)	Each lot	Every 50 tonnes or part thereof. Each brand of cement brought to site shall be tested as per this frequency.
		(ii) Soundness	Lab	IS 4031 (Part III)		
		(iii) Setting time (Intital & Final)	Lab	IS 4031 (Part V)		
		(iv) Compressive strength	Lab	IS 4031 (Part VI)		
		(v) Consistency of Standard cement paste	Lab	IS 4031 Part VI)		
	Sand	Organic impurities	Field	As given in specification Chapter of mortars	20 cum	Every 20 cum or part thereof or more frequently as decided by Engineer-in-Charge.
		Silt Content	Field	As given in specification Chapter of mortars	20 cum	- do -
		Particle size distribution a,b,c,d & e	Field or Laboratory as decided by the Engineer-in-Charge	As given in specification Chapter of mortars	40 cum	40 cum or part thereof
	Sand	Bulking of Sand	Field	As given in specification Chapter of mortars	20 cum	Every 20 cum or part thereof or more frequently as decided by Engineer-in-charge.
(For Detail Refer UADD MORTAR specification / CPWD specification)						

CHAPTER - 3
MORTARS

S.No	Description of Items	Unit	Rate (In Rs.)
3.1	Cement Mortar 1:1 (1 cement : 1 sand)	cum	6733.00
3.2	Cement mortar 1:2 (1 cement : 2 sand).	cum	5146.00
3.3	Cement mortar 1:3 (1 cement : 3 sand).	cum	4360.00
3.4	Cement mortar 1:4 (1 cement : 4 sand).	cum	3646.00
3.5	Cement mortar 1:5 (1 cement : 5 sand).	cum	3262.00
3.6	Cement mortar 1:6 (1 cement : 6 sand).	cum	2933.00
3.7	Cement mortar 1:2 (1 cement : 2 marble dust).	cum	5058.00
3.8	Cement mortar 1:5 (1 cement : 5 marble dust).	cum	3162.00
3.9	White cement mortar 1:2 (1 white cement : 2 marble dust).	cum	9062.00
3.10	White cement mortar 1:3 (1 white cement : 3 marble dust).	cum	7270.00
3.11	White cement mortar 1:5 (1 white cement : 5 marble dust).	cum	5000.00
3.12	Mortar in lime, surkhi (50% Red & 50% Light Yellow) and marble dust (1:1.5:0.5)	cum	2200.00

CHAPTER - 4
CONCRETE WORK (PLAIN CEMENT CONCRETE)

Notes for Specifications :-

1 Cement: Cement to be used in the works shall be any of the following types specified to the prescribed tests and approval of the Engineer-in-charge :

(a) Ordinary portland cement, 33 Grade conforming to IS : 269.
(b) Ordinary portland cement, 43 Grade conforming to IS : 8112.
(c) Ordinary portland cement, 53 Grade conforming to IS : 12269.
(d) Sulphate resistant portland cement conforming to IS : 12330.
(e) Portland Pozzolona Cement conforming to IS : 1489.

2 Aggregates: aggregate shall consist of clean, hard, strong, dense, non-porous and durable pieces of crushed stone. They shall not consist pieces of disintegrated stones, soft, flaky, elongated particles, salt, alkali, vegetable matter or other deleterious materils. All aggregate shall conform to IS: 383 and tests for conformity shall be carried

2.1 Size and Grading

(i) Stone aggregate and gravel: it shall be either graded or single size as specified. Nominal size and grading shall be as under:-

(a) Nominal size of graded stone aggregate or gravel shall be 40, 20, 16, or 12.5 mm as specified.For any one of the nominal sizes, The proportion of other sizes as determined by the method prescribed in IS 2386 (Part-I) shall be in accordance with tabel 4.1.

TABLE 4.1
Graded stone Aggregate or Gravel

IS Sieve Designation	% by weight passing the nominal size			
	40mm	20mm	16 mm	12.5mm
80 mm	100	-	-	-
63mm	-	-	-	-
40mm	95-100	100	-	-
20mm	30-70	95-100	100	100
16mm	-	-	90-100	-
12.5mm	-	-	-	90 to 100
10 mm	10-35	25-55	30-70	40 to 85
4.75	0-5	0-10	0-10	0 to 10

(b) Nominal size of single sized stone aggregate or gravel shall be 63, 40, 20, 16, 12.5,or 10 mm as specified. For any one of the nominal sizes,the proportion of other sizes as determined by the method prescribed in IS 2386 (Part-I) shall be in accordance with tabel 4.2.

TABLE 4.2
Single size (ungraded) stone Aggregate or Gravel

IS Sieve Designation	*Percentage passing (by weight) for nominal size of*					
	63mm	*40mm*	*20 mm*	*16mm*	*12.5mm*	*10 mm*
80 mm	100	-	-	-	-	-
63 mm	85-100	100	-	-	-	-
40 mm	0-30	85-100	100	-	-	-
20mm	0-5	0-20	85-100	100	-	-
16 mm	-	-	-	85-100	100	-
12.5mm	-	- .	-	-	85-100	100
10mm	0-5	0-5	0-20	0-30	0-45	85-100
4.75 mm	-	-	0-5	0-5	0-10	0-20
2.36 mm	-	-	-	-	-	0-5

(c) Strenght of Aggregate

C.1 Aggregate crushing value: -

The aggregate of crushing value, when determined in accordance with IS:2386 (Part-IV) -1963 shall not exceed 45 percent for aggregate used for concrete other then for wearing surfaces, and 30 percent for concrete for wearing surfaces, such as runways, roads and pavements.

C.2 Aggregate Impact value

As an alternative to 3.3 the aggregate impact value may be determined in accordance with the method specified in IS:2386 (Part-IV) – 1963. The aggregate impact value shall not exceed 45 percent by weight for aggregate used for concrete other then for wearing surface and 30 percent by wearing for concrete for wearing surface, such as runways, roads and pavements.

C.3 Aggregate Abrasion Value

Unless otherwise agreed to between the purchasers and supplied, the abrasion value of aggregates, when tested in accordance with the method specified in IS:2386 (Part-IV)-1963 using Los Angeles machine, shall not exceed the following values

For aggregate to be used in concrete for wearing surfaces	30 Percent
For aggregate to be used in other concrete	50 Percent

3 Sand/Fine Aggregates :

Sand to be used for lime or cement concrete should be dry and free from all deleterious materials, and shall conform to IS: 383-2007 & fine aggregates shall not contain dust, lumps, soft or flaky materials, mica or other deleterious materials. Fine aggregates having positive alkali-silica reaction shall not be used. All fine aggregate shall conform to IS : 383. The fineness modulus of fine aggregate shall neither be less than 2.0 nor greater than 3.5.

4 Water : Water used for mixing and curing shall be clean and free from injurious amounts of oils, acids, alkalis, salts, sugar, organic materials or other substances that may be deleterious to concrete. Potable water is generally considered satisfactory for mixing and curing of concrete.

5 Concrete: Concrete shall be mixed either in a concrete mixer or in a batching and mixing plant. Hand mixing is prohibited. Mixing shall be continued till materials are uniformly distributed and a uniform colour of the entire mass is obtained and each individual particle of the aggregate shows complete coating of mortar, containing its proportionate amount of cement. In no case, mixing shall be done for less than 2 minutes.

Table 4.3 Grades of Concrete

As per IS 456 : 2000 Table number 2

Group	Grade *Designation*	*Specified characteristic compressive strength of 150 mm Cube at 28 Days in N/mm²*
(1)	(2)	(3)
Ordinary Concrete	M10	10
	M15	15
	M20	20
Standard Concrete	M25	25
	M30	30
	M35	35
	M40	40
	M45	45
	M50	50
	M55	55
High Strength Concrete	M60	60
	M65	65
	M70	70
	M75	75
	M80	80

Notes:-

1 In the designation of concrete mix M refers to the mix and the number to the specified compressive strength of 150 mm size cube at 28 days, expressed in N/mm2.

2 For concrete of compressive strength greater than M55, design parameters given in the standard may not be applicable and the values may be obtained from specialized literatures and experimental results.

Grade of concrete for plain & reinforced

The minimum grade of concrete for plain and reinforced concrete shall be as per Table given below.

Table 4.4

Minimum Cement Content, Maximum Water-Cement Ratio & Minimum Grade of Concrete for Different Exposures with Normal Weight Aggregates of 20 mm Nominal;Maximum Size

As per IS 456 : 2000 Table number 5

Sl No	*Exposure*	*Plain Concrete*			*Reinforced Concrete*		
		Minimum Cement Content kg/m³	*Maximum Free Water Cement Ratio*	*Minimum Grade of Concrete*	*Minimum Cement Content kg/m³*	*Maximum Free Water-Cement Ratio*	*Minimum Grade of Concrete*
(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
(i)	Mild	220	0 60	-	300	0 55	M20
(ii)	Moderate	240	0 60	M15	300	0 50	M25
(iii)	Severe	250	0 50	M20	320	0 45	M30
(iv)	Very Severe	260	0 45	M20	340	0 45	M35
(v)	Extreme	280	0 40	M25	360	0 40	M40

Notes:-

1 Cement content prescribed in this Table is irrespective of the grades of cement. The additions such as fly or ground granulated blast furnace slag may be taken into account in the concrete composition with respect to the cement content and water-cement ratio, if the suitability is established and as long as the maximum amounts taken into account do not exceed the limit of pozzolona and slag specified in IS 1489 (Part 1) and IS 455 respectively

2 Minimum grade for plain concrete under mild exposure condition is not specified.

3 The above minimum cement content and maximum water cement ratio apply only to 20 mm nominal maximum size aggregate. For other sizes of aggregate, these should be changed as per Table 6 of IS 456.

5.1 Concrete Mix: -

The mix proportion shall be selected to ensure the workability of the fresh concrete and when concrete is hardened, it shall have the required strength, durability and surface finish.

The determination of the proportions of cement, aggregates and water to attain the required strength shall be made as follows: -

(a) By designing the concrete mix; such concrete shall be called 'Design mix concrete' , or

(b) By adopting nominal concrete mix; such concrete shall be called 'Nominal mix concrete'.

Design mix concrete is preferred to nominal mix. If design mix concrete can not be used for reason on the work for graded of M-20 or lower, nominal mixes may be used with the permission of engineer in charge, which, however, is likely to involve a higher cement content.

5.2 Nominal Mix: -

Nominal mix concrete may be used for concrete for M-20 or lower. The proportion of materials for nominal mix concrete shall be in accordance with table given below :-

Table 4.5 Proportions for Nominal Mix Concrete

As per IS 456 : 2000 Table number 9

Grade of Concrete	*Total Quantity of Dry Aggregates by Mass per 50 kg of cement, to be taken as the Sum of the Individual Masses of Fine and Coarse Aggregates, Kg. Max*	*Proportion of Fine Aggregate to Coarse Aggregate (by Mass)*	*Quantity of Water per 50 kg of Cement, max Ltr*
(1)	(2)	(3)	(4)
M5	800	Generally 1:2 but subject to an upper limit of 1:1½ and a lower limit of 1:2 V2	60
M7.5	625		45
M10	480		34
M15	330		32
M20	250		30

Notes:-

1 The proportion of the fine to coarse aggregate should be adjusted from upper limit progressively as the grading of fine aggregate becomes finer and the maximum size of coarse aggregate becomes larger. Graded coarse aggregate shall be used.

2 Quantity of water required from durability point of view may be less than the value given Concrete shall be transported and placed as near as practicable to its final position. Concrete shall not be freely dropped into place from a height exceeding 1.50meters and it shall be compacted in its final position within 30 minutes of its discharge from the mixer. It shall be compacted thoroughly by vibration or other means during placing so as to produce a dense homogeneous void-free mass having the required surface finish. Bottom and side surfaces shall give a uniform texture, smooth surface and good appearance. Non uniform texture and rough surface of concrete shall be treated as defective work and it has to be remedied with 1:3 cement plaster but in no case, more than 5% of area be permitted to be made good with plastering, Concrete having rough, non uniform texture and honey combing in more than 5% area shall be rejected and the payment for the formwork shall also be not made.

6 Formwork shall include all temporary or permanent forms required for forming the concrete of the shape, dimensions and surface finish as shown on the drawings together with all props, staging, centering, scaffolding and temporary construction required for their support.

7 All materials shall conform to the specifications issued by the Indian Standards Institution. Materials and components used for formwork shall be examined for damage or excessive deterioration before use/reuse and shall be used only if found suitable after necessary repairs. In case of timber form work, the inspection shall not only cover physical damages but also signs of attacks by decay, rot or insect attack or the development of splits.

8 Form shall be constructed with metal or timber. The metal used for forms shall be of such thickness that the forms remain true to shape. All bolts should be counter sunk.

9 The contractor shall furnish the design and drawing of complete formwork (i.e. the forms as well as their supports) for approval of the Engineer-in-Charge before any erection is taken up. Not withstanding any approval or review of drawing and design by the Engineer-in-Charge, the contractor shall be entirely responsible for the adequacy and safety of form work.

10 The formwork shall be robust and strong and joints shall be leakproof. Staging must have cross bracings and diagonal bracings in both direction and the number of joints in the form work shall be kept to a minimum by using large size panels.

11 Rates in this chapter are for the finished work including the cost of all materials, labour, tools and plant required for design, construction and removal of formwork including properly supporting the members until the concrete is cured, set and hardened as required and also inclusive of lining with material approved by the Engineer-in-Charge so as to provide a smooth finish of uniform texture, appearance and to produce a finished concrete true to shape, line, levels and dimension as shown on the drawings. The material used shall leave no stain on the concrete and so fixed to its backing as not to impart any blemishes. The rate also includes coating of formwork with an approved release agent that will effectively prevent sticking and will not stain the concrete surface. Lubricating (machine oils) are prohibited for use as a coating.

12 The rate includes provision of gradient in formwork for terrace roof as per direction of Engineer-in-Charge and the gradient shall be provided necessarily so that water is drained out quickly and effectively.

13 Rates also include all leads and lifts of all materials etc. required for the work.

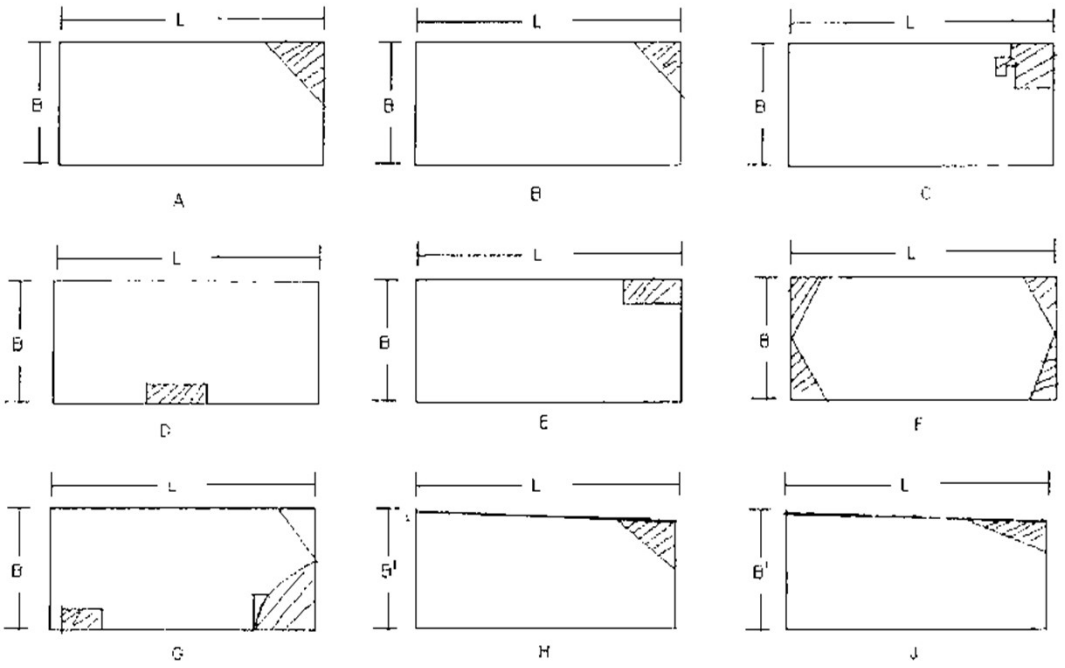
14 Measurements :

14.1 Dimensions of length, breadth and thickness shall be measured correct to nearest cm. Except for the thickness of slab and partition which shall be measured to nearest 5 mm. Areas shall be worked out to nearest 0.01 sq.m and the cubic contents of consolidated concrete shall be worked out to nearest 0.01 cum. Any work done in excess over the specified dimension or sections shown in the drawing shall be ignored.

14.2 Concrete work executed in the following conditions shall be measured separately:
(a) Work in or under water
(b) Work in liquid mud
(c) Work in or under foul positions

14.3 Cast-in-situ concrete and or precast concrete work shall be measured in stages described in the item of work, such as:
(a) At or near the ground level
(b) Upto specified floor level
(c) Between two specified floor levels
(d) Upto specified height above or depth below plinth level/ defined datum level.
(e) Between two specified heights or depths with reference to plinth/defined datum level.

14.4 No deduction shall be made for the following:
(a) Ends of dissimilar materials for example beams, posts, girders, rafters, purlins, trusses, corbels and steps upto 500 sq cm in cross sections.
(b) Opening upto 0.1 sq meter (1000 sq.cm)
(c) Volume occupied by pipes, conduits, sheathing etc. not exceeding 100 sq cm each in cross sectional areas.
(d) Small voids such as shaded portions in Figure A to J below when these do not exceed 40 sq cm each in cross section.



MANDATORY TESTS FOR STONE AGGREGATE & CONCRETE

Material	Test	Field/ Laboratory	Test procedure	Min. qty of Material for Carrying out test	Frequency of Testing
1	2	3	4	5	6
Stone aggregate	(a) Percentage of soft or deleterious material	Field or Laboratory-Test as required	IS 2386-Part II	As required by Engineer-in-charge	For all quantities
	Particle size	Field/ Lab	As given in Specification Chapter of Concrete	45 cum	For every 45 cum or part thereof for RCC Work only. For rest of items as decided by Engineer-in-charge
	(a) Estimation of organic impurities	Field/ Lab	IS 2306-Part2	10 cum	For every 40 cum or part thereof
	(b) Surface moisture	Field/ Lab	IS 2386	10 cum	-do-
	(c) Determination of 10% fine value	Field/ Lab	IS 2386	10 cum	-do-
	(d) Specific gravity	Field/ Lab	IS 2386	10 cum	-do-
	(e) Bulk density	Field/ Lab	IS 2386	10 cum	-do-
	(f) Aggregate crusing strength	Field/ Lab	IS 2386	10 cum	-do-
	(g) Aggregate impact value	Field/ Lab	IS 2386	10 cum	-do-
Concrete	Slump test	Field	As given in Specification Chapter of Concrete	10 cum	15 cum or part thereof

15 Special Structures

For structures like retaining walls, wing walls, chimneys, over head reservoirs/tanks and other elevated structures, where elevations heights above a defined datum level have not been specified and identification of floors cannot be done as in case of building. Level, at 1.2m above the ground level shall be the floor 1 level as well as plinth level. Level at a height of 3.5m above floor 1 level will be reckoned as floor 2 level and level at a height of 3.5m above the floor 2 level will be floor 3 level and so on, where the total height above floor 1 level is not a whole number multiple of 3.5m meter. Top most floor level shall be the next in sequence to the floor level below even if the difference in height between the two upper most floor levels is less than 3.5 meters.

16 FOUNDATION AND PLINTH

work in foundation and plinth shall include:

(a) For buildings: All works upto 1.2 meter above ground level or upto floor 1 level whichever is lower:

(b) For abutments, piers and well steining: all works upto 1.2m above the bed level:

(c) For retaining wall, wing walls, compound walls, chimneys, over head reservoirs/tanks and other elevated structures: All works upto 1.2 meter above the ground level:

(d) For reservoirs/tanks (other than overhead reservoirs/tanks): All works upto 1.2 meter above the ground level:

(e) For basements: All works upto 1.2m above ground level or upto floor 1 level whichever is lower.

Note: Specific provisions shall be made in the estimate for such situations where the foundation level is more than 3 (three) meter depth from the plinth for all types of structures mentioned above.

(For Detail Refer UADD CONCRETE WORK specification / CPWD specification)

CHAPTER - 4			
CONCRETE WORK (PLAIN CEMENT CONCRETE)			
S.No	**Description of Items**	**Unit**	**Rate (In Rs.)**
4.1	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering All work up to plinth level.		
4.1.1	Cement concrete grade M-25 (Nominal Mix) with 20 mm maximum size of stone aggregate	Cum	5647.00
4.1.2	Cement concrete grade M-20 (Nominal Mix) with 20 mm maximum size of stone aggregate	Cum	5178.00
4.1.3	Cement concrete grade M-15 (Nominal Mix) with 20 mm maximum size of stone aggregate	Cum	4755.00
4.1.4	Cement concrete grade M-10 (Nominal Mix) with 20 mm maximum size of stone aggregate	Cum	4219.00
4.1.5	Cement concrete grade M-15 (Nominal Mix) with 40 mm maximum size of stone aggregate	Cum	4663.00
4.1.6	Cement concrete grade M-10 (Nominal Mix) with 40 mm maximum size of stone aggregate	Cum	4112.00
4.1.7	Cement concrete grade M-7.5 (Nominal Mix) with 40 mm maximum size of stone aggregate	Cum	3793.00
4.1.8	Labour rate for Item No.- 4.1.1 to 4.1.7	Cum	827.00
4.1.9	1:2:3½:9 (1 ordinary portland cement : 2 Fly ash : 3½ coarse sand : 9 graded stone aggregate 40 mm nominal size)	Cum	3611.00
4.1.10	1:2½:4:11 (1 ordinary portland cement : 2½ fly ash : 4 coarse sand : 11 graded stone aggregate 40 mm nominal)	Cum	3293.00
4.2	Providing and laying cement concrete in retaining walls, return walls, walls (any thickness) including attached pilasters, columns, piers, abutments, pillars, posts, struts, buttresses, string or lacing courses, parapets, coping, bed blocks, anchor blocks, plain window sills, fillets etc. up to floor two level, excluding the cost of centering, shuttering and finishing :		
4.2.1	Cement concrete grade M-25 (Nominal Mix) with 20 mm maximum size of stone aggregate	Cum	5886.00
4.2.2	Concrete grade M-20 (nominal mix) with 20 mm maximum size of stone aggregate	Cum	5417.00
4.2.3	Concrete grade M-15 (nominal mix) with 20 mm maximum size of stone aggregate	Cum	4994.00
4.2.4	Concrete grade M-10 (nominal mix) with 20 mm maximum size of stone aggregate	Cum	4460.00
4.2.5	Concrete grade M-15 (nominal mix) with 40 mm maximum size of stone aggregate	Cum	4904.00
4.2.6	Concrete grade M-10 (nominal mix) with 40 mm maximum size of stone aggregate	Cum	4353.00
4.2.7	Labour rate for Item No.- 4.2.1 to 4.2.5	Cum	992.00
4.3	Providing and laying cement concrete in kerbs, steps and the like at or near ground level excluding the cost of centering, shuttering and finishing.		

S.No	Description of Items	Unit	Rate (In Rs.)
4.3.1	Cement concrete grade M-15 (Nominal Mix) with 20 mm maximum size of stone aggregate	Cum	4755.00
4.3.2	Cement concrete grade M-10 (Nominal Mix) with 20 mm maximum size of stone aggregate	Cum	4219.00
4.3.3	Labour rate for Item No.- 4.3.1 to 4.3.2	Cum	751.00
4.4	Providing and fixing up to floor Two level precast cement concrete string or lacing courses, copings, bed plates, anchor blocks, plain window sills, shelves, louvers, steps, stair cases, etc. including hoisting and setting in position with cement mortar 1:3 (1 Cement : 3 coarse sand), cost of required centering, shuttering and finishing smooth with 6mm thick cement plaster 1:3 (1 Cement : 3 fine sand) on exposed surfaces complete.		
4.4.1	Cement concrete grade M-25 (Nominal Mix) with 20 mm maximum size of stone aggregate	Cum	6502.00
4.4.2	Cement concrete grade M-20 (Nominal Mix) with 20 mm maximum size of stone aggregate	Cum	5517.00
4.4.3	Labour rate for Item No.- 4.4.1 to 4.4.2	Cum	1061.00
4.5	Providing and fixing at or near ground level precast cement concrete in kerbs, edgings etc. as per approved pattern and setting in position with cement mortar 1:3 (1 Cement : 3 coarse sand) including the cost of required centering, shuttering and finishing smooth with 6mm thick cement plaster 1:3 (1 cement : 3 fine sand) on exposed surfaces complete.		
4.5.1	Cement concrete grade M-15 (Nominal Mix) with 20 mm maximum size of stone aggregate	Cum	6299.00
4.6	Providing and fixing up to floor Two level precast cement concrete solid block including hoisting and setting in position with cement mortar 1:3 (1 cement : 3 coarse sand), cost of required centering, shuttering and finishing smooth with 6mm thick cement plaster 1:3 (1 cement : 3 fine sand) on exposed surfaces complete :		
4.6.1	Cement concrete grade M-15 (Nominal Mix) with 20 mm maximum size of stone aggregate	Cum	7537.00
4.6.2	Cement concrete grade M-10 (Nominal Mix) with 20 mm maximum size of stone aggregate	Cum	7101.00
4.7	Providing and fixing up to floor Two level precast cement concrete hollow block including hoisting and setting in position with cement mortar 1:3 (1 cement : 3 coarse sand), cost of required centering, shuttering and finishing smooth with 6mm thick cement plaster 1:3 (1 cement : 3 fine sand) on exposed surfaces complete :		
4.7.1	Cement concrete grade M-15 (Nominal Mix) with 20 mm maximum size of stone aggregate	Cum	7319.00
4.7.2	Cement concrete grade M-10 (Nominal Mix) with 20 mm maximum size of stone aggregate	Cum	7073.00

S.No	Description of Items	Unit	Rate (In Rs.)
4.8	Extra for Plain / Precast concrete work in superstructure above floor Two level for each floors or part thereof.	Cum	1%
4.9	Extra for laying concrete in or under water and/or liquid mud including cost of pumping or bailing out water and removing slush etc. complete.	Cum	168.00
4.10	Extra for laying concrete in or under foul positions.	Cum	124.00
4.11	Making plinth protection 50mm thick of Cement concrete grade M-10 (Nominal Mix with 20 mm maximum size of stone aggregate) over 75mm bed by dry brick ballast 40mm nominal size well rammed and consolidated and grouted with fine sand including finishing the top smooth.	Sqm	363.00
4.12	Plum Cement concrete 1:2:4 with 75% graded metal of maxium size 40 mm and 25% plum of 150mm size.	Cum	4103.00
4.13	Providing and laying damp-proof course 40mm thick with cement concrete M-15 (Nominal Mix) with 10/12 mm maximum size of stone aggregate.	Sqm	240.00
4.13.1	Labour rate for Item No.- 4.9	Sqm	29.00
4.14	Providing and laying damp-proof course 50mm thick with cement Cement concrete grade M-15 (Nominal Mix) with 20 mm maximum size of stone aggregate	Sqm	270.00
4.14.1	Labour rate for Item No.- 4.10	Sqm	29.00
4.15	Extra for providing and mixing water proofing material as per IS Standard in cement concrete work. Qty as prescribed by the manufacturer.	Per bag of 50 kg cement	53.00
4.16	Applying a coat of residual petroleum bitumen of penetration 80/100 of approved quality using 1.7kg per square meter on damp proof course after cleaning the surface with brushes and finally with a piece of cloth lightly soaked in kerosene oil.	Sqm	120.00
4.17	Providing and placing in position 125 mm dia Precast Bollards 600 mm high of required shape including providing M.S. Pipe Sleeve 50 mm dia 300 mm long in the Bollard and M.S. Pipes 40 mm dia and 450 mm long with 150x150x6mm M.S. plate welded at bottom and embedded 150mm in cement concrete grade M-10 (Nominal Mix with 20 mm maximum size of stone aggregate) including necessary excavation of size 250x 250x 450mm deep for the same in bitumen/ concrete pavement at specified spacing.	Each	465.00

CHAPTER - 5
REINFORCED CEMENT CONCRETE

5.1 General

IS 456-2000 Code of practice for plain and reinforced concrete (as amended up to date) Shall be followed in regard to concrete Mix proportion and its production as under:

(a) The concrete mix design shall be done as “Design Mix Concrete” as prescribed in clause-9 of IS 456 mentioned above.

(a) Concrete shall be manufactured in accordance with clause 10 of above mentioned IS 456 covering quality assurance measures both technical and organizational, which shall also necessarily require a qualified concrete technologist to be available during manufacture of concrete for certification of quality of concrete.

Minimum M-20 grade of concrete shall be used in all structural elements made with RCC both in load bearing and framed structure.

5.2 Materials

Water, cement, fine and coarse aggregate shall be as specified under respective clauses of chapter 03 mortars and chapter 04 concrete work as applicable.

5.3 Steel for reinforcement

The steel used for reinforcement shall be any of the following types.

(a) Mild steel and medium tensile bars conforming to IS 432 (Part-I)

(b) High strength deformed steel bars conforming to IS 1786

(c) Hard drawn steel wire fabric conforming to IS 1566

(d) Structural steel conforming to Grade A of IS 2062

(e) Thermo-mechanically treated (TMT) Bars.

Elongation percent on gauge length in 5.65 >A where A is the cross sectional areas of the test piece.

Mild steel is not recommended for the use in structures located in earthquake zone subjected to severe damage and for structures subjected to dynamic loading (other than wind loading) such as railway and highway bridges.

Welding of reinforcement bars covered in this SOR shall be done in accordance with the requirements of IS 2751.

Nominal mass/weight : The tolerance on mass/weight for round and square bars shall be the percentage given in table 5.1 or the mass/weight calculate on the basis that the masses of the bar/wire of nominal diameter and of density 7.85 kg/cm3 or 0.00785 kg/cm3. Or 7850 kg per m3

TABLE 5.1
Tolerance of Nominal Mass/Weight

Nominal size in mm	Tolerance on the nominal mass per cent		
	Batch	Individual sample+	Individual sample for coil(x)
(a) Upto and including 10	±7	-8	±8
(b) Over 10, upto and including 16	±5	6	±6
(c) Over 16	±3	4	±4

·High strength deformed bars and wires shall conform to IS 1786 the physical properties for all sizes of steel bars are mentioned below in

TABLE 5.2

S.No.	Property	Fe 415	Fe 415D	Fe 500D	Fe 550D
1	0.2 Per cent proof stress/yield stress, Min, N/mm2	415	415	500	550
2	Elongation, per cent min on gauge lenth 5.65 >A, where A is the corss-sectional are of the test piece.	14.5	18	16	14.5
3	Tensile strength, Min	10 per cent more than the actual 0.2 per cent proof stress but not less than 485.0 N/mm2	12 per cent more than the actual 0.2 per cent proof stress but not less than 500.0 N/mm2	10 per cent more than the actual 0.2 per cent proof stress but not less than 565.0 N/mm2	8 per cent more than the actual 0.2 per cent proof stress but not less than 600.0 N/mm2
4	Total elongation at maximum force, percent, Min on gauge length 5.65 >A, where A is the cross-sectional area of the test piece.	-	5	5	5

Thermo Mechanically treated reinforement bars:

(a) There is no BIS code for TMT bars. The available code BIS 1786 pertains to HSD Bars. Therefore there should be no stipulation that TMT bars should conform to relevant BIS code.

(b) The TMT bars are being produced under valid licence form either of the firms namely Tempcore, Themex Evcon Turbo and Tubo Quench. These firms have acquired patents and arre giving licences to various producers to produce TMT Bars.

(C) The TMT bars shall conform to IS 1786 pertaining to Fe 415 D or FE 500 D or De 550 grade of steel as specified.

(d) In design and consturcton of reinforced concrete in seismic zone III and above, steel reinforcemet of Grade Fe 415 D shall be used, However, high strength deformed steel bars, produced by thermomechanical treatemnt process of grade Fe 415, Fe 500 and havind elongation more than 14.5% and conform to other be used for reinforcement.

All reinforcement shall be free form loose mill scales, loose rust and coats of poaints, oil mud or other conatings which may destroy or reduce bond.

The contractor shall have to produce Test Certificate in the proforma prescribed approved by BIS form the manufacturer for every batch of steel brought to site of work.

Before commencement of use of steel, form any batch brought to site of work by the contractor, the Engineer-in Charge shall arrange to get samples tested for nominal mass. Tensile strength, bend test and rebeend test from any Laboraory of his choice at the cost of Contractor. The selecton of test specimens and frequency shall be as per relevent I.S. specificatoin and of steel used.

5.4 From work

From work shall include all temporary ofr permanent forms or moulds required for forming the concrete which is cost-in-situ, together with all temporary construction required for their support.

5.5 Material for From Work

Propping and Centering : All Propping and centering should be either of steel tubes with extension pieces or built up sections of rolled steel.

Centering/Staging : Staging should be as designed with required extension pieces as approved by Engineer-in-Charge to ensure proper slopes, as per design for slabs/beams etc. and aas per levels as shown in drawing. All the staging to be either of Tubular steel structure with adequate bracing as approved or made of build up structural sections made from rolled structural steel sections.

Shuttering: Shuttering used shall be of sufficient stiffness to avoid excessive deflection and joints shall be tightly butted to avoid leakage of slurry. If required, rubberized lining of material as approved by the Engineer-in-Charge shall be provided in the joints. Steel shutteing used or concreting should be suffficienly stiffened. The steel shutteing should also be properly repared before use and properly cleaned to avoid stains. honey combing, seepage of slurry through joints etc.

(a) Runner joists: RSJ, MS Channerl or any other suitable section of the reqquired size shall be used as runners.
(b) Assembly of beam head over props. Beam head is an adopter that fits snugly on the head plates of props to provide wider support under beam bottoms.

(c) Only steel shuttering shall be used, except for unavoidable portions and very small works for which 12mm thick water profing ply of approved quality may be used.

From work shall be properly designed for self weight, weight of reinforcement, weight of fresh concrete, and in addition, the various live loads likely to be immposed during the construction process (such as workmen, materials and equipment). In case the height of centering exceeds 3.50 metres, the prop may be provided in multi-stages.

5.6 Desigh and Tolerance in Construction

From work shall be designed and constructed to the shapes, line and dimension shown on the drawing with the tolerance given below

Table 5.3

(a)	Deviation from specified dimension of cross section of columns and	.+12mm
(b)	Deviation from dimensions of footings	.-6mm
	(i) Dimension in Plan	.+50 mm -12 mm
	(ii) Eccentricity in Plan	0.02 times the width of the footin in the direction of deviation but not more than 50 mm.
	(iii) Thickness	.+0.05 times the specified thickness.

Note:- These tolerance apply to concrete dimensions only, and not to positioning of vertical steel or dowels.

5.7 General Requirement

It shall be storng enouth to withstand the dead and live loads and forces caused by ramming and vibrations of concrete and other incidental loads, imposed upon it duing and after casting of concrete. It shall be made sufficiently rigid by using adequate number of ties and braces, screw jacks or hard board wedges where required shall be provided to make up any settlement in the from work either before or duing the placing of concrete.

From shall be so constructed as to be removable in section in the desired sequence, without damaging the surface of concrete or disturbing other section, care shall b e taken to see that no piece is keyed into the cncrete.

(a) In case of structures with two or more floors, the weight of concrete, centering and shuttering of any upper floor being cast shall be suitably supported on one floor below the top most floor already cast.

(b) Form work and concreting of upper floor shall not be done until concrete of lower floor has set at least for 14 days.

Camber : Suitable camber shall be provided in horizontal members of structure, especially in cantilever spans to counteract the effect of deflectin. The form work shall be so assembled as to provide for camber. The Camber for beams and slabs shall be 4 mm per metre (1 to 250) or as directed by the Engineer-inCharge, so as to offset the subsequent deflection for cantilevers the camber at free end shall be 1/50th the projected length or as directed by the Engineer-in-Charge.

Removal of form work (Stripping Time) : In normal circumstance and where various types of cements are used, forms, may generally be removed after the expiry of the following periods;

TABLE 5.4

Type of form work	Minimum period before striking form work for OPC 33 grade	Minimum period before striking form work for OPC 43 grade	Minimum period before striking form work for ppc
(a) Vertical form work to columns, walls, beams	16-24 h	16-24H	24-36h
(b) Soffit form work to slabs (Props to be refixed immediately after removal of formwork)	3 days	3 days	4 days
(c) Soffit form work to beams (Props to be refixed immediately after removal of formwork)	7 days	7 days	10 days
(d)Props to slabs : (1) Spanning upto 4.5m (2) Spanning over 4.5 m	 7 days 14 days	 7 days 14 days	 10 days 20 days
(e) Props to beams and arches: (1) Spanning upto 6mm (2) Spaning over 6mm	 14 days 21 days	 14 days 21 days	 20 days 30 days

5.8 Placing of concrete

Concreting shall be conmmenced only after Engineer-in-Charge has inspected the centering, shuttering and reinforcement as placed and passed the same. Shuttering shall clean and free from all shaving, saw dust, pieces of wood, or othe foreign material and surfaces shall be treated with oil lubricant as prescribed.

Incase of concreting of slab and beams, wooden palnk or cat walks of cheguerred MS plated or bamboo chalies or any other suitable material supported directly on the centering by mens of wooden blocks or lugs shall be provided to convey the concrete to the place of deposition without disturbing the reinforcement in any way. Labour shall be allowed to walk over the reinforcement.

In case of columns and wall, it is desirable to place concrete without construction joints. The progress of concreting in the veritical direction, shall be restricted to one metre per hour.

The concrete shall be deposited in its final position in a manner to preclude segregation of ingredients. In deep trenches and footings concrete shall be placed through chutes or as directed by the Engineer-inCharge. In case of coumns and walls, the shuttering shall be so adjusted that the verical drop of concrete is not more than 1.5 metres at a time.

During could weather, concreting shall not be done when the temperature falls below 4.5°C The concrete placed shall b e protected against frost by suitable covering. Concrete damaged by frost shall be removed and work redone.

During ht weather precautin shall be taken to see that the temperature of we concrete does not exceed 38°C. No concrete shall be laid within half an hour of the closing time of the day, unless permitted by the Engineer-in-Charge.

It is necessary that the time between mixing and placing of concrete shall not exceed 30 minutes so that the initial setteing process is not interfered with.

5.9 Compaction

It shall be as specified in chapte IV sub-head concrete work of this S.O.R.

5.10 Finishing

In case of roof slabs the top surface shall be finished even and smooth with wooden trowel, before the concrete being to set. Sprinkling of dry cement while finishing shall not be resorted to.

Immediately on removal of rorms, the RCC wrok shall be examined by the Engineer-in-Charge, before any defectes arre made good.

(a) The work that has sagged or contains noney combing to an extent derimental to structural safety or architectural concept shall be rejected.

(b) Surface defects of minor nature may be accepted. On acceptance of such a work by the Engineer-in-Charge, the same shall be rectified as follows:
Surface defects which require repari when forms are removed usally consist of bulged due to movement of froms, ridges at form joints, honey-combed ares, damage resulting form the stripping of forms and holt holes, bulges and ridges are removed by careful chipping or toling and the surface is then rubbed with a grinding stone Honeycombed and other defective areas must be chipped out, the edges being cut as straight provide a key at the edge of the patch.

(c) The surface which is to receive plaster or where it is to be joined with brick masonry wall, shall be properly roughened immediately after the shuttering is removed, taking care to remeove the laitance completely witthout distrubing the concrete. The roughening shall be done by hacking, Before the surfuce is plastere, it shall be clened and wetted so as to give bond between concrete and plaster. RCC work shall be done carefully so that the thickness of plaster required for finishing the surface is not more that 6mm.

(d) The surface of RCC slab on which the cement concrete or mosaic floor is to be laid shall be roughened with brushes while the concrete is green. This shall be done without disturbing the concrete.

5.11 Strength of Concrete

The compressive strength on the work tests for different mixed shall be as given in Table 5.6

5.12 Ready Mixed Concrete (as per IS 4926)

Selection and Approval of Materials : Materials used should satisfy the requirements for the safety, structural performance durability and appearance of the finished structure, taking full account of the environment to which it will be subjected. The selection and use of materials shall be in accordance with IS 456. Materials used shall conform to the relevant Indian Standards applicable. Where materials are used which are not covbered by the provisions of the elevant Indian Standard, there should be satisfactory data on their suitability and assurance of quality contro. Records and details of performance of such compatibiloity between IS 4926 and materials used. Also, prior permission of the purchaser shall be obtainded befor use fo such materials.

Cement : Cement used for concrete shall be in accordance with the requirement of IS 456.

Mineral Admixtures : Use of mineral admixtures shall be permitted in accordance with the provisions of IS 456.

Aggregates : Aggregates used for concrete shall be in accordance with the requirment of IS 456. Unless otherwise agreed testting frequencies for aggregates in plant shall be as given IS 4926.

Chemical Admixtures

(i) Use of chemical admixtures shall be permitted in accordance, with the provisions of IS 456 and IS 9103

(ii) Its shal be the resosibility of the producer to establish compatibility and sutability of any admixure with the other ingredients of the mix and the determine the dosage required to give the desired effect.

(iii) Admixtures should be stored in a manner that prevents degradation of the product and consumed within the time period indicated by the admixture supplier. Any vessel containing an admixure in the plant or taken to site by the producer shall be clearly marked as to its content.

(iv) When offering or delivering a mix to a purchaser it should be indicated if such a mix contains an admixture of combination of admixtures or not. The admixtures may be identified generically and should be declared on the deliver ticket.

(v) The amount of admixture added to mix shall be recorded in the production record. In special circustances, if necessary, additional dose of admixture may be added at project site to regain the workability of concrete with the mutual agreemet between the producer and the pruchaser.

Water : Water used shal be in accordance with the requirement of IS 456. The use of re-cycled water is encouraged as long as concrete of satisfactory performance can be produced and steps arre taken to monitor the built up of chlorides in any recirdulated water and that any subsequent adjustments to the mix design are made to ensure that any overall limit on chloride contents is satisfied. The addition of any recycled water shall b e monitored and controlled to meet these requirements. The total amount of water added to the mix shall controlled to meet these requirements. The totla amount of water added to the mix shall be recorded in the production record. The water content of concrete shall be regulated by controlling its workability or by measuring and adusting the moisture contents of its constituent materials. The producer's production staff and truck-mixer, drivers shall be made aware of the appropriate responses to variation in concrete consistency of a particular mix caused by normal variations in aggregate moisture content or grading.

5.13 General Requirements

Basis of supply : Ready-mixed concrete shall be supplied having the quality and the quantity in accordance with the requirement agreed with the purchaser or his agent. Notwithstanding this, the concrete supplied shall generally comply with requirements of IS 456. All concrete will be supplied and invoiced in terms of cubic metres (full or part) of compacted fresh concrete. All proportioning is to be carred out by mass except water and admixture, which may be measured by valume.

Transport of concrete : Ready-mixed concrete shall be transported from the mixer to the point of placing as rapidly as practicable by methods that will maintain the required workability and will prevent segregation, loss of any constituents or ingress of forign matter or water. The concrete shall be placed as soon as possible after delivery, as close as is practicable to its final positioin to avoid re-handling or moving the concrete horizontally by vibration. If required by the purchaser the producer can utiize. admixures to slow down place the concrete as rapidly as possible. The purchaser should paln his arrangements so as to enable a full load of concrete to be discharged within 30 minutes of arrival on site. Concrete shall be transported in a trunk-mixer unless the purchaser agrees to the use of non agitating vehicles. When non-agitating vehicles are used, the mixed concrete shall be protected from gain or loss of water.

Time in Transport : The general requirement is that concrete shall be discharged form truck-mixer within 2 h of the time of loading. However, a longer period may be permitted if rtarding admixtures are used or in cool humid weather or when chilled concrete is cement and aggregate or of adding the cement to the wet aggregate whichever is applicable Ready-mixed concrete plant shall have tyest facilities at its premises to carry out routine tests as per the requirement of the standard.

5.14 Sampling and Testing of Ready-Mixed Concrete

Point and Time of Sampling : For the assessment of compliance of ready-mixed concrete, the point and time of sampling shall be at discharge from the producer's delivery vehicle or from the mixer to the site or when delivered into the purchaser's vehicle. It is crititcal that the sampling procedure and equipment use enables as representative a sample as possible to be taken of the quantity of concrete delivered. The sampling may carried out jointly by the purchaser and the supplier with its frequency mutually agreed upon. However, it will not absolve the supplier of his responsibility form suppling in concrete as per the requirment given in this standard or otherwise agreed to where so permitted in the standard.

5.15 Workability :

The workability shall be within following limits on the specified value as appropiate Slamp ±25mm or 1/3 of the specified value, whichever is less.

Compacting factor; ± 0.03, where the specified value is 0.90 or greater,

± 0.04, where the specified value is less than 0.90 but more than 0.80,

± 0.05, where the specified value is 0.80 or less.

Flow table test may be specified for concrete, for vary high workability (sse IS 9103) Acceptance criteria for spread (flow) are to be established between the supplier and the purchaser.

5.16 Specified Strength

Compliance shall be assessed against the requirements of IS 456 or other agreed Indian standard. The purchaser may perfume his sampling and testing or may enter into an arrangement with the producer to provide his testing requirements.

Unless otherwise agreed between the parties involved, the minimum testing frequency to be appli3d by the producer in the absence of a recognized ready-mixed concrete industry method of production control should be one sample for every 50 M3 of production or every 50 batches, whichever is the greater frequency. Three test specimens shall be made up for of the quality of concrete, optional test on beams for modulus of rupture at 72± 2 h or at 7 days or compressive strength test at 7 days may be carried out in addition to 28 days compressive strength test. For this purpose the value should be arrived at based on actual testing. In all cases 28 days compressive strength shall alone be the criteria for acceptance or rejection of the concrete.

The purchaser shall inform the producer if his requirements for sampling and testing are higher than one sample every 50 M3 or 50 batches, whichever is the greater frequency.

5.17 Sampling and Testing for Quality Control of Hardened Concrete

Test on cube crushing strength of concrete in accordance and compiance with IS 456 and IS 516 shall done as under :-

Sample of fresh concrete shall be taken from concrete at central batch plant mixer while loading delivery trucks or other transport and also from concrete transported to placement location.

Test on specimens made form samples collected at placement location shall be considered as fiel test specimens and results therefrom shall be the criterion of concrete strength. Test in spssecimens made form samples at the batch plant shall ony be taken as gudelenes test. Only in the case of doubtful result, the Engineer-in-Charge may refer to such guideline results for deciding on the quality of concrte.

For truck mix concrte and shrink mix concrete guideline test specimens shall be made from samples collected at discharge location for mixing trucks. For this purpose first and last 15% of the load shal be omitted while collecting samples.

Frequency of sampling shall be as given below in Table 5.5 for each grade of concrete of different workability's qand for each type of specimens (field tes spsecimens and guideline test speciments) for conducting 28 days crushing strength tests.

TABLE 5.5

Quantity of conrete Delivered (cum)	**Number of Samples**
Less than 5	1
6 to 15	2
31 to 50	3
51 and above sample for each	4 Plus one additional 50 cum or part thereof

Each sample shall be of adequate quantity so that a minimum of 3 specimen cubes can be made test of the sample in accordance with IS 516.

All test specimens shall be made compacted cured and tested in commpliance with IS 516 and test result interpreted in accordance with IS 456 for acceptance of concrete strength, field specimens test results shall not be less than values as prescribed.

In additin to 28 day crushing strength test on specimens made at frequencies specified above, early strength test at 7 days shall also be conducted on field specimens as well as guideline test specimens. Frequency of sampling for this set of test shall also be same as those specified above. 7 day strength shall coform to values given in Table as under. But these test results even if conforming to specified values shall only be taken a guideline values for projecting concrete strength and shall not be construed as conforming to specifications.

Table 5.6

Concrete Mix (Nominal Mix on Valume basis)	Compressive Strength in (Kg/Sq.Cm)	
	7 day's	28 day's
1:1:2	210	315
1:1:5:3	175	265
1:2:4	140	210

For each grade of concrete and for all workability conditionas with different water - cement ratios and compositions of admixtures, preliminary test shall be conducted for crushing strength on finalization to design mix for each type of concrete. Such test shall be conducted both at 7 days and 28 days under laboratory conditions. Six test specimens shall be made for 7 days test and six tyest specimens shall be made for 28 days test. Average of the xis test results of different periods shall not be less than those specified.

Crushing stengths on cubes shall also be conducted during the process of finalization of concrete dising mix Frequency and number of such test shall be as per Mix of requirements of concrete manufacture.

All test specimens for conducting crushing strength shall be properly labeled for identification indicationg:-
(i) Date of making speciment
(ii) Grade of concrete
(iii) Placement location exact
(iv) Purchasers order number

In addition to crushing strength tes on concrete, the Engineer-in-Charge may call for other tests on hardend concrete. The placement contractor and the manufacturer of concrete shall comply with all such instructions.

5.18 Non-destructive tests

When the 28 days crushing values on field specimens and/or specimens and/or spsecimens made for guideline test fall short of specified values, or in case of doubtful placement of concrete, the Engineer-in-Charge shall call for non-destruction tests on the structure. Such tests may be any one or combination of the following :-
(i) Rebound hammer test
(ii) Windsor penetration probe test
(iii) Pulse velocity (Sonic or Ultrasonic) test
(iv) Core test
(v) Load test

Interpretation of rebound hammer, Windsor probe and pulse velocity test results shall rest with the Engineer-in-Charge.

Core test, I f ordered by the Engineer-in-Charge, shall be done in accordance with IS 516. Samples for such test shall be taken form locations to be identified by the Engineer-in-Charge and such samples be collected in compliance with IS: 1199.

If felt necessary, the Engineer-in-Charge may instruct load testing for any pary of the structure based on doubtful concrete strengths. Succh test shall be carried out as per details to be provided by the Engineer-in-Charge in consultation with structural consultants.

The concrete manufacturer/concrete placement contractor shall arrqange for all test to be conducted in accordance with these specifications, including all necessary tools, plants, equipment and material, and shall be responsible for conducting all test at his cost.

All test conducted at the filed laboratory shall be carried out by qualified technicians employed by the concrete manufacture/concrete placement contractor, in presence of authorized representative of the Engineer-in-Charge. All test reports and abservation reporst shall be jointly signed by the Engineer-in-Charge authorized representative and the techician conduction such test.

Engineer-in-Charges shall alone decide where such tests are to be conducted. He may instruct tests to be conducted at laboratories other than the field laboratory and such instructions shall be followed withouth claiming extra charges on this account.

The Concrete Manufacture/placement contractor shall set up a laboratory at this own expense which shall have facilities, for conducting all necessary field test on materials and field and laboratory test on concrete.

CHAPTER-5
REINFORCED CEMENT CONCRETE

S.No	Description of Items	Unit	Rate (in Rs)
5.1	Providing and laying in position specified grade of reinforced cement concrete excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level :		
5.1.1	Cement concrete grade M-20 (Nominal Mix) with 20 mm maximum size of stone aggregate.	Cum	5435.00
5.2	Reinforced cement concrete work in walls (any thickness), including attached pilasters, buttresses, plinth and string courses, fillets, columns, pillars, piers, abutments, posts and struts etc.above plinth level and up to floor two level excluding cost of centering, shuttering and reinforcement etc.		
5.2.1	Cement concrete grade M-20 (Nominal Mix) with 20 mm maximum size of stone aggregate.	Cum	5656.00
5.3	Reinforced cement concrete work in beams, suspended floors, roofs having slope up to 15° landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor two level excluding the cost of centering, shuttering and reinforcement with Cement concrete grade M-20 (Nominal Mix) with 20 mm maximum size of stone aggregate.	Cum	5932.00
5.4	Providing and laying up to floor two level reinforced cement concrete in kerbs, steps and the like excluding the cost of centering, shuttering and reinforcement with Cement concrete grade M-20 (Nominal Mix) with 20 mm maximum size of stone aggregate.	Cum	5543.00
5.5	Reinforced cement concrete work in arches, archribs, domes, vaults, shells, folded plate and roofs having slope more than 15° up to floor two level excluding the cost of centering, shuttering and reinforcement with Cement concrete grade M-20 (Nominal Mix) with 20 mm maximum size of stone aggregate.	Cum	6140.00
5.6	Reinforced cement concrete work in chimneys, shafts, up to floor two level excluding the cost of centering, shuttering and reinforcement with Cement concrete grade M-20 (Nominal Mix) with 20 mm maximum size of stone aggregate.	Cum	5736.00
5.7	Reinforced cement concrete work in well-steining excluding the cost of centering, shuttering and reinforcement with Cement concrete grade M-20 (Nominal Mix) with 20 mm maximum size of stone aggregate.	Cum	5486.00

S.No	Description of Items	Unit	Rate (in Rs)
5.8	Reinforced cement concrete work in vertical and horizontal fins individually or forming box louvers, facias and eaves boards up to floor two level excluding the cost of centering, shuttering and reinforcement with Cement concrete grade M-20 (Nominal Mix) with 20 mm maximum size of stone aggregate.	Cum	5831.00
5.9	Providing, hoisting and fixing up to floor two level precast reinforced cement concrete in lintels, manhole cover, shelves and like including setting in cement mortar 1:3 (1 cement : 3 sand), cost of required centering, shuttering and finishing with neat cement punning on exposed surfaces but excluding the cost of reinforcement with M 20 –Grade Concrete.	Cum	7944.00
5.10	Providing precast cement concrete Jali of cement concrete grade M-15 (Nominal Mix) with 6 mm maximum size of stone aggregate reinforced with 1.6 mm dia mild steel wire including centering and shuttering, roughening cleaning, fixing and finishing in cement mortar 1:3 (1 cement: 3 fine sand) etc. complete excluding plastering of the jambs, sills and soffits.		
5.10.1	50 mm thick	Sqm	795.00
5.10.2	40 mm thick	Sqm	658.00
5.10.3	25 mm thick	Sqm	583.00
5.11	Reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding upto floor level including cost of binding wire, wastage and over laps upto 12mm horizontal/ inclined position of reinforcement bars in slab and beams, plinth, chajjas, lintels, upto 4.5m vertical length of reinforcement in wall columns (over laps shall be provided as per requirement of IS : 13920; IS 456 & SP : 34) etc. complete.		
5.11.1	Mild steel and Medium Tensile steel bars.	kilogram	57.00
5.11.2	Hot rolled deformed bars	kilogram	58.00
5.11.3	Cold twisted bars	kilogram	57.00
5.11.4	Thermo-Mechanically Treated bars. (Fe 500 D or more)	kilogram	58.00
5.11.5	Hard drawn steel wire	kilogram	57.00
5.11.6	Hard drawn steel wire fabric	kilogram	65.00
5.11.7	Add extra for providing reinforcement above Floor two level for every additional floor or part there of.	kilogram	1% of the respective item
5.12	Providing and fixing in position copper plate as per design for expansion joints.	kilogram	474.00
5.13	Providing and filling in position, blown bitumen in expansion joints.	per cm depth per cm width per 100m length	483.00

S.No	Description of Items	Unit	Rate (in Rs)
5.14	Providing and filling in position bitumen mix filler of Proportion 80 kg. of hot bitumen, 1 kg. of cement and 0.25 cubicmeter of coarse sand for expansion joints.	per cm depth per cm width per 100m length	136.00
5.15	Providing and fixing in position 12mm thick bitumen impregnated fibre board conforming to IS: 1838 including cost of primer, sealing compound in expansion joints.	Sqm	433.00
5.16	Providing and fixing sheet covering over expansion joints with iron screws as per design to match the colour / shade of wall treatment.		
5.16.1	Non-asbestos fibre cement board 6 mm thick as per IS: 14862.		
5.16.1.1	150mm wide.	R.M	78.00
5.16.1.2	200mm wide.	R.M	102.00
5.16.1.3	250mm wide.	R.M	127.00
5.16.2	Aluminium fluted strips 3.15mm thick.		
5.16.2.1	150 mm wide.	R.M	319.00
5.16.2.2	200 mm wide.	R.M	391.00
5.16.2.3	250 mm wide	R.M	449.00
5.17	Providing and fixing in position stainless steel grade 304 plate - 1.0 mm as per design for expansion Joints.		
5.17.1	200 mm wide	Meter	483.00
5.17.2	300 mm wide	Meter	698.00
5.18	Providing plaster drip course/ groove in plastered surface or moulding to R.C.C. projections.	Meter	23.00
5.19	Extra for laying reinforced cement concrete in or under water and/ or liquid mud including cost of pumping or bailing out water and removing slush etc., complete.	Cum	270.00
5.20	Extra for laying reinforced cement concrete in or under foul positions.	Cum	64.00

S.No	Description of Items	Unit	Rate (in Rs)
5.21	Providing and laying in position machine batched and machine mixed and machine vibrated design mix cement concrete of M-25 grade mixed in a concrete mixer of not less than 0.2 cum capacity and approporiate weigh batcher using approved mix design, for reinforced cement concrete work including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement. including Admixtures in recommended proportions as per IS 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge.		
5.21.1	Upto Plinth level	Cum	5547.00
5.21.2	Above Plinth upto floor 2 level	Cum	5701.00
5.22	Extra for richer mixes at all floor levels.		
5.22.2	Providing M-30 grade concrete instead of M-25 grade BMC.	Cum	66.00
5.22.2	Providing M-35 grade concrete instead of M-25 grade BMC.	cum	131.00
5.22.3	Providing M-40 grade concrete instead of M-25 grade BMC.	Cum	197.00
5.23	Providing and laying in position ready mixed M-25 grade concrete for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site on work in transit mixer for all leads, having continous aggitated mixer, manufactuer as per mix design of specified grade for reinforced cement work, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement. including Admixtures in recommended proportions as per IS 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge.		
5.23.1	Upto Plinth level	Cum	5826.00
5.23.2	Above Plinth upto floor 2 level	Cum	5980.00
5.24	Extra for richer mixes at all floor levels.		
5.24.1	Providing M-30 grade concrete instead of M-25 grade RMC.	Cum	66.00
5.24.2	Providing M-35 grade concrete instead of M-25 grade RMC.	cum	131.00
5.24.3	Providing M-34 grade concrete instead of M-25 grade RMC.	Cum	197.00
5.25	Extra for R.C.C./B.M.C./R.M.C. all works above floor 2 level for each floors or part thereof.	Cum	49.00
5.26	Providing and placing in position precast reinforced cement concrete waffle units square or rectangular as per design and shape for floors and roofs in 1:1½:3 (1 Cement : 1½ coarse sand : 3 graded stone aggregate 10mm nominal size) including flush or deep ruled pointing at joints in Cement mortar 1:2 (1 Cement : 2 Fine sand), making necessary holes of required sizes for carrying through service lines etc., providing steel hooks for lifting etc, form work in precasting, handling, hoisting, centering and erection complete for all floor levels but excluding the cost of reinforcement.	Cum	10100.00

S.No	Description of Items	Unit	Rate (in Rs)
5.27	Supplying and applying pre tested and approved water based concrete curing compound to concrete/ masonry surface, all as per manufacturer's specification and direction of Engineer-in-charge.		
5.27.1	Non pigmented wet curing compound	sqm	33.00
5.27.2	Pigmented wet curing compound.	sqm	35.00
5.28	Providing and fixing in position factory made precast RCC M-40 doors and windows frames having excellent smooth finish as per IS: 6523 with reinforcement of 3 Nos, 6 mm dia main bars tied with 3 mm M.S stirrups placed @ 200 mm C/C and 6 numbers high strength polymer blocks of required size for fixing hinges including providing 6 no specially designed M.S. galvanised sleeves for accomodating 6 mm dia fully threaded bolts for fixing hold fast on vertical members, providing suitable arrangement for recieving sliding door bolts and tower bolt etc all complete, as per the direction of Engineer in charge. (The cost of hold fast and Cement Concrete block of 1:3:6 (1 Cement : 3 sand : 6 Graded stone agreegate 20mm nominal size) mix is also included in the item.) The frame shall be measured in running meter correct to two places of decimal.		
5.28.1	Door frame 125 mmx 60 mm	RM	362.00
5.28.2	Door frame 100mmx 60 mm	RM	330.00
5.28.3	Door frame 85 mmx 60 mm	RM	313.00
5.29	Providing and fixing in position pre moulded compressible filler board made from polymer base in black color approved make conforming to the specifications having minimum density of 95 kg / cum, non staining, with less than 1 percent water absorption and compression recovery of 93 percent minimum including cost of double sided adhesive tape, sealant etc. in expansion joints.		
5.29.1	12 mm thick	Sqm	478.00
5.29.2	25 mm thick.	Sqm	573.00

CHAPTER - 6
BRICK WORK

Notes for Specifications :-

Applicable IS Codes
IS 1200 (Part 3): Method of measurements of brick works
IS 1077 : Common burnt clay building bricks.
IS 712 : Specification for building limes.
IS 3495 : Method of test for burnt clay building bricks.

1 This work shall consist of construction of structures with bricks jointed together by cement mortar in accordance with the details shown on the approved drawings or as approved by the competent authority.

2 Burnt clay bricks shall conform to the requirements of IS:1077. They shall be free from cracks and flaws and nodules of free lime. The brick shall have smooth rectangular faces with sharp corners and emit a clear ringing sound when struck.

3 Cement mortar for the work shall be as per details given in Chapter III of this SOR.

4 Fire Bricks shall be as per IS : 1526

5 Fire cly mortar shall be as per IS : 195 :2005

6 All bricks shall be thoroughly soaked in a tank filled with water for a minimum period of one hour prior to being laid. Soaked bricks shall be removed from the tank sufficiently in advance so that they are skin dry at the time of actual laying. Such soaked bricks shall be stacked on a clean place where they are not contaminated with dirt, earth, etc.

7 The thickness of joints shall not exceed 10mm. All joints on exposed faces shall be tooled to give concave finish.

8 The brick work shall be built in uniform layers, and for this purpose wooden straight edge with graduations indicating thickness of each course including joint shall be used. Corners and other advanced work shall be raked back. Brick work shall be done true to plumb or in specified batter. All courses shall be laid truly horizontal and vertical joints shall be truly vertical. Vertical joints in alternate courses shall come directly one over the other. During construction, no part of work shall rise more than one meter above the general construction level, to avoid unequal settlement and improper jointing. Where this is not possible in the opinion of the Engineer in charge, the works shall be raked back according to the bond (and not toothed) at an angle not steeper than 45 degrees with prior approval of the Engineer in charge. Toothing may also be permitted where future extension is contemplated.

9 Where fresh masonry is to join with masonry that is partially/entirely set, the exposed jointing surface of the set masonry shall be cleaned, roughened and wetted, so as to effect the best possible bond with the new work. All loose bricks and mortar or other material shall be removed.

In the case of vertical or inclined joints, it shall be further ensured that proper bond between the old and new masonry is obtained by interlocking the bricks. Any portion of the brick work that has been completed shall remain undisturbed until thoroughly set.

10 Green work shall be protected from rain by suitable covering and shall be kept constantly moist on all faces for a minimum period of seven days. Brick work carried out during the day shall be suitably marked indicating the date on which the work is done so as to keep a watch on the curing period. Watering may be done carefully so as not to disturb or washout the green mortar.

During hot weather, all finished or partly completed work shall be covered or wetted in such a manner as will prevent rapid drying of the brick work.

During the period of curing of brick work, it shall be suitably protected from all damages. At the close of day's work or for other period of cessation, watering and curing shall have to be maintained. Should the mortar perish i.e. become dry, white or powdery through neglect of curing, work shall be pulled down and rebuilt as directed by the Engineer in charge. If any stains, appear during watering, the same shall be removed from the face.

The scaffolding shall be sound, strong and safe to withstand all loads likely to come upon it. Putlog holes are not allowed.

11 Bricks having crushing strength of more than 40 kg/cm^2. shall be used for load bearing walls.

12 Classification of Bricks and Masonry:-

In this schedule the following three classifications of bricks and masonry is given and shall have the minimum crushing strength when tested according to IS: 1077-1992

(a) Class 40 TM chimney brick/grog or ghol brick: - For this item either selected chimney burnt bricks or ghol bricks are used and superior workmanship than the following varieties is required. The crushing strength when thoroughly soaked in water shall not be less than 40kg/sq.cm.

(b) Class 25 TM chimney brick masonry: - The crushing strength when thoroughly soaked in water shall not be less than 25 kg/sq.cm.

(c) Class 25 TM open bhatta or pajaw a burnt brick :- As is clear the only difference between (b) and (c) varies in the method of burning bricks. The crushing strength when thoroughly soaked in water shall not be less than 25 kg/sq.cm.

13 Periodical sampling and testing of bricks shall be carried out at contractors cost to classify the brick. The record of test results shall be kept with the Executive Engineer, or Authorised officer.

14 When reinforcement is used in 10cm thick brick masonry, minimum lap of reinforcement should be 15cm. In case of wall joints of the main wall, reinforcement should go 15cm into the main wall.

15 Curing :-

The brick work shall be constantly kept moist on all faces for a minimum period of seven days. Brick work done during the day shall be suitably marked indicating the date on which the work is done so as to keep an watch on the curing period.

16 Measurement :-

Brick work shall be measured in cubic meters unless otherwise specified. Any extra work over the specified dimensions shall be ignored. Demensions shall be measured correct to the nearest 0.01 m i.e. 1 cm. Areas shall be calculated to the nearest 0.01 sq mtrs and the cubic contents shall be worked out to the nearest 0.01 cubic meters.

Brick work shall be measured separately in the following stages:

(a) From foundation to floor one level (Plinth level)

(b) Plinth (floor one) level to floor two level

(c) Between two specified floor levels above floor two level

Note : (i) Brick work in parapet walls, mumty, lift machine room and water tanks constructed on the roof upto 1.2 m height above roof shall be measured together with the corresponding work of the floor next below.

No deductions or additions shall be done and no extra payment made for the following.:

(a) Ends of dissimilar materials (that is, Joists, beams, lintels, posts, girders, rafters, purlins, trusses, corbels, steps, etc.); up to 0.1 m^2 in section;

(b) Opening up to 0.1 Sq.m. in area (see Note);

(c) Wall plates, bed plates, and bearing of slabs, chajjas and the like, where thickness does not exceed 10 cm and bearing does not extend over the full thickness of wall;

(d) Cement concrete blocks as for hold fasts and holding down bolts;

(e) Iron fixtures, such as wall ties, pipes upto 300 mm diameter and hold fasts for doors and windows; and

(f) Chases of section not exceeding 50 cm in girth.

(g) Bearing portion of drip course, bearing of moulding and cornice.

Note : In calculating area of an opening, any separate lintel or "sills shall be included with the size of the opening but end portions of lintel shall be excluded. Extra width of rebated reveals, if any, shall also be excluded.

Note : Where minimum area is defined for deduction of an opening, void or both, such areas shall refer only to opening or void within the space measured.

Walls half brick thick and less shall each be measured separately in square meters stating thickness.

Walls beyond half brick thickness shall be measured in multiples of half brick which shall be deemed to be inclusive of mortar Joints. For the sizes of bricks specified in 6.1.1, half brick thickness shall mean 100 mm for modular and 115 mm for non-modular bricks.

Where fractions of half brick occur due to architectural or other reasons, measurement shall be as follows:

(a) upto 1/4th brick-actual measurements and

(b) exceeding 1/4 brick-full half bricks.

String courses, projecting pilasters, aprons, sills and other projections shall be fully described and measured separately in running meters stating dimensions of each projection.

Square or rectangular pillars shall be measured separately in cubic meters in multiple of half brick.

Circular pillars shall be measured separately in cubic meters as per actual dimensions.

Brick work curved on plan shall be measured like the brick work in straight walls and shall include all cutting and wastage of bricks, tapered vertical joints and use of extra mortar, if any. Brick work curved on plan to a mean radius not exceeding six meters shall be measured separately and extra shall be payable over the rates for brick work in straight walls. Nothing extra shall be rate payable if the mean radius of the brick work curved in plan exceeds six meters.

Tapered walls shall be measured net as walls and extra payment shall be allowed for making tapered surface for brick work in walls.

Brick work with brick tiles shall be measured and paid for separately.

17 Rates :-

The rate includes the cost of materials and labour required for all the operations described above except the vertical reinforcement and its encasement in cement mortar or cement concrete. The rate shall also include the following :

(a) Raking out joints or finishing joints flush as the work proceeds;
(b) Preparing tops of existing walls and the like for raising further new brick work.
(c) Rough cutting and waste for forming gables, splays at eaves and the like.
(d) Leaving holes for pipes upto 150 mm dia. and encasing hold fasts etc.

(e) Rough cutting and waste for brick work curved in plan and for backing to stone or other types of facing.

(f) Embedding in ends of beams, joists, slabs, lintels, sills, trusses etc.

(g) Bedding wall plates, lintels, sills, roof tiles, corrugated sheets, etc. in or on walls if not covered in respective items and

(h) Leaving chases of section not exceeding 50 cm in girth or 350 sq cm in cross-section.

(i) Brick on edge courses, cut brick corners, splays reveals, cavity walls, brick works curved on plan to a mean radius exceeding six meters.

LIST OF BUREAU OF INDIAN STANDARD CODES

S.No.	I.S. No.	Subject
1	IS 712	Specification for building limes.
2	IS 1077	Common burnt clay building bricks.
3	IS 1200 (Part 3)	Method of measurements of brick works
4	IS 2212	Code of practice for brick work. (1st Revision)
5	IS 2222	Specification for burnt clay perforated building bricks.
6	IS 2849	Specification for non load bearing gypsum partition blocks, (Solid and hollow types)
7	IS 3495	Method of test for burnt clay building bricks.
8	IS 3812	Specification for fly ash for use as pozzolana and admixture.
9	IS 4139	Specification of calcium silicate bricks
10	IS4885	Specification for sewer brick
11	IS 5454	Methods of sampling of clay building bricks.
12	IS 12894	Pulverized fuel ash lime bricks specification
13	IS13757	Specification of burnt clay fly ash bricks.
14	IS 2185(Part-3)	Autoclaved cellaular aerated concrete
15	IS 6073	Autoclaved reinforced cellular concrete floor and roof slabe stacifications
16	IS 1893	Autoclaved reinforced cellular concrete wall slabs
17	IS 6072	Criteria for earth quake

MANDATORY TESTS FOR BRICKS/BRICK TILES

S.No.	Material	Test	Field/ laboratory test	Test procedure	Minimum Qty of material for carrying out test
1	**2**	**3**	**4**	**5**	**6**
(i)	Bricks/ Brick tiles	Testing of Bricks/Brick Tiles for dimensions, Compressive strength, Water absorption and efflorescence	Laboratory	As given in specification of Chapter Brick work	As Per given specification chapter
(ii)	Sewer Bricks	Dimensions, Compressive strength, Water absorption and efflorescence	Laboratory	As given in specification of Chapter Brick work	As Per given specification chapter
(iii)	Burnt clay perforated building bricks	- do -	- do -	- do -	- do -
(For Detail Refer UADD BRICK WORK specification / CPWD specification)					

CHAPTER - 6
BRICK WORK

S.No.	Description of Items	Unit	Rate (in Rs)
6.1	Brick work with well burnt chimney bricks in bulls patent trench kiln manufactured by ghol process,crushing strength not less than 40kg /sqcm and water absorption not more than 15% in foundation and plinth.		
6.1.1	Cement mortar 1:4 (1 cement : 4 coarse sand)	Cum	5030.00
6.1.2	Cement mortar 1:6 (1 cement : 6 coarse sand	Cum	4824.00
6.1.3	Labour rate for Item No.- 6.1.1 to 6.1.2	Cum	810.00
6.2	Brick work with well burnt chimney bricks in bulls patent trench kiln ,crushing strength not less than 25kg /sqcm and water absorption not more than 20% in foundation and plinth		
6.2.1	Cement mortar 1:4 (1 cement : 4 coarse sand)	Cum	4435.00
6.2.2	Cement mortar 1:6 (1 cement : 6 coarse sand	Cum	4229.00
6.2.3	Labour rate for Item No.- 6.2.1 to 6.2.2	Cum	810.00
6.3	Brick work with chimeny brick of class designation 40 in superstructure above plinth level upto floor 2 level including the cost of scaffolding in :		
6.3.1	Cement mortar 1:4(1 cement : 4 coarse sand)	Cum	5209.00
6.3.2	Cement mortar 1:6(1 cement : 6 coarse sand)	Cum	4975.00
6.3.3	Labour rate for Item No.- 6.3.1	Cum	1087.00
6.4	Half brick masonry with of class designation 40 in foundation and plinth in.		
6.4.1	Cement mortar 1:3 (1 cement : 3 coarse sand)	Sqm	575.00
6.4.2	Cement mortar 1:4 (1 cement : 4 coarse sand)	Sqm	552.00
6.4.3	Labour rate for Item No.- 6.9.1 to 6.9.2	Sqm	185.00
6.5	Half brick masonry with of class designation 40 in super structure above plinth level up to floor 2 level including the cost of scaffolding.		
6.5.1	Cement mortar 1:3 (1 cement : 3 coarse sand)	Sqm	594.00
6.5.2	Cement mortar 1:4 (1 cement : 4 coarse sand)	Sqm	566.00
6.5.3	Labour rate for Item No.- 6.10.1 to 6.10.2	Sqm	342.00
6.6	Extra for half brick masonry in superstructure, above floor 2 level for every floors or part thereof by mechanical means by lifting material using mobile crane.	Sqm	11.00
6.7	Extra for providing and placing in position 2 Nos. 8mm dia. M.S. / HYSD bars at every third course of half brick masonry.	Sqm	66.00
6.8	Brick work will well burnt open bhatta bricks crushing strength not less than 25kg/cm² and water absoption not more than 20% in foundation and plinth In cm 1:6.	Cum	3868.00
6.8.1	Labour rate for Item No.- 6.38	Cum	736.00
6.9	Brick work will well burnt open bhatta bricks crushing strength not less than 25kg/cm² and water absoption not more than 20% in above plinth level upto floor two level in cm 1:6 including the cost of scaffholding etc.	Cum	4155.00
6.9.1	Labour rate for Item No.- 6.39	Cum	965.00

S.No.	Description of Items	Unit	Rate (in Rs)
6.10	Add Extra from item No. 6.8 & 6.9 if Mortar used 1:4 instead of 1:6.	cum	345.00
6.11	Half brick masonry with open bhatta of class designation 25 in foundation and plinth including the cost of scaffolding :		
6.11.1	Cement mortar 1 : 3 (1 cement : 3 coarse sand)	sqm	490.00
6.11.2	Cement mortar 1 : 4 (1 cement : 4 coarse sand)	sqm	467.00
6.12	Half brick masonry with open bhatta of class designation 25 in superstructure above plinth level upto floor 2 level including the cost of scaffolding.		
6.12.1	Cement mortar 1 : 3 (1 cement : 3 coarse sand)	sqm	517.00
6.12.2	Cement mortar 1 : 4 (1 cement : 4 coarse sand)	sqm	494.00
6.13	Brick work with fly ash lime bricks (FALG Bricks) conforming to IS:12894-2002, class designation 50 (average compressive strength) upto plinth level :		
6.13.1	Cement mortar 1:4 (1 cement : 4 coarse sand)	Cum	4531.00
6.13.2	Cement mortar 1:6 (1 cement : 6 coarse sand)	Cum	4349.00
6.14	Brick work with fly ash lime bricks (FALG Bricks) conforming to IS:12894-2002, class designation 50 (average compressive strength) in superstructure above plinth level up to floor 2 level including the cost of scaffolding :		
6.14.1	Cement mortar 1:4 (1 cement : 4 coarse sand)	Cum	4789.00
6.14.2	Cement mortar 1:6 (1 cement : 6 coarse sand)	Cum	4607.00
6.15	Half Brick work with fly ash lime bricks (FALG Bricks) conforming to IS:12894-2002, class designation 50 (average compressive strength) in superstructure above plinth level up to floor 2 level including the cost of scaffolding :		
6.15.1	Cement mortar 1:3 (1 cement : 3 coarse sand)	Sqm	619.00
6.15.2	Cement mortar 1:4 (1 cement : 4 coarse sand)	Sqm	596.00
6.16	Brick work with fly ash lime bricks (FALG Bricks) conforming to IS:12894-2002, class designation 75 Kg/CM^2 (average compressive strength) up to plinth level :		
6.16.1	Cement mortar 1:4 (1 cement : 4 coarse sand)	Cum	4734.00
6.16.2	Cement mortar 1:6 (1 cement : 6 coarse sand)	Cum	4552.00
6.17	Brick work with fly ash lime bricks (FALG Bricks) conforming to IS:12894-2002, class designation 75 Kg/CM^2 (average compressive strength) in superstructure above plinth level up to floor 2 level including the cost of scaffolding :		
6.17.1	Cement mortar 1:4 (1 cement : 4 coarse sand)	Cum	4992.00
6.17.2	Cement mortar 1:6 (1 cement : 6 coarse sand)	Cum	4810.00

S.No.	Description of Items	Unit	Rate (in Rs)
6.18	Half Brick work with fly ash lime bricks (FALG Bricks) conforming to IS:12894-2002, class designation 75 Kg/CM^2 (average compressive strength) in superstructure above plinth level up to floor 2 level including the cost of scaffolding :		
6.18.1	Cement mortar 1:3 (1 cement : 3 coarse sand)	Sqm	643.00
6.18.2	Cement mortar 1:4 (1 cement : 4 coarse sand)	Sqm	619.00
6.19	Extra for brick work in superstructure above floor 2 level for each floors or part there of .	Cum	117.00
6.20	Brick work in plain arches in superstructure including centering and shuttering complete for span up to 6 meters with of class designation 40 in cement mortar 1:3 (1 cement : 3 coarse sand).	Cum	7912.00
6.21	Brick work in gauged arches in superstructure in cement mortar 1:3 (1 cement : 3 coarse sand) including centering and shuttering complete, for span up to 6 meters with of class designation 40.	Cum	9286.00
6.22	Extra for additional cost of centering for arches exceeding 6m span including all shuttering, bolting, wedging and removal. (Area of the soffit to be measured).	Sqm	399.00
6.23	Honey-comb brick work 10 cm thick with bricks of class designation 40 in cement mortar 1:4 (1 cement : 4 coarse sand).	Sqm	465.00
6.24	Honey-comb brick work 10 cm thick with open bhatta brick of class designation 25 in cement mortar in 1:4 (1 cement : 4 coarse sand)	sqm	381.00
6.25	Providing and laying Autoclaved Aerated Concrete (AAC) blocks masonary, using AAC blocks (Size length 300, 400, 500, 600 Height 200, 250, 300 Width 100, 150, 200, 250mm) conforming to IS 2185 PART-3, having compressive strength not less than 3 Mpa (Grade H) in super structure, blocks jointed with cement mortar 1:6 (1 cement : 6 sand) or with polymer modified cement mortar as per ASTM 1660-09, applied in uniform thickness of 2 to 3 mm in horizontal and verticals joints using special trowel, polymer modified mortar having minimum compressive strength and minimum splitting tensile strength of not less than 5 MPa and 0.34 MPa respectively as per ASTM international standard including raking out joints. The surface of masonary units (AAC- Block) should be slightly moist prior to application of jointing mortar. Block should be gently pressed down using a rubber mallet to expel out entrapped air and the masonary shall be carried for even days for cement mortar and two days for polymer modified mortar. Ist layer of masonary block shall be placed on perfectly leveled surface, which if required, shall be leveled with M-20 cement concrete at plinth or floor level. Masonary shall have 75mm thick RCC band with M-20 cement concrete and 2 bars of 8mm dia. Such bands shall be spaced at interval of 1.8 meter in vertical direction. RCC bands shall be measured with AAC block masonary. Rates include all materials including steel bars wastage, scaffolding and all labour etc. complete upto floor two level :		

S.No.	Description of Items	Unit	Rate (in Rs)
6.25.1	AAC masonary in cement mortar 1:6 (1 cement : 6 sand)	Cum	4301.00
6.25.2	ACC Masonary in polymer modified mortar	Cum	4429.00
6.26	Extra for AAC masonary work in superstructure above floor two level for each additional floor or part.	Cum	102.00
6.27	Providing and laying Gypsum panel partitions 100mm thick with water proof Gypsum panels of size 666x500x100mm, made of calcite phosphor Gypsum fixed with tongue and groove, jointed with bonding plaster as per manufacturers specifications in superstructure above plinth level up to floor 5 level. Gypsum blocks will have a minimum compressive strength of 9.3 kg/cm2	Sqm	579.00
6.28	Extra for Gypsum panel Partitions in superstructure above floor V level for every Four or part thereof.	Sqm	21.00
6.29	Brick work with common burnt clay machine moulded perforated modular bricks of class designation 125 conforming to IS : 2222 -1991 in exposed brick work including making horizontal and vertical grooves 10 mm wide 12mm deep complete from ground level up to floor two level in cement mortar 1:6 (1 cement : 6 coarse sand).	Cum	4269.00
6.30	Extra for exposed brick work in superstructure above floor two level, for each floor or part there of.	Cum	462.00

CHAPTER - 7
STONE WORK

Notes for specification :-

Applicable IS Codes

S.No.	I.S. No.	Subject
1	IS 737	Specifications for wrought aluminium and aluminium alloy, steel and strip for general engineering purpose.
2	IS 1121 - (Pt. I)	Methods of determination of properties and strengths of natural building stones (Part-I compressive strength).
3	IS 1122	Methods for determination of specific gravity of natural building stone
4	IS 1123	Methods of identification of natural building stones.
5	IS 1124	Methods of test of determination of water absorption, apparent, specific gravity and porposity of natural building stones.
6	IS 1125	Methods of test of determination of weathering of natural building stone
7	IS 1126	Methods of test for determination of durability of natural building stone
8	IS 1128	Specification for Lime stone (Slab and Tiles).
9	IS 1129	Recommendations for dressing of natural building stones.
10	IS 1200 (Pt. IV)	Methods of measurements of building and Civil engineering works stone Masonry.
11	IS 1197 (Pt. I)	Code of practice for construction of rubble stone masonry
12	IS 1597 (Pt. II)	Code of practice for construction of ashlar stone masonry
13	IS 1805	Glossary of terms relating to stones, quarrying and dressing
14	IS 3620	Specification for latrite stone block for masonry
15	IS 3622	Sand stone (Slab and Tiles)
16	IS 4104 (Pt. I)	Code of practice for external facings and veneers (Part I-Stone facing)
17	IS 4101 (Part II)	Code of practice for external facing and veneers: (Part II-Cement Concrete facing).

1 The work shall consist of construction of structures with stone jointed together by cement mortar in accordance with the details shown on the drawings.

2 Stones shall be of the type specified. It shall be hard, sound, free from cracks, decay and weathering and shall be freshly quarried from an approved quarry. Stone with round surface shall not be used.

The stones, when immersed in water for 24 hours, shall not absorb water by more than 5 percent of their dry weight when tested in accordance with IS: 1124.

3 Size of Stones

Normally stones used should be small enough to be lifted and placed by hand. Unless otherwise indicated, the length of stones for stone masonry shall not exceed three times the height and the breadth on base shall not be greater than three-fourth of the thickness of wall, or not less than 150 mm. The height of stone for rubble masonry may be upto 300 mm.

The selection and grading of stones for rubble masonry is largely done at site and the smaller stones are used in the hearting of wall.

4 The type of masonry used for the structures shall be random rubble masonry(coursed or uncoursed) or Coursed rubble masonry (Second Sort) or ashler masonry.

5 The dressing of stone shall be as specified for individual type of masonry work and it shall also conform to the general requirements of IS:1597 and requirement for dressing of stone covered in IS : 1129.

6 Dressing

Each stone shall be hammer dressed on the face, the sides and the beds. Hammer dressing shall enable the stones to be laid close to neighbouring stones such that the bushing in the face shall not project more than 40 mm on the exposed face.

(i) Face stone; At least 25% stones shall be headers tailing into the work at least 2/3rd the thickness of wall in super structure masonry. Such stones shall not be less than 200 sq. cm in cross sections.

(ii) Hearting Stones: The hearting or interior filling of a wall face shall consist of rubble stones not less than 150 mm in any direction, carefully laid, hammered down with a wooden mallet into position and solidly bedded in mortar. The hearting should be laid nearly level with facing and backing.

(iii) Quoin Stone: Quoin stone shall be less than 0.03 cum in volume.

(iv) Jamb stones: The jambs shall not be made with stones specified for quoins except that the stones which were required to be provided at 1 meter centre to centre on both the exposed faces shall here be provided only on the jamb and the length shall be equal to the thickness of the wall for wall upto 60 cm and a line of headers shall be provided for walls thicker than 60 cm as specified for bond.

7 The masonry work shall be laid to lines, levels, curves and shapes as shown in the plan. The height, in each course, shall be kept same and every stone shall be fine tooled on all beds, joints and face full and true. The exposed faces shall be gauged out, grooved, regulated and sunk or plain moulded as the case may be.

8 Stones shall be sufficiently wetted before laying to prevent absorption of water from mortar. Stratified stones must be laid on their natural beds. All bed joints shall be normal to the pressure upon them.

9 Stones in the hearting shall be laid on their broadest face that gives a better opportunity to fill the spaces between stones. The practice of placing loose mortar on the course and pouring water on it to fill the gaps in stones is not acceptable. Mortar may be fluid mixed throughly and then poured in the joints. No dry or hollow space shall be left anywhere in the masonry and each stone shall have all the embedded faces completely covered with mortar.

10 Shaping and dressing shall be done before the stone is laid in the work. No dressing and hammering, which will loosen the masonry, will be allowed after it is once placed. All necessary chases for joggles, dowels and clamps should be formed before hand.

11 Sufficient transverse bonds shall be provided by the use of bond stone extending from the front to the back of the wall and in case of thick wall from outside to the interior and vice versa. In the latter case, bond stones shall overlap each other in their arrangement.

12 In case, headers are not available, precast headers of M 15 concerete shall be used. Castinsitu headers are not permitted.

13 Stones shall break joint on the face for at least half the height of the course and the bond shall be carefully maintained throughout.

14 The practice of building up thin faces tied with occasional through stones and filling up the middle with small stuff or even dry packing is not acceptable.

15 All quoins and the angles of the opening shall be made from selected stones, carefully squared and bedded and arranged to bond alternately long and short in both directions.

16 All vertical joints shall be truly vertical. Vertical joints shall be staggered as far as possible. Distance between the nearer vertical joints of upper layer and lower shall not be less than half the height of the course.

17 Only rectangular shaped bond stones or headers shall be used. Bond stones shall overlap each other by 150mm or more.

18 All connected masonry in a structure shall be carried up nearly at one uniform level throughout but when breaks are unavoidable, the masonry shall be raked in sufficiently long steps to facilitate jointing of old and new work. The stepping of raking shall not be more than 45 degrees with the horizontal.

19 Quoin stone i.e. stone specially selected and neatly dressed for forming an external angle in masonary work, shall not be less than 0.03 cubic meter in volume.

20 The plum stones are selected long stones embedded vertically in the interior of the masonary to form a bond between successive courses and shall be provided at about 900mm. intervals.

21 Courses

The masonry shall be carried out in regular courses of height not exceeding 50 cm and masonry on any day will not be raised more than 60 cm in height when using mortars having compressive strength less than 20 kg./sq. cm at 28 days and 100 cm when using mortars exceeding this strength.

Thickness of Joints

The joint thickness shall not exceed 30 mm at any point on the face. Chips of the stone and spalls shall be wedged into seating bed of face stones to avoid excessive bed thickness. No pinning shall be allowed to avoid excessive joint thickness.

22 Measurement

The length, height and thickness shall be measured correct to a cm. The thickness of wall shall be measured at joints excluding the bushing. Only specified dimensions shall be allowed; anything extra shall be ignored. The quantity shall be calculated in cubic meter nearest to two places of decimal.

The work under the following categories shall be measured separately. (i) From foundation to plinth level .

(a) work in or under water or in liquid mud,

(b) work in or under foul positions.

(i) Above plinth level and upto floor five level.

(ii) Above floor five level to every floor/floors or part thereof.

(iv) Stone masonry in parapet shall be measured together with the corresponding item in the wall of the storey next below.

(a) The length and breadth of the finished work shall be measured correct to a cm. The area of Chajja projecting beyond the wall shall be calculated in sq.m correct to two places of decimal.

In case of sloping chajja, the sloping breadth shall be measured correct to a cm and the area of chajja projecting beyond the wall shall be calculated in sq.m correct to two places of decimal.

Shelves : The length and breadth shall be measured inclusive of bearings correct of a cm. The thickness shall be as specified with permissible tolerance of 2 mm. The area shall be calculated in sqm correct to two places of decimal.

Copings : The dimensions of the circumscribing rectangles of the dressed stones as used in work shall be measured correct to a cm. The cubical contents shall be calculated correct to two places of decimal in cum.

LIST OF MANDATORY TESTS						
Material	**Clause**	**Test**	**Field/ Lab laboratory test**	**Test Procedure**	**Min. quantity of material for carrying out the test**	**Frequency of testing**
1	2	3	4	5	6	7
Stone Aggregate	4.1.2.2	(a) Percentage of soft or deleterious material	Field or Laboratory-Test as Required	IS 2386-Part II	As required by Engineerin-charge	For all quantities
	4.1.2.3	Particle size	Field/ Lab	Appendix 'E'	45 cum	For every 45 cum or part thereof for RCC Work only. For rest of items as decided by Engineer-incharge
	4.1.2.5	(a) Estimation of organic impurities	Field/ Lab	IS 2386-Part II	10 cum	For every 40 cum or part thereof
		(b) Surface moisture	Field/ Lab	IS 2386	10 cum	For every 40 cum or part thereof
		(c) Determination of 10% fine value	Field/ Lab	IS 2386	10 cum	For every 40 cum or part thereof
		(d) Specific gravity	Field/ Lab	IS 2386	10 cum	For every 40 cum or part thereof
		(e) Bulk density	Field/ Lab	IS 2386	10 cum	For every 40 cum or part thereof
		(f) Aggregate crusing strength	Field/ Lab	IS 2386	10 cum	For every 40 cum or part thereof
		(g) Aggregate impact value	Field/ Lab	IS 2386	10 cum	For every 40 cum or part thereof
Concrete	4.2.2	Slump test	Field	Appendix 'F'	10 cum	15 cum or part hereof

CHAPTER - 7
STONE WORK

S.No.	Description of Items	Unit	Rate (in Rs)
7.1	Random rubble masonry with hard stone in foundation and plinth with Cement mortar 1:6 (1 cement : 6 coarse sand)	Cum	3724.00
7.2	Extra for random rubble masonry with hard stone in superstructure above plinth level and upto floor 2 level	Cum	279.00
7.3	Extra for random rubble masonry with hard stone in superstructure above floor 2 level for each floor or part thereof.	Cum	117.00
7.4	Extra for random rubble masonry with hard stone in :		
7.4.1	Square or rectangular pillars	Cum	281.00
7.4.2	Circular pillars.	Cum	939.00
7.5	Extra for random rubble masonry with hard stone curved on plan for a mean radius not exceeding 6 m.	Cum	375.00
7.6	Coursed rubble masonry (first sort) with hard stone in foundation and plinth with Cement mortar 1:6 (1 cement : 6 coarse sand)	Cum	4435.00
7.7	Coursed rubble masonry (second sort) with hard stone in foundation & plinth with Cement mortar 1:6 (1 cement : 6 coarse sand)	Cum	4180.00
7.8	Extra for coursed rubble masonry with hard stone (first or second sort) in superstructure above plinth level & upto 2 floor level.	Cum	197.00
7.9	Extra for coursed rubble masonry with hard stone (first or second sort) in superstructure above floor 2 level for every floors or part thereof.	Cum	117.00
7.10	Extra for coursed rubble masonry with hard stone (first or second sort) in :		
7.10.1	Square or rectangular pillars	Cum	312.00
7.10.2	Circular pillars.	Cum	1060.00
7.11	Extra for coursed rubble masonry with hard stone (first or second sort) curved on plan for a mean radius not exceeding 6 m.	Cum	407.00
7.12	Stone work in plain ashlar masonary in super structure upto floor two level in cement mortar 1:4 (1 cement : 4 coarse sand) including pointing with cement mortar 1:2 (1 white cement : 2 Marble dust) with an admixture of pigment matching the stone shade :		
7.12.1	One face dressed.		
7.12.1.1	Red sand stone	Cum	24673.00
7.12.1.2	White sand stone	Cum	26806.00
7.12.2	Both face dressed.		

S.No.	Description of Items	Unit	Rate (in Rs)
7.12.2.1	Red sand stone	Cum	31301.00
7.12.2.2	White sand stone	Cum	33434.00
7.13	Stone work plain ashlar masonary in arches in cement mortar 1:3 (1 cement : 3 coarse sand) including centring, shuttering and pointing with white cement mortar 1:2 (1 white cement : 2 Marble dust) with an admixture of pigment matching the stone shade.		
7.13.1	Red sand stone	Cum	29455.00
7.13.2	White sand stone	Cum	31589.00
7.14	Stone work plain ashlar masonary in domes in cement mortar 1:3 (1 cement :3 coarse sand) including centring, shuttering and pointing with white cement mortar 1:2 (1 white cement : 2 Marble dust) with an admixture of pigment matching the stone shade.		
7.14.1	Red sand stone	Cum	43970.00
7.14.2	White sand stone	Cum	46104.00
7.15	Stone work ashlar punched (ordinary) in superstructure upto floor two level in cement mortar 1:4 (1 white cement : 4 coarse sand) including pointing with cement mortar 1:2 (1 white cement : 2 Marble dust) with an admixture of pigment matching the stone shade.		
7.15.1	Red sand stone.		
7.15.1.1	One faced punched.	Cum	23683.00
7.15.1.1.2	Double faced punched.	Cum	29557.00
7.15.2	White sand stone.		
7.15.2.1	One faced punched.	Cum	25816.00
7.15.2.2	Double faced punched.	Cum	31690.00
7.16	Extra for stone work, plain ashlar or ashlar punched above floor 2 level for every floor or part thereof.	Cum	215.00
7.17	Extra for plain ashlar or ashlar punched in :		
7.17.1	Square or rectangular pillars	Cum	2084.00
7.18	Extra for stone work; plain ashlar or ashlar punched curved on plan with a mean radius not exceeding 6 m.	Cum	1450.00
7.19	Extra for additional cost of centering for arches exceeding 6m span including all strutting, bolting, wedging etc. And removal (area of soffit to be measured).	Sqm	496.00
7.20	Stone work sunk or moulded or sunk and moulded upto floor two level in cement mortar 1:4 (1 cement : 4 coarse sand) including pointing with white cement mortar 1:2 (1 white cement : 2 Marble dust) with an admixture of pigment matching the stone shade :		
7.20.1	Red sand stone	Cum	31713.00
7.20.2	White sand stone	Cum	35611.00

S.No.	Description of Items	Unit	Rate (in Rs)
7.21	Extra for stone work sunk or moulded or sunk and moulded or carved in :		
7.21.1	Triangular or Square or rectangular pillars	Cum	2718.00
7.21.2	Circular or polygonal pillars	Cum	6156.00
7.22	Extra for stone work sunk or moulded in cornices.	per meter per cm girth	18.00
7.23	Stone work (machine cut edges) for wall lining etc. (veneer work) backing filled with a grout of 12mm thick cement mortar 1:3 (1 cement : 3 coarse sand) including pointing in white cement mortar 1:2 (1 white cement : 2 Marble dust) with an admixture of pigment matching the stone shade : (To be secured to the backing by means of cramps which shall be paid separately) :		
7.23.1	Red sand stone - exposed face fine dressed with rough backing.		
7.23.1.1	70 mm thick.	Sqm	2316.00
7.23.1.2	60 mm thick	Sqm	2207.00
7.23.1.3	50 mm thick	Sqm	2014.00
7.23.1.4	40 mm thick	Sqm	1905.00
7.23.1.5	30 mm thick	Sqm	1796.00
7.23.2	Red sand stone - Exposed face machine cut and table rubbed with rough backing.		
7.23.2.1	70 mm thick.	Sqm	2877.00
7.23.2.2	60 mm thick	Sqm	2768.00
7.23.2.3	50 mm thick	Sqm	2660.00
7.23.2.4	40 mm thick	Sqm	2551.00
7.23.2.5	30 mm thick	Sqm	2442.00
7.23.3	White sand stone - exposed face fine dressed with rough backing		
7.23.3.1	70 mm thick.	Sqm	2380.00
7.23.3.2	60 mm thick	Sqm	2250.00
7.23.3.3	50 mm thick	Sqm	2121.00
7.23.3.4	40 mm thick	Sqm	1990.00
7.23.3.5	30 mm thick	Sqm	1890.00
7.23.4	White sand stone - Exposed face machine cut and table rubbed with rough backing.		
7.23.4.1	70 mm thick.	Sqm	3085.00
7.23.4.2	60 mm thick	Sqm	2926.00
7.23.4.3	50 mm thick	Sqm	2767.00
7.23.4.4	40 mm thick	Sqm	2671.00
7.23.4.5	30 mm thick	Sqm	2506.00
7.24	Extra for stone work (veneer work) curved on plan with a mean radius not exceeding 6 m.	Cum	2084.00

S.No.	Description of Items	Unit	Rate (in Rs)
7.25	Providing and fixing stainless steel cramps of required size and shape for anchoring stone wall lining to the backing or securing adjacent stones in stone wall lining in cement mortar 1:2 (1 cement : 2 coarse sand) including making the necessary chases in stone and holes in walls wherever required.	Kg	626.00
7.26	Providing and fixing stone dowels 10x5x2.50 cm cut to double wedge shape as per design in cement mortar 1:2 (1 cement : 2 coarse sand) including making the necessary chases.	Each	39.00
7.27	Providing and fixing copper pins 7.5 cm long 6 mm diameter for securing adjacent stones in stone wall lining in cement mortar 1:2 (1 cement : 2 coarse sand) including making the necessary chases.	Each	34.00
7.28	Providing and fixing sloping chajja of stone 40 mm thick and upto 80 cm wide beyond the wall as measured along the slope in cement mortar 1:4 (1 cement : 4 coarse sand) with 12mm diameter anchoring steel bar 45 cm long fixed in each stone and supported on and including with bricks cover of class designation 40 in cement mortar 1:4 (1 cement : 4 coarse sand) including pointing in cement mortar 1:2 (1 white cement : 2 stone dust) with an admixture of pigment matching the stone shade:		
7.28.1	Red sand stone:		
7.28.1.1	With chimney Bricks (25 Kg/cm^2)	Sqm	1177.00
7.28.2	White sand stone:		
7.28.2.1	With chimney bricks (25 Kg/cm^2)	Sqm	1174.00
7.29	Providing and fixing horizontal chajja of stone 40 mm thick and upto 80 cm projection in cement mortar 1:4 (1 cement : 4 coarse sand) including pointing in white cement mortar 1:2 (1 white cement : 2 Marble dust) with an admixture of pigment matching the stone shade:		
7.29.1	Red sand stone:	Sqm	716.00
7.29.2	White sand stone:	Sqm	716.00
7.30	30mm red sand stone sun-shade (chisel-dressed) supported on red sand stone brackets, fixed in walls with cement mortar 1:4 (1 cement : 4 coarse sand) including finishing complete.	Sqm	728.00
7.31	Providing and fixing red sand stone brackets 55x22.5x45cm sunk and moulded including providing and fixing with 4 Nos. gun metal cramp 25x6mm 30 cm long and dowel bars 7.5 cm long 6 mm dia as per design.	Each	2431.00

S.No.	Description of Items	Unit	Rate (in Rs)
7.32	Stone work, plain in copings, cornices, string courses and plinth courses, upto 75 mm thick in Cement mortar 1:6 (1 cement : 6 coarse sand) including pointing with white cement mortar 1:2 (1 white cement : 2 Marble dust) with an admixture of pigment matching the stone shade.		
7.32.1	Red sand stone:	Sqm	33240.00
7.32.2	White sand stone:	Sqm	35374.00
7.33	Providing and fixing stone jali 40mm thick in cement mortar 1:3(1cement : 3 coarse sand) including pointing in white cement mortar 1:2 (1white cement : 2 Marble dust) with an admixture of pigment, matching the stone shade, jali slab without any chamfers etc.		
7.33.1	Red sand stone:	Sqm	5003.00
7.33.2	White sand stone:	Sqm	5003.00
7.34	Extra for laying stone work in or under water and/or liquid mud including cost of pumping or bailing out water and removing slush etc. complete.	Cum	278.00
7.35	Extra for laying stone work in or under foul position.	Cum	138.00
7.36	Wall lining butch work upto 10m height with red/ white sand stone 40 mm thick rough facing on the exposed surface with stone strips of minimum length 300 mm and required width including embedding every tenth layer and bottom most layer in masonry or concrete after making necessary chases of size 75x75mm and by providing layer of 75mm thick strips i/c 12mm thick bed of cement mortar 1:3 (1 Cement : 3 coarse sand) i/c ruled pointing in cement mortar 1:2 (1 white cement : 2 Marble dust) with an admixture of pigment to match the shade of stone complete as per direction of Engineer-in- charge.	Sqm	1341.00
7.37	Stone work (machine cut edges) for wall lining upto 10 m height etc. (Veneer work) backing filled with a grout of 12mm thick cement mortar 1:3 (1 Cement : 3 coarse sand) and jointed with Cement mortar 1:2 (1 cement : 2 stone dust) including rubbing and polishing complete. (To be secured to the backing by means of cramps which shall be paid for separately).		
7.37.1	Kota stone slabs exposed face dressed and rubbed - 25 mm thick	Sqm	1384.00
7.38	Stone tile work for wall lining upto 10 m height with special adhesive over 12mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) including pointing in white cement with an admixture of pigment to match the stone shade.		
7.38.1	8mm thick (mirror polished and machine cut edge)		
7.38.1.1	Granite stone of any colour and shade.	Sqm	1544.00
7.38.1.2	Raj Nagar plain white marble/ Udaipur green marble/ Zebra black marble.	Sqm	1222.00

S.No.	Description of Items	Unit	Rate (in Rs)
7.39	Extra for stone work for wall lining on exterior walls of height more than 10 m from ground level for every additional height of 3m or part there of.	Sqm	82.00
7.40	Providing and fixing dry cladding upto 10 meter heights with 30mm thick gang saw cut stone with (machine cut edges) of uniform colour and size upto 1mx1m, fixed to structural steel frame work and/ or with the help of cramps, pins etc. and sealing the joints with approved weather sealant as per Architectural drawing and direction of Engineer-in-charge. (The steel frame work, stainless steel cramps and pins etc. shall be paid for separately.)		
7.40.1	Red sand stone.	Sqm	1294.00
7.40.2	White sand stone	Sqm	1542.00
7.41	Providing and fixing structural steel frame (for dry cladding with 30 mm thick gang saw cut with machine cut edges sand stone) on walls at all heights using M.S. square/ rectangular tube in the required pattern as per architectural drawing including cost of cutting, bending, welding etc. The frame work shall be supported in wall with the help of MS brackets/ lugs of angle iron/ flats etc. which shall be welded to the frame and embedded in brick wall with cement concrete block of CC grade M-15 stone aggregate 20mm nominal size of size 300x230x300mm including cost of necessary centring and shuttering and with approved expansion hold fasteners on CC/RCC surface including drilling necessary holes. Approved cramps/ pins etc. shall be welded to the frame work to support stone cladding the steel work will be given a priming coat of Zinc primer as approved by Engineer-in-charge and painted with two or more coats of epoxy paint (Shop drawings shall be submitted by the contractor to the Engineer-in-charge for approval before execution). The frame work shall be fixed in true horizontal & vertical lines/planes. (Only structural steel frame work shall be measured for the purpose of payment, stainless steel cramps shall be paid for separately and nothing extra shall be paid.)	Kg	141.00
7.42	Providing and fixing adjustable stainless steel cramps of approved quality and of required shape and size adjustable with stainless steel nuts bolts and washer (total weight not less than 260 gms) for dry stone cladding fixed on frame work at suitable location including making necessary recesses in stone slab, drilling required holes etc complete as per direction of the Engineer.	Each	167.00

CHAPTER - 8
MARBLE WORK OTHER THAN FLOORING

Notes for specification

Applicable IS Codes

IS 1122 : Method of test for determination of true specific gravity of natural building stones.

IS 1124 : Method of test for determination of water absorption, apparent specific gravity and porosity of natural building stones.

IS 1130 : Marble (blocks, slabs and tiles).

IS 4101 (Part1) : Code of practice for external facing and veneers: Stone facing.

IS 3316 : Specifications for structural granite

IS 14223 (Part1) : Polished Building Stones (Part-1) Granite

1 Marble work in wall lining etc. (Veneer Work).

Marble slab to be used in wall lining shall be hard, sound, dense, homogeneous and of uniform texture. It shall be uniform in colour and free from stains, cracks, decay and weathering. As far as possible single stone slab shall be used for wall lining but in no case more than 2 slabs shall be permitted to be used to cover the wall height.

2 CLASSIFICATION

The marble blocks, slabs and tiles shall be classified broadly in two categories,i.e White Marble & Coloured Marble.

3 White Marble

Raj Nagar (plain white) Marble:

It shall be plain white marble with coarse grains predominantly showing mica particles giving reflection in light.

4 Coloured Marble

(i) Plain Black Marble

Black marble sawn along veins locally known as 'Peta Pasu sawing' available at Bhainslana.

(ii) Black Zebra Marble

(a) Bhainslana Black Zebra Marble: Black marble having grey or white veins available at Bhainslana.

(b) Kishangarh Black Zebra Marble: Black marble with grey and/or white veins available at Kishangarh.

(c) Abu Black Zebra Marble: Black marble having white patches and streaks available at Abu.

(d) Namaul Black Zebra Marbles: Black marble with thin white veins available at Narnaul.

(e) Makrana Dhobi Doongri Zebra Marble: Greyish black marble with white flowery pattern available at Dhobi Doongri.

(iii) Green Marble

(a) Baroda Green Marble: Dark green marble with flowery pattern available at Baroda.

(b) Abu Green Marble: Light green marble with green and/or brown streaks on white ground available at Ambaji.

(c) Falna Green Marble: Green marble with prominent yellowish pattern available at Falna.

(d) Bundi Green Marble: Green marble with pinkish shades available at Umar, (Bundi).

(iv) Grey Marble

(a) Kumari Grey Marble: Grey marble having light blue shades available at Makrana.

(b) Bundi Grey Marble: Grey Marble with pink or green or black streaks available at Umar (Bundi).

(v) Brown Marble

(a) Bar Brown Marble/Brown Marble with light and dark brown shades available at Bar.

(b) Narnaul Brown Marble

Brown marble having teak wood shades available at Narnaul.

5 MARBLE JALI

White marble shall be classified as specified in item no. I above and marble slabs used for making jali shall satisfy minimum requirements for marble slab as specified in head note above.

The marble jali shall be of required thickness and as per pattern specified. All exposed faces shall be fine tooled to a uniform finish. Fixing shall be done with the adjoining working grooves, rivets etc. as shown in the drawing or as specified by the Engineer-in-Charge.

6 Sizes of Marble Blocks,

The size of marble blocks, slabs and tiles shall be as mentioned in Table 8.1.

TABLE 8.1

Sizes of Marble Blocks, Slabs and Tiles

		Length (in c.m)	Width (in c.m)	Thickness (in c.m)
1	Blocks	30 to 250	30 to 100	30 to 90
2	Slabs	70 to 250	30 to 100	2 to 15
3	Tiles	10 to 60	10 to 60	0.8 to 2.4

Notes

(1) The length and width, of the blocks shall be in multiple of 30 cm.

(2) Length and width of slab shall be in multiple of 10 cm. and thickness in multiple of 1 cm.

(3) Tiles shall be square cut and linear dimensions in multiple of 10 cm.

(4) Only slabs and tiles shall be machine cut and factory made.

(5) For 8 mm thick tiles, special precautions will be required for fixing them like using special adhesive as per manufacturer's specifications. Such tiles are not suitable for outside veneering work exposed to rains/sun if used in large areas in continuous stretches. For tiles of thickness 20 mm and above cramps may be provided if approved by Engineer-in-Charge.

7 Dressing, Cutting and Rubbing

Every marble stone shall be gang saw/machine cut to the required size and shape, chisel dressed machine finished on all beds and joints, so as to be free from any waviness and to give truly vertical,horizontal, radial or circular joints as required. The exposed faces and sides of stones forming joints upto 6mm. from the face shall be fine tooled machine cut such that a straight edge laid along the face of the stone is in contact with every point on it. All window sills, tread of steps, counters vanities moulding edges etc. shall be machine cut & polished to give high gloss mirror finish as per direction of Engineer-in-Charge. These surfaces shall then be rubbed smooth. All visible angles and edges shall be true, square and free from chipping. Beyond the depth of 6 mm from face, the joints shall be dressed with a slight splay so that the thickness of joint increases, in an inverted V shape. The surfaces of the stones coming in contact with backing need not be chisel dressed.A sample of dressed and rubbed stone shall be prepared for approval and it shall be kept on worksite after being approved by the Engineer-in Charge.

8 Laying

The stone shall be wetted before laying. They shall then be fixed with mortar in position without the use of chips or under pinning of any sort. Care shall be taken to match the grains of veneer work as directed by the Engineer-in-Charge.For purpose of matching the grains, the marble slabs shall be selected judiciously having uniform pattern of veins/streaks.Preferably the slabs shall be those got out of the same block from the quarry. The area to be veneered shall be reproduced on the ground and the marble slabs laid in position and arranged in the manner to give the desired matching of grains.Any adjustment needed for achieving the best results shall be then carried out by replacing or interchanging the particular slabs. Special care shall be taken to achieve the continuity of grains between the two slabs one above the other along the horizontal joints.This shall then be got approved by the Engineer-in-Charge and each marble slabs numbered properly and the same number shall be marked on a separate drawing as well as on the surface to be actually veneered,so as to ensure the fixing of the particular slabs in the correct location.

For the facing of the columns also the same procedure as mentioned above shall be followed.

9 Joints

All joints shall be full of mortar. Special care shall be taken to see that groundings for veneer work are full of mortar. If any hollow groundings are detected by tapping the face stones, these shall be taken out and relaid. The thickness of the face joints shall be uniform, straight and as fine as possible, not more than 1.5 mm and in the face joint, the top 6 mm depth shall be filled with mortar specified for the pointing.

10 Curing

The work shall be kept constantly moist on all faces for a period of atleast seven days.

11 Grinding and Finishing

After the marble work is cured, it shall be rubbed with carborandum stone of different grades no. 60, 120 and 320 in succession or with electrical rubbing machines rubbed with carborandum items 0 to 6 nos.in succession, so as to give a plane true and highly smooth surface. It shall then be cleaned with a solution of oxalic acid, washed and finished clean.

12 Measurements

The length and breadth shall be measured correct to a cm. In case of radially dressed or circular slabs used in the work, the dimensions of the circumscribing rectangles of the dressed stone used in the work, shall be measured & paid for. The area shall be calculated in sqm nearest to two places of decimal.

List of Mandatory Test

Material	*Test*	*Field/ Laboratory Test*	*Test Procedure*	*Minimum quantity of material/ work for carrying out the test*	*Frequency of testing*
Marble	(i) Moisture Absorption	Laboratory	IS 1124	50 Sq.m.	100 sqm. or part thereof.
	(ii) Hardness Test	-do-	Mho's Scale	-do-	-do-
	(iii) Specific Gravity	-do-	IS 1122	-do- .	-do-
Granite	(i) Moisture	-do-	1S1124	-do-	-do-
	(ii) Specific Gravity	-do-	IS 1122	-do- .	-do-

13 Rates

The rate includes the cost of materials and labour required for all the operations described above except for the cost of providing and fixing of dowel and cramps which shall be paid for separately, unless otherwise stipulated in the item of work.

(For Detail Refer UADD Marble Work specification / CPWD specification)

CHAPTER - 8
MARBLE WORK (OTHER THAN FLOORING)

S.No.	Description of Items	Unit	Rate (in Rs)
8.1	Marble work gang saw cut (polished and machine cut)of thickness 16mm for wall lining (veneer work) in cement mortar 1:3 (1 cement : 3 coarse sand) including pointing with white cement mortar 1:2 (1 white cement:2 marble dust) with an admixture of pigment to match the marble shade:(To be secured to the backing by means of cramps, which shall be paid for separately).		
8.1.1	Raj Nagar Plain white marble		
(a)	Area of slab upto 0.50 sqm	Sqm	2231.00
(b)	Area of slab over 0.50 sqm	Sqm	2352.00
8.1.2	Udaipur green marble		
(a)	Area of slab upto 0.50 sqm	Sqm	2364.00
(b)	Area of slab over 0.50 sqm	Sqm	2537.00
8.1.3	Zebra black marble		
(a)	Area of slab upto 0.50 sqm	Sqm	2390.00
(b)	Area of slab over 0.50 sqm	Sqm	2561.00
8.1.4	Makrana Marble		
(a)	Area of slab upto 0.50 sqm	Sqm	2745.00
(b)	Area of slab over 0.50 sqm	Sqm	3077.00
8.1.5	Katni Marble		
(a)	Area of slab upto 0.50 sqm	Sqm	2484.00
(b)	Area of slab over 0.50 sqm	Sqm	2713.00
8.2	Providing and fixing 16mm thick gang saw cut mirror polished premoulded and prepolished) machine cut for kitchen platforms, vanity counters, window sills , facias and similar locations of required size of approved shade, colour and texture laid over 20mm thick base cement mortar 1:4 (1 cement : 4 coarse sand) with joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edge to give high gloss finish etc. complete at all levels.		
8.2.1	Raj Nagar Plain white marble		
8.2.1.1	Area of slab upto 0.50 sqm.	Sqm	1655.00
8.2.1.2	Area of slab over 0.50 sqm.	Sqm	1603.00
8.2.2	Udaipur green marble		
8.2.2.1	Area of slab upto 0.50 sqm.	Sqm	1771.00
8.2.2.2	Area of slab over 0.50 sqm.	Sqm	1765.00
8.2.3	Zebra black marble		
8.2.3.1	Area of slab upto 0.50 sqm.	Sqm	1794.00
8.2.3.2	Area of slab over 0.50 sqm.	Sqm	1786.00

S.No.	Description of Items	Unit	Rate (in Rs)
8.2.4	Makrana Marble		
8.2.4.1	Area of slab upto 0.50 sqm.	Sqm	2105.00
8.2.4.2	Area of slab over 0.50 sqm.	Sqm	2237.00
8.2.5	Katni Marble		
8.2.5.1	Area of slab upto 0.50 sqm.	Sqm	1876.00
8.2.5.2	Area of slab over 0.50 sqm.	Sqm	1920.00
8.2.6	Granite of any colour and shade		
8.2.6.1	Area of slab upto 0.50 sqm	Sqm	2591.00
8.2.6.2	Area of slab over 0.50 sqm.	Sqm	2542.00
8.3	Extra for providing full edge moulding to 16mm thick marble stone counters, Vanities etc. including machine polishing to edge to give high gloss finish etc. complete as per design approved by Engineer-in- Charge.		
8.3.1	Marble work	meter	108.00
8.3.2	Granite work.	meter	181.00
8.4	Extra for fixing marble /granite stone over and above corresponding basic item, in facia and drops of width upto 150 mm with epoxy resin based adhesive including cleaning etc. complete.	meter	218.00
8.5	Extra for providing opening of required size & shape for wash basins/ kitchen sink in kitchen platform, vanity counters and similar location in marble/Granite/stone work including necessary holes for pillar taps etc. including rubbing and polishing of cut edges etc. complete.	Each	246.00
8.6	Mirror polishing on marble work/Granite work/stone work where ever required to give high gloss finish complete.	Sqm	157.00
8.7	Providing and fixing cramps of required size & shape in RCC/ CC/ brick masonary backing with cement mortar 1:2 (1 cement :2 coarse sand) including drilling necessary hole in stones and embedding the cramp in the hole (fastener to be paid separately).		
8.7.1	Gunmetal cramps.	Kg	550.00
8.7.2	Stainless steel cramps.	Kg	539.00
8.8	Providing and fixing expansion hold fasteners on C.C. /R.C.C. brick masonary surface backing including drilling necessary holes and the cost of bolt etc complete.		
8.8.1	Wedge expansion type		
8.8.1.1	Fastener with threaded dia 6 mm.	Each	24.00
8.8.1.2	Fastener with threaded dia 10 mm.	Each	25.00
8.8.1.3	Fastener with threaded dia 12 mm.	Each	43.00
8.9	Stone tile (polished) work for wall lining over 12mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and cement slurry @ 3.3 kg/sqm including pointing in white cement complete.		
8.9.1	8mm thick.		

S.No.	Description of Items	Unit	Rate (in Rs)
8.9.1.1	Raj nagar plain white marble/ Udaipur green marble/ Zebra black marble.	Sqm	1309.00
8.9.1.2	Granite of any colour and shade.	Sqm	1690.00
8.10	Providing and fixing stone slab table rubbed, edges rounded and polished of size 75x50 cm deep and 1.8 cm thick fixed in urinal partitions by cutting a chase of appropriate width with chase cutter and embedding the stone in the chase with epoxy grout or with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 6 mm nominal size) as per direction of Engineer-in-charge and finished smooth.		
8.10.1	White Agaria Marble Stone.	Sqm	2421.00
8.10.2	Granite Stone of approved shade.	Sqm	2492.00

CHAPTER - 9
WOOD WORKS AND P.V.C. WORKS

Notes for specification

LIST OF BUREAU OF INDIAN STANDARD CODES

S.No.	I.S. No.	Subject
1	IS 204 (Part I)	Specification for tower bolts (ferrous bolt)
2	IS 204 (Part II)	Specification for tower bolts (non ferrous metals)
3	IS 205	Specification for non ferrous metal butt hinges
4	IS206	Specification for Tee and strap hinges
5	IS 207	Specification for Gate and shutter hook and eye
6	IS 208	Specification for door handles
7	IS 281	Specification for mild steel door bolts for use with pad locks
8	IS 287	Recommendations for maximum permissible moisture contents of timber used for different purpose
9	IS 303	Specification for plywood for general purposes
10	IS 362	Specification for parliament hinges
11	IS 363	Specification for hasps and stapple
12	IS 364	Specification for fan light catch
13	IS 401	Code of practice for preservation of timber
14	IS 419	Putty for use on window frames
15	IS 451	Technical supply condition for wood screws
16	IS 452	Specification for door spring rat tail type
17	IS 453	Specification for double acting spring hinge
18	IS 707	Glossary of terms applicable to timber technology and utilization
19	IS 710	Specifications for Marine Plywood
20	IS 723	Specification for steel counter sunk head wire nails.
21	IS 729	Specification for drawer lock, cup board lock and box locks
22	IS 848	Specification for synthetic resin adhesive for plywood (phenoic and amino plastic)
23	IS 851	Specification for synthetic resin adhesive for const. work (non structural in wood)
24	IS 852	Specification for animal glue for general wood work purpose
25	IS 1003 (Part I)	Specification for timber panelled and glazed shutter Part I (door shutters)
26	IS 1003 (Part II)	Specification for timber panelled and glazed shutter Part II (window and ventilator shutter)
27	IS 1141	Specification for code of practice for seasoning of timber
28	IS 1200 Part XIV	Method of measurement of building and civil engg work glazing.

29	IS 1200 Part XII	Wood work and joinery
30	IS 1328	Specification for veneered decorative plywood
31	IS 1341	Specification for steel butt hinges
32	IS 1378	Specification for oxidized copper finishes
33	IS 1566	Specification for hard drawn steel wire fabric
34	IS 1568	Specification for wire cloth for general purpose
35	IS 1658	Specification for hard drawn steel wire fabric
36	IS 1659	Specification for block boards
37	IS 1708 (part 1 to 18)	Testing of small clear specimen for timber
38	IS 1734	Determination of density and moisture content.
39	IS 1823	Specification for floor door stopper
40	IS 1868	Specification for anodic coating on aluminium and its alloy -do-
41	IS 2046	Decorative thermosetting synthetic resin bonded laminated sheet
42	IS 2095	Specification for gypsum plaster board
43	IS 2096	Specification for asbestos cement flat sheet.
44	IS 2202 (Pt 1)	Specification for wooden flush door shutter, solid core type (plywood face panels)
45	IS 2202 (Part II)	-do-
46	IS 2209	(Particle boards and hard board face panels) Specification for mortice lock (Vertical Type)
47	IS 2380	Method of test for wood particle board and board for lignocelluloses material
48	IS 2547	Specification for gypsum plaster
49	IS 2753	Method for estimation of preservatives in treated timber and in treating solutions.
50	IS 2681	Specification for non-ferrous metal sliding door bolts use with pad locks
51	IS 3087	Specification for wood particle boards (Medium density) for general purpose.
52	IS 3097	Specification for veneered particle board
53	IS 3828	Specification for ventilator chain
54	IS 3400 (Part II)	Method of test for Vulcanized rubber (hardness)
55	IS 3400 (Part IV)	Accelerated aging
56	IS 3400 (Part IX)	Density
57	IS 3564	Specification for door closer (hydraulically regulated)
58	IS 3618	Phosphate treatment of iron and steel for protection against corrosion
59	IS 3813	“C” hooks for use with swivels
60	IS 3818	Specification for continuous (Piano) hinges

61	IS 3847	Specification for mortice night latch
62	IS 4835	Specification for polyvinyl acetate dispersion based adhesive for wood
63	IS 4948	Specification for welded steel wire fabric for general use
64	IS 4992	Specification for rebated mortice lock
65	IS 5187	Specification for flush bolts
66	IS 5509	Specification for Fire Retardant Plywood
67	IS 5930	Specification for mortice latch
68	IS 6318	Specification for plastic wire window fastners
69	IS 6607	Specification for rebated mortice lock (Vertical type)
70	IS 6760	Specification for sloted counter sunk head wood screws.
71	IS 7196	Specification for hold fast
72	IS 7534	Specification for sliding locking bolts for use with pad lock
73	IS 7638	Wood/lignocellulosic based panel products - Method for sampling
74	IS 8756	Specification for mortice ball catch for use in wooden almirah
75	IS 9308 (Part II)	Specification for mechanically extracted coir fibres. (Mattress coir fibres)
76	IS 9308 (Part III)	-do- Decorated coir fibre
77	IS 11215	Moisture content of timber and timber products method of determination
78	IS 12049	Dimensions and tolerance relating to wood based panel materials
79	IS 12406	Specification for medium density fibre board
80	IS 12817	Specification for stainless steel Butt Hinges
81	IS 12823	Specification for wood products -Prelaminated particle Boards
82	IS 14616	Specifications for laminated veneer lumber
83	IS 14842	Specification for coir veneer board for general purposes
84	IS 14856	Specification for glass fibre reinforced plastic (FRP) panel type door
85	IS 14900	Specifications for transparent float glass

LIST OF MANDATORY TESTS

Material	Clause	Test	Field/laboratory test	Test Procedure	Min. quantity of material for carrying out the test	Frequency of testing
Timber	9.1.6	Moisture content	Field (by moisture meter) laboratory test as required by Engineer-in-Charge	Appendix 'C'	1 cum	Every one cum or part thereof.
Flush door	9.7.10	End immersion Test knife test Adhesion Test	Laboratory	IS 2202 Appendix 'F'	26 shutters	As per sampling and testiNg Specified in lause 9.7.11
Mortice Locks	9.15.13	Testing of spring	Laboratory	IS 2209- Appendix 'G'	50 Nos	100 or part thereof.

TABLE 9.1
Sample Size and Criteria for Conformity

Lot Size	*Sample Size*	*Permissible no. of Defective*	*Sub. Sample size*
1	2	3	4
Upto 26 to 50	8	0	1
51 – 100	13	1	2
101 – 150	20	1	2
151 – 300	32	1	3
301 – 500	50	2	4
501 and above	80	2	5

9.1 DOOR, WINDOW AND VENTILATOR FRAMES

Timber for door, window and ventilators frames shall be as specified. Timber shall be sawn in the direction of the grains. All members of a frame shall be of the same species of timber and shall be straight without any warp or bow. Frames shall have smooth, well-planed (wrought) surfaces except the surfaces touching the walls, lintels, sill etc., which may be left clean sawn. Rebates, rounding or moulding shall be done before the members are jointed into frames. The depth of the rebate for housing the shutters shall be 15 mm, and the width of the rebates shall be equal to the thickness of the shutters. A tolerance of ± 2 mm shall be permitted in the specified finished dimensions of timber sections in frames.

9.2 Joints

The Jamb posts shall be through tenoned in to the mortise of the transoms to the full thickness of the transoms and the thickness of the tenon shall be not less than 2.5 cm. The tenons shall closely fit into the mortise without any wedging or filling. The contact surface of tenon and mortise before putting together shall be glued with polyvinyl acetate dispersion based adhesive conforming to IS 4835 or adhesive conforming IS 851 and pinned with 10 mm dia hard wood dowels, or bamboo pins or star shaped metal pins. The joints shall be at right angles when checked from the inside surfaces of the respective members. The joints shall be pressed in position. Each assembled door frame shall be fitted with a temporary stretcher and a temporary diagonal brace on the rebated faces.

9.3 Fixing of Frames

The frames shall be got approved by the Engineer-in-Charge before being painted, oiled or otherwise treated and before fixing in position. The surface of the frames abutting masonry or concrete and the portions of the frames embedded in floors shall be given a coating of coal tar. Frames shall be fixed to the abutting masonry or concrete with holdfasts or metallic fasteners as specified. After fixing, the jamb posts of the frames shall be plugged suitably and finished neat. Vertical members of the door frames shall be embedded in the floor for the full thickness of the floor finish and shall be suitably strutted and wedged in order to prevent warping during construction. A minimum of three hold fasts shall be fixed on each side of door and window frames one at centre point and other two at 30 cm from the top and bottom of the frames. In case of window and ventilator frames of less than 1 m in height two hold fasts shall be fixed on each side at quarter point of the frames. Hold fasts and metallic fasteners shall be measured and paid for separately.

9.4 PANELLED GLAZED OR PANELLED AND GLAZED SHUTTERS

Panelled or glazed shutters for doors, windows, ventilators and cupboards shall be constructed in the form of timber frame work of stiles and rails with panel inserts of timber, plywood, block board, veneered particle board, fibre board wire gauze or float glass. The shutters may be single or multipanelled, as directed by the Engineer-in-Charge. Timber for frame work, material for panel inserts and thickness of shutters shall be as specified. All members of the shutters shall be straight without any warp or bow and shall have smooth well planed face at right angles to each other. Any warp or bow shall not exceed 1.5 mm for door shutter and 1 mm for window and ventilator shutters The right angle for the shutter shall be checked by measuring the diagonals and the difference between the two diagonals should not be more than 3 mm. Generally panelled glazed or panelled and glazed shutter shall conform to IS 1003 (Pt. 1 and 2).

9.5 Frame Work

Timber for stiles and rails shall be of the same species and shall be sawn in the directions of grains. Sawing shall be truly straight and square. The timber shall be planed smooth and accurate to the required dimensions. The stiles and rails shall be joined to each other by plain or haunched mortise and tenon joints and the rails shall be inserted 25 mm short of the width of the stiles. The bottom rails shall have double tenon joints and for other rails single tenon joints shall be provided. The lock rails of door shutter shall have its centre line at a height of 800 mm from the bottom of the shutters unless otherwise specified. The thickness of each tenon shall be approximately one-third the finished thickness of the members and the width of each tenon shall not exceed three times its thickness.

Gluing of Joints : The contact surfaces of tenon and mortise shall be treated, before putting together, with bulk type synthetic resin adhesive conforming to IS 851 suitable for construction in wood or synthetic resin adhesive (Phenolic and aminoplastic) conforming to IS 848 or polyvinyl acetate dispersion based adheshive conforming to IS 4835 and pinned with 10 mm dia hardwood dowels or bamboo pins or star shaped metal pins; after the frames are put together and pressed in position by means of press.

Stiles and bottom rail shall be made out of one piece of timber only. Intermediate rail exceeding 200 mm in width may be of one or more pieces of timber. The width of each piece shall be not less than 75 mm. Where more than one piece of timber is used for rails, they shall be joined with a continuous tongued and grooved joint glued together and reinforced with metal dowels at regular intervals not exceeding 200 mm

9.6 Window and Ventilator Shutters

Rebating :- The shutters shall be single-leaf or double leaved as directed by the Engineer-in-Charge. In case of double leaved shutters, the meeting of the stiles shall be rebated by one third the thickness of the shutter. The rebating shall be either splayed or square type.

Panelling :- The panel inserts shall be either framed into the grooves or housed in the rebate of stiles and rails. Timber, plywood, and particle board panels shall be fixed only with grooves. The depth of the groove shall be 12 mm and its width shall accommodate the panel inserts such that the faces are closely fitted to the sides of the groove. Panel inserts shall be framed into the grooves of stiles and rails to the full depth of the groove leaving space of 1.5 mm. Width and depth of the rebate shall be equal to half the thickness of stiles and rails. Glass panels, asbestos panels wire gauze panels and panel inserts of cupboard shutters shall be housed in the rebates of stiles and rails.

Timber Panels : Timber panels shall be preferably made of timber of large width, the minimum width and thickness of the panel shall be 100 mm, and 15 mm respectively. When made from more than one piece, the pieces shall be jointed with a continuous tongued and grooved joint glued together and reinforced with headless nails at regular intervals not exceeding 100 mm. Depth and thickness of such joint shall be equal to one-third of thickness of panel. The panels shall be designed such that no single panel exceeds 0.5 square metre in area. The grains of timber panels shall run along the longer dimensions of the panels. All panels shall be of the same species of timber unless otherwise specified.

Plywood Panels : Plywood boards used for panelling of shutters shall be BWP type or grade as specified. Each panels shall be a single piece of thickness, 9 mm for two or more panel construction and 12 mm thickness for single panel construction unless otherwise specified.

Veneered Particle Board Panels : Veneered Particle board used for panelling of shutters shall be Exterior Grade bonded with BWP type synthetic resin adhesive as specified. Each panel shall be a single piece of thickness 12 mm unless otherwise specified.

Fibre Board Panels : Fibre board used for panelling of shutters shall be Exterior Grade bonded with BWP type synthetic resin adhesive Each fibre board panel shall be a single piece unless otherwise specified.

Wire Gauze Panels: Wire Gauze used for panelling of shutters shall be woven with 0.63 mm dia galvanised mild steel wire to form average aperture size of 1.40 mm as specified. Wire gauze shall be securely housed into the rebates of stiles and rails by giving right angles bend turned back and fixed by means of suitable staples at intervals of 75 mm and over this wooden beading shall be fixed. The space between the rebate and the beading shall be fixed with putty to give a neat finish. Each wire gauze panel shall be a single piece, and the panels shall be so designed that no single panels exceeds 0.5 sqm in area. However, care shall be taken to prevent sagging of wire gauge, of panel by providing and fixing 20 x 20 mm square or equivalent beading to the external face to the required patterns as decided by the Engineer-in-Charge.

Glass Panels : Glass panelling (Glazing) shall be done as specified. Glazing in the shutters of doors, windows and ventilators of bath, WC and Lavatories shall be provided with frosted glass the weight of which shall be not less than 10 kg/sqm. Frosted glass panes shall be fixed with frosted face on the inside. Glass panels shall be fixed by providing a thin layer of putty conforming to IS 419 applied between glass pane and all along the length of the rebate and also between glass panes and wooden beading.

Putty can be prepared by mixing one part of white lead with three parts of finely powdered chalk and then adding boiled linseed oil to the mixture to form a stiff paste and adding varnish to the paste at the rate of 1 litre of varnish to 18 kg of paste. Fixing of glass panes without beading shall not be permitted. Glazing shall be done after the shutters have been primed and prepared for painting, so that wood may not draw oil out of putty.

Finish : Panels of shutters shall be flat and well sanded to a smooth and level surface.

9.7 Beading :-

Beadings in panelled shutter shall be provided where specified in architectural drawings or directed by the Engineer-in-Charge. Each length of beading shall be single piece. Joints at the corners shall be mitred and exposed edges shall be rounded. Beading shall be fixed with headless nails at 75 mm intervals. For external shutters, the beading shall be fixed on the outside face.

9.8 Machine/Factory made Shutters

Beadings in panelled shutter shall be provided where specified in architectural drawings or directed by the Engineer-in-Charge. Each length of beading shall be single piece. Joints at the corners shall be mitred and exposed edges shall be rounded. Beading shall be fixed with headless nails at 75 mm intervals. For external shutters, the beading shall be fixed on the outside face.

9.9 Machine / Factory Made Shutters :-

Machine made shutters, where specified, shall be procured from an approved factory. For machine made shutters, operations like sawing, planning, making tongue and tenons, cutting grooves, mortises and rebates, drilling holes and pressing of joints shall be done by suitable machines. Machines made shutters shall be brought to the site fully assembled but without any priming coat. Panel inserts of sheet glass and wire gauze may, however, be fixed at site.

9.10 Fixing of Shutters

For side hung shutters of height upto 1.2 m, each leaf shall be hung on two hinges at quarter points and for shutter of height more than 1.2 m, each leaf shall be hung on three hinges one at the centre and the other two at 200 mm from the top and bottom of the shutters. Top hung and bottom hung shutters shall be hung on two hinges fixed at quarter points of top rail or bottom rail. Centre hung shutter shall be suspended on a suitable pivot in the centre of the frame. Size and type of hinges and pivots shall be as specified. Flap of hinges shall be neatly counter sunk into the recesses cut to the exact dimensions of flap. Screws for fixing the hinges shall be screwed in with screw driver and not hammered in. Unless otherwise specified, shutters of height more than 1.2 mm shall be hung on butt hinges of size 100 mm and for all other shutters of lesser height butt hinges of size 75 mm shall be used. For shutter of more than 40 mm thickness butt hinges of size 125 × 90 × 4 mm shall be used. Continuous (piano) hinges shall be used for fixing cup-board shutters where specified.

9.11 Flush Door Shutters :-

Flush door shutters shall have a solid core and may be of the decorative or non-decorative (Paintable type as per IS 2202 (Part I). Nominal thickness of shutters may be 25, 30 or 35 mm. Thickness and type of shutters shall be as specified.

Width and height of the shutters shall be as shown in the drawings or as indicated by the Engineerin- Charge. All four edges of the shutters shall be square. The shutter shall be free from twist or warp in its plane. The moisture content in timbers used in the manufacture of flush door shutters shall be not more than 12 per cent when tested according to IS 1708.

9.11 Core

The core of the flush door shutters shall be a block board having wooden strips held in a frame constructed of stiles and rails. Each stile and rail shall be a single piece without any joint. The width of the stiles and rails including lipping, where provided shall not be less than 45 mm and not more than 75 mm. The width of each wooden strip shall not exceed 30 mm. Stiles, rails and wooden strips forming the core of a shutter shall be of equal and uniform thickness. Wooden strips shall be parallel to the stiles. End joints of the pieces of wooden strips of small lengths shall be staggered. In a shutter, stiles and rails shall be of one species of timber. Wooden strips shall also be of one species only but it may or may not be of the same species as that of the stiles and rails. Any species of timber may be used for core of flush door. However, any non-coniferous (Hard wood) timber shall be used for stiles, rails and lipping.

9.12 Face Panel

The face panel shall be formed by gluing, by the hot-press process on both faces of the core, either plywood or cross-bands and face veneers. The thickness of the cross bands as such or in the plywood shall be between 1.0 mm and 3.0 mm. The thickness of the face veneers as such or in the plywood shall be between 0.5 mm and 1.5 mm for commercial veneers and between 0.4 mm and 1.0 mm for decorative veneers, provided that the combined thickness of both is not less than 2.2 mm. The direction of the veneers adjacent to the core shall be at right angles to the direction of the wooden strips. Finished faces shall be sanded to smooth even texture. Commercial face veneers shall conform to marine grade plywood and decorative face veneers shall conform to type I decorative plywood in IS 1328.

9.13 Test :-

Samples of flush door shutters shall be subjected to the following tests:

(i) End Immersion Test

(ii) Knife Test

(iii) Glue Adhesion Test

One end of each sample shutter shall be tested for End Immersion Test. Two specimens of 150 x150 mm size shall be cut from the two corners at the other end of each sample shutter for carrying out Glue Adhesion Test. Knife Test shall be done on the remaining portion of each sample shutter. Test shall be done as laid down in Appendix P

9.14 Sample Size

Shutters of decorative and non-decorative type from each manufacturer, irrespective of their thickness, shall be grouped separately and each group shall constitute a lot. The number of shutters (sample size) to be selected at random from each lot for testing shall be as specified in Table 9.1 If The total number of shutters of each type in a work (and not the lot) is less than twenty five, testing may be done at the discretion of the Engineer-in-Charge and in such cases extra payment shall be made for the sample shutter provided the sample does not fail in any of the test. For knife test, glue adhesive test, slamming test, the end immersion test, the number of shutters shall be as per col. 4 of Table 9.1

9.15 WIRE GAUZE FLY PROOF SHUTTERS

Specified timber shall be used, and it shall be sawn in the direction of the grains. Sawing shall be truly straight and square. The timber shall be planed smooth and accurate to the full dimensions, rebates, roundings and mouldings as shown in the drawings made, before assembly. Patching or plugging of any kind shall not be permitted except as provided.

9.16 Stile and Rails

The stiles and rails shall be given a rebate to receive the wire gauze which shall form the panels.

9.17 Wire Gauze

The wire gauze shall be bent at right angles in the rebates of stiles and rails, turned back and fixed tight with blue tacks at about 75 mm centres, fixed alternately in the two faces of the rebates. Over this, wooden beading shall be fixed with brads or small screws at about 75 mm centres. The space between the beading and rebates, where the wire gauze is bent, shall be neatly finished with putty, so that the end of the wire gauze may not be visible.

9.18 Moisture Content

The average moisture content of three test specimens, when determined in accordance with IS 1734 (Part 1) shall be between 5 to 15%.

Tests

(1) The tests as per Table-1 of IS 14616 shall be carried out by the manufacturer on the LVL (Laminated Veneer Lumber) sections on each batch.

(2) The manufacturer shall get the tests done on at least three samples of each batch by the standard method of test to ensure quality and performance of the material as per para of IS 14616.

(3) The manufacturer shall provide a certificate with the delivery challan indicating that the material conforms to IS 14616 along with the copy of the test report of the relevant batch.

9.19 Laminated Veneer Lumber (LVL) Door Shutters

This specification lays down requirements regarding types, sizes, material, construction, workmanship and finish, performance evaluation, sampling, measurements, rates and testing of Laminated Veneer Lumber (LVL) door shutter for use in domestic buildings, offices, schools, hospitals etc. This specification does not cover large size door shutters for industrial and special buildings such as workshops, garages, godowns etc.

The material of each lot shall be supported by a certificate to that effect: Each lot of LVL materials shall be accompanied by the test reports. Fabricator shall take up manufacturing of shutters only if provisions of IS 14616 are fulfilled; failing which, shutters so manufactured are liable for rejection.

9.20 Panelling Materials

Plain Particle Board: Plain particle boards used for panels shall be FPT-1 conforming to IS 3087 and shall have been bonded with BWP type of synthetic resin adhesive as per IS 848.

Pre-laminated Particle Board: Pre-laminated particle boards used for panels shall conform to IS 12823. The plain particle boards used in pre-laminated particle boards conform to specifications.

Medium Density Fibre Board: Medium density fibre board used for panels shall conform to exterior grade as per IS 12406 made from agro-forest products or agricultural wastes or natural fibers.

Pre-laminated Medium Density Fibre Board: Pre-lamination in pre-laminated medium density fiber board shall conform to the requirements such as Abrasion Resistance, Resistance to Steam, Crack Resistance, Resistance to Cigarette Burn and Resistance to Stain as specified in IS 12823.

Glass: Glass for glazing shall conform to IS 2835 or IS 2553. The use of other types of glass, such as frosted glass, wired glass and coloured glass may also be specified by the Engineer-in-Charge.

Wire Gauze: Wire gauze shall generally conform to IS 1568 and shall be regularly woven with equally spaced galvanized mild steel wires of 0.63 mm nominal diameter in both warp and weft directions to form aperture of average width 1.40 mm.

9.21 uPVC Door Frame

uPVC door frame shall be made of PVC material conforming to IS 10151. The door frame shall be made from extruded uPVC section having overall dimensions of 48 x 40 mm or 42 x 50 mm having wall thickness of 2.0 mm + 0.2 mm. Corners of the door frame to be jointed by M.S. galvanized brackets. Joints mitred and plastic welded. The hinge side vertical outer frames shall be reinforced by galvanized M.S. Tube of size 19 x 19 mm of wall thickness 1 mm + 0.1 mm and a tie rod shall be provided at the bottom of the frame. The frame shall be fabricated in factory as per nomenclature of the item and directions of Engineer-in-Charge.

9.22 Fixing of Frames

The frames are to be fixed in prepared openings in the walls. All civil work and tiling should be completed before the fixing of the frames. The frames are to be fixed directly on the plastered wall. In case tiling is to be done in the place the frames are to be fitted, a 50 mm strip should be left untiled at the location where the frames are to be fitted. The frames are erected in the prepared opening such that the vertical members of the door frame are embedded 50 mm in the floor. The frame shall be fitted truly in plumb. A minimum of three anchor bolts or screws of size 65/100 shall be used to fix each vertical member. One bolt shall be fixed at 200 mm from the top member and one bolt shall be fixed at 200 mm from the floor. The third anchor bolt shall be fixed in the center. The top horizontal member shall be fixed using two 65/100 size anchor bolts or screws at a distance of 200 mm from both the corners.

9.23 PVC DOOR SHUTTERS

The shutters shall be fabricated at factory as per nomenclature of the item and directions of Engineer-in-Charge. Shutter shall be made of PVC material conforming to IS 10151.

24 mm thick PVC Door Shutter
30 mm Thick PVC Door Shutters
Sampling and Criteria for Conformity

9.24 General Precautions

The test specimens shall not have been exposed to a temperature below 40oC for 24 hours immediately preceding the test and shall be free from all visible moisture. The specimen shall be inspected and any specimen with visible flaws shall be discarded.

If any test specimen fails because of mechanical reason, such as failure of testing equipment or improper specimen preparation, it shall be discarded and another specimen taken.

9.25 Test

The door shutters shall be subjected to the following tests in accordance with IS 4020 (Part 1 to 16).

(i) Dimension and Squareness Test : Door shutters when tested in accordance with IS 4020 (Part 2) the dimensions of nominal width and height will be within a limit of + 5 mm. The door shutter shall not deviate by more than 1 mm on a length of 500 mm. The thickness of the door shutter shall be uniform throughout with the permissible variation of not more than 0.8 mm between any two points. The nominal thickness of the shutter shall be within a limit of + 1.5 mm.

(ii) General Flatness Test : Door shutter, when tested in accordance with IS 4020 (Part 3) the twist, cupping and warping shall not exceed 6 mm.

(iii) Local Planeness Test : Door shutters, when tested in accordance with IS 4020 (Part 4), the depth of deviation measured at any point shall not be more than 0.5 mm.

(iv) Impact Indentation Test : Door shutters, when tested in accordance with IS 4020 (Part 5), shall have no defects such as cracking, tearing or delamination and the depth of indentation shall not be more than 0.2 mm.

(v) Edge Loading Test : Door shutters, when tested in accordance with IS 4020 (Part 7) the deflection of the edge at the maximum load shall not be more than 5 mm. On removal of the loads, the residual deflection shall not be more than 0.5 mm, failing which the test may be repeated on the other edge in the reverse direction. Also there shall be no lateral buckling by more than 2 mm during loaded condition and no residual lateral buckling after removal of the load.

(vi) Shock Resistance Test : Door shutters, when tested in accordance with 2.1 of IS 4020 (Part 8), there shall be no visible damage in any part of the door after twenty five blows on each end.

(vii) Buckling Test *:* Door shutters, when tested in accordance with IS 4020 (Part 9), shall not show any deterioration and any residual deformation more than 5 mm after 15 min. of unloading and the initial deflection also shall not be more than 50 mm.

(viii) Slamming Test : Door shutters, when tested in accordance with 2.1 of IS 4020 (Part 10), shall not have any damage in any part of the door at the end of successive impacts. Door shutters, when tested in accordance with 3.1 of IS 4020 (Part 10), shall not have any visible damage in part of the door at the end of 100 successive impacts.

(ix) Misuse Test : Door shutters, when tested in accordance with IS 4020 (Part 11), there shall not be any permanent deformation of the fixing or any other part of the door set in hindering its normal working after the test.

(x) Screw Holding Test : Door shutters, when tested in accordance with IS 4020- Part 16, the load shall not be less than 1000 N.

(xi) End Immersion Test : Door shutters, when tested in accordance with IS 4020- Part 13, the shutter shall not show any delamination.

(xii) Knife Test : Door shutter, when tested in accordance with IS 4020 – Part 14, the grading shall be standard and excellent.

(xiii) Glue Adhesion Test : Door shutters shall be tested in accordance with IS 4020 – Part 15. There should be no delamination.

9.26 GYPSUM PARTITION PANELS

The material shall conform to IS:2849.

9.27 Dimensions

As per the item nomenclature.

9.28 Laying

(i) Panels are stored in a dry place and water should not come in contact with panels during or after construction. If the panels get wet, they should be dried before use.

(ii) The floor should be perfectly level before laying the first course. All panels must be properly aligned to the plumb. Successive layer of panels must be alternatively staggered so that vertical joints are not in the same line.

(iii) The recommended quantity of Gypsum Bonding Plaster must be used for joints and filling the grooves made for conduits, pipelines, etc. Excess Bonding Plaster must be scooped and removed, so that the joints and the places where the grooves are filled in are flush and even.

(iv) The walls should be dry and sanding done properly especially at joints before the primer is applied so that the surface is even and joints will not be visible after painting. Avoid chasing with chisel and hammer. Use electrical saw or grooving tools for conduiting etc.

(v) The recommended span of walls is maximum 6 meters and maximum height is 4.5 meters.

(vi) Gypsum panel can easily be cut with coarse tooth hand saw, electric jigsaw, etc. The panels can be cut, sawn, drilled, milled or dowelled on the job. For concealed piping and conduit, the depth of groove should not exceed 50 mm. Hammer and chisel techniques to form chases must be avoided.

9.29 Sanding:

This application is to make the surface level without undulations. To make the gypsum wall surface level (in particular at joints, where there is excess bonding plaster), do sanding with sand paper at joints and other places, wherever you find uneven surface, otherwise joints will be visible after painting. It is important to sand all joints uniformly.

9.30 Primer Application:

The purpose of the primer is to give a better adhesion to the paint and also to reduce consumption of paint on the wall. Water thinable primers shall be used only.

CHAPTER - 9
WOOD WORKS AND P.V.C. WORKS

S.No.	Description of Items	Unit	Rate (in Rs)
9.1	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position :		
9.1.1	Second class teak wood	Cum	93005.00
9.1.2	Sal wood	Cum	61741.00
9.1.3	Kiln seasoned and chemically treated Hard wood. (Haldu, Kail, Bija wood)	Cum	44970.00
9.1.4	Labour rate for Item No.- 9.1.1 to 9.1.3	Cum	7428.00
9.2	Providing laminated veneer lumber conforming to IS:14616 and TAD -15: 2001 (Part B) in factory made frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position as per directions of Engineer-in-charge.	Cum	72605.00
9.3	Providing wood work in frames of false ceiling, partitions etc. sawn and put up in position :		
9.3.1	Sal wood	Cum	58961.00
9.3.2	Kiln seasoned and chemically treated Hard wood. (Haldu, Kail, Bija wood)	Cum	41959.00
9.3.3	Labour rate for Item No.- 9.3.1, 9.3.2	Cum	4901.00
9.4	Extra for additional labour for circular works, such as in frames of fan light:		
9.4.1	Second class teak wood	Cum	9300.00
9.4.2	Sal wood	Cum	6174.00
9.4.3	Kiln seasoned and chemically treated Hard wood. (Haldu, Kail, Bija wood)	Cum	4497.00
9.5	Providing and fixing panelled or panelled and glazed wooden shutters for doors, windows and clerestory windows including ISI marked M.S pressed bright finished butt hinges with necessary screws excluding, panelling / glazing which will be paid for separately.		
9.5.1	Second class teak wood		
9.5.1.1	35 mm thick shutters	Sqm	2354.00
9.5.1.2	30 mm thick shutters	Sqm	2097.00
9.5.2	Kiln seasoned and chemically treated Hard wood. (Haldu, Kail, Bija wood)		
9.5.2.1	35 mm thick shutters	Sqm	1381.00
9.5.2.2	30 mm thick shutters	Sqm	1257.00
9.6	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured). Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick :		
9.6.1	Second class teak wood	Sqm	1879.00

S.No.	Description of Items	Unit	Rate (in Rs)
9.6.2	Kiln seasoned and chemically treated Hard wood. (Haldu, Kail, Bija wood)	Sqm	1101.00
9.6.3	Ply wood 5 ply, 9 mm thick :		
9.6.3.1	Decorative plywood both side decorative veneer (Type - I) conforming to IS 1328 BWR type.	Sqm	1405.00
9.6.3.2	Decorative plywood one side decorative veneer and commercial veneer on other face (Type 1) conforming to IS 1328 BWR Type	Sqm	1400.00
9.6.4	Ply wood 7 ply, 9 mm thick		
9.6.4.1	Decorative plywood one side decorative veneer and commercial veneer on other face (Type 1) conforming to IS 1328 BWR Type	Sqm	1463.00
9.6.5	Particle Board 12 mm thick		
9.6.5.1	Plain particle board flat pressed, 3 layer or graded wood particle board medium density Grade I, IS : 3087 marked.	Sqm	743.00
9.6.5.2	Veneered flat pressed three layer or graded wood particle board with commercial veneering on both sides conforming to IS:3097, grade I.	Sqm	952.00
9.6.5.3	Pre-laminated particle board with decorative lamination on one side and balancing lamination on other side, Grade I, Type II IS: 12823 marked.	Sqm	1217.00
9.6.5.4	Pre-laminated particle board with decorative lamination on both sides, Grade I, Type II, IS:12823 marked.	Sqm	1301.00
9.6.5.5	Providing and fixing Coir veneer board (conforming to IS : 14842-2000) : 12mm thick	Sqm	1170.00
9.6.6	Providing and fixing Float glass panes		
9.6.6.1	4mm thick glass panes	Sqm	988.00
9.6.6.2	5.5mm thick glass panes	Sqm	1160.00
9.7	Providing and fixing 35 mm thick factory made laminated veneer lumber door shutter conforming to IS : 14616 and TADS 15:2001 (Part B) including ISI marked M.S. pressed bright finished butt hinges with necessary screws as per directions of Engineer and panelling with panels of:		
9.7.1	12mm thick plain grade -1,medium density flat pressed three layer particle board FPT-1 (Flat pressed three layer) or graded wood particle board FPT-1 IS:3087 marked bonded with BWP type synthetic resin adhesive as per IS : 848 : (Plain particle board)	Sqm	1900.00
9.7.2	12 mm thick pre-laminated particle board (decorative lamination on both sides) grade - 1, medium density flat pressed, three layer particle board FPT - I or graded wood particle board FPT - I, conforming to IS : 3087 bonded with BWP type synthetic resin adhesive as per IS : 848 and pre- laminated conforming to IS : 12823 Grade 1, Type - II marked:	Sqm	2186.00

S.No.	Description of Items	Unit	Rate (in Rs)
9.7.3	12 mm thick one side Pre-laminated particle board (decorative lamination on one side and other sides balancing lamination) grade - 1 medium density flat pressed, three layer particle board FPT - I or graded wood particle board FPT-1 conforming to IS : 3087 bonded with BWP type synthetic resin adhesive as per IS : 848 and pre-laminated conforming to IS : 12823 Grade -1, Type II marked:	Sqm	1930.00
9.8	Providing and fixing glazed shutters for doors, windows and clerestory windows using 4 mm thick float glass panes including black enamelled ISI marked M.S butt hinges with necessary screws.		
9.8.1	Second class teak wood		
9.8.1.1	35 mm thick	Sqm	2850.00
9.8.1.2	30 mm thick	Sqm	2556.00
9.8.2	Kiln seasoned and chemically treated Hard wood. (Haldu, Kail, Bija wood)		
9.8.2.1	35 mm thick	Sqm	1743.00
9.8.2.2	30 mm thick	Sqm	1604.00
9.9	Providing and fixing factory made laminated veneer lumber glazed shutter conforming to IS: 14616 and TADS 15:2001 (Part B) , using 4mm thick float glass panes for doors, windows and clerestory windows including ISI marked M.S pressed bright finished butt hinges with necessary screws as per directions of Engineer. 30 mm thick shutters	Sqm	1918.00
9.10	Extra for Providing heavy sheet float glass panes instead of ordinary float glass in glazed doors, windows and clerestory window shutters. (Area of opening for glass panes excluding portion inside rebate shall be measured)		
9.10.1	10.00mm to 12.00mm thick float glass	Sqm	190.00
9.10.2	5.50mm thick Safety glass	Sqm	422.00
9.10.3	10.00mm to 12.00mm thick Safety glass	Sqm	986.00
9.11	Extra for Providing frosted glass panes 4 mm thick instead of ordinary float glass panes 4 mm thick in doors, windows and clerestory window shutters. (Area of opening for glass panes excluding portion inside rebateshall be measured).	Sqm	225.00
9.12	Deduct for providing pin headed glass panes instead of ordinary float glass panes weighing 4 mm thick in doors, windows and clerestory windows, shutters (Area of opening for glass panes excluding portion inside rebate shall be measured).	Sqm	38.00
9.13	Extra for providing ISI marked Stainless Steel butt hinges instead of M.S. pressed bright finished butt hinges with necessary screws. (Shutter area to be measured).	Sqm	87.00

S.No.	Description of Items	Unit	Rate (in Rs)
9.14	Deduct if fixed shutters (without hinges) are provided instead of openable shutters for doors, windows or clerestory windows.	Sqm	132.00
9.15	Providing and fixing 25 mm thick Second Class teak wood shutters using 4.00mm thick float glass panes for cup board etc. :		
9.15.1	Panelled or panelled & glazed shutters :		
9.15.1.1	ISI marked anodised aluminium butt hinges with necessary screws.	Sqm	2367.00
9.15.1.2	Piano Hinges	Sqm	2489.00
9.15.2	Glazed shutters :		
9.15.2.1	ISI marked anodised aluminium butt hinges with necessary screws.	Sqm	2278.00
9.15.2.2	Piano Hinges	Sqm	2424.00
9.16	Providing and fixing flat pressed 3 layer particle board medium density exterior grade (Grade I) or graded wood particle board IS : 3087 marked to frame, backing or studding with screws etc. complete (Frames, backing or studding to be paid separately) :		
9.16.1	12 mm thick	Sqm	440.00
9.16.2	18 mm thick	Sqm	603.00
9.17	Providing and fixing Pre-laminated flat pressed 3 layer (medium density) particle board or graded wood particle board IS : 3087 marked with one side decorative and other side balancing lamination Grade I, Type II exterior grade IS : 12823 marked in shelves with screws and fittings wherever required, edges to be painted with polyurethane primer (fittings to be paid separately).		
9.17.1	18 mm thick	Sqm	995.00
9.17.2	25 mm thick	Sqm	1123.00
9.18	Providing and fixing ISI marked flush door shutters conforming to IS: 2202 (Part I) decorative type, core of block board construction with frame of 1st class hard wood and well matched teak 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters using following hinges.		
9.18.1	35 mm thick including ISI marked Stainless Steel butt hinges with necessary screws.	Sqm	2181.00
9.18.2	30 mm thick including ISI marked Stainless Steel butt hinges with necessary screws	Sqm	1961.00
9.18.3	25 mm thick (for cupboard) including ISI marked nickel plated bright finished M.S. Piano hinges IS : 3818 fixed with necessary screws.	Sqm	1648.00

S.No.	Description of Items	Unit	Rate (in Rs)
9.19	Providing and fixing ISI marked flush door shutters conforming to IS: 2202 (Part I) non-decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters using following hinges.		
9.19.1	35 mm thick including ISI marked Stainless Steel butt hinges with necessary screws.	Sqm	1384.00
9.19.2	30 mm thick including ISI marked Stainless Steel butt hinges with necessary screws.	Sqm	1271.00
9.19.3	25 mm thick (for cupboard) including ISI marked nickel plated bright finished M.S. Piano hinges IS : 3818 fixed with necessary screws.	Sqm	1133.00
9.20	Extra for Providing and fixing flush doors with decorative veneering instead of non decorative ISI marked flush door shutters to IS : 2202 Part-1 on one side only.	Sqm	362.00
9.21	Extra for providing lipping with 2nd class teak wood battens 25 mm minimum depth on all edges of shutters (over all area of door shutter to be measured).	Sqm	323.00
9.22	Extra for providing vision panel not exceeding 0.1 sqm in all type of flush doors (cost of glass excluded) (overall area of door shutter to be measured) :		
9.22.1	Rectangular or square.	Sqm	134.00
9.22.2	Circular.	Sqm	203.00
9.23	Extra if louvers (not exceeding 0.2 sqm) are provided in flush door shutters (overall area of door shutters to be measured).	Sqm	259.00
9.24	Extra for cutting rebate in flush door shutters (Total area of the shutter tobe measured).	Sqm	96.00
9.25	Providing and fixing 35mm thick wire gauze shutters using galvanised M.S. wire gauze of average width of aperture 1.4mm in both direction with wire of dia. 0.63 mm for doors, windows and clerestory windows including ISI marked bright finished M.S. butt hinges with necessary screws :		
9.25.1	Second class teak wood.	Sqm	2677.00
9.25.2	Kiln seasoned and chemically treated Hard wood. (Haldu, Kail, Bija wood)	sqm	1706.00
9.26	Providing and fixing 35mm thick wire gauze shutters using galvanised M.S. wire gauze of average width of aperture 1.4mm in both direction with wire of dia. 0.63 mm for doors, windows and clerestory windows including ISI marked stainless steel butt hinges with necessary screws :		
9.26.1	Second class teak wood.	Sqm	2764.00
9.26.1	Kiln seasoned and chemically treated Hard wood. (Haldu, Kail, Bija wood)	Sqm	1792.00

S.No.	Description of Items	Unit	Rate (in Rs)
9.27	Providing and fixing 30mm thick wire gauge shutters using galvanised M.S. wire gauge of average width of aperture 1.4mm in both direction with wire of dia. 0.63 mm for doors, windows and clerestory windows including ISI marked Stainless Steel butt hinges with necessary screws :		
9.27.1	Second class teak wood.	Sqm	2409.00
9.27.2	Kiln seasoned and chemically treated Hard wood. (Haldu, Kail, Bija wood)	Sqm	1579.00
9.28	Providing and fixing 30mm thick wire gauze shutters using galvanised M.S. wire gauze of average width of aperture 1.4mm in both direction with wire of dia 0.63 mm for doors, windows and clerestory windows including ISI marked bright finished M.S. butt hinges with necessary screws :		
9.28.1	Second class teak wood.	Sqm	2363.00
9.28.2	Kiln seasoned and chemically treated Hard wood. (Haldu, Kail, Bija wood)	Sqm	1533.00
9.29	Providing and fixing wire gauze laminated veneer lumber shutters conforming to IS : 14616, and as per TADS 15 :2001 (Part B) using galvanised wire gauze with average width of aperture 1.4mm in both directions with wire of dia 0.63mm as per IS :1568 for doors, windows and clerestory windows including ISI marked bright finished or/ and black enamelled M.S. butt hinges with necessary screws as per directions of Engineer.		
9.29.1	35 mm thick shutters	Sqm	1954.00
9.29.2	30 mm thick shutters	Sqm	1759.00
9.30	Providing 50x50x50mm 2nd class teak wood plugs including cutting brick work and fixing in cement mortar 1:3 (1 cement : 3 fine sand) and making good the walls etc.	Each	19.00
9.31	Providing and fixing expandable fasteners of specified size with necessary plastic sleeves and galvanised M.S. screws including drilling holes in masonry work /CC/ R.C.C. and making good etc. complete.		
9.31.1	25 mm long	Each	16.00
9.31.2	32 mm long	Each	18.00
9.31.3	40 mm long	Each	19.00
9.31.4	50 mm long	Each	21.00
9.32	Providing and fixing 2nd class teak wood plain lining, tongued and grooved on and including wooden plugs complete with necessary screws and priming coat on unexposed surface.		
9.32.1	40 mm thick	Sqm	4484.00
9.32.2	25 mm thick	Sqm	2854.00
9.32.3	20 mm thick	Sqm	2304.00
9.32.4	12 mm thkck	Sqm	1481.00

S.No.	Description of Items	Unit	Rate (in Rs)
9.33	Providing and fixing in wall lining flat pressed three layer (medium density) particle board or graded wood Prelaminated one side decorative lamination, on other side balancing lamination Grade I, Type II, IS : 12823 marked including priming coat on unexposed surface, with necessary fixing arrangement and screws etc. complete :		
9.33.1	12 mm thick	Sqm	1062.00
9.33.2	18 mm thick	Sqm	1179.00
9.33.3	25 mm thick	Sqm	1314.00
9.34	Providing and fixing specified wood frame work consisting of battens 50x25mm fixed with rawl plug and drilling necessary holes for rawl plug etc. including priming coat complete with Hard wood.	Cum	106338.00
9.35	Providing and fixing plywood 4 mm thick one side decorative veneer conforming to IS: 1328 (type-1) for plain lining / cladding with necessary screws, priming coat on unexposed surface with: Decorative veneer facings of approved manufacture	Sqm	838.00
9.36	Providing and fixing 4mm thick coir veneer board, ISI marked IS : 14842 - 2000, plain lining with necessary screws, priming coat on unexposed surface etc., complete.	Sqm	784.00
9.37	Providing and fixing skirting of Pre-laminated with (one side decorative and other side balancing lamination) flat pressed, 3 layer or graded particle board (medium density) Grade I, Type II, IS :12823 marked, with necessary fixing arrangements and screws including drilling necessary holes for rawl plugs etc. and priming coat on unexposed surface complete:		
9.37.1	18 mm thick	Sqm	1546.00
9.37.2	25 mm thick	Sqm	1680.00
9.38	Providing and fixing wooden moulded beading to door and window frames with iron screws, plugs and priming coat on unexposed surface etc. complete:		
9.38.1	2nd class teak wood		
9.38.1.1	50x12 mm	meter	101.00
9.38.1.2	50 x 20 mm	meter	136.00
9.38.2	Hard wood		
9.38.2.1	50x12 mm	meter	73.00
9.38.2.2	50 x 20 mm	meter	90.00
9.39	Providing and fixing plain jaffri of 35x10 mm laths placed 35 mm apart (frames to be paid separately) including fixing 50x12 mm beading complete with: Second class teak wood	Sqm	1567.00

S.No.	Description of Items	Unit	Rate (in Rs)
9.40	Providing and fixing 18 mm thick, 150 mm wide pelmet of flat pressed 3 layer or graded wood particle board medium density grade I, IS : 3087 marked including top cover of 6 mm commercial ply wood conforming to IS: 303 BWR grade, nickel plated M.S. pipe 20 mm dia (heavy type) curtain rod with nickel plated brackets including fixing with 25x3 mm M.S. flat 10 cm long and rawl plugs 50 mm long (designation 10 no.) etc all complete	meter	313.00
9.41	Providing and fixing 18 mm thick, 150 mm wide pelmet of coir veneer board ISI marked IS : 14842 - 2000, including top cover of 6 mm coir veneer board, nickle plated M.S. Pipe 20 mm dia. (heavy type) curtain rod with nickel plated brackets including fixing with 25x3 mm M.S. Flat 10 cm long and rawl plug 50 mm long (designation 10 No.) etc., all complete	meter	405.00
9.42	Extra for using veneered particle board conforming to IS 3097 Grade I, in item of pelmet 18mm thick 150mm wide.		
9.42.1	Non decorative veneer on both sides.	meter	26.00
9.42.2	Particle board with decorative veneering on both sides.	meter	76.00
9.43	Providing and fixing teak wood lipping of size 25x3 mm in pelmet.	meter	36.00
9.44	Providing and fixing curtain rods of 1.25 mm thick chromium plated brass plate, with two chromium plated brass brackets fixed with C.P. brass screws and wooden plugs, etc., wherever necessary complete :		
9.44.1	12mm dia (18 gauge)	meter	239.00
9.44.2	20 mm dia (18 gauge)	meter	317.00
9.44.3	25 mm dia (18 gauge)	meter	400.00
9.45	Providing and fixing nickel plated M.S. pipe curtain rods with nickel plated brackets :		
9.45.1	20 mm dia (heavy type)	meter	100.00
9.45.2	25 mm dia (heavy type)	meter	110.00
9.46	Providing and fixing M.S. grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. all complete.		
9.46.1	Fixed to steel windows by welding.	Kg	92.00
9.46.2	Fixed to openings /wooden frames with rawl plugs screws etc.	Kg	107.00
9.47	Providing and fixing expanded metal 20x60mm strands 3.25mm wide and 1.6mm thick for windows etc. including 62x19mm beading of IInd class teak wood.	Sqm	784.00
9.48	Providing and fixing hard drawn steel wire fabric 75x25 mm mesh of weight not less than 7.75 Kg per sqm to window frames etc. including 62x19 mm beading of second class teak wood.	Sqm	940.00

S.No.	Description of Items	Unit	Rate (in Rs)
9.49	Providing and fixing fly proof galvanised M.S. wire gauze to windows and clerestory windows using galvanised M.S. wire gage with average width of aperture 1.4 mm in both directions with wire of dia. 0.63 mm.		
9.49.1	With 2nd class teak wood beading 62X19 mm.	Sqm	732.00
9.49.2	With 12 mm mild steel U beading.	Sqm	468.00
9.50	Deduct for fixing 75x25mm hard drawn steel wire fabric of weight not less than 7.75Kg. per sqm in panelled and glazed door and window shutter instead of glass sheet 4mm thick including the difference cost of material.	Sqm	100.00
9.51	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embeddings in cement concrete M-10 (Nominal Mix with 20 mm maximum size of stone aggregate) block 30x10x15 cm.	Each	101.00
9.52	Providing beams including hoisting, fixing in position and applying wood preservative for the unexposed surfaces, etc. complete with :		
9.52.1	Sal Wood	Cum	57273.00
9.52.2	Hard wood.	Cum	39944.00
9.53	Providing and fixing ISI marked M.S. pressed butt hinges bright finished with necessary screws etc. complete :		
9.53.1	125x65x2.12 mm	Each	35.00
9.53.2	100x58x1.90 mm	Each	22.00
9.53.3	75x47x1.70 mm	Each	18.00
9.53.4	50x37x1.50 mm	Each	9.00
9.54	Providing and fixing IS : 1341 marked M.S. heavy weight butt hinges with necessary screws etc. complete :		
9.54.1	125x90x4.00 mm	Each	35.00
9.54.2	100x75x3.50 mm	Each	27.00
9.54.3	75x60x3.10 mm	Each	20.00
9.54.4	50x40x2.50 mm	each	12.00
9.55	Providing and fixing ISI marked oxidised M.S. pressed butt hinges with necessary screws etc. complete.		
9.55.1	125x65x2.12 mm	Each	28.00
9.55.2	100x58x1.90 mm	Each	22.00
9.55.3	75x47x1.70 mm	Each	18.00
9.55.4	50x37x1.50 mm	Each	10.00
9.56	Providing and fixing ISI marked oxidised M.S. pressed Parliamentary hinges with necessary screws etc. complete		
9.56.1	150x125x27x2.50 mm	Each	44.00
9.56.2	125x125x27x2.50 mm	Each	40.00
9.56.3	100x125x27x2.50 mm	Each	38.00
9.56.4	75x100x20x2.24 mm	Each	32.00

S.No.	Description of Items	Unit	Rate (in Rs)
9.57	Providing and fixing ISI marked oxidised M.S. single acting spring hinges with necessary screws etc. complete		
9.57.1	150 mm	Each	151.00
9.57.2	125 mm	Each	127.00
9.57.3	100 mm	Each	111.00
9.58	Providing and fixing oxidised M.S. double acting spring hinges with necessary screws etc. complete.		
9.58.1	150 mm	Each	162.00
9.58.2	125 mm	Each	141.00
9.58.3	100 mm	Each	123.00
9.59	Providing M.S. Piano hinges ISI marked IS : 3818 finished with nickel plating and fixing with necessary screws etc. complete.		
9.59.1	Overall width 35 mm.	meter	129.00
9.59.2	Overall width 50 mm.	meter	132.00
9.59.3	Overall width 65 mm.	meter	137.00
9.60	Providing and fixing ISI marked oxidised M.S. sliding door bolts with nuts and screws etc. complete :		
9.60.1	300x16 mm	Each	138.00
9.60.2	250x16 mm	Each	120.00
9.61	Providing and fixing ISI marked oxidised M.S. tower bolt black finish, (Barrel type) with necessary screws etc. complete :		
9.61.1	250x10 mm	Each	59.00
9.61.2	200x10 mm	Each	43.00
9.61.3	150x10 mm	Each	34.00
9.61.4	100x10 mm	Each	25.00
9.62	Providing and fixing ISI marked 85x42mm oxidised M.S. pull bolt lock conforming to IS : 7534 with necessary screws bolts, nut and washers etc. complete.	Each	65.00
9.63	Providing and fixing ISI marked oxidised M.S. door latches conforming to IS:5930 with screws etc. complete :		
9.63.1	300x20x6 mm	Each	54.00
9.63.2	250x20x6 mm	Each	46.00
9.64	Providing and fixing ISI marked oxidised M.S. handles conforming to IS:4992 with necessary screws etc. complete :		
9.64.1	125 mm	Each	21.00
9.64.2	100 mm	Each	17.00
9.64.3	75mm	Each	15.00
9.65	Providing and fixing oxidised Mild Steel hasp and staple (safety type) conforming to IS : 363 with necessary screws etc. complete :		
9.65.1	150mm	Each	17.00
9.65.2	115mm	Each	15.00
9.65.3	90mm	Each	12.00

S.No.	Description of Items	Unit	Rate (in Rs)
9.66	Providing and fixing oxidised M.S. casement stays (straight peg type) with necessary screws etc. complete.		
9.66.1	300 mm weighing not less than 200 gms.	Each	36.00
9.66.2	250 mm weighing not less than 150 gms.	Each	31.00
9.66.3	200 mm weighing not less than 120 gms.	Each	25.00
9.67	Providing and fixing oxidised M.S. Safety chain with necessary fixtures for doors. (Weighting not less than 450 gms.)	Each	85.00
9.68	Providing and fixing IS : 12817 marked stainless steel butt hinges with stainless steel screws etc. complete :		
9.68.1	125x64x1.90 mm	Each	55.00
9.68.2	100X58X1.90 mm	Each	47.00
9.68.3	75x47x1.80 mm	Each	34.00
9.68.4	50x37x1.50 mm	Each	20.00
9.69	Providing and fixing IS : 12817 marked stainless steel butt hinges (heavy weight) with stainless steel screws etc. complete :		
9.69.1	125x64x2.50 mm	Each	58.00
9.69.2	100x60x2.50 mm	Each	49.00
9.69.3	75x50x2.50 mm	Each	37.00
9.70	Providing and fixing bright finished brass butt hinges with necessary screws etc. complete :		
9.70.1	125x85x5.5 mm (heavy type)	Each	445.00
9.70.2	125x70x4 mm (ordinary type)	Each	142.00
9.70.3	100x85x5.5 mm (heavy type)	Each	400.00
9.70.4	100x70x4 mm (ordinary type)	Each	94.00
9.70.5	75x65x4 mm (heavy type)	Each	137.00
9.70.6	75x40x2.5 mm (ordinary type)	Each	50.00
9.70.7	50x40x2.5 mm (ordinary type)	Each	30.00
9.71	Providing and fixing bright finished brass parliamentary hinges with necessary screws etc. complete :		
9.71.1	150x125x27x5 mm	Each	411.00
9.71.2	125x125x27x5 mm	Each	388.00
9.71.3	100x125x27x5 mm	Each	330.00
9.71.4	75x100x20x3.2 mm	Each	286.00
9.72	Providing and fixing bright finished brass tower bolts (barrel type) with necessary screws etc. complete :		
9.72.1	300x10 mm	Each	295.00
9.72.2	250x10 mm	Each	245.00
9.72.3	200x10 mm	Each	201.00
9.72.4	150x10 mm	Each	150.00
9.72.5	100x10 mm	Each	102.00
9.73	Providing and fixing bright finished brass door latch with necessary screws etc. complete :		
9.73.1	300x16x5 mm	Each	190.00
9.73.2	250x16x5 mm	Each	166.00

S.No.	Description of Items	Unit	Rate (in Rs)
9.74	Providing and fixing bright finished brass 100 mm mortice latch and lock with 6 levers and a pair of lever handles with necessary screws etc. complete (best make of approved quality).	Each	473.00
9.75	Providing and fixing bright finished brass 100 mm mortice latch with one dead bolt and a pair of lever handles with necessary screws etc. complete (best make of approved quality).	Each	367.00
9.76	Providing and fixing bright finished brass night latch including necessary screws etc. complete (best make of approved quality).	Each	699.00
9.77	Providing and fixing special quality bright finished brass cupboard or ward robe locks with four levers including necessary screws etc. complete (best make of approved quality) :		
9.77.1	40mm	Each	129.00
9.77.2	50mm	Each	153.00
9.77.3	65mm	Each	158.00
9.77.4	75mm	Each	181.00
9.78	Providing and fixing 50 mm bright finished brass cup board or wardrobe knob with necessary screws (best make of approved quality)	Each	46.00
9.79	Providing and fixing bright finished brass handles with screws etc. complete :		
9.79.1	125 mm	Each	151.00
9.79.2	100 mm	Each	141.00
9.79.3	75mm	Each	112.00
9.80	Providing and fixing bright finished brass hanging type floor door stopper with necessary screws, etc. complete.	Each	78.00
9.81	Providing and fixing ISI : 3564 marked Aluminium die cast body tubular type universal hydraulic door closer with necessary accessories and screws etc. complete.	Each	683.00
9.82	Providing and fixing ISI : 3564 marked aluminium extruded section body tubular type universal hydraulic door closer with double speed adjustment with necessary accessories and screws etc. complete.	Each	1118.00
9.83	Providing and fixing bright finished brass casement window fastener with necessary screws etc. complete.	Each	53.00
9.84	Providing and fixing bright finished brass casement stays (straight peg type) with necessary screws etc. complete :		
9.84.1	300 mm weighing not less than 330 gms	Each	135.00
9.84.2	250 mm weighing not less than 280 gms	Each	113.00
9.84.3	200 mm weighing not less than 240 gms	Each	106.00

S.No.	Description of Items	Unit	Rate (in Rs)
9.85	Providing and fixing bright finished brass hasp and staple (safety type) with necessary screws etc. complete:		
9.85.1	150 mm	Each	84.00
9.85.2	115 mm	Each	69.00
9.85.3	90 mm	Each	62.00
9.86	Providing and fixing chromium plated brass 100 mm mortice latch and lock with 6 levers and a pair of lever handles with necessary screws etc. complete (best make of approved quality).	Each	702.00
9.87	Providing and fixing chromium plated brass night latch including necessary screws etc. complete (Best make of approved quality).	Each	656.00
9.88	Providing and fixing special quality chromium plated brass cupboard locks with six levers including necessary screws etc. complete (Best make of approved quality) of :		
9.88.1	Size 40 mm	Each	131.00
9.88.2	Size 50 mm	Each	138.00
9.88.3	Size 65 mm	Each	150.00
9.88.4	Size 75 mm	Each	189.00
9.89	Providing and fixing chromium plated brass 50 mm cupboard or wardrobe knobs with nuts complete.	Each	78.00
9.90	Providing and fixing chromium plated brass handles with necessary screws etc. complete:		
9.90.1	125 mm	Each	144.00
9.90.2	100 mm	Each	130.00
9.90.3	75 mm	Each	125.00
9.91	Providing and fixing chromium plated brass casement window fastener with necessary screws etc. complete.	Each	96.00
9.92	Providing and fixing chromium plated brass casement stays (straight peg type) with necessary screws etc. complete :		
9.92.1	300 mm weighing not less than 330 gms	Each	162.00
9.92.2	250 mm weighing not less than 280 gms	Each	135.00
9.92.3	200 mm weighing not less than 240 gms	Each	117.00
9.93	Providing and fixing ISI marked aluminium butt hinges ISI marked anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade with necessary screws etc. complete:		
9.93.1	125x75x4 mm	Each	95.00
9.93.2	125x63x4 mm	Each	77.00
9.93.3	100x75x4 mm	Each	71.00
9.93.4	100x63x4 mm	Each	60.00
9.93.5	100x63x3.2 mm	Each	57.00
9.93.6	75x63x4 mm	Each	49.00
9.93.7	75x63x3.2 mm	Each	47.00
9.93.8	75x45x3.2 mm	Each	46.00

S.No.	Description of Items	Unit	Rate (in Rs)
9.94	Providing and fixing aluminium sliding door bolts ISI marked anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade with nuts and screws etc. complete :		
9.94.1	300x16 mm	Each	207.00
9.94.2	250x16 mm	Each	155.00
9.95	Providing and fixing aluminium tower bolts ISI marked anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade with necessary screws etc. complete :		
9.95.1	300x10 mm	Each	108.00
9.95.2	250x10 mm	Each	92.00
9.95.3	200x10 mm	Each	79.00
9.95.4	150x10 mm	Each	65.00
9.95.5	100x10 mm	Each	49.00
9.96	Providing and fixing aluminium pull bolt lock anodised ISI marked (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour and shade with necessary screws bolts, nut and washers etc. complete.	Each	54.00
9.97	Providing and fixing 50cm long aluminium kicking plate 100x3.15 mm anodised (anodic coating not less than grade AC 10 as per IS :1868) transparent or dyed to required colour or shade with necessary screws etc. complete.	Each	154.00
9.98	Providing and fixing aluminium handles ISI marked anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade with necessary screws etc. complete :		
9.98.1	125 mm	Each	66.00
9.98.2	100 mm	Each	49.00
9.98.3	75 mm	Each	42.00
9.99	Providing and fixing aluminium hanging floor door stopper ISI marked anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour and shade with necessary screws etc. complete.		
9.99.1	Single rubber stopper	Each	30.00
9.99.2	Twin rubber stopper	Each	69.00
9.100	Providing and fixing aluminium casement stays ISI marked anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour and shade with necessary screws etc. complete.	Each	63.00
9.101	Providing and fixing bright finished brass 100 mm mortice latch and lock ISI marked with six levers and a pair of anodised (anodic coating not less than grade AC 10 as per IS : 1868) aluminium lever handles with necessary screws etc. complete (Best make of approved quality).	Each	546.00

S.No.	Description of Items	Unit	Rate (in Rs)
9.102	Providing and fixing aluminium tee channels (heavy duty) with rollers, stop end in pelmets as curtain rod.	meter	96.00
9.103	Providing and fixing partition upto ceiling height consisting of G.I. frame and required board including providing and fixing of frame work made of special section power pressed/ roll form G.I. sheet with zinc coating of 120 gms/sqm(both side inclusive), consisting of floor and ceiling channel 50mm wide having equal flanges of 32 mm and 0.50 mm thick, fixed to the floor and ceiling at the spacing of 610 mm centre to centre with dash fastener of 12.5 mm dia meter 50 mm length or suitable anchor fastener or metal screws with nylon plugs and the studs 48 mm wide having one flange of 34 mm and other flange 36 mm and 0.50 mm thick fixed vertically within flanges of floor and ceiling channel and placed at a spacing of 610mm centre to centre by 6 mm dia bolts and nuts, including fixing of studs along both ends of partition fixed flush to wall with suitable anchor fastener or metal screws with nylon plugs at spacing of 450 mm centre to centre, and fixing of boards to both side of frame work by 25 mm long dry wall screws on studs, floor and ceiling channels at the spacing of 300 mm centre to centre. The boards are to be fixed to the frame work with joints staggered to avoid through cracks, M.S. fixing channel of 99 mm width (0.9 mm thick having two flanges of 9.5 mm each) to be provided at the horizontal joints of two boards, fixed to the studs using metal to metal flat head screws, including jointing and finishing to a flush finish with recommended jointing compound, jointing tape, angle beads at corner (25 mm x 25 mm x 0.5 mm), joint finisher and two coats of primer suitable for board as per manufacture's specification and direction of engineer in charge all complete.		
9.103.1	75mm overall thickness partition with 12.5mm thick double skin fire rated board conforming to IS: 2095: part I.	Sqm	1067.00
9.103.2	75mm overall thickness partition with 12.5mm thick double skin tapered edge plain Gypsum board conforming to IS: 2095: part I	Sqm	946.00
9.103.3	66mm overall thickness Partition with 8mm thick double skin Calcium Silicate Board made with Calcareous & Siliceous materials reinforced with cellulose fiber manufactured through autoclaving process with Compressive Strength 225 kg/sq.cm, Bending Strength 100 kg/ sg.cm.	Sqm	1238.00
9.103.4	66mm overall thickness partition using 8mm thick double skin non-asbestos multipurpose cement board reinforced with cellulose fibre manufactured through autoclaving process (High pressure steam cured) as per IS: 14862 with suitable fibre cement screw.	Sqm	1013.00
9.104	Providing and fixing PTMT handles with necessary screws etc. complete.		
9.104.1	125x34x24 mm weighing not less than 23 gms.	Each	36.00
9.104.2	150x34x24 mm weighing not less than 26 gms.	Each	43.00

S.No.	Description of Items	Unit	Rate (in Rs)
9.105	Providing and fixing PTMT Butt hinges with necessary screws etc. complete.		
9.105.1	75x60x10 mm fitted with 5.5 mm dia M.S. Bright Bar Rod weighing not less than 34 gms.	Each	46.00
9.105.2	100x75x10 mm fitted with 5.5 mm dia MS Bright Bar Rod weighing not less than 53 gms.	Each	57.00
9.106	Providing and fixing PTMT Tower Bolts with 12 mm one piece rod inside and necessary screws etc., complete.		
9.106.1	152x42x18 mm weighing not less than 60 gms.	Each	52.00
9.106.2	202x42x18 mm weighing not less than 78 gms.	Each	71.00
9.107	Providing and fixing PTMT door catcher of length 72 mm and dia. of 42 mm with suitable washers weighing not less than 33 gms.	Each	27.00
9.108	Providing and fixing Bamboo jaffery/ fencing consisting of superior quality 25mm dia (Average) half cut bamboo placed vertically and fixed together with three numbers horizontal running members of Hard wood in scantling of section 50X25mm fixed with nails and G.I wire to existing surface complete as per direction of Engineer-in-charge.	Sqm	329.00
9.109	Providing and fixing wooden moulded corner beading of triangular shape to the junction of panelling etc. with iron screws, plugs and priming coat on unexposed surface etc. complete 2nd class teak wood.		
9.109.1	50x50mm (base and height).	meter	172.00
9.110	Providing and fixing 2nd class teak wood lipping/ moulded beading or taj beading of size 18X5mm fixed with wooden adhesive of approved quality and screws/ nails on the edges of the Pre-laminated particle board as per direction of Engineer-in-charge.	meter	42.00
9.111	Providing and fixing magnetic catcher in cupboard / ward robe shutters including fixing with necessary screws etc. complete (Best make of approved quality).		
9.111.1	Triple strip vertical type.	Each	29.00
9.111.2	Double strip (horizontal type).	Each	23.00
9.112	Providing and fixing powder coated telescopic drawer channels 300mm long with necessary screws etc. complete as per directions of Engineer-in-charge.	Each	255.00
9.113	Providing and fixing sliding arrangement in racks/ cupboards/cabinets shutter by P/F stainless steel rollers to run inside C or E aluminium channel section (The payment of C or E channel shall be made separately)	Each	11.00

S.No.	Description of Items	Unit	Rate (in Rs)
9.114	Providing and fixing factory made UPVC door frame made of UPVC extruded section having an overall dimension as below (tolerance ±1mm) with wall thickness 2.0mm ± 0.2mm, corners of the door frame to be mitred and welded of plastic, galvanized brackets and stainless steel screws. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 X 19mm and 1mm ± 0.1mm wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturers specification and direction of Engineer-in-charge		
9.114.1	Extruded section profile size 48x40 mm.	meter	141.00
9.114.2	Extruded section profile size 42x50 mm.	meter	164.00
9.115	Providing and fixing to existing door frames.		
9.115.1	24 mm thick factory made PVC door shutters made of styles and rails of a UPVC hollow section of size 59x24 mm and wall thickness 2 mm ± 0.2 mm with inbuilt edging on both sides.The styles and rails mitred and joined at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0mm and stainless steel screws.The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm ± 0.1 mm wall thickness.The lock rail made up of 'H' section, a UPVC hollow section of size 100x24 mm and 2 mm ± 0.2 mm wall thickness fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a UPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm ± 0.1 mm wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers,complete as per manufacturer's specification and direction of Engineer-in- charge. (For W.C. and bathroom door shutter).	Sqm	1216.00
9.115.2	30 mm thick factory made Polyvinyl Chloride (PVC) door shutter made of styles and rails of a UPVC hollow section of size 60x30 mm and wall thickness 2 mm ± 0.2 mm with inbuilt decorative moulding edging on one side. The styles and rails mitred and joined at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 25x20 mm and 1 mm ± 0.1 mm wall thickness. The lock rail made up of 'H' section, a UPVC hollow section of size 100x30 mm and 2 mm ± 0.2 mm wall thickness fixed to the shutter styles by means of plastic/ galvanised M.S. 'U' cleats. The shutter frame filled with a UPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm ± 0.1 mm wall thickness . The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge.	Sqm	1407.00

S.No.	Description of Items	Unit	Rate (in Rs)
9.115.3	25mm thick PVC flush door shutters made out of a one piece Multi chamber extruded PVC section of the size of 762mm X 25mm or less as per requirement with an average wall thickness of 1mm ± 0.3mm. PVC foam end cap of size 23x10mm are provided on both vertical edges to ensure the overall thickness of 25mm. An M.S. tube having dimensions 19mm x 19mm is inserted along the hinge side of the door. Core of the door shutter should be filled with High Density Polyurethane foam. The Top & Bottom edges of the shutter are covered with an end-cap of the size 25MM X 11MM. Door shutter shall be reinforced with special polymeric reinforcements as per manufactures' specification and direction of Engineer-in-charge to take up necessary hardware and fixtures. Stickers indicating the locations of hardware will be pasted at appropriate places	Sqm	1883.00
9.116	Providing and fixing factory made P.V.C. door frame of size 50x47mm with a wall thickness of 5mm, made out of extruded 5mm rigid PVC foam sheet mitred at corners and joined with 2 Nos. of 150mm long brackets of 15x15mm M.S. square tube, the vertical door profiles to be reinforced with 19x19mm M.S. square tube of 19 gauge, EPDM rubber gasket weather seal to be provided through out the frame. The door frame to be fixed to the wall using M.S. screws of 65/100mm size complete as per manufacturers specification and direction of ngineer-in-Charge.	meter	277.00
9.117	Providing and fixing to existing door frames.		
9.117.1	30mm thick factory made panel PVC door shutter consisting of frame made out of M.S. tubes of 19 gauge thickness and size of 19mm x 19mm for styles and 15x15mm for top & bottom rails. M.S. frame shall have a coat of steel primers of approved make and manufacture M.S. frame covered with 5mm thick heat moulded PVC 'C' channel of size 30mm thickness, 70mm width out of which 50mm shall be flat and 20mm shall be tapered in 45degree angle on either side forming styles; and 5mm thick, 95mm wide PVC sheet out of which 75mm shall be flat and 20mm shall be tapered in 45 degree on the inner side to form top and bottom rail and 115mm wide PVC sheet out of which 75mm shall be flat and 20mm shall be tapered on both sides to form lock rail. Top, bottom and lock rails shall be provided either side of the panel. 10mm (5mm x 2) thick, 20mm wide cross PVC sheet be provided as gap insert for top rail & bottom rail. paneling of 5mm thick both side PVC sheet to be fitted in the M.S. frame welded/ sealed to the styles & rails with 7mm (5mm+2mm) thick x 15mm wide PVC sheet beading on inner side, and joined together with solvent cement adhesive. An additional 5mm thick PVC strip of 20mm width is to be stuck on the interior side of the 'C' Channel using PVC solvent adhesive etc. complete as per direction of Engineer-in- charge. Manufacturer’s specification & drawing (for W.C. and bathroom door shutter).	SQM.	1694.00

S.No.	Description of Items	Unit	Rate (in Rs)
9.117.2	30mm thick factory made solid both side Pre-laminated panel PVC door shutter consisting of frame made out of M.S. tubes of 19 gauge thickness and size of 19mmx19mm for styles and 15x15mm for top & bottom rails. M.S. frame shall have a coat of steel primers of approved make and manufacture. M.S. frame covered with 5mm thick heat moulded Pre-laminated PVC 'C' channel of size 30mm thickness, 70mm width out of which 50mm shall be flat and 20mm shall be tapered in 45degree angle on either side forming styles; and 5mm thick, 95mm wide PVC sheet out of which 75mm shall be flat and 20mm shall be tapered in 45 degree on the inner side to form top and bottom rail and 115mm wide PVC sheet out of which 75mm shall be flat and 20mm shall be tapered on both sides to form lock rail. Top, bottom and lock rails shall be provided either side of the panel. 10mm (5mmx2) thick, 20mm wide cross PVC sheet be provided as gap insert for top rail & bottom rail. paneling of 5mm thick both side Pre-laminated PVC sheet to be fitted in the M.S. frame welded/ sealed to the styles & rails with 7mm (5mm+2mm) thick x 15mm wide PVC sheet beading on inner side, and joined together with solvent cement adhesive. An additional 5mm thick PVC strip of 20mm width is to be stuck on the interior side of the 'C' Channel using PVC solvent adhesive etc. complete as per direction of Engineer-in-charge. Manufacturer's specification & drawing (for W.C. and bathroom door shutter).	Sqm.	1699.00
9.118	Providing and fixing of Fiber Glass Reinforced plastic (FRP) Door Frames of three legged of cross-section 90mm x 45mm having single rebate of 32mm x 15mm to receive shutter of 30mm thickness .The laminate doorframe molded with fire resistant grade unsaturated polyester resin and chopped mat .Doorframe laminate shall be 2mm thick and shall be filled with suitable wooden block in all the three legs. The frame shall be covered with fiberglass from all sides. M.S. stay shall be provided at the bottom to steady the frame.	meter	498.00
9.119	Providing and fixing to existing door frames.		
9.119.1	30 mm thick Glass Fibre Reinforced Plastic (FRP) panelled door shutter of required colour and approved brand and manufacture, made with fire - retardant grade unsaturated polyester resin, moulded to 3 mm thick FRP laminate for forming hollow rails and styles, with wooden frame and suitable blocks of seasoned wood inside at required places for fixing of fittings, cast monolithically with 5mm thick FRP laminate for panels and conforming to IS: 14856 - 2000 including fixing to frames	Sqm	2558.00

S.No.	Description of Items	Unit	Rate (in Rs)
9.119.2	30mm thick fiberglass reinforced plastic (F.R.P.) flush door shutter in different plain and wood finish made with fire retardant grade unsaturated polyester resin, moulded to 3mm thick FRP laminate all around, with suitable wooden blocks inside at required places for fixing of fittings and polyurethane foam (PUF) / Polystyrene foam to be used as filler material throughout the hollow panel, casted monolithically with testing parameters of F.R.P. laminate conforming to table - 3 of IS: 14856 : 2000, complete as per direction of Engineer-in-charge.	Sqm	2126.00
9.120	Providing and fixing factory made door frame (single rebate) made of solid PVC foam profile with homogenous fine cellular structure having smooth outer integral skin having 60mm width & 30mm thickness and shall be fixed to wall as per instructions of engineer-in-charge using 100x8 sheet metal CSK screws.	meter	334.00
9.121	Providing and fixing 28 mm thick door shutter made of solid PVC foam profile with homogenous fine cellular structure having smooth outer integral skin having 71mm width & 28mm thick as styles and rails. Joints are made using solvent adhesive and GI 'C' sections (39mm x 19mm x 0.6mm thick) or M S pipe (40mm x 20mm) stiffener frame insert & telescopic polymeric 'L' corners .The panel shall be filled with 3mm thick high - pressure compact laminate as per manufacturer's specifications and direction of Engineer-in-charge, cover moulding shall be provided for covering fixing screws and elegant look.(for W.C. and bathroom door shutter).	Sqm	3244.00
9.122	Providing and fixing PVC rigid foam sheet 1mm thick on existing door shutters (bathroom and W.C. doors) using synthetic rubber based adhesive.	Sqm	632.00
9.123	Providing and fixing 12mm thick panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (area of opening for panel inserts excluding portion inside grooves or rebates to be measured). Panelling for panelled or panelled and glazed shutters 25mm to 40mm thick.		
9.123.1	Marine plywood of lamination / painting quality and conforming to IS: 710	sqm	1111.00
9.123.2	Fire retardant plywood of lamination / painting quality conforming to IS: 5509.	Sqm	1352.00
9.124	Providing & Fixing decorative high pressure laminated sheet of plain / wood grain in gloss / matt / suede finish with high density protective surface layer and reverse side of adhesive bonding quality conforming to IS : 2046 Type S including cost of adhesive of approved quality.		
9.124.1	1.5 mm thick	Sqm	583.00
9.124.2	1.0 mm thick	Sqm	481.00

S.No.	Description of Items	Unit	Rate (in Rs)
9.125	Providing and fixing factory made Fiberglass Reinforced plastics (F.R.P.) chajja 4mm thick of required colour, size and design made by Resin Transfer Moulding (RTM) Machine Technology, resulting in void free compact laminate in single piece, having smooth gradual slope curvature for easy drainage of water and duly reinforced by 2nos. vertically and 1nos. horizontally 50x2mm thick M.S. flat with 12mm in built hole for grouting on the existing wall along with the 50mm flanges duly inserted and sealed in the wall complete in one single piece casted monolithically, including all necessary fittings . The FRP Chajja should be manufactured using unsaturated Polyester resin as per IS: 6746 duly reinforced with fibre glass chopped strand mat (CSM) as per IS: 11551 complete with protective Gel coat U/V coating on Top for complete resistance from the extreme of temperature, weather & sunlight.	Sqm	3728.00
9.126	Providing and fixing cup board shutters 25mm thick, with Pre-laminated flat pressed three layer particle board or graded wood particle board IS: 12823 marked exterior grade (Grade I Type II) having one side decorative lamination and other side balancing lamination including IInd class teak wood lipping of 25mm wide x12 mm thick with necessary screws and bright finished stainless steel piano hinges complete as per direction of the Engineer-in-Charge	Sqm	1292.00
9.127	Providing and fixing cup board shutters with 25mm thick veneered particle board IS : 3097 marked exterior grade (Grade I) of approved make including IInd class teak wood lipping of 25mm wide x 12 mm thick with necessary screws and bright finished stainless steel piano hinges complete as per direction of Engineer-in-Charge.		
9.127.1	With decorative veneering on one side and commercial veering on other side.	Sqm	1096.00
9.127.2	With non decorative veneering on both sides.	Sqm	1036.00
9.128	Providing and fixing aluminum U beading of required size to Pre- laminated /flush door shutter including fixing etc. complete as per direction of Engineer-in-charge.	Kg.	483.00

S.No.	Description of Items	Unit	Rate (in Rs)
9.129	Providing and fixing, in position concealed G.I. section for wall paneling using board of required thickness fixed on the 'W' profile (0.55mm thick) having a knurled web of 51.55mm and two flanges of 26mm each with lips of 10.55 mm placed @ 610mm C/C in perimeter channel having one flange of 20mm and another flange of 30mm with thickness of 0.55mm and web of length 27mm. Perimeter channel is fixed on the floor and the ceiling with the nylon sleeves @ 610mm C/C with fully threaded self- tapping drywall screws. Board is fixed to the 'W' profile with 25 mm countersunk ribbed head screws @ 200mm C/C., all complete as per the drawing & directions of engineer-in-charge the joints of the boards are finished with specially formulated jointing compound and 48mm wide jointing tape to provide seamless finish.		
9.129.1	Tapered edge calcium silicate board made with calcareous & siliceous materials reinforced with cellulose fiber manufactured through autoclaving process to give stable crystalline structure with compressive strength 225 kg/sq.cm, Bending strength 100 kg/sq.cm. - 10mm thick.	Sqm	841.00
9.129.2	Non -asbestos multipurpose cement board reinforced with cellulose fibre manufactured through autoclaving process (high pressure steam cured) as per IS 14862 with suitable fibre cement screw. - 8 mm thick	Sqm	613.00
9.129.3	Gypsum board conforming to IS: 2095 - 1996: Part - I . 12.5 mm thick	Sqm	644.00

CHAPTER - 10
STEEL WORK

Notes for Specifications :-

1 Structural steel shall be of tested, standard quality conforming to IS: 226-69 & commercial quality shall conform to IS: 1977-69.

2 Steel work in single section are for works, like hold fasts & iron work for wooden trusses, M.S. Square/round guard bars fixed in wooden or steel windows & ventilators frames etc.

3 Steel work riveted or bolted shall conform to IS: 1148-1968 and IS : 800-1962.

4 Welding of steel shall be electric arc welding as per IS : 816-1956 and shall be on the lines given in IS : 800-1962.

5 Rolling shutters should conform to IS : 6248-1971.

6 Rolled steel sections for fabrication of steel glazed doors, windows & ventilators shall conform to IS : 7452-1974.

7 Glass panes should conform to IS : 1761-1960.

8 Screws shall conform to IS : 4218 (Part I to V I) 1967.

9 Steel doors, windows & ventilators shall conform to IS : 1038-1975 and IS : 7452-1974.

10 The rates of steel doors, windows & ventilators include cost of all materials, labour, T&P, hire & running charges of machineries & wastages etc. and also include cost of welding, all fixtures, erecting and fixing the sections in position.

11 Rates of steel angle iron fencing include all forging, reducing to required size, shape & figure, drilling, tapping, punching, counter sinking for screws, nailing etc. and every description of workmanship that may be necessary to fabricate, finish, erect and fix in positions in perfect manner.

12 Cold rolled framed profiles of pressed steel made from commercial M.S. Sheets conforming IS-513 of 1973 and as per general specifications of IS : 4351 are to be filled with M-15 grade of concrete and rates of items with these sections are inclusive of the cost of concrete.

Measurement of steel work in single section fixed independently with connecting plate:-

The work as fixed in place shall be measured in running meters correct to a millimeter and weights calculated on the basis of standard tables correct to nearest kilogram. The standard weight of steel sections shall conform to IS 808 with tolerances in sizes as per IS 1852.

Fabricated work :-

The weight of finished section door/windows of different sizes, inclusive of all fixed /welded fittings i.e. hinges pivots, lugs, brackets striking plates etc., shall be worked out before fixing of windows (exclusive of wieght of glass panes, glazing clips, putty etc.). Sectional weight of steel members only shall be measured without weight of glass panes etc. Any loose fittings such as casement stays/fastners etc. shall be enumerated and paid for separately.

T-iron door windows and ventilator frames shall be measured in running meter, along the centre line of the frame correct to a 1mm and weight calculated on the basis of standard tables. No deduction or extra payment shall be made for making holes and making arrangement for fixing fittings including packing wherever necessary. No deduction will be made for not providing tie bars in case of windows and ventilators.

MANDATORY TESTS

Material	Test	Field/ Laboratory Test	Test Procedure	Minimum quantity of material/ work for carrying out the test	Frequency of testing
Steel if arranged by the contractor	(a) Tensile strength (b) Bend test	Laboratory	IS 1599	20 tonne	Every 20 tonne or part thereof.
Steel tubular pipes	(a) Tensile Test	Laboratory	IS 1608	Every 8 tonne or part thereof	Every 8 tonne or part thereof
	(b) Bend Test		IS 2329		
	(c) Flattening Test		IS 2328		

LIST OF BUREAU OF INDIAN STANDARD CODES

S.No.	I.S. No.	Subject
1	IS 63	Whiting for paints and putty
2	IS 198	Varnish gold size
3	IS 228	Structural steel (Standard quality)
4	IS 277	Specification for galvanized steel sheets (Plain and corrugated)
5	IS 800	Code of practice for use of structural steel in general in steel construction
6	IS 806	Code of practice for use of steel Tubes in general building construction
7	IS 808	Dimensions for Hot rolled steel beams, columns, channel and angle sections
8	IS 812	Glossary of terms relating to welding and cutting metals
9	IS 813	Scheme of symbols for welding
10	IS 814	Covered electrodes for manual metal arc welding of carbon and carbon manganese steel
11	IS 816	Code of practice for use of metal arc welding for general construction in mild steel
12	IS 817	Code of practice for training and testing of metal arc welders
13	IS 818	Code of practice for safety and healthy requirements in electric and gas welding and cutting operations

14	IS 822	Code of procedure for inspection of welds
15	IS 823	Manual for metal arc welding in mild steel
16	IS 1038	Steel doors, windows and ventilators
17	IS 1081	Code of practice for fixing and glazing of metal (Steel and aluminium) doors, windows and ventilators
18	IS 1148	Hot rolled steel rivet bars (upto 40 mm diameters) for structural purposes
19	IS 1161	Steel tubes for structural purposes
20	IS 1182	Recommended practice for radiographic examination of fusion welded butt joints in steel plates
21	IS 1200- (Pt. VIII)	Method of measurements of steel work and iron works
22	IS 1363 Part I	Haxagon head bolts, screws, and nuts of product grade C (Hexagon Head bolt)
23	IS 1363 Part II	Haxagon Head Bolts, screws and nuts of product Grade ‘C’
24	IS 1363 Part-III	Haxagan Head Bolts, screws and Nuts of product grade ‘C’
25	IS 1367	Technical supply conditions for threaded steel fasteners
26	IS 1599	Method for bend test
27	IS 1608	Metallic materials - Tensile Testing at Ambient Temperature.
28	IS 1821	Dimensions for clearance holes for bolts and screws
29	IS 1852	Rolling and cutting tolerance for hot rolled steel products
30	IS 1894	Method for tensile testing of steel tubes
31	IS 1977	Structural steel (ordinary quality)
32	IS 2062	Hot Rolled low, medium and high tensile structural steel
33	IS 2074	Ready mixed paint, air drying redoxide zinc chrome priming
34	IS 4351	Specification for steel door frames
35	IS 4454 (Part I)	Steel wires for mechanical springs. Cold drawn unalloyed steel wire.
36	IS 4711	Methods for sampling of steel pipes, tube and fittings.
37	IS 4736	Hot - dip zinc coating on mild steel tubes
38	IS 4923	Hollow Steel Sections for Structural Use - Specification
39	IS 6248	Metal rolling shutters and rolling grills
40	IS 7452	Specification for hot rolled steel sections for doors, windows and ventilators.

(For Detail Refer UADD Steel Work specification / CPWD specification)

CHAPTER - 10
STEEL WORK

S.No.	Description of Items	Unit	Rate (in Rs)
10.1	Structural steel work in single section fixed with or without connecting plate including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.	Kg	63.00
10.2	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete:	Kg.	69.00
10.3	Providing and fixing in position collapsible steel shutters (Channel Gate) with vertical channels 20x10x2 mm and braced with flat iron diagonals 20x5mm size with top and bottom rail of T-iron 40x40x6 mm with 40mm dia, steel pulleys complete with bolts, nuts, locking arrangement, stoppers, handles, including applying a priming coat of approved steel primer. Rates includes recess cutting in floor and making good the same where ever required.	Sqm	4641.00
10.4	Providing and fixing 1mm thick M.S. sheet sliding-shutters with frame and diagonal braces of 40x40x6mm angle iron, 3mm M.S. gusset plates at the junction and corners 25mm dia pulley, 40x40x6mm angle and T-iron guide at the top and bottom respectively including applying a priming coat of approved steel primer.	Sqm	3208.00
10.5	Providing and fixing 1mm thick M.S. sheet door with frame of 40x40x6mm angle iron and 3mm M.S. gusset plates at the junctions and corners, all necessary fittings complete, including applying a priming coat of approved steel primer.		
10.5.1	Using M.S. angels 40x40x6 mm for diagonal braces.	Sqm	2691.00
10.5.2	Using flats 30x6mm for diagonal braces and central cross piece.	Sqm	2565.00
10.6	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths interlocked together through their entire length and jointed together at the end by end locks mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete including the cost of providing and fixing necessary 27.5cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS : 4454 Part-I. and M.S. top cover of required thickness for rolling shutters.		
10.6.1	80x1.25mm M.S. laths with 1.25 mm thick top cover.	Sqm	2049.00
10.6.2	80x1.20 mm M.S. laths with 1.20 mm thick top cover.	Sqm	1986.00
10.6.3	80x0.90 mm M.S. laths with 0.90 mm thick top cover.	Sqm	1865.00
10.7	Providing and fixing ball bearing for rolling shutters.	Each	354.00
10.8	Extra for providing mechanical device chain and crank operation for operating rolling shutters.		
10.8.1	Exceeding 10.00 sqm and upto 16.80 sqm in the area.	Sqm	774.00

S.No.	Description of Items	Unit	Rate (in Rs)
10.8.2	Exceeding 16.80 sqm in area.	Sqm	809.00
10.9	Extra for providing grilled rolling shutters manufactured out of 8 mm dia. M.S. bar instead of laths as per design approved by Engineer-in-charge.(area of grill to be measured).	Sqm	493.00
10.10	Providing and fixing factory made ISI marked steel glazed doors, windows and ventilators side /top /centre hung with beading and all members such as F7D, F4B, K11 B and K12 B etc. complete of standard rolled steel sections, joints mitred and flash butt welded and sash bars tenoned and riveted, including providing and fixing of hinges, pivots, including priming coat of approved steel primer, but excluding the cost of other fittings, complete all as per approved design (sectional weight of only steel members shall be measured for payment).		
10.10.1	Fixing with 15x3 mm lugs 10 cm. long embedded in cement concrete block 15x10x10 cm of Cement Concrete 1:3:6 (1 Cement : 3 sand : 6 graded stone aggregate 20 mm nominal size).	Kg.	237.00
10.10.2	Fixing with carbon steel galvanised dash fastener of required dia and size (to be paid for separately).	Kg.	79.00
10.10.3	Extra for providing and fixing steel beading of approved shape and section with screw instead of glazing clips and metal sash putty in steel doors, windows, ventilators and composite units.	meter	34.00
10.11	Providing and fixing L-iron or T-iron frames for doors, windows and ventilators of mild steel L-section or Tee-sections, joints mitred and welded, including fixing of necessary butt hinges and screws and applying a priming coat of approved steel primer. Fixing with 15x3 mm lugs 10 cm. long embedded in cement concrete block 15x10x10 cm of Cement Concrete 1:3:6 (1 Cement : 3 sand : 6 graded stone aggregate 20 mm nominal size).	Kg.	79.00
10.12	Providing and fixing pressed steel door frames confirming to IS: 4351manufactured from commercial mild steel sheet of 1.25 mm thickness including hinges jamb, lock jamb, bead and if required angle threshold of mild steel angle of section 50x25mm, or base ties of 1.25mm pressed mild steel welded or rigidly fixed together by mechanical means, adjustable lugs with split end tail to each jamb including steel butt hinges 2.5mm thick with mortar guards, lock strike- plate and shock absorbers as specified and applying a coat of approved steel primer after pre-treatment of the surface as directed by Engineer-in-charge:		
10.12.1	Single rebate 80x50mm	Rmt	296.00
10.12.2	Single rebate 100x50mm	Rmt	309.00
10.12.3	Double rebate 115x50mm	Rmt	327.00
10.13	Providing and fixing pressed steel door confirming to IS: 4351 manufactured from commercial mild steel sheet of 3.15mm thickness and applying a coat of approved steel primer after pre-treatment of the surface as directed by Engineer-in-charge:	Sqm	1948.00

S.No.	Description of Items	Unit	Rate (in Rs)
10.14	Providing and fixing M.S. Tubular frames for doors, windows, ventilators and cupboard with any section made of 1.60mm or 1.25mm thick M.S. Sheet, joints mitred and welded and grinded finish with profiles required size with 15x3mm lugs 10cm long embedded in cement concrete M-10 (Nominal Mix with 20mm maximum size of stone aggregate) blocks 15x10x10cm or with wooden plugs and screws or rawl plugs and screws or with fixing clips or with bolts and nuts as required including fixing of necessary butt hinges and screws and applying a priming coat of approved steel primers.	Kg.	104.00
10.14.1	Steel work welded in built up sections/ framed work including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.		
10.14.1.1	In stringers, treads, landings etc. of stair cases including use of chequered plate wherever required, all complete.	Kg.	84.00
10.14.1.2	In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works.	Kg.	92.00
10.15	Steel work in built up M.S. tubular section (round, square or rectangular Hollow tube etc.) trusses/frame work etc./ railing work etc. including cutting, hoisting fixing in position and applying a priming coat of approved steel primer, welded and bolted including special shaped washers etc. complete.		
10.15.1	Hot finished welded type tubes.	Kg.	99.00
10.15.2	Hot finished seamless type tubes.	Kg.	110.00
10.15.3	Electric resistance or induction butt welded tubes.	Kg.	93.00
10.16	Providing and fixing circular/ Hexagonal cast iron or M.S. sheet box for ceiling fan clamp of internal dia 140mm, 73mm height, top lid of 1.5mm thick M.S. sheet with its top surface hacked for proper bonding, top lid shall be screwed into the cast iron/ M.S. sheet box by means of 3.3mm dia. round headed screws, one lock at the corners. Clamp shall be made of 12mm dia M.S. bar bent to shape as per standard drawing.	Each	120.00
10.17	Providing and fixing M.S. round holding down bolts with nuts and washer plates complete.	Kg.	60.00
10.18	Providing and fixing bolts including nuts and washers complete.	Kg.	74.00
10.19	Providing and fixing M.S. rivets of sizes in position.	Kg.	113.00
10.20	Welding by gas or electric plant including transportation of plant at site etc. complete.	Cm	3.00

S.No.	Description of Items	Unit	Rate (in Rs)
10.21	R.C.C. Standards post/ struts/rails/ poles of mix 1:1.5:3 (1 cement : 1.5 sand : 3 graded stone aggregate 12.5 mm nominal size) with wooden plugs or 6mm bar nibs wherever required as per direction of Engineer-in-charge including fixing (cost of earth works in excavation, concrete works in foundation to be paid separately).	Cum	16667.00
10.21.1	Providing and fixing Welded steel wire fabric of required width heaving rectangular mesh painted with two or more coats of enamel paint of approved shade over a coat of primer (Painting to be paid for separately).	Kg	56.00
10.22	Fencing with R.C.C. post placed at required distance, embedded in cement concrete blocks, every 15th post, last but one end post and corner post shall be strutted on both sides and end post one side only, provided with horizontal lines and two diagonals of barbed wire weighing 9.38 kg per 100 metres (minimun) between the two posts fitted and fixed with G.I. staples on wooden plugs or G.I. binding wire tied to 6 mm bar nibs fixed while casting the post (cost of R.C.C. posts, struts, earth work and concrete to be paid for separately) :- Payment to be made per metre cost of total length of barbed wire used.		
10.22.1	With G.I. barbed wire	Meter	10.00
10.23	Providing and fixing Angle iron post & strut of required size including bottom to be split and bent at right angle in opposite direction for 10 cm length and drilling holes upto 10 mm dia. etc. complete.	Kg.	65.00
10.24	Providing and fixing concertina coil fencing with punched tape concertina coil 600 mm dia 10 metre openable length (total length 90 m), having 50 nos rounds per 6 metre length, upto 3 m height of wall with existing angle iron 'Y' shaped placed 2.4 m or 3.00m apart and with 9 horizontal R.B.T. reinforced arbed wire, stud tied with G.I. staples and G.I. clips to retain horizontal, including necessary bolts or G.I. barbed wire tied to angle iron, all complete as per direction of Engineer-incharge, with reinforced barbed tape(R.B.T.) / Spring core (2.5 mm thick) wire of high tensile strength of 165 kg/ sq mm with tape (0.52 mm thick) and weight 43.478 gm/ metre (cost of M.S. angle, C.C. blocks shall be paid separately).	Meter	156.00
10.25	Providing and fixing G.I. chain link fabric fencing of required width and mesh size including strengthening with 2mm dia wire or nuts, bolts and washers as required complete with posts of specified material and of standard design placed and embedded in cement concrete blocks 45x45x60cm of mix 1:5:10 (1cement :5 sand :10 graded stone aggregate 40mm nominal size) every 15th post, last but one end post and corner post shall be strutted on both sides and end post on one side only and struts embedded in cement concrete blocks 70x45x50cm of the same mix, as per the direction of Engineer- in-charge. (Cost of post, painting, earthwork and CC to be paid separately)		
10.25.1	Made of G.I. wire.	Sqm	485.00

S.No.	Description of Items	Unit	Rate (in Rs)
10.25.2	Made of G.I. wire, PVC coated to achieve outer dia. not less than 5mm in required colour and shade.	Kg.	537.00
10.26	Providing and fixing stainless steel (Grade 304) railing made of Hollow tubes, channels, plates etc. including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete i/c fixing the railing with necessary accessories and stainless steel dash fasteners , stainless steel bolts etc., of required size, on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-in-charge. (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.)	Kg	407.00
10.27	Providing and fixing fly proof wire gauze to windows, clerestory windows and doors with M.S. Flat 15x3mm and nuts and bolts complete.		
10.27.1	Galvanised M.S. Wire gauze with 0.63mm dia wire and 1.4 mm aperture on both sides	Sqm	452.00
10.27.2	Stainless steel (grade 304) wire gauze of 0.5 mm dia wire and 1.4 mm aperture on both sides.	Sqm	687.00

CHAPTER- 11
FLOORING

Notes:

Applicable IS Code

IS 1124 Method of test for determination of water absorption, apparent specific gravity and porosity of natural building stones

IS 1130 Specification for marble (blocks, slabs and tiles)

IS1200-(Part XI) Method of measurement of Building and Civil Engineering work (Part 11) paving, floor finishes, dado and skirting

IS 1237-Edition 2.3 Specification for cement concrete flooring tiles

IS 2114 Code of practice for laying in-situ terrazzo floor finish

IS 13630 (Part-1 to 15) Methods of Testing of ceramic tiles

IS 15622 Specification for pressed ceramic tile

1 Marble chips / terrazo floors, skirting and dados shall conform to IS : 2114-1962.

2 Marble powder used in mosaic/terrazo topping shall pass through IS : sieve No.30.

3 Pigments used in terrazo/marble chips shall be of permanent colour.

4 For the situ marble chips/terrazo flooring the first grinding shall be done with carborandom stones of 60 grit size, the second grinding with 80 grit size and the third grinding with 120 to 150 grit size and the fourth grinding with 320 to 400 grit size.

5 For the slab or tiles flooring, the joints in the tiles or slab shall be of 1.50mm thickness. The joints shall be filled with the cement grout of the same shade as the colour of slab or tile. The terrazo tiles shall conform to IS : 1237-1959.

6 The slab or tiled flooring shall be grinded with carborandom stone. The first grinding shall be with carborandom stones of 48 to 60 grit size and the second grinding with 120 grit and final grinding with 220 to 350 grit. In case of plain/coloured terrazo tiles, initial grinding with carborandom stones of 48 to 60 grit is not necessary.

7 In case of composite flooring with two or more types of stones and where single type of stone used is 90% or more in area, the entire area is to be paid at the rate of flooring with that type of stone and in case, where the area of single type of stone is less than 90%, the flooring done shall be measured separately and paid at the rate of flooring for each type of stone separately.

8 MARBLE STONE: Marble shall be hard, sound, dense and homogeneous in texture with crystalline texture. It shall be uniform in colour and free from stains, cracks, decays and weathering.

(i)	Makarana second quality	White marble having lighter shades/spots.
(ii)	Raj nagar plain	White marble with blue or grey shades.
(iii)	Agaria White katani	White marble with irregular blue and black spots.

PHYSICAL PROPERTIES OF MARBLE BLOCKS, SLABS AND TILES

S.No	Characteristics	Requirements	Method of Test
1	Moisture absorption after 24hours immersion in cold water.	Max. 0.40% by weight	IS : 1124-1974
2	Hardness	Min. - 3	Mhos scale
3	Specific gravity	Min. - 2.50	IS : 1122-1974.

9 CEMENT CONCRETE FLOORING

9.1 Base Concrete

Flooring shall be laid on base concrete where so provided. The base concrete shall be provided with the slopes required for the flooring. Flooring in verandah, Courtyard, kitchens & baths shall have slope ranging from 1 : 48 to 1 : 60 depending upon location and as decided by the Engineer-in-Charge. Floors in water closet portion shall have slope of 1:30 or as decided by the Engineer-in-Charge to drain off washing water. Further, necessary drop in flooring in bath, WC, kitchen near floor traps ranging from 6 mm to 10 mm will also be provided to avoid spread of water. Necessary margin to accommodate this drop shall be made in base concrete. Plinth masonry off set shall be depressed so as to allow the base concrete to rest on it.

The flooring shall be commenced preferably within 48 hours of the laying of base concrete. The surface of the base shall be roughened with steel wire brushes without disturbing the concrete. Immediately before laying the flooring, the base shall be wetted and a coat of cement slurry @ 2 kg of cement spread over an area of one sqm so as to get a good bond between the base and concrete floor.

If the cement concrete flooring is to be laid directly on the RCC slab, the top surface of RCC slab shall be cleaned and the laitance shall be removed and a coat of cement slurry @ 2 kg of cement spread over an area of one sqm so as to get a good bond between the base and concrete floor.

9.2 Thickness

The thickness of floor shall be as specified in the description of the item.

9.3 Laying

Panels : Flooring of specified thickness shall be laid in the pattern including the border as given in the drawings or as directed by the Engineer-in-Charge. The border panels shall not exceed 450 mm in width and the joints in the border shall be in line with panel joints. The panels shall be of uniform size and no dimension of a pane! shall exceed 2 m and the area of a panel shall not be more than 2 sqm. The joints of borders at corners shall be mitred for provision of strips.

9.4 Curing

Curing shall be commenced on the next day of plastering when the plaster has hardened sufficiently and shall be continued for a minimum period of 7 days.

9.5 Measurement

Length and breadth shall be measured before laying skirting, dado or wall plaster. No deduction shall be made nor extra paid for voids not exceeding 0.20 sqm. Deductions for ends of dissimilar materials or other articles embedded shall not be made for areas not exceeding 0.10 sqm.

The flooring done either with strips (in one operation) or without strips (in alternate panels) shall be treated as same and measured together

9.6 Rates

The rate shall include the cost of all materials and labour involved in all the operations described above including application of cement slurry on RCC slab or on base concrete including roughening and cleaning the surface but excluding the cost of strips which shall be paid separately under relevant item.

10 TERRAZO TILES FLOORING

Terrazo tiles shall generally conform to IS 1237-Edition 2.3. Unless otherwise specified, the tiles shall be supplied with initial grinding and grouting of wearing layer

The size of tiles shall be as given in Table Below or as shown in the drawings or as required by the Engineer-in-Charge. Half tiles for use with the full tiles shall be such as to make two half tiles when joined together, match with the dimensions of one full tile.

Length Nominal	*Breadth Nominal*	*Thickness not less than*
200 mm	200 mm	20 mm
250 mm	250 mm	22 mm
300 mm	300 mm	25 mm

10.1 Laying of Terrazo tile :-

(i) Base concrete or RCC slab on which the tiles are to be laid shall be cleaned, wetted and mopped. The bedding for the tiles shall be with cement mortar of specified proportion and in conformity with provisions in relevant para of chapter on 'Mortar'.

(ii) Cement mortar 1:4 (1 Cement : 4 coarse sand) bedding shall be used. Average thickness of the bedding mortar shall be 20 mm and the thickness at any place shall not be less than 10 mm.

(iii) Cement mortar bedding shall be spread, tamped and corrected to proper levels and allowed to harden for a day before the tiles are set. If cement mortar is laid in bedding the terrazo tiles, these shall be set immediately after laying the mortar. Over this bedding neat grey cement slurry of honey like consistency shall be spread at the rate of 4.4 kg of cement per square meter over such an area as would accommodate about twenty tiles. Tiles shall be washed clean and shall be fixed in this grout one after another, each tile being gently tapped with a wooden mallet till it is properly bedded, and in level with the adjoining tiles. The joints shall be kept as thin as possible not exceeding 1 mm and in straight lines or to suit the required pattern. The joints shall be properly cleaned before filling with cement grout of matching colour.

10.2 Curing, Polishing and Finishing

The floor shall then be kept wet for a minimum period of 7 days. The surface shall thereafter be grounded evenly with machine fitted with coarse grade grit block (No. 60). Water shall be used profusely during grinding. After grinding the surface shall be thoroughly washed to remove all grinding mud, cleaned and mopped. It shall then be covered with a thin coat of grey or white cement, mixed with or without pigment to match the colour of the topping of the wearing surface in order to fill any pin hole that appear. The surface shall be again cured. The second grinding shall then be carried out with machine fitted with fine grade grit block (No. 120).

10.3 Measurements

(i) Terrazo tiles flooring with tiles manufactured from ordinary grey cement without pigment and coloured terrazo tile flooring shall be measured in length and breadth correct to a cm before laying separately. Terrazo tile flooring shall be measured as laid in square meter correct to two plains of decimal. For length and breadth dimensions correct to a cm before laying skirting, dado or wall plaster shall be taken. No deduction shall be made nor extra paid for voids not exceeding 0.20 sqm. Deductions for ends of dissimilar materials or other articles embedded shall not be made for areas not exceeding 0.10 square meter. Nothing extra shall be paid for use of cut tiles nor for laying the floor at different levels in the same room or courtyard.

(ii) Terrazo tile flooring laid in floor borders and similar band shall be measured under the item of terrazo tile flooring. Nothing extra shall be paid in respect of these and similar bands formed of half size or multiplies of half size standard tiles or other uncut tiles.

(iii) Treads of stairs and steps paved with tiles without nosing, shall also be measured under flooring- Moulded nosing shall be paid in running meter except where otherwise stated, returned moulded ends and angles to mouldings shall be included in the description. Extra shall, however, be paid for such areas where the width of treads does not exceed 30 cm.

10.4 Rate:-

The rate shall include the cost of all materials and labour involved in all the operations described above. Where cement mortar bedding is used in place of lime mortar the rate will be adjusted accordingly.

11 CHEQUERED TILE FLOORING

(i) The tiles shall be of nominal sizes such as 20 x 20 cm, 25 x 25 cm and 30 x 30 cm or of standard sizes with equal sides. The size of tiles to be used shall be as shown in approved drawings or as required by the Engineer-in-Charge. The centre to centre distance of chequers shall not be less than 2.5 cm and not more than 5 cm.

(ii) The overall thickness of the tiles shall not be less than 30 mm. The grooves in the chequers shall be uniform and straight. The depth of the grooves shall not be less than 3 mm. The chequered tiles shall be cement tiles, or terrazo tiles as specified in the description of the item. The thickness of the upper layer, measured from the top of the chequers shall not be less than 6 mm.

The terrazo tiles shall be given the first grinding with machine before delivery to site.

(iii) Laying, curing, Polishing and Finishing shall be same as TERRAZO TILES FLOORING except that the polishing of the tiles and the chequer grooves, after laying, may be done by hand. Special care shall be taken to polish the grooves in such a manner as to get a uniform section and that their finish shall match with the finish of flat portion of the tiles. Cement concrete tiles normally do not require polishing but where polishing is required the same shall be done as described above.

11.1 Measurements

Chequred tiles on stair treads shall be measured in square meter correct to two places of decimal. Length shall be measured correct to a cm before laying skirting, dado or wall plaster. Width shall be measured correct to a cm from the outer edge of the nosing, as (aid, before providing the riser. In the case of the edge tiles of the landing and wide steps, width shall be measured upto the near edge of the chequered stair tread tiles. Deductions for ends of dissimilar materials or other articles embedded shall not be made for areas not exceeding 0.10 square meter.

11.2 Rates: -

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

Nothing extra shall be payable for cutting the tiles to suit the size of treads and also for nosing.

12 PRESSED CERAMIC TILE FLOORING

The tiles shall be of approved make and shall generally conform to IS 15622. They shall be flat, and true to shape and free from blisters crazing, chips, welts, crawling or other imperfections detracting from their appearance. The tiles shall be tested as per IS 13630.

Classification and Characteristics of pressed ceramic tiles shall be as per IS 13712.

The tiles shall be square or rectangular of nominal size. Table 1,3,5, and 7 of IS 15622 give the modular preferred sizes and table 2,4,6 and 8 give the most common non modular sizes. Thickness shall be specified by the manufacturer. It includes the profiles on the visible face and on the rear side. Allowable nominal joint width upto 2mm for unrectified floor tiles and upto 1mm for rectified floor tiles. The joint in case of spacer lug tile shall be as per spacer. The tiles shall conform to table 10 of IS 15622 with water absorption 3 to 6%.

The top surface of the tiles shall be glazed. Glaze shall be either glossy or matt as specified. The underside of the tiles shall not have glaze on more than 5% of the area in order that the tile may adhere properly to the base. The edges of the tiles shall be preferably free from glaze. However, any glaze if unavoidable, shall be permissible on only upto 50 % of the surface area of the edges.

12.1 Coloured Tiles

Only the glaze shall be coloured as specified. The sizes and specifications shall be the same as for the white glazed tiles.

12.2 Decorative Tiles

The type and size of the decorative tiles shall be as follows: -

(i) Decorated white back ground tiles

The size of these tiles shall be as per IS 15622.

(ii) Decorated and having coloured back-ground

The sizes of the tiles shall be as per IS 15622.

12.3 Preparation of Surface and Laying

(i) Base concrete or the RCC slab on which the tiles are to be laid shall be cleaned, wetted and mopped. The bedding for the tile shall be with cement mortar 1:4 (1 cement : 4 coarse sand) or as specified. The average thickness of the bedding shall be 20 mm or as specified while the thickness under any portion of the tiles shall not be less than 10 mm.

(ii) Mortar shall be spread, tamped and corrected to proper levels and allowed to harden sufficiently to offer a fairly rigid cushion for the tiles to be set and to enable the mason to place wooden plank across and squat on it.

(iii) Over this mortar bedding neat grey cement slurry of honey like consistency shall be spread at the rate of 3.3 kg of cement per square meter over an area upto one square meter. Tiles shall be soaked in water washed clean and shall be fixed in this grout one after another, each tile gently being tapped with a wooden mallet till it is properly bedded and in level with the adjoining tiles. The joints shall be kept as thin as possible and in straight lines or to suit the required pattern.

(iv) The surface of the flooring during laying shall be frequently checked with a straight edge about 2 m long, so as to obtain a true surface with the required slope. In bath, toilet W.C. kitchen and balcony/verandah flooring, suitable tile drop or as shown in drawing will be given in addition to required slope to avoid spread of water. Further tile drop will also be provided near floor trap.

(v) Where full size tiles cannot be fixed these shall be cut (sawn) to the required size, and their edge rubbed smooth to ensure straight and true joints.

Tiles which are fixed in the floor adjoining the wall shall enter not less than 10 mm under the plaster, skirting or dado.

(vi) After tiles have been laid surplus cement slurry shall be cleaned off.

12.4 Pointing and Finishing

The joints shall be cleaned off the grey cement slurry with wire/coir brush or trowel to a depth of 2 mm to 3 mm and all dust and loose mortar removed. Joints shall then be flush pointed with white cement added with pigment if required to match the colour of tiles. Where spacer lug tiles are provided, the half the depth of Joint shall be filled with polysulphide or as specified on top with under filling with cement grout without the lugs remaining exposed. The floor shall then be kept wet for 7 days. After curing, the surface shall be washed and finished clean. The finished floor shall not sound hollow when tapped with a wooden mallet.

12.5 Measurements

Length and breadth shall be measured correct to a cm before laying skirting, dado or wall plaster and the area calculated in square meter correct to two places of decimal. Where coves are used at the junctions, the length and breadth shall be measured between the lower edges of the coves.

No deduction shall be made nor extra paid for voids not exceeding 0.20 square meter. Deductions for ends of dissimilar materials or other articles embedded shall not be made for areas not exceeding 0.10 square meter.

Areas, where glazed tiles or different types of decorative tiles are used will be measured separately.

12.6 Rates

The rate for flooring shall include the cost of all materials and labour involved in all the operations described above, For tiles of sizes upto 0.16 sqm, unless otherwise specified in the description of the item. Nothing extra shall be paid for the use of cut (sawn) tiles in the work.

Extra over and above the normal rate for white tiles shall be paid where coloured or any other type of decorative tiles have been used.

13 MARBLE STONE FLOORING

13.1 Marble Stone

It shall be as specified in para number 8.

13.2 Dressing of Slabs

Every stone shall be cut to the required size and shape, fine chisel dressed on all sides to the full depth so that a straight edge laid along the side of the stone shall be fully in contact with it. The top surface shall also be fine chisel dressed to remove all waviness. In case machine cut slabs are used, fine chiesel dressing of machine cut surface need not be done provided a straight edge laid any where along the machine cut surfaces is in contact with every point on it. The sides and top surface of slabs shall be machine rubbed or table rubbed with coarse sand before paving. All angles and edges of the marble slabs shall be true, square and free from chippings and the surface shall be true and plane.

The thickness of the slabs shall be 18, 30 or 40 mm as specified in the description of the item. Tolerance of + 3% shall be allowed for the thickness. In respect of length and breadth of slabs a tolerance of ± 2% shall be allowed.

13.3 Laying of Mable stone

(i) Base concrete or the RCC slab on which the slabs are to be laid shall be cleaned, wetted and, mopped. The bedding for the slabs shall be with cement mortar 1:4 (1 cement : 4 coarse sand) or as given in the description of the item.

(ii) The average thickness of the bedding mortar under the slab shall be 20 mm and the thickness at any place under the slab shall be not less than 12 mm.

(iii) The slabs shall be laid in the following manner:

Mortar of the specified mix shall be spread under the area of each slab, roughly to the average thickness specified in the item. The slab shall be washed clean before laying, it shall be laid on top, pressed, tapped with wooden mallet and brought to level with the adjoining slabs. It shall be lifted and laid aside. The top surface of the mortar shall then be corrected by adding fresh mortar at hollows. The mortar is allowed to harden a bit and cement slurry of honey like consistency shall be spread over the same at the rate of 4.4 kg of cement per sqm. The edges of the slab already paved shall be buttered with grey or white cement with or without admixture of pigment to match the shade of the marble slabs as given in the description of the item.

(iv) The slab to be paved shall then be lowered gently back in position and tapped with wooden mallet till rt is properly bedded in level with and close to the adjoining slabs with as fine a joint as possible. Subsequent slabs shall be laid in the same manner. After each slab has been laid, surplus cement on the surface of the slabs shall be cleaned off- The flooring shall be cured for a minimum period of seven days. The surface of the flooring as laid shall be true to levels, and, slopes as instructed by the Engineer-in-Charge. Joint thickness shall not be more than 1 mm.

(v) Due care shall be taken to match the grains of slabs which shall be selected Judiciously having uniform pattern of Veins/streaks or as directed by the Engineer-in-Charge.The slabs shall be matched as shown in drawings or as instructed by the Engineer-in-Charge.

(vi) Slabs which are fixed in the floor adjoining the wall shall enter not less than 12 mm under the plaster skirting or dado. The junction between waif plaster and floor shall be finished neatly and without waviness.

14 RED OR WHITE FINE DRESSED SAND STONE FLOORING

14.1 Red/White/Coloured Sand stone : The slabs of white, red and stones of other colours found at Shivpuri, Mandana, Jaisalmer, Dholpur, Basoda, Raisen and at other places to be used in flooring work shall be hard, durable and tough, free from cracks, decays and weathering. In case of red sand stones and other coloured sand stones, white patches or streaks and in case of white sand stones, coloured patches or streaks shall not be allowed. How ever, scattered spots upto 10mm diameter shall be permitted.

14.2 Dressing of Slabs

Every slab shall be cut to the required size and shape and chisel dressed on all sides to a minimum depth of 20 mm. The top and the Joints shall be fine tooled so that straight edge laid along the face is fully in contact with it. In case machine cut stones are used, chisel dressing and fine tooling of machine cut surface need not be done provided a straight edge laid anywhere along the machine cut surface is in contact with every point on it.

The thickness of the slabs after dressing shall be 40 mm or as specified in the description of item with a permissible tolerance of ± 2 mm.

14.3 Laying

(i) Base concrete on which the slabs are to be laid shall be cleaned, wetted and mopped. The bedding for the slabs shall be with cement mortar 1:5 (1 cement : 5 coarse sand) or as given in the description of the item.

(ii) The average thickness of the bedding mortar under the slabs shall be 20 mm and the thickness at any place under the slabs shall not be less than 12 mm.

(iii) The slab shall be laid in the following manner:

Mortar of specified mix shall be spreaded under each slab. The slab shall be washed clean before laying. It shall then be laid on top, pressed and larried, so that all hollows underneath get filled and surplus mortar works up through the joints. The top shall be tapped with a wooden mallet and brought to level and close to the adjoining slabs, with thickness of joint not exceeding 5 mm. Subsequent slabs shall be laid in the same manner. After laying each slab surplus mortar on the surface of slabs shall be cleaned off and joints finished flush.

(iv) In case pointing with other mortar mix is specified, the joint shall be left raked out uniformly and to a depth of not less than 12 mm when the mortar is still green. The pointing shall be cured for a minimum period of 7 days. The surface of the flooring as laid shall be true to levels and slopes as instructed by the Engineer-in-Charge.

15 RED OR WHITE FINE DRESSED AND RUBBED SAND STONE FLOORING

Stone Slabs shall be as specified in 14.1.

15.1 Dressing

The specifications for dressing the top surface and the sides shall be as described in para 14.2. In addition the dressed top and sides shall be table rubbed with coarse grade carborundum stone before paving, to obtain a perfectly true and smooth surface free from chisel marks.

The thickness of the slabs after dressing shall be as specified with a permissible tolerance of ± 2 mm.

15.2 Laying

The slabs shall be laid with 3 mm thick or 5 mm thick joints as specified in the description of the item.

Where the joints are to be limited to 3 mm thickness, the slabs shall be laid as method specified in Marble flooring except that the bedding mortar shall be as specified in para 10.3 and sides of the slabs to be jointed shall be buttered with cement mortar 1:2 (1 cement ; 2 stone dust) admixed with pigment to match the shade of the slab.

Where the slabs are to be laid with 5 mm thick joints, the specifications for laying shall be as described in para 14.3.

16 Kota stone flooring

Kota stone slabs/tiles shall be of selected quality, hard, sound, dense and homogeneous in texture, free from cracks, decay, weathering and flaws. They shall be hand or machine cut in requisite thickness. They shall be of the colour indicated in the approved drawings or as instructed by the Engineer-in-Charge.

The slabs shall have the top (exposed) face polished before being brought to site, unless otherwise specified. The slabs shall conform to the size required. Before starting the work the contractor shall get the samples of slabs approved by the Engineer-in-Charge.

16.1 Dressing

Every slab shall be cut to the required size and shape and fine chisel dressed on the sides to the full depth so that a straight edge laid along the side of the stone shall be in full contact with it. The sides (edges) shall be table rubbed with coarse sand or machine rubbed before paving. All angles and edges of the slabs shall be true, square and free from chippings and the surface shall be true and plane.

The thickness of the slab after it is dressed shall be 20, 25, 30 or 40 mm as specified in the description of the item. Tolerance of ±2 mm shall be allowed for the thickness. In respect of length and breadth of slabs Tolerance of ± 5 mm for hand cut slabs and ± 2 mm for machine cut stabs shall be allowed.

16.2 Preparation of Surface and Laying

The specification shall be same as marble laying except that the edges of the slabs to be jointed shall be buttered with grey cement, with admixture of pigment to match the shade of the slab. The thickness of the joints should be minimum as possible. In any location, it shall not exceed 1 mm.

16.3 Polishing and Finishing

The specifications shall be same as marble polishing and finishing except that
(a) first polishing with coarse grade carborundum stone shall not be done,
(b) cement slurry with or without pigment shall not be applied on the surface before polishing.

16.4 Measurement & Rates: -

Same as specified in marble flooring.

17 Tiles shall be used of premier class.

18 Engineer in charge shall inspect the cement concrete interlocking paver block in factory and approved the interlocking paver block before supply.

(For Detail Refer UADD Flooring specification / CPWD specification)

CHAPTER - 11
FLOORING

S.No.	Description of Items	Unit	Rate (in Rs)
11.1	Brick on edge (Depth) flooring with bricks of class designation 40 including cement slurry etc. complete in cement mortar with chimney brick class designation 40.		
11.1.1	1:4 (1 cement : 4 coarse sand)	Sqm	677.00
11.1.2	1:6 (1cement : 6 coarse sand)	Sqm	641.00
11.1.3	Deduct from Item no.11.1.1 & 11.1.2 if open Bhatta bricks are used.	Sqm	66.00
11.2	Dry brick on edge flooring in required pattern with bricks of class designation 40 on a bed of 12 mm mud mortar including filling joints with Sand (with M.S. bricks) complete.	Sqm	548.00
11.3	Cement concrete flooring M-15 (nominal mix) finished with a floating coat of neat cement including cement slurry, but excluding the cost of nosing of steps etc. complete.		
11.3.1	40mm thick with 20mm maximum size of stone aggregate.	Sqm	285.00
11.4	52 mm thick cement concrete flooring with concrete hardener topping under layer 40 mm thick cement concrete grade M-15 (Nominal Mix with 20mm maximum size of stone aggregate) and top layer 12 mm thick cement hardener consisting of mix 1:2 (1 cement hardener mix : 2 graded stone aggregate 6 mm nominal size) by volume .hardening compound is mixed @ 2 litre per 50 kg of cement or as per manufacturers specifications. This includes cost of cement slurry, but excluding the cost of nosing of steps etc. complete.	Sqm	429.00
11.5	62 mm thick cement concrete flooring with concrete hardener topping under layer 50 mm thick cement concrete grade M-15 (Nominal Mix with 20mm maximum size of stone aggregate) and top layer 12mm thick cement hardener consisting of mix 1:2 (1 cement hardener mix : 2 graded stone aggregate 6mm nominal size) by volume. Hardening compound is mixed @ 2 litre per 50kg of cement or as per manufactures specifications. This includes cost of cement slurry, but excluding the cost of nosing of steps etc. complete.	Sqm	474.00
11.6	Cement plaster skirting 18mm thick (up to 30 cm height) with cement mortar 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.	Sqm	273.00
11.7	Extra for making chequers of approved pattern on cement concrete floors, steps, landing, pavements etc.	Sqm	20.00

S.No.	Description of Items	Unit	Rate (in Rs)
11.8	40 mm thick marble chips flooring rubbed and polished to granolithic finish, under layer 34 mm thick cement concrete grade M-15 (Nominal Mix with 12.5mm maximum size of stone aggregate) and top layer 6mm thick with white, black, chocolate, grey, yellow or green marble chips of sizes from 1mm to 4mm nominal size laid in cement marble powder mix 3:1 (3 cement : 1 marble powder) by weight in proportion of 4:7 (4 cement marble powder mix : 7 marble chips) by volume including cement slurry etc. complete :		
11.8.1	Dark shade pigment with ordinary cement.	Sqm	459.00
11.8.2	Light shade pigment with white cement.	Sqm	488.00
11.8.3	Medium shade pigment with 50% white cement and 50% ordinary cement.	Sqm	469.00
11.8.4	White cement without any pigment.	Sqm	470.00
11.8.5	Light shade pigment with ordinary cement.	Sqm	457.00
11.8.6	Ordinary cement without any pigment.	Sqm	437.00
11.9	40 mm thick marble chips flooring, rubbed and polished to granolithic finish, under layer 31mm thick cement concrete grade M-15 (Nominal Mix with 12.5mm maximum size of stone aggregate) and top layer 9mm thick with white, black, chocolate, grey, yellow or green marble chips of sizes from 4mm to 7mm nominal size laid in cement marble powder mix 3:1 (3 cement : 1 marble powder) by weight in proportion of 4:7 (4 cement marble powder : 7 marble chips) by volume including cement slurry etc. complete.		
11.9.1	Dark shade pigment with Ordinary cement.	Sqm	487.00
11.9.2	Light shade pigment with white cement.	Sqm	527.00
11.9.3	Medium shade pigment with 50% white cement and 50% ordinary cement.	Sqm	501.00
11.9.4	White cement without any pigment.	Sqm	506.00
11.9.5	Light shade pigment with ordinary cement.	Sqm	485.00
11.9.6	Ordinary cement without any pigment.	Sqm	500.00
11.10	40 mm thick marble chips flooring, rubbed and polished to granolithic finish, under layer 28 mm thick cement concrete M-15 (Nominal Mix with 12.5mm maximum size of stone aggregate) and top layer 12mm thick with white, black, chocolate, grey yellow or green marble chips of sizes from 7mm to 10mm nominal size laid in cement marble powder mix 3:1 (3 cement : 1 marble powder) by weight in proportion of 2:3 (2 cement marble powder mix : 3 marble chips) by volume including cement slurry etc. complete :		
11.10.1	Dark shade pigment with ordinary cement.	Sqm	577.00
11.10.2	Light shade pigment with white cement.	Sqm	634.00
11.10.3	Medium shade pigment with 50% white cement and 50% ordinary cement.	Sqm	596.00
11.10.4	White cement without any pigment.	Sqm	534.00
11.10.5	Light shade pigment with ordinary cement.	Sqm	572.00
11.10.6	Ordinary cement without any pigment.	Sqm	473.00

S.No.	Description of Items	Unit	Rate (in Rs)
11.11	Marble chips skirting (up to 30 cm height) 18 mm thick with under layer 12 mm thick in cement plaster 1:3 (1 cement : 3 coarse sand) : rubbed and polished to granolithic finish, top layer 6 mm thick with white, black, chocolate, grey, yellow or green marble chips of sizes from smallest to 4 mm nominal size laid in cement marble powder mix 3:1 (3 cement : 1 marble powder) by weight in proportion of 4:7 (4 cement marble powder mix : 7 marble chips) by volume :		
11.11.1	Dark shade pigment with ordinary cement.	Sqm	596.00
11.11.2	Light shade pigment with white cement.	Sqm	624.00
11.11.3	Medium shade pigment with 50% white cement and 50% ordinary cement.	Sqm	606.00
11.11.4	White cement without any pigment.	Sqm	607.00
11.11.5	Light shade pigment with ordinary cement.	Sqm	594.00
11.11.6	Ordinary cement without any pigment.	Sqm	573.00
11.12	Providing and fixing glass strips 40 mm wide and 4 mm thick in joints of terrazo/cement concrete floors.	meter	33.00
11.13	Extra for laying terrazo flooring on staircase treads not exceeding 30 cm in width including cost of forming, nosing etc.	Sqm	27.00
11.14	18 mm thick crazy marble stone white, black or as specified marble stone flooring including filling the gaps with light shade pigment with white cement marble powder mixture (3 parts of white cement : 1 part of marble powder) by weight in proportion of 4:7 (4 cement marble powder mix : 7 white, black or white and black marble chips of sizes from 1mm to 4mm nominal size by volume) and under layer 25mm thick cement concrete M-15 (Nominal Mix with 12.5mm maximum size of stone aggregate) rubbing, polishing and cement slurry etc. complete.	Sqm	666.00
11.15	Precast terrazo tiles 18-20mm thick with graded marble chips of size upto 12mm laid in floors, and landings, jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete with precast tiles on 20mm thick bed of cement mortar 1:4 (1 cement :4 coarse sand)		
11.15.1	Light shade using white cement.	Sqm	797.00
11.15.2	Medium shade using 50%white cement and 50% ordinary cement.	Sqm	776.00
11.15.3	Dark shade using ordinary cement.	Sqm	766.00
11.15.4	Ordinary cement without any pigment.	Sqm	723.00
11.16	Extra if terrazo tiles are laid in treads of steps not exceeding 30 cm in width.	Sqm	30.00
11.17	Precast terrazo tiles 18-20mm thick with graded marble chips of sizes upto 12 mm in skirting and risers of steps not exceeding 30 cm in height on 12 mm thick cement plaster 1:3 (1 cement : 3 coarse sand) jointed with neat cement slurry mixed with pigment to match the shade of the tiles, including rubbing and polishing complete with tiles of :		
11.17.1	Light shade using white cement.	Sqm	983.00
11.17.2	Medium shade using 50%white cement and 50% ordinary cement.	Sqm	952.00

S.No.	Description of Items	Unit	Rate (in Rs)
11.17.3	Dark shade using ordinary cement.	Sqm	936.00
11.17.4	Ordinary cement without any pigment.	Sqm	893.00
11.18	Chequered terrazo tiles 18-20mm thick with graded marble chips of size up to 6 mm in floors jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete on 20 mm thick bed of cement mortar 1:4 (1 cement :4 coarse sand) :		
11.18.1	Light shade using white cement.	Sqm	797.00
11.18.2	Medium shade using 50%white cement and 50% Grey cement.	Sqm	790.00
11.18.3	Dark shade using ordinary cement.	Sqm	741.00
11.18.4	Ordinary cement without any pigment.	Sqm	698.00
11.19	Chequerred precast cement concrete tiles 18-20mm thick in footpath & courtyard jointed with neat cement slurry mixed with pigment to match the shade of tiles including rubbing and cleaning etc. complete on 20 mm thick bed of cement mortar 1:4 (1 cement: 4 coarse sand).		
11.19.1	Light shade using white cement.	Sqm	788.00
11.19.2	Medium shade using 50%white cement and 50% Grey cement.	Sqm	706.00
11.19.3	Dark shade using ordinary cement.	Sqm	582.00
11.19.4	Ordinary cement without any pigment.	Sqm	538.00
11.20	Providing and fixing 8mm to 10mm thick acid and or alkali resistant tiles of approved make and colour using acid and or alkali resisting mortar bedding and joints filled with acid and or alkali resisting cement as per IS : 4457 complete as per the direction of Engineer-in- Charge.		
11.20.1	In flooring on a bed of 10 mm thick mortar 1:4 (1 acid proof cement : 4 coarse sand).	Sqm	1023.00
11.21.2	In dado/skirting on 12 mm thick mortar 1:4 (1 acid proof cement : 4 coarse sand).	Sqm	1075.00
11.21	Tile work in skirting, risers of steps and dado (up to 2 m height) over 12 mm thick bed of cement mortar 1:4 (1 cement : 4 coarse sand) and jointed with grey cement slurry @ 3.3 kg/sqm including pointing in white cement mixed with pigment of matching shade complete.		
11.21.1	Marble tiles (polished) Raj Nagar. - 8 mm thick	Sqm	867.00
11.22	Marble stone flooring with 16mm to 18mm thick marble stone (sample of marble shall be approved by Engineer-in-charge of Laid over 20 mm (average) thick base of cement mortar 1:4 (1 cement : 4 coarse sand) jointed with grey cement slurry including rubbing and polishing complete with :		
11.22.1	Makrana white second quality.	Sqm	2142.00
11.22.2	Raj Nagar plain	Sqm	1176.00
11.22.3	Agaria White	Sqm	1805.00
11.22.4	Black Zebra.	Sqm	1382.00
11.22.5	Udaipur green marble	Sqm	1242.00
11.22.6	Pink plain marble.	Sqm	1187.00

S.No.	Description of Items	Unit	Rate (in Rs)
11.23	Extra for pre finished nosing to treads of steps of marble stone.	meter	173.00
11.24	Extra for marble stone flooring in treads of steps and risers using single length up to 2.00 meter .	Sqm	204.00
11.25	Kota stone 25mm thick flooring over 20 mm (average) thick base laid over and jointed with grey cement slurry mixed with pigment to match the shade of the slab including rubbing and polishing complete with base of 1:4 cement mortar (1 cement : 4 course sand) (minimum size of kota stone 2.0 sqft)	Sqm	875.00
11.26	Kota stone slabs 25mm thick in risers of steps, skirting,dado and pillars laid on 12mm (average) thick cement mortar 1:3 (1 cement 3 coarse sand) and jointed with grey cement slurry mixed with pigment to match the shade of the slabs, including rubbing and polishing complete.	Sqm	949.00
11.27	40 mm thick fine dressed stone flooring over 20 mm (average) thick base of cement mortar 1:3 (1cement : 3 coarse sand) with joints finished flush with cement mortar 1:3.		
11.27.1	Red sand stone	Sqm	541.00
11.27.2	White sand stone	Sqm	541.00
11.28	40 mm thick machine rubbed stone flooring over 20 mm (average) thick base of cement mortar 1:5 (1 cement :5 coarse sand) with joints 3mm thick, side buttered with cement mortar 1:2 (1 cement : 2 sand) admixed with pigment to match the shade of stone and pointing with same mortar.		
11.28.1	Red sand stone	Sqm	660.00
11.28.2	White sand stone	Sqm	660.00
11.29	Extra for pre finished nosing in treads of steps of Kota stone/ sand stone slab.	meter	39.00
11.30	Extra for Kota stone/ sand stone in treads of steps and risers using single length above 1.05 meter .	Sqm	10.00
11.31	Providing and fixing Ist quality ceramic glazed wall tiles conforming to IS : 15622 (6 to 7mm thick) of approved make in all colours, shades of any size as approved by Engineer-in-Charge in skirting, risers of steps and dados over 12 mm thick bed of cement Mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry including pointing in white cement mixed with pigment of matching shade complete.	Sqm	693.00
11.32	Providing and laying Ceramic glazed floor tiles 300x300mm or more (6 to 7 mm thick) of 1st quality conforming to IS : 15622 of approved make in colours such as White, Ivory, Grey, Fume Red Brown, laid on 20 mm thick Cement Mortar 1:4 (1 Cement : 4 Coarse sand) including pointing the joints with white cement and matching pigment etc., complete.	Sqm	647.00

S.No.	Description of Items	Unit	Rate (in Rs)
11.33	Providing and laying rectified Glazed Ceramic floor tiles 300x300 mm or more (8mm to 10mm thick) of 1st quality conforming to IS : 15622 of approved make in and colours laid on 20mm thick cement mortar 1:4 (1 Cement : 4 Coarse sand) including grouting the joints with white cement and matching pigments etc., complete.	Sqm	767.00
11.34	Providing and laying rectified Glazed Ceramic wall tiles 300x450 mm or more (8mm to 10mm thick) of 1st quality conforming to IS : 15622 of approved make in all colours, laid on 12 mm thick Cement Mortar 1:3 (1 Cement : 3 Coarse sand) including grauting the joints with white cement and matching pigments etc., complete.	Sqm	820.00
11.35	Providing and laying vitrified floor tiles (without Soluble salt) or printed (with soluble salt) Nano polished (Glossy finish) in different sizes with water absorption less than 0.05% and conforming to IS : 15622 of approved make in all colours & shades, Ist quality/ premium quality in flooring laid on 20mm thick cement mortar 1:4 (1 cement : 4 sand) including grouting the joints with white cement and matching pigments etc. complete. Size 600x600mm as per manufacturer specification.	Sqm	1116.00
11.36	Providing and laying vitrified floor tiles (without soluble salt) or printed (with soluble salt) Nano polished (Glossy finish) in different sizes with water absorption less than 0.05% and conforming to IS : 15622 of approved make in all colours & shades, Ist quality/ premium quality in skirting laid on 12mm thick cement mortar 1:4 (1 cement : 4 sand) including grouting the joints with white cement and matching pigments etc. complete. Size 600x600mm thickness as per manufacturer specification).	Sqm	937.00
11.37	Providing and laying vitrified floor tiles Multi/Dobule charged (Minimum top layer thickness 2.0mm) Neno Polished self design, in different size with water absorption less than 0.05% and conforming to IS : 15622 of approved make in all colours & shades Ist preminum quality in flooring laid on 12mm thick cement mortar 1:4 (1 cement : 4 sand) including grouting the joints with white cement and matching pigments etc. complete. (thickness as per manufacturer specification)	Sqm	886.00
11.38	Providing and laying vitrified floor tiles Multi/Dobule charged (Minimum top layer thickness 2.0mm) Neno Polished self design, in different size with water absorption less than 0.05% and conforming to IS : 15622 of approved make in all colours & shades Ist preminum quality in skirting laid on 12mm thick cement mortar 1:4 (1 cement : 4 sand) including grouting the joints with white cement and matching pigments etc. complete. (thickness as per manufacturer specification)	Sqm	1082.00
11.39	Deduct for not using 20mm thick cement mortar 1:4 (1 cement : 4 coarse sand) bedding in laying of floor tiles.	Sqm	193.00

S.No.	Description of Items	Unit	Rate (in Rs)
11.40	Fixing glazed/ Ceramic/ Vitrified floor tiles with cement based high polymer modified quick-set tile adhesive (Water based) conforming to IS: 15477 , using 5kg. adhesive per sqm of tile area, in average 3mm thickness with fixing material.	Sqm	338.00
11.41	Making bajri path including preparation of subgrade, supplying and laying brick aggregate of 50mm nominal size 7.5 cm deep with blinding material consisting of 12 mm moorum and 12 mm red bajri consolidated with road roller.	Sqm	110.00
11.42	Providing and fixing at or near ground level factory made RCC pavement slab of M-30 grade of size 450x450x50mm (HPL or equivalent) including reinforcement with 6mm dia M.S. bars 4 nos on each side including setting in position in footpath to the required level and line over a bed of 20mm average thick cement mortar (1 cement : 3 coarse sand) having thickness not more than 5mm except on curve including filling of joints with same cement mortar and making grooves etc. complete as per direction of Engineer-in-charge.	Sqm	804.00
11.43	Providing and laying 60 mm thick factory made cement concrete interlocking paver block of M -30 grade made by block making machine ith strong vibratory compaction and of approved size and design/shape laid in required colour and pattern over and including 50 mm thick compacted bed of stone dust sand, filling the joints with coarse sand etc. all complete as per the direction of Engineer-in-charge.	Sqm	612.00
11.43.1	Providing and laying 80mm thick factory made cement concrete interlocking paver block of M -40 grade made by block making machine with strong vibratory compaction and of approved size and design/ shape laid in required colour and pattern over and including 50mm thick compacted bed of stone dust sand, filling the joints with coarse sand etc. all complete as per the direction of Engineer-in-charge.	Sqm	691.00
11.43.2	Providing and laying 100 mm thick factory made cement concrete interlocking paver block of M -40 grade made by block making machine with strong vibratory compaction and of approved size and design/ shape laid in required colour and pattern over and including 50mm thick compacted bed of Stone dust sand, filling the joints with coarse sand etc. all complete as per the direction of Engineer-in-charge.	Sqm	834.00
11.44	Providing and laying 60mm thick factory made cement concrete interlocking paver block of M-30 grade reflective type rubber modulded glossy colour paving block made by block making machine with strong vibratory compaction and of approved size and shape laid in required colour and pattern over and including 50mm thick compacted bed of stone dust/sand filling the joints with sand etc. all complete as per the direction of Engineer in charge including locking edges wherever required with cement concrete M15 grade or cement mortor 1:3 with pigment of required shade to match the colour /shade of block including cost of labour, material , etc. all complete.	Sqm	678.00

S.No.	Description of Items	Unit	Rate (in Rs)
11.45	Granite work gang saw cut (polished and machine cut) of thickness 18mm for wall lining (veneer work), backing filled with a grout of average 12 mm thick in cement mortar 1:3 (1 cement : 3 sand) including pointing with white cement mortar 1:2 (1 white cement : 2 marble dust) with an admixture of pigment to match the marble shade: (To be secured to the backing by means of cramps, which shall be paid for separately).		
11.45.1	Area of Slab Over 0.50 Sqm		
11.45.1.1	Fine granite dark Black/dark Red/ White with self design/ pattern/ crystals of other colors of glitter.	Sqm	2084.00
14.45.1.2	Course granite light Black/ light Red/ off White with self design/ pattern/ crystals of other colour of glitter.	Sqm	1968.00
11.45.2	Area of slab upto 0.50 Sqm		
11.45.2.1	Fine granite dark Black/dark Red/ White with self design/ pattern/ crystals of other colors of glitter.	Sqm	2281.00
11.45.2.2	Course granite light Black/ light Red/ off White with self design/ pattern/ crystals of other colour of glitter.	Sqm	2154.00

CHAPTER - 12
ROOFING AND CEILING

Notes

Applicable IS Code

IS 277 Galvanised steel sheets (plain and corrugated)

IS1200(PT.IX) Method of measurements of building and civil engineering works: Part - 9 Roof covering (including cladding)

IS2095(PT-1) Gypsum plaster boards (Pt.1) plain Gypsum plaster boards

IS 2645 Specification for integral water proofing compounds for cement mortar and concrete

Type of Roofing

(i) Corrugated Galvanised Steel Roofing

(ii) Non Asbestos High Impact Poly Propylene Reinforced Cement Semi Corrugated Sheets Roofing

(iii) Red or White Sand Stone Roofing

1 CGS (Corrugated Galvanised Steel) Sheet Roofing

The G.S. sheet to be used in work shall conform to IS : 277-2003.

2 The C.G.S. sheets shall be free from cracks, split edges, twists, surface flaws etc. They shall be clean, bright and smooth. The galvanising shall be non-injured and in perfect condition. The sheets shall not show signs of rust or white powdry deposits on the surface. The corrugations shall be uniform in depth and pitch and parallel with the side.

3 Purlins

Purlins of the specified material or M.S. rolled sections of requisite size shall be fixed over the principal rafters. These shall not be spaced at more than the following distances.

Thickness of C.G.S. sheet	*Maximum spacing of purlins*
1.00 mm	2.00 metre
0.80 mm	1.80 metre
0.63 mm	1.60 metre

4 Roof shall not be pitched at a flatter slope than 1 vertical to 5 horizontal. The normal pitch adopted shall usually be 1 vertical to 3 horizontal.

5 Laying and fixing

(i) The sheets shall be laid with a minimum lap of 15 cm at the ends and 2 ridges of corrugations at each side. The above minimum end lap of 15 cm shall apply to slopes of 1 vertical to 2 horizontal and steeper slopes. For flatter slopes the minimum permissible end lap shall be 20 cm. The minimum lap of sheets with ridge, hip and valley shall be 20 cm measured at right angles to the line of the ridge, hip and valley respectively. These sheets shall be cut to suit the dimensions or shapes of the roof, either along their length or their width or in a slant across their lines of corrugations at hips and valleys. They shall be cut carefully with a straight edge chisel to give a smooth and straight finish.

(ii) Lapping in C.G.S. sheets shall be painted with a coat of approved steel primer and two coats of painting with approved paint suitable for G.S. sheet, before the sheets are fixed in place.

(iii) Sheets shall not generally be fixed into gables and parapets. They shall be bent up along their side edges close to the wall and the junction shall be protected by suitable flashing or by a projecting drip course, the later to cover the Junction by at least 7.5cm.

(iv) The laying operation shall include all scaffolding work involved.

(v) Sheets shall be fixed to the .purlins or other roof members such as hip or valley rafters etc. with galvanised J or L hook bolts and nuts, 8 mm diameter, with bitumen and G.I. limpet washers or with a limpet washer filled with white lead as directed by the Engineer-in-Charge. White J hooks are used for fixing sheets on angle iron purlins, and L hooks are used for fixing the sheet to R.S. joists, timber or precast concrete purlins. The length of the hook bolt shall be varied to suit the particular requirements.

The bolts shall be sufficiently long so that after fixing they project above the top of the nuts by not less than 10 mm. The grip of J or L hook bolt on the side of the purlin shall not be less than 25 mm. There shall be a minimum of three hook bolts placed at the ridges of corrugations in each sheet on every purlin and their spacing shall not exceed 30 cm. Coach screws shall not be used for fixing sheets to purlins.

6 GALVANISED STEEL SHEETS

6.1 Dimensions

Sizes of plain Sheet: The plain sheets shall be supplied in any combination of the following lengths, widths and thickness.

(a) Length : 2500 and 3000 mm

(b) Width: 900 and 1000mm

(c) Thickness : 0.50, 0.63, 0.80, 1.00 mm

In case of sheets supplied in coil, the internal diameter of coil shall be 450, 510 and 610 mm and the mass of each coil shall not exceed 12 tonne.

Coils weighing more than 12 tonnes may be supplied subject to mutual agreement between the contracting parites.

6.2 Corrugated sheets.

Length- The length of the corrugated sheets shall be as follows: 2500, 3000 mm.

6.3 Zinc Coating

The weight of coating referred to in this specification shall represent the total weight of zinc both side inclusive.

On any sample selected at random from the delivery, one set of three samples each 50 x 50mm or 50mm diameter shall be selected at random from one sheet for every 500 G.S. sheets, the coating for the different classes shall be within the limit specified in table below;

TABLE A

Mass of Coating (Total Both Sides)

Grade of coating	*Minimum average coating Triple spot test g/sqm*	*Minimum coating single spot test g/sqm**
600	600	510
450	450	380
350	350	300
275	275	235

* minimum individual value obtained in triple spot test.

6.4 Mass

The mass of sheets and coils shall be calculated as given in Table B on the basis of nominal dimensions and mass of zinc coating.

Table B

Calculation of mass of sheets or coils

Type *of materials*	*Order of calculation*	*Method of calculation*	*Number of Numerals in resultant value*
Sheet	Mass of single sheet	Nominal mass of single sheet plus mass of zinc coating	Rounded off to 4 effective figures
	Total mass	Mass of single sheet (kg) x number of sheets	Rounded off to integral value of kg
Coil	Unit mass of coil	Unit mass of sheet (kg/m^2)x width (mm) X10-3	Rounded off to 3 effective figures
	Mass of single coil	Unit mass of coil (kg/m)x length (m)	
	Total mass (kg)	Total mass of each coil	Integral number of kg

Note:

(i) Nominal mass of single sheet shall be calculated by calculating the volume of the sheet and multiplying the same with density of sheet (density 7.85 g/ cubic cm) and rounding the same to 4 effective figures.

(ii) Mass of the coating shall be calculated by multiplying the surface area of single sheet with indicated/nominal coating mass (g/square meter) as shown for triple spot test (Table A).

(iii) For calculation of corrugated sheet mass, the width before corrugation shall be considered while calculating the area.

6.5 Corrugations

The depth and pitch of corrugation shall be as follows;

Grade	*Depth of Corrugation (mm)*	*Pitch of Corrugation (mm)*
A	17.5	75
B	12.5	75

The number of corrugations shall be 8,10, 11 or 13 per sheet. The overall width of the sheets before and after corrugation shall be as given in Table below.

TABLE C

Details of Corrugations

Number of corrugations	*Grade*	*Nominal overall width of sheet measured between crowns of outside corrugations*	
		Before corrugation mm	*After corrugation mm*
(1)	*(2)*	*(3)*	*(4)*
8	A	750	660
10	A	900	810
11	A	1000	910
13	A	1200	1110
8	B	750	680
10	B	900	830
11	B	1000	930
13	B	1200	1130

7 Non Asbestos High Impact Poly Propylene Reinforced Cement Semi Corrugated Sheets Roofing

Non Asbestos High Impact Poly Propylene Reinforced Cement Semi Corrugated Sheets shall be to IS 14871 : 2000. These sheets shall be free from cracks, chipped edge corners or other damages.

7.1 The laying shall be the same as CGS sheet except that

(i) The sheets shall be laid with the end stamped ‘Top' on the smooth side pointing towards the ridge,

(ii) The sheets shall invariably be laid from right to left starting at the eaves with the procedure for mitring etc.

(iii) The side laps provided will be of one corrugation, the left hand small corrugation of each sheet being covered by the right hand large corrugation of the next sheet.

(iv) Asbestos cement expansion joints shall be inserted every 45 metres or so in the length of the roof. Specially manufactured expansion joint pieces shall be used for the purpose. The end lap of expansion joints shall not be less than 150 mm. If the expansion Joints may be between the purlins, these should be stitched with seam bolts.

8 RED OR WHITE SAND STONE ROOFING

8.1 Sand Stone Slabs

Stone slabs shall be hard, sound and durable. The slabs shall be rough chisel dressed on the top so that the dressed surface shall not be more than 6 mm from a straight edge placed on it. The edges of the depressions or projections shall be chisel dressed in a slant, so that surface does not have sharp unevenness. The sides shall also, be chisel dressed to a minimum depth of 20 mm so that the dressed edges shall at no place be more than 3 mm from a straight edge butted against it. The thickness of the slab shall be uniform and as specified in the item with a permissible tolerance of 2 mm. The slabs shall be uniform in length, the length being 5 to 8 mm less than the centre to centre spacing of the supporting wooden Joists (Karries) or RCC battens. Unless the design require some other shape the slabs shall be rectangular.

The width of the slabs shall not be less than 40 cm. The maximun spacing of rafters (Karries) or RCC batten supporting the slab shall not mare then the spacing given below:-

Thickness of Slab	*Maximum Spacing of Rafters*
40 mm	52.5 cm.
45 mm	60 cm.
50 mm	68 cm.

8.2 Laying

The slabs shall be washed clean and wetted before being laid. The stone slabs shall be jointed in cement mortar 1:4 (1 cement: 4 coarse sand). The width of joints shall not be more than 8 mm not less than 5 mm. The top joints shall be finished flush and ceiling Joints pointed with the cement mortar 1:3 (1 cement: 3 fine sand).

9 In case of corrugated G.S. sheet, the sheet shall be laid on the roof with a lap of not less than 15 cm. at the end of two corrugation at the sides. The holes for the screws or bolt shall be drilled (not punched) from in side toward outside about 23 cm. apart or as directed by the Engineer-in-charge. On the sides and at every 2nd corrugation on the ends, care being taken that all holes shall occur on the ridge of the sheet on the outside as laid in a uniform pattern.

10 The rates for G.S. sheet roofing are inclusive of necessary overlaps and wastages in cutting and all standard screws, nuts, washers, bolts, patent 'J' & 'L' hooks, bolts and other fasteners required as per specifications unless otherwise specified.

11 In tiled roofing, the three lowest courses of tiles of each layer, ridge and hip tiles shall be set in cement mortar 1:6 (with pigment to match the colour of tiles and are inclusive of these items).

12 In Mangalore tiles, the three end rows at eves, gable or other exposed parts should be tied with G.I. wire 18 gauge.

13 The wooden planks, fixed in the ceiling shall be of 20mm thickness and shall be planned, moulded, beaded and fixed to the pattern as directed by the Engineer-in-charge. The wooden beading should be of size 65x12mm section, fixed to the frame work with necessary screws and spacing not exceeding 30cm. or as directed by the Engineer-in-Charge. The overlaps of beading shall be mitred at the junction.

14 The blown bitumen to be used for water proofing treatment shall conform to IS : 702.

15 The self finished felt type-2, grade-2 fibre base, self finished, bitumen felt shall conform to IS: 1322-1970.

16 Hessain base felt type-3 shall conform to IS : 1322-1970.

17 The rates include the cost of all materials, labour, T&P, wastages and hire & running charges of machineries etc. for all the items of this chapter.

(For Detail Refer Roofing specification / CPWD specification)

CHAPTER - 12
ROOFING

S.No.	Description of Items	Unit	Rate (in Rs.)
12.1	Providing & fixing corrugated Galvanised steel (CGS) sheet roofing including vertical/curved surface fixed with polymer coated J or L hooks, bolts and nuts 8mm diameter with bitumen and G.I. limpet washers or with G.I. limpet washers filled with white lead and including a coat of approved steel primer and two coats of approved paint on overlapping of sheets complete (up to any pitch in orizontal/vertical or curved surfaces) excluding the cost of purlins, rafters and trusses and including cutting to size and shape wherever required.		
12.1.1	1.00mm thick with zinc coating not less than 275gm/m²	Sqm	871.00
12.1.2	0.80mm thick with zinc coating not less than 275gm/m²	Sqm	738.00
12.1.3	0.63 mm thick with zinc coating not less than 275gm/ m²	Sqm	624.00
12.2	Extra for straight cutting in C.G.S. sheet roofing of any thickness for making opening of area exceeding 40 sq. decimeter for chimney stacks, sky light etc. :	Meter	28.00
12.3	Extra for circular cutting in C.G.S. sheet roofing of any thickness for making opening of area exceeding 40 square decimeter :	Meter	169.00
12.4	Providing & fixing ridges or hips of width 60 cm over all width plain G.S. sheet fixed with polymer coated J. or L hooks, bolts and nuts 8 mm dia. G.I. limpet and bitumen washers complete.		
12.4.1	0.80mm thick with zinc coating not less than 275gm/m²	Meter	416.00
12.4.2	0.63mm thick with zinc coating not less than 275gm/m²	Meter	368.00
12.5	Providing & fixing valleys of 90cm wide overall in plain G.S. sheet fixed with polymer coated J, or L hooks, bolts and nuts 8mm dia.. G.I. limpet and bitumen washers complete :		
12.5.1	1.60mm thick with zinc coating not less than 350gm/m²	Meter	764.00
12.6	Providing & fixing flashing of 40 cm over all width flashing in plain, G.S. sheet fixed with polymer coated J, or L hooks, bolts and nuts, G.I. limpet and bitumen washer complete, bent to shape and fixed in wall with cement mortar 1:3 (1cement : 3 coarse sand).		
12.6.1	1.00mm thick with zinc coating not less than 275gm/m²	Meter	326.00
12.7	Providing and fixing plain G.S. sheet gutter with iron brackets 40x3mm size, bolts, nuts and washers etc. including making necessary connections with rain water pipes complete.		
12.7.1	Providing and fixing 15 cm wide 45 cm over all semi circular plain G.S. sheet gutter with iron brackets 40x3mm size, bolts, nuts and washers etc. including making necessary connections with rain water pipes complete.		
12.7.1.1	0.80mm thick with zinc coating not less than 275gm/m²	Meter	410.00
12.7.1.2	0.63mm thick with zinc coating not less than 275gm/m²	Meter	371.00

S.No.	Description of Items	Unit	Rate (in Rs.)
12.7.2	Providing and fixing Trapezoidal (Top width 0.3m, bottem width 0.2m and depth 0.1m) plain G.S. sheet gutter with iron brackets 40x3mm size, bolts, nuts and washers etc. including making necessary connections with rain water pipes complete.		
12.7.2.1	0.80mm thick with zinc coating not less than 275gm/m²	Meter	382.00
12.7.2.2	0.63mm thick with zinc coating not less than 275gm/m²	Meter	346.00
12.8	Supply & installation of precoated galvanised iron profile sheets (size, shape and pitch of corrugation as approved by Engineer-in-charge) 0.50 mm ±5% total coated thickness (TCT) thick Zinc coating 120gsm as per IS: 277 in 240mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns. Sheet should have protective guard film of 25 microns minimum to avoid scratches while transportation and should be supplied in single length upto 12 meter or as desired by Engineer-in-charge. The sheet shall be fixed using self drilling/self tapping screws of size (5.5x 55mm) with EPDM seal or with polymer coated J or L hooks, bolts and nuts 8mm diameter with bitumen and G.I. limpet washers or with G.I. limpet washers filled with white lead complete upto any pitch in horizontal/vertical or curved surfaces excluding the cost of purlins, rafters and trusses and including cutting to size and shape wherever required.	Sqm	422.00
12.9	Providing and fixing precoated galvanised steel sheet roofing accessories 0.50 mm +/- 5% total coated thickness (TCT) thick Zinc coating 120gsm as per IS: 277 in 240mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns using self drilling/ self tapping screws or with polymer coated J or L hooks, bolts and nuts and or G.I. seam bolts and nuts, G.I. plain and bitumen washers complete :		
12.9.1	Ridges plain (500 - 600mm).	Meter	628.00
12.9.2	Flashings/ Aprons.(Upto 600 mm)	Meter	609.00
12.9.3	North light curves.	Meter	311.00
12.9.4	Barge board (Upto 300 mm).	Meter	235.00
12.9.5	Crimp curve	Sqm	263.00
12.9.6	Gutter .(600 mm over all girth).	Meter	630.00

S.No.	Description of Items	Unit	Rate (in Rs.)
12.10	Providing & fixing UV stabilised fiberglass reinforced plastic sheet roofing up to any pitch including fixing with polymer coated 'J' or 'L' hooks, bolts & nuts 8mm dia. G.I plain/bitumen washers complete but excluding the cost of purlins, rafters, trusses etc. The sheets shall be manufactured out of 2400 TEX panel rovigs incorporating minimum 0.3% Ultra-violet stabiliser in resin system under approximately 2400 psi and hot cured. They shall be of uniform pigmentation and thickness without air pockets and shall conform to IS 10192 and IS 12866.The sheets shall be opaque or translucent, clear or pigmented, textured or smooth as specified.		
12.10.1	2mm thick corrugated (2.5" or 4.2" or 6") or step-down (2" or 3" or 6") as specified.	Sqm	756.00
12.10.2	2mm thick flat.	Sqm	673.00
12.11	Providing & fixing non-asbestos high impact Polypropylene reinforced cement 6 mm thick corrugated sheets (as per IS: 14871) roofing up to any pitch and fixing with polymer coated J, or L hooks, bolts and nuts 6mm dia. G.I. plain and bitumen washers or with self drilling fastener and EPDM washers etc. complete excluding the cost of purlins, rafters and trusses: corrugated sheets and including cutting to size and shape wherever required.	Sqm	297.00
12.12	Extra for straight cutting in non-asbestos polypropylene reinforced cement corrugated, semi-corrugated 6mm thick sheet roofing for making openings of area exceeding 40 square decimeter for chimney stacks, skylights etc.	Meter	28.00
12.13	Extra for circular cutting in non-asbestos polypropylene reinforced cement corrugated/semi-corrugated 6mm thick sheet roofing for making openings of area exceeding 40 square decimeter.	Meter	78.00
12.14	Extra for providing and fixing wind ties of 40x 6mm flat iron section.	Meter	117.00
12.15	Providing and fixing ridges and hips in non-asbestos fibre cement high impact polypropylene reinforced roofing with suitable fixing accessories or self drilling fastener and EPDM washer etc. complete.		
12.15.1	Corrugated serrated adjustable ridges	Meter	281.00
12.15.2	Plain wing adjustable ridges	Meter	268.00
12.15.3	Close fitting adjustable ridges	Meter	311.00
12.15.4	Unserrated adjustable hips	Meter	297.00

S.No.	Description of Items	Unit	Rate (in Rs.)
12.16	Providing and fixing non-asbestos fibre cement high impact polypropylene reinforced roofing accessories in all colours with polymer coated J or L hooks, bolts and nuts and or G.I. seam bolts and nuts, G.I. plain and bitumen washers or with self drilling fastener and EPDM washer etc. complete:		
12.16.1	Corrugated apron pieces	Meter	236.00
12.16.2	Eave's filler pieces	Meter	193.00
12.16.3	North light curves	Meter	332.00
12.16.4	Ventilator curves	Meter	365.00
12.16.5	Barge boards	Meter	436.00
12.16.6	Ridge finials	Meter	192.00
12.16.7	Special north light curves	Meter	584.00
12.16.8	S type louvers	Meter	265.00
12.17	Providing & fixing flat iron brackets 50x3mm size with necessary bolts, nuts and washers etc. for fixing asbestos cement/G.S. sheets gutters with purlins.	Meter	54.00
12.18	Painting top of roofs with bitumen of approved quality (UG10) at 17kg per 10 sqm impregnated with a coat of coarse sand at 60 cudm per 10 sqm including cleaning the slab surface with brushes and finally with a piece of cloth lightly soaked in kerosene oil complete :	Sqm	123.00
12.19	10 cm thick (average) mud phaska of damped brick earth on roofs laid to slope consolidated and plastered with 25 mm thick mud mortar mixed with bhusa at 35 kg per cum of earth and gobri leaping with mix 1:1 (1 clay : 1 cow dung) and covered with flat tile bricks of class designation 100 grouted with cement mortar 1:3 (1 cement : 3 fine sand) mixed with 2% of integral water proofing compound by weight of cement and finished neat :		
12.19.1	With chimney brick tiles	Sqm	558.00
12.20	10cm thick (average) mud phaska of damped brick earth on roofs laid to slope consolidated and plastered with 25mm thick mud mortar with bhusha at 35kg per cum of earth and gobri leaping with mix 1:1 (1 clay : 1 cow-dung) and covered with machine moulded tile bricks of class designation 125 conforming to IS:2690 (Part I) - 1992 grouted with cement mortar 1:3 (1 cement : 3 fine sand) mixed with 2% of integral water proofing compound by weight of cement and finished neat.		
12.20.1	With machine moulded Chimney brick tiles	Sqm	642.00
12.21	Extra for every additional 1 cm thickness of mud phaska	Sqm	12.00
12.22	Providing and laying pressed clay tiles (as per approved pattern 20 mm nominal thickness and of approved size) on roofs jointed with cement mortar 1:4 (1 cement : 4 coarse sand) mixed with 2% integral water proofing compound laid over a bed of 20 mm thick cement mortar 1:4 (1 cement : 4 coarse sand) and finished neat complete.	Sqm	586.00

S.No.	Description of Items	Unit	Rate (in Rs.)
12.23	Providing gola 75x75 mm in cement concrete M-15 with aggregate 10mm and down gauge including finishing with cement mortar 1:3 (1 cement : 3 fine sand) as per standard design : In 75x75mm deep chase.	Meter	116.00
12.24	Making khurras 45x45 cm with average minimum thickness of 5 cm cement concrete M-15 with aggregate of 20 mm nominal size over P.V.C. sheet 1mx1mx400micron, finished with 12mm cement plaster 1:3 (1cement : 3 coarse sand) and a coat of neat cement rounding the edge sand making and finishing the outlet complete.	Each	165.00
12.25	Providing sand stone slab for roofing and laying them in cement mortar 1 : 4 (1 cement : 4 coarse sand) over wooden karries or R.C.C. battens (Karries and battens to be paid separately) including pointing the ceiling joints with cement mortar 1:3 (1 cement : 3 fine sand) complete :		
12.25.1	Red sand stone slab (40 to 50mm thick)	Sqm	416.00
12.25.2	White sand stone slab : (40 to 50mm thick)	Sqm	441.00
12.26	Providing and fixing fiber insulating board ceiling of approved quality with necessary nails etc.complete (frame work to be paid separately) :		
12.26.1	Natural colour insulating board (12 mm thick)	Sqm	423.00
12.26.2	White face insulating board (12 mm thick)	Sqm	447.00
12.26.3	Flame retardant face insulating board (12mm thick)	Sqm	527.00
12.27	Providing and fixing (12mm thick) flat pressed 3 layer medium density particle board or graded particle board (Grade I) IS: 3087 marked in ceiling with necessary nails etc. complete (frame work to be paid separately) :	Sqm	481.00
12.28	Providing and fixing 6mm thick plain Multipurpose Cement board (High Pressure steam cured) as per IS : 14862 : 2000) with suitable fibre cement screw in ceiling etc. complete (frame work to be paid separately) :	Sqm	407.00
12.29	Extra for Circular cutting and waste in ceiling with:		
12.29.1	2nd class teak wood planks (20 mm thick)	Meter	337.00
12.29.2	Natural colour insulating board (12mm thick)	Meter	166.00
12.29.3	White face insulating board: (12mm thick)	Meter	169.00
12.29.4	Flame retardant face insulating board: (12mm thick)	Meter	179.00
12.29.5	Standard quality hard board sheet: (3mm thick)	Meter	155.00
12.30	Extra for providing and fixing ceiling to curved surfaces in narrow widths	Sqm	112.00

S.No.	Description of Items	Unit	Rate (in Rs.)
12.31	Providing and fixing false ceiling with 12 mm thick plain/semi perforated or with design ceiling tiles of BWP type phenol formaldehyde synthetic resin bonded pressed particle board conforming to IS:3087 finished with a coat of aluminium primer on both sides & edges and two coats of synthetic enamel paint of approved quality on exposed face to be fixed on a grid made out of anodised aluminium(with 15 micron anodic coating) T-sections 35x15x1.5 mm size main runners and cross runners 23.5x19x1.5mm fixed to main runners placed 600 mm centre to centre both ways so as to form a grid of 600 mm square. The frame work shall be suspended from ceiling by level adjusting hangers of 6 mm dia M.S rod fixed to roof slab by means of ceiling cleats. The suspenders shall be placed 600x1200 mm centre to centre including fixing to the frame with C.P brace screws and applying a priming coat of zinc chromate yellow primer (aluminium frame work shall be paid separately).	Sqm	324.00
12.32	Extra for providing 3mm thick translucent white acrylic plastic sheets of approved quality in false ceiling instead of 12 mm thick plain/or with design particle board ceiling tiles in item above.	Sqm	457.00
12.33	Providing 10mm thick plaster of Paris (gypsum anhydrous) ceiling up to a height of 5m above floor level over first class kail wood strips 25x6mm with 10mm gap in between and reinforced with rabbit wire mesh fixed to any frame (frame work to be paid separately) :		
12.33.1	Flat surfaces	Sqm	735.00
12.33.2	Curved surfaces	Sqm	795.00
12.34	Extra for any sunk or raised mouldings in the plaster of Paris (Gypsum anhydrous) ceiling	Sqm	197.00
12.35	Extra for providing plaster of Paris (Gypsum anhydrous) ceiling above 5 meters height from floor level.	sqm per meter height	67.00
12.36	Providing and fixing thermal insulation of ceiling (under deck insulation) with Resin Bonded Fibre glass wool conforming to IS : 8183 density 24kg/m3, 50mm thick, wrapped in 200 G Virgin Polythene bags fixed to ceiling with metallic cleats (50x50x3 mm) @ 60 cm and wire mesh of 12.5mm x 24g wire and mesh, for top most ceiling of building.	Sqm	488.00
12.37	Providing and fixing thermal insulation with Resin Bonded Fibre glass wool conforming to IS: 8193. Density 16kg/m3 , 50mm thick, wrapped in 200G Virgin Polythene bags placed over existing false ceiling and held in position by criss-crossing GI wire.	Sqm	294.00

S.No.	Description of Items	Unit	Rate (in Rs.)
12.38	Thermal Insulation of roofing with Expanded polystyrene fixed with suitable adhesive to the false ceiling as per the directions of the Engineer-in-charge		
12.38.1	With Type N - Normal 50 mm thick	Sqm	212.00
12.38.2	With Type SE - Self Extinguishing type 50 mm thick	Sqm	245.00
12.39	Providing and fixing 100 mm diameter and 60 cm long rain water spout in cement mortar 1:4 (1 cement : 4 fine sand).		
12.39.1	Stone ware spout	Each	52.00
12.40	Providing and fixing M.S. holder bat clamps of approved design to C.I. or S.C.I. rain water pipes embedded in and including cement concrete blocks 10x10x10cm of M-15 grade concrete with aggregate 20 mm nominal size and cost of cutting holes and making good the walls etc. :		
12.40.1	100 mm diameter	Each	110.00
12.40.2	150 mm diameter	Each	122.00
12.41	Providing lead caulked joints to sand cast iron rain water pipes and fittings:		
12.41.1	100 mm diameter	Each	217.00
12.41.2	150 mm diameter	Each	302.00
12.43	Providing and fixing to the inlet mouth of rain water pipe cast iron grating 15 cm diameter and weighing not less than 440 grams.	Each	67.00

S.No.	Description of Items	Unit	Rate (in Rs.)
12.44	Providing and fixing at all height false ceiling including providing and fixing of frame work made of special sections power pressed from M.S. sheet and galvanised in accordance with zinc coating of grade 350 as per IS : 277 and consisting of angle cleats of size 25mm wide x 1.6mm thick with flanges of 22mm and 37mm at 1200mm centre to centre one flange fixed to the ceiling with dash fastener 12.5mm diax40mm long with 6mm dia bolts to the angle hangers of 25x25x0.55mm of required length, and other end of angle hanger being fixed with nut and bolts to G.I. channels 45x15x0.9mm running at the rate of 1200mm centre to centre to which the ceiling section 0.5mm thick button wedge of 80mm with tapered flanges of 26mm each having clips of 10.5mm at 450mm centre to centre shall be fixed in a direction perpendicular to G.I. channel with connecting clips made out of 2.64mm dia 230mm long G.I. wire at every junction including fixing the gypsum board with ceiling section and peri meter channels 0.5mm thick 27mm high having flanges of 20mm and 30mm long, the perimeter of ceiling fixed to wall/partition with the help of rawl plugs at 450mm centre to centre with 25mm long drive-all screws @ 230mm interval including jointing and fixing to a flush finish of tapered and square edges of the board with recommended filler, jointing tapes, finisher and two coats of primer suitable for board as per manufactures specification and also including the cost of making openings for light fittings, grills, diffusers, cutouts made with frame of perimeter channels suitably fixed all complete as per drawing and specification and direction of the Engineer in Charge but excluding the cost of painting with :		
12.44.1	12.5 mm thick tapered edge gypsum board conforming to IS: 2095-Part I.	Sqm	906.00
12.45	Providing and fixing to the inlet mouth of rain water pipe PTMT (an Engineering Thermoplastic) grating square (Slit) 150 mm square with a height of 8 mm and weighing not less than 100 gms.	Each	65.00

S.No.	Description of Items	Unit	Rate (in Rs.)
12.46	Providing and Fixing of sky lights consisting of Multi cell/tight cell Polycarbonate Panel System of approved colour, 16 mm thick (minimum) having uniform in color with an integral Tight-Cell core constructed not to exceed 4mmx4mm in a cross section, Vertical Standing Seam manufactured at both sides of the panel. Snap-on connector to interlock the panels shall have a grip-lock double tooth locking mechanism to ensure maximum uplift capability and shall be of same color as that of panel. Panel shall be factory sealed/end welded panels with additional End-cap/Aluminium U-Profile (mill finish) for ends. Panel shall be co-extruded with special anti glare compound and UV protected. The full system shall be fitted on MS purlins perpendicular to direction of sheeting with purlin spacing as specified by Manufacturer. The rate includes cost of all the operations, labour and all materials and tests (as applicable) involved such as bolts nuts and screws etc. and labour for cutting bending to required profile, necessary scaffolding, hoisting in position etc. for proper completion of the work etc. complete as per specification drawings and direction of Engineer in charge. Finished surface area of roofing fixed over steel tublar structure shall be measured for payment. MS tabular frame work shall be measured separately for payment.	Sqm	3277.00
12.47	Providing & fixing pressed clay tile (Mangalore tile) 20 mm nominal hickness and of approved size and as per approved pattern ceiling on steel frame work complete (steel frame work to be paid separately).	Sqm	233.00
12.48	Providing & laying pressed clay tile ridge (Mangalore tile) of 20mm thickness of approved pattern ceiling over steel frame work complete (steel frame work to be paid separately).	Sqm	113.00

S.No.	Description of Items	Unit	Rate (in Rs.)
12.49	Providing and fixing False Ceiling Tiles of approved materials of size 595 x 595mm in true horizontal level suspended on inter locking metal grid of hot dipped galvanised steel sections (galvanized @ 170 gsm/sqm.) consisting of main "T" runner suitably spaced at joints to get required length and of size 24x38mm made from 0.30mm thick (minimum) sheet spaced at 1200mm center to center and cross "T" of size 24x25mm made of 0.30mm thick (minimum) sheet, 1200mm long spaced between main "T" at 600mm center to center to form a grid of 1200x600mm and secondary cross "T" of length 600mm and size 24x25mm made of 0.30 mm thick (minimum) sheet to be interlocked at middle of the 1200x600mm panel to form grids of 600x600mm and laying false ceiling tiles of approved texture in the grid including, wherever,required, cutting/making, opening for services like diffusers, grills, light fittings, fixtures, smoke detectors etc. Main "T" runners to be suspended from ceiling using GI slotted cleats fixed to ceiling with 6 mm dia and 50mm long dash fasteners, 4mm GI adjustable rods with galvanised level clips spaced at 1200m center to center along main T, bottom exposed width of 24mm of all T-sections shall be pre-painted with polyester paint, all complete at all heights as per specifications drawings and as directed by Engineer-in-Charge.(The rate is excluding cost of tiles which will be paid separately).	Sqm.	253.00
12.50	Providing and fixing and applying plaster of paris (POP) false ceiling consisting of frame work made with 50 mm sq. M.S tubes of 18 G thickness as main runners at 600 mm c/c both ways, suspended/supported with M.S flats 25 x 4 mm from existing R.C.C slab including providing and fixing expanded metal of size 5.25 mm x 1.25 mm thickness welded to main runner and applying POP (Calcium sulphate semihydrate variety) to the expanded metal of thickness not less than 10mm finished smooth to line and level including necessary supports scaffolding etc. as required and also including applying a coat of red oxide zinc chromate primer over the M.S frame work and suspenders complete.	Sqm	1123.00
12.51	Providing and fixing on wall face unplasticised Rigid PVC rain water pipes conforming to IS : 13592 Type A including jointing with seal ring conforming to IS : 5382 leaving 10 mm gap for thermal expansion. (i) Single socketed pipes.		
12.51.1	75mm diameter	Meter	129.00
12.51.2	110mm diameter	Meter	201.00
12.51.3	Labour rate for Item No. 12.41.1 to 12.41.2	Meter	40.00

S.No.	Description of Items	Unit	Rate (in Rs.)
12.52	Providing and fixing on wall face unplasticised - PVC moulded fittings/ accessories for unplasticised Rigid PVC rain water pipes conforming to IS : 13592 Type A including jointing with seal ring conforming to IS : 5382 leaving 10 mm gap for thermal expansion.		
12.52.1	Coupler		
12.52.1.1	75mm	Each	80.00
12.52.1.2	110mm	Each	112.00
12.52.2	Single pushfit Coupler :		
12.52.2.1	75mm	Each	62.00
12.52.2.2	110mm	Each	89.00
12.52.3	Single tee with door		
12.52.3.1	75x75x75 mm	Each	106.00
12.52.3.2	110x110x110 mm	Each	165.00
12.52.4	Single tee without door		
12.52.4.1	75x75x75 mm	Each	98.00
12.52.4.2	110x110x110 mm	Each	145.00
12.52.5	Bend 87.5°		
12.52.5.1	75 mm bend	Each	72.00
12.52.5.2	110 mm bend	Each	101.00
12.52.6	Shoe (Plain)		
12.52.6.1	75 mm Shoe	Each	64.00
12.52.6.2	100 mm shoe	Each	85.00

CHAPTER - 13
FINISHING WORK

13.1 CEMENT PLASTER

The cement plaster shall be 12 mm, 15 mm or 20 mm thick as specified in the item

13.2 Preparation of Surface

The joints shall be raked out properly. Dust and loose mortar shall be brushed out. Efflorescence if any shall be removed by brushing and scrapping. The surface shall then be thoroughly washed with water, cleaned and kept wet before plastering is commenced. In case of concrete surface if a chemical retarder has been applied to the form work, the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the retarders is left on the surface

13.3 Application of Plaster

Ceiling plaster shall be completed before commencement of wall plaster.

Plastering shall be started from the top and worked down towards the floor. All putlog holes shall be properly filled in advance of the plastering as the scaffolding is being taken down. To ensure even thickness and a true surface, plaster about 15 × 15 cm shall be first applied, horizontally and vertically, at not more than 2 metres intervals over the entire surface to serve as gauges. The surfaces of these gauged areas shall be truly in the plane of the finished plaster surface. The mortar shall then be laid on the wall, between the gauges with trowel. The mortar shall be applied in a uniform surface slightly more than the specified thickness. This shall be brought to a true surface, by working a wooden straight edge reaching across the gauges, with small upward and side ways movements at a time. Finally the surface shall be finished off true with trowel or wooden float according as a smooth or a sandy granular texture is required. Excessive troweling or over working the float shall be avoided.

All corners, arrises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering corners, arrises, provision of grooves at junctions etc. where required shall be done without any extra payment. Such rounding, chamfering or grooving shall be carried out with proper templates or battens to the sizes required.

When suspending work at the end of the day, the plaster shall be left, cut clean to line both horizontally and vertically. When recommencing the plastering, the edge of the old work shall be scrapped cleaned and wetted with cement slurry before plaster is applied to the adjacent areas, to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of wall and not nearer than 15 cm to any corners or arrises. It shall not be closed on the body of the features such as plasters, bands and cornices, nor at the corners of arrises. Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invariably lead to leakages. The plastering and finishing shall be completed within half an hour of adding water to the dry mortar. No portion of the surface shall be left out initially to be patched up later on. The plastering and finishing shall be completed within half an hour of.

13.4 Finish

The plaster shall be finished to a true and plumb surface and to the proper degree of smoothness as required. The work shall be tested frequently as the work proceeds with a true straight edge not less than 2.5 m long and with plumb bobs. All horizontal lines and surfaces shall be tested with a level and all jambs and corners with a plumb bob as the work proceeds.

13.5 Precaution

Any cracks which appear in the surface and all portions which sound hollow when tapped, or are found to be soft or otherwise defective, shall be cut out in rectangular shape and redone as directed by the Engineer-in-Charge.

(i) When ceiling plaster is done, it shall be finished to chamfered edge at an angle at its junction with a suitable tool when plaster is being done. Similarly when the wall plaster is being done, it shall be kept separate from the ceiling plaster by a thin straight groove not deeper than 6 mm drawn with any suitable method with the wall while the plaster is green.

(ii) To prevent surface cracks appearing between junctions of column/beam and walls, 150 mm wide chicken wire mesh should be fixed with U nails 150 mm centre to centre before plastering the junction. The plastering of walls and beam/column in one vertical plane should be carried out in one go. For providing and fixing chicken wire mesh with U nails payment shall be made separately.

13.6 Scaffolding

For all exposed brick work or tile work double scaffolding independent of the work having two sets of vertical supports shall be provided. The supports shall be sound and strong, tied together with horizontal pieces over which scaffolding planks shall be fixed. For all other work in buildings, single scaffolding shall be permitted. In such cases the inner end of the horizontal scaffolding pole shall rest in a hole provided only in the header course for the purpose. Only one header for each pole shall be left out. Such holes for scaffolding shall, however, not be allowed in pillars/columns less than one metre in width or immediately near the skew backs of arches. The holes left in masonry works for scaffolding purposes shall be filled and made good before plastering.

13.7 White washing/Colour washing/ Painting/ Distempering etc.

Before new work is white washed, the surface shall be thoroughly brushed free from mortar droppings and foreign matter. In case of old work, all loose particles and scales shall be scrapped off and holes in plaster as well as patches of less than 50 cm area shall be filled up with mortar of the same mix. Where so specifically ordered by the Engineer-in-Charge, the entire surface of old white wash shall be thoroughly removed by scrapping and this shall be paid for separately. Where efflorescence is observed the deposits may be brushed clean and washed. The surface shall then be allowed to dry for atleast 48 hours before white washing is done.

13.8 Protective Measures

Doors, windows, floors, articles of furniture etc. and such other parts of the building not to be white washed, shall be protected from being splashed upon. Splashings and droppings, if any shall be removed by the contractor at his own cost and the surfaces cleaned. Damages if any to furniture or fittings and fixtures shall be recoverable from the contractor.

13.9 Material

The paint shall be (Texured exterior paint/Acrylic smooth exterior paint/premium acrylic smooth exterior paint) of approved brand and manufacture. This paint shall be brought to the site of work by the contractor in its original containers in sealed condition. The material shall be brought in at a time in adequate quantities to suffice for the whole work or at least a fornight's work. The materials shall be kept in the joint custody of the contractor and the Engineer-in-Charge. The empty containers shall not be removed from the site of work till the relevant item of work has been completed and permission obtained from the Engineer-in-Charge.

13.10 Preparation of Surface

For new work, the surface shall be thoroughly cleaned off all mortar dropping, dirt dust, algae, fungus or moth, grease and other foreign matter of brushing and washing, pitting in plaster shall make good, surface imperfections such as cracks, holes etc. should be repaired using white cement. The prepared surface shall have received the approval of the Engineer in charge after inspection before painting is commenced.

Before pouring into smaller containers for use, the paint shall be stirred thoroughly in its container, when applying also the paint shall be continuously stirred in the smaller containers so that its consistency is kept uniform. Dilution ratio of paint with potable water can be altered taking into consideration the nature of surface climate and as per recommended dilution given by manufacturer. In all cases, the manufacturer's instructions and directions of the Engineer-in-charge shall be followed meticulously. The lids of paint drums shall be kept tightly closed when not in use as by exposure to atmosphere the paint may thicken and also be kept safe from dust.

Paint shall be applied with a brush/ roller on the cleaned and smooth surface. Horizontal strokes shall be given and vertical strokes shall be applied immediately afterwards. This entire operation will constitute one coat. The surface shall be finished as uniformly as possible leaving no brush roller marks.

Where so stipulated, the painting shall be done by spraying. Spray machine used may be (a) high pressure (small air aperture) type, or (b) a low pressure (large air gap) type, depending on the nature and location of work to be carried out. Skilled and experienced workmen shall be employed for this class of work. Paints used shall be brought to the requisite consistency by adding a suitable thinner.

Spraying should be done only when dry condition prevails. Each coat shall be allowed to dry out thoroughly and rubbed smooth before the next coat is applied. This should be facilitated by thorough ventilation. Each coat except the last coat, shall be lightly rubbed down with sand paper or fine pumice stone and cleaned off dust before the next coat is laid.

No left over Paint shall be put back into the stock tins. When not in use, the containers shall be kept properly closed.

No hair marks from the brush or clogging of Paint puddles in the corners of panels, angles of mouldings etc. shall be left on the work.

In painting doors and windows, the putty round the glass panes must also be painted but care must be taken to see that no Paint stains etc. are left on the glass. Tops of shutters and surfaces in similar hidden locations shall not be left out in painting. However, bottom edge of the shutters where the painting is not practically possible, need not be done nor any deduction on this account will be done but two coats of primer of approved make shall be done on the bottom edge before fixing the shutters.

On painting steel work, special care shall be taken while painting over bolts, nuts, rivets overlaps etc.

TABLE 13.1

Sr. No.	Description of work	How measured	Multiplying coefficients
1	2	3	4
I	Wood work doors, windows etc.		
1	Panelled or framed and braced doors, windows etc.	Measured flat (not girthed including)	1.30 (for each side)
2	Ledged and battened or ledged, battened and braced doors, windows etc.	Chowkhat or frame, Edges, chocks, cleats, etc. shall be deemed to be included in the item.	-do-
3	Flush doors etc.	-do-	1.20 (for each side)
4	Part panelled and part glazed or gauzed doors, window etc. (Excluding painting of wire gauze portion)	-do-	1.00 (for each side)
5	Fully glazed or gauzed doors, windows etc. (Excluding painting of wire gauze portion)	-do-	0.80 (for each side)
6	Fully venetioned or louvered doors, windows etc.	-do-	1.80 (for each side)
7	Trellis (or Jaffri) work one way or two way	Measured flat overall, no deduction shall be made for open spaces, sup-porting members shall not be mea-sured separately	2 (for painting all over)
8	Carved or enriched work	Measured flat	2 (for each side)
9	Weather boarding	Measured flat (not girthed supporting frame work shall not be measured separately	1.20 (for each side)
10	Wood shingle roofing	Measured flat (not girthed)	1.10 (for each side)
11	Boarding with cover fillets and match boarding	Measured flat (not girthed)	1.05 (for each side)
12	Tile and slate battening	Measured flat overall no deductions shall be made for open spaces	0.80 (for painting all over)

II	Steel work doors, windows etc.		
13	Plain sheeted steel doors or windows	Measured flat (not girthed) including frame edges etc.	1.10 (for each side)
14	Fully glazed or gauzed steel doors and windows (excluding painting of wire gauze portion)	-do-	0.50 (for each side)
15	Partly panelled and partly glazed or gauzed doors and windows (excluding painting of wire gauze portion)	-do-	0.80 (for each side)
16	Corrugated sheeted steel doors or windows	-do-	1.25 (for each side)
17	Collapsible gates	Measured flat	1.50 (for each side)
18	Rolling shutters of interlocked laths	Measured flat (size of opening) all over; jamb guides, bottom rails and locking arrangement etc. shall be in- cluded in the item (top cover shall be measured separately)	1.10 (for each side)
III	General		
19	Expanded metal, hard drawn steel wire fabric of approved quality, grill works and gratings in guard bars, balustrades, railing partitions and MS Bars in windows frames	Measured flat overall; no deduction shall be made for open spaces; supporting members shall not be measured separately	1 (for Paint all over
20	Open palisade fencing and gates including standards, braces, rails stays etc. in timber or steel Corrugated iron sheeting in roofs, side cladding etc.	(see note No. 12)	1 (for Paint all over)
21		(see note No. 12)Measured flat (not girthed)	1.14 (for each side)
22	AC corrugated sheeting in roofs, side cladding etc	-do-	1.20 (for each side)
23	AC semi corrugated sheeting in roofs, side cladding etc. or Nainital pattern using plain sheets	-do-	1.10 (for each side)
24	Wire gauze shutters including painting of wire gauze	-do-	1.00 (for each side)

13.11 Explanatory Notes for Table 13.1

(i) Measurements for doors windows etc., shall be taken flat (and not girthed) over all including chowkhuts or frames, where provided. Where Chowkhuts or frames are not provided, the shutter measurements shall be taken.

(ii) Where doors, windows etc, are of composite types other than those included in Table 13.1 the different portion shall be measured separately with their appropriate coefficients, the centre line of the common rail being taken as the dividing line between the two portions

(iii) The coefficients for door and windows shall apply irrespective of the size of frames and shutter members.

(iv) In case steel frames are used the area of doors, windows shutters shall be measured flat excluding frames.

(v) When the two faces of a door, window etc. are to be treated with different specified finishes, measurable under separate items, the edges of frames and shutters shall be treated with the one or the other type of finish as ordered by the Engineer-in-Charge and measurement of this will be deemed to be included in the measurement of the face treated with that finish.

(vi) In the case where shutters are fixed on both faces of the frames, the measurement for the door frame and shutter on one face shall be taken in the manner already described, while the additional shutter on the other face will be measured for the shutter only excluding the frame.

(vii) Where shutters are provided with clearance at top or/and bottom each exceeding 15 cm height, such openings shall be deducted from the overall measurements and relevant coefficient shall be applied to obtain the area payable.

(viii) Collapsible gates shall be measured for width from outside to outside of gate in its expanded position and for height from bottom to top of channel verticals. No separate measurements shall be taken for the top and bottom guide rails rollers, fittings etc.

(ix) Coefficients for sliding doors shall be the same as for normal types of doors in the table. Measurements shall be taken outside to outside of shutters, and no separate measurements shall be taken for the painting guide rails, rollers, fittings etc.

(x) Measurements of painting as above shall be deemed to include painting all iron fittings in the same or different shade for which no extra will be paid.

(xi) The measurements of guard bars, expanded metal, hard drawn steel wire fabric of approved quality, grill work and gratings, when fixed in frame work, painting of which is once measured else where shall be taken exclusive of the frames. In other cases the measurements shall be taken inclusive of the frames.

(xii) For painting open palisade fencing and gates etc., the height shall be measured from the bottom of the lowest rail, if the palisades do not go below it, (or from the lower end of the palisades, if they project below the lowest rail), upto the top of rails or palisades whichever are higher, but not up to the top of standards when the latter are higher than the top rails or the palisades. Width of moulded work of all other kinds, as in hand rails, cornices, architraves shall be measured by girth.

For trusses, compound girders, stanchions, lattice girders, and similar work, actual areas will be measured in sq. metre and no extra shall be paid for painting on bolt heads, nuts, washers etc. even when they are picked out in a different tint to the adjacent work.

Painting of rain water, soil, waste, vent and water pipes etc. shall be measured in running metres of the particular diameter of the pipe concerned. Painting of specials such as bends, heads, branches, junctions, shoes, etc. shall be included in the length and no separate measurements shall be taken for these or for painting brackets, clamps etc.

CHAPTER - 13
FINISHING WORK

S.No.	Description of Items	Unit	Rate (in Rs)
13.1	12 mm cement plaster of mix :		
13.1.1	1:4 (1 cement: 4 sand)	Sqm	149.00
13.1.2	1:6 (1 cement: 6 sand)	Sqm	137.00
13.2	15 mm cement plaster on rough side of single or half brick wall of mix		
13.2.1	1:4 (1 cement: 4 sand)	Sqm	174.00
13.2.2	1:6 (1 cement: 6 sand)	Sqm	159.00
13.3	20 mm cement plaster of mix :		
13.3.1	1:4 (1 cement: 4 sand)	Sqm	212.00
13.3.2	1:6 (1 cement: 6 sand)	Sqm	194.00
13.4	12 mm cement plaster finished with a floating coat of neat cement of mix :		
13.4.1	1:3 (1 cement: 3 sand)	Sqm	181.00
13.4.2	1:4 (1 cement: 4 sand)	Sqm	169.00
13.5	15 mm cement plaster on rough side of single or half brick wall finished with a floating coat of neat cement of mix :		
13.5.1	1:3 (1 cement: 3 sand)	Sqm	206.00
13.5.2	1:4 (1 cement: 4 sand)	Sqm	191.00
13.6	20mm cement plaster 1:3(1 cement : coarse sand) finished with coat of neat cement	Sqm	262.00
13.10	18 mm cement plaster in two coats under layer 12 mm thick cement plaster 1:5 (1 cement: 5 coarse sand) finished with a top layer 6mm thick cement plaster 1:4 (1 cement: 4 fine sand).	Sqm	206.00
13.11	18 mm cement plaster in two coats under layer 12 mm thick cement plaster 1:5 (1 cement: 5 coarse sand) and a top layer 6mm thick cement plaster 1:3 (1 cement: 3 coarse sand) finished rough with sponge.	Sqm	224.00
13.12	6 mm cement plaster of mix :		
13.12.1	1:3 (1 cement: 3 fine sand)	Sqm	111.00
13.13	6 mm cement plaster 1:3 (1 cement: 3 fine sand) finished with a floating coat of neat cement and thick coat of Lime wash on top of walls when dry for bearing of R.C.C. slabs and beams.	Sqm	148.00
13.14	Providing sand faced plaster upto 10meter height above ground level concrete or brick masonry surfaces in two coats, base coat of 13 mm thick in cement mortar 1:4 (1 cement : 4 sand), clearing the surface by combing it and finishing coat of 8 mm. thick in cement mortar 1:3 (1 cement: 3 sand) and taking out surface grains by mechanical arrangement including cost of all material, labour, and T and P including all lead, lift and scaffolding etc. complete.	Sqm	375.00

S.No.	Description of Items	Unit	Rate (in Rs)
13.15	Neat cement punning	Sqm	30.00
13.16	Rough cast plaster upto 10m height above ground level with a mixture of sand and gravel or crushed stone from 6mm to 10mm nominal size dashed over and including the fresh plaster in two layers, under layer 12mm cement plaster 1:4 (1 cement: 4 coarse sand) and top layer 10mm cement plaster 1:3 (1 cement: 3 fine sand) mixed with 10% finely grounded hydrated lime by volume of ordinary cement.	Sqm	347.00
13.17	Pebble dash plaster upto 10m height above ground level with a mixture of washed pebble or crushed stone 6mm to 12.5mm nominal size dashed over and including fresh plaster in two layers under layer 12mm cement plaster 1:4 (1 cement: 4 coarse sand) and top layer 10mm cement plaster with cement mortar 1:3 (1 cement: 3 fine sand) mixed with 10% finely grounded hydrated lime by volume of cement.	Sqm	331.00
13.18	Extra for providing and mixing water proofing material in cement plaster work in proportion recommended by the manufacturers.	Per bag (50Kg) of cement used in mixed	63.00
13.19	Extra for plastering exterior walls of height more than 10 m from ground level for every additional height of 3 m or part thereof.	Sqm	28.00
13.20	Extra for plastering on circular work not exceeding 6 m in radius:		
13.20.1	In one coat	Sqm	12.00
13.20.2	In two coat	Sqm	19.00
13.21	Extra for plastering done on moulding cornices or architraves including neat finish to line and level:		
13.21.1	In one coat	Sqm	182.00
13.21.2	In two coat	Sqm	288.00
13.22	Extra for plastering :		
13.22.1	Spherical ceiling	Sqm	48.00
13.22.2	Groined ceiling	Sqm	55.00
13.22.3	Flewing soffits	Sqm	29.00
13.23	Providing and applying plaster of paris putty of 2 mm thickness over plastered surface to prepare the surface even and smooth complete	Sqm	87.00
13.24	Providing and applying plaster of paris punning of 10 mm average thickness over plastered surface to prepare the surface even and smooth complete	Sqm	157.00

S.No.	Description of Items	Unit	Rate (in Rs)
13.25	Providing and applying 1.0 mm thick white cement based wall putty of best quality, over plastered surface to prepare the surface even and smooth complete.	Sqm	63.00
13.26	Extra for lining out plaster to imitate stone or concrete blocks walling	Sqm	33.00
13.27	12 mm thick plain cement mortar bands in cement mortar 1:4 (1 cement: 4 sand) :		
13.27.1	Flush Band	Meter	3.00
13.27.2	Sunk Band	Meter	3.00
13.27.3	Raised Band	Meter	3.00
13.27.4	Moulded Band	Meter	5.00
13.28	18 mm thick plain cement mortar band in cement mortar 1:4 (1 cement:4 sand):		
13.28.1	Flush Band	Meter	3.00
13.28.2	Sunk Band	Meter	3.00
13.28.3	Raised Band	Meter	4.00
13.28.4	Moulded Band	Meter	7.00
13.29	18 mm thick moulded cement mortar band in two coats under layer 12mm thick with cement mortar 1:5 (1 cement: 5 coarse sand) top layer 6mm thick with cement mortar 1:4 (1 cement: 4 fine sand).	cm per meter	7.00
13.30	Pointing on brick work or brick flooring with cement mortar 1:3 (1 cement: 3 sand) :		
13.30.1	Flush / Ruled/ Struck or weathered pointing.	Sqm	84.00
13.30.2	Raised and cut pointing	Sqm	136.00
13.31	Pointing on tile brick work with cement mortar 1:3 (1cement:3 sand)		
13.31.1	Flush/ Ruled/ Struck or weathered pointing	Sqm	116.00
13.32	Pointing on stone work with cement mortar 1:3 (1 cement: 3 sand) :		
13.32.1	Flush/ Ruled pointing	Sqm	104.00
13.32.2	Raised and cut pointing	Sqm	202.00
13.33	Raised and cut pointing on stone work in white cement mortar 1:3 (1white cement: 3 marble dust)	Sqm	215.00
13.34	Pointing on stone slab ceiling with cement mortar 1:2 (1 cement: 2 sand): Flush/ Ruled pointing	Sqm	60.00
13.35	Extra for pointing on walls on the outside at height more than 10m from ground level for every additional height of 3m or part there of.	Sqm	6.00
13.36	White washing with lime to give an even shade:		
13.36.1	New work (three or more coats)	Sqm	11.00
13.36.2	Satna lime wash on walls one coat	Sqm	5.00

S.No.	Description of Items	Unit	Rate (in Rs)
13.37	Colour washing such as green, blue or buff to give an even shade - New work (two or more coats) with a base coat of white washing with lime	Sqm	17.00
13.38	Distempering with 1st quality acrylic distemper (ready mixed) of approved manufacturer, of required shade and colour complete, as per manufacturer's specification.		
	Two or more coats on new work.	Sqm	42.00
13.39	Wall painting with plastic emulsion paint of approved brand and manufacture to give an even shade:		
	Two or more coats on new work	Sqm	58.00
13.40	Wall painting with premium acrylic emulsion paint of interior grade, having VOC (Volatile Organic Compound) content less than 50 grams/ litre. of approved brand and manufacture, including applying additional coats wherever required to achieve even shade and colour.		
13.40.1	One coat.	Sqm	41.00
13.40.2	Two coats.	Sqm	78.00
13.41	Applying one coat of cement primer of approved brand and manufacture on wall surface : Cement primer.	Sqm	32.00
13.42	Finishing walls with water proofing cement paint of required shade - New work (Two or more coats applied @ 3.84 kg/10 sqm).	Sqm	46.00
13.43	Finishing walls with textured exterior paint of required shade :		
13.43.1	New work (Two or more coats applied @ 3.28 ltr/10 sqm) over and including priming coat of exterior primer applied @ 2.20kg/10 sqm.	Sqm	146.00

S.No.	Description of Items	Unit	Rate (in Rs)
13.44	Finishing walls with Acrylic Smooth exterior paint of required shade:		
13.44.1	New work (Two or more coat applied @ 1.67 ltr/10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm).	Sqm	93.00
13.45.	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade		
13.45.1	New work (Two or more coats applied @ 1.43 ltr/ 10 sqm. over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm).	Sqm	89.00
13.46	Finishing with Deluxe Multi surface paint system for interiors and exteriors using Primer as per manufacturers specifications :		
13.46.1	Two or more coats on walls applied @ 1.25 ltr/10 sqm. over and including one coat of Special primer applied @ 0.75 ltr/10 sqm.	Sqm	80.00
13.46.2	Painting wood work with Deluxe Multi Surface Paint of required shade. Two or more coat applied @0.90 ltr/10 sqm over an under coat of primer applied @0.75 ltr/ 10 sqm of approved brand or manufacture	Sqm	71.00
13.46.3	Painting Steel work with Deluxe Multi Surface Paint to give an even shade. Two or more coat applied @0.90 ltr/10 sqm over an under coat of primer applied @ 0.80 ltr/ 10 sqm of approved brand or manufacture	Sqm	68.00
13.47	Applying priming coat :		
13.47.1	With ready mixed pink or Grey primer of approved brand and manufacture on wood work (hard and soft wood)	Sqm	30.00
13.47.2	With ready mixed aluminium primer of approved brand and manufacture on resinous wood and plywood	Sqm	31.00
13.47.3	With ready mixed red oxide zinc chromate primer of approved brand and manufacture on steel galvanised iron/steel works	Sqm	26.00
13.47.4	With ready mixed red oxide zinc chromate primer of approved brand and manufacture on steel work (second coat)	Sqm	14.00
13.48	Painting with silicon and acrylic emulsion based water thinnable sealer of approved brand and manufacture on wet or patchy portion of plastered surfaces:		
13.48.1	One coat	Sqm	45.00
13.48.2	Two coats	Sqm	71.00
13.49	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.		
13.49.1	On steel work	Sqm	103.00
13.49.2	On concrete work	Sqm	102.00

S.No.	Description of Items	Unit	Rate (in Rs)
13.50	Painting on G.S. sheet with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade : New work (two or more coats) including a coat of approvedsteel primer but excluding a coat of mordant solution.	Sqm	61.00
13.51	Applying a coat of mordant solution on G.S. sheet :		
13.51.1	With a solution of 38 gms of copper acetate in a litre of soft water	Sqm	21.00
13.51.2	With a solution made of 13 gms of hydrochloric acid in a solution of 13 gms each of copper chloride, copper nitrate and ammonium chloride dissolved in a litre of soft water.	Sqm	20.00
13.52	Painting (two or more coats) on rain water, soil, waste and vent pipes and fittings with black anticorrosive bitumastic paint approved brand and manufacture over and including a priming of ready mixed zinc chromate yellow primer on new work :		
13.52.1	75 mm diameter pipes	meter	15.00
13.52.2	100 mm diameter pipes	meter	27.00
13.52.3	150 mm diameter pipes	meter	41.00
13.53	Painting (two or more coats) on rain water, soil, waste and vent pipes and fittings with synthetic enamel paint of approved brand and manufacture and required colour over a priming coat of approved steel primer on new work.		
13.53.1	75 mm diameter pipes	meter	16.00
13.53.2	100 mm diameter pipes	meter	30.00
13.53.3	150 mm diameter pipes	meter	44.00
13.54	Painting with oil type wood preservative of approved brand and manufacture: New work (two or more coats)	Sqm	24.00
13.55	Providing and applying two coats of fire retardant paint unthinned on cleaned wood/ply surface @ 3.5 sqm per litre per coat including preparation of base surface as per recommendations of manufacturer to make the surface fire retardant.	Sqm	222.00
13.56	Coal tarring two coats on new work using 0.16 and 0.12 litre coal tar per sqm in the first coat and second coat respectively.	Sqm	29.00
13.57	Painting with aluminium paint of approved brand and manufacture to give an even shade - Two or more coats on new work	Sqm	56.00
13.58	Painting with acid proof paint of approved brand and manufacture of required colour to give an even shade: Two or more coats on new work.	Sqm	69.00
13.59	Painting with black anti-corrosive bitumastic paint of approved brand and manufacture to give an even shade: Two or more coats on new work.	Sqm	50.00

S.No.	Description of Items	Unit	Rate (in Rs)
13.60	Floor painting with floor enamel paint of approved brand and manufacture of required colour to give an even shade: Two or more coats on new work.	Sqm	67.00
13.61	Varnishing with varnish of approved brand and manufacture:		
13.61.1	Two or more coats of glue sizing with copal varnish over an under coat of flatting varnish.	Sqm	87.00
13.61.2	Two or more coats glue sizing with spar varnish or an under coat of flatting varnish.	Sqm	88.00
13.62	French spirit polishing : Two or more coats on new works including a coat of wood filler.	Sqm	123.00
13.63	Polishing on wood work with ready mixed wax polish of approved brand and manufacture : New work	Sqm	72.00
13.64	Floor polishing on masonry or concrete floors with wax polish of approved brand and manufacture.	Sqm	34.00
13.65	Lettering with black Japan paint of approved brand and manufacture	per letter per cm height	2.00
13.66	Washed stone grit plaster on exterior walls of height upto 10 M. above level in two layers, under layer 12mm cement plaster 1:4 (1 cement: 4 coarse sand) furrowing the under layer with scratching tool, applying cement slurry on the under layer @ 2 Kg of cement per square meter, top layer 15mm cement plaster 1:1/2:2 (1 cement: 1/2 coarse sand : 2 stone chipping 10mm nominal size) in panels with groove all around as per approved pattern including scrubbing and washing, the top layer with brushes and water to expose the stone chippings ,complete as per specification and direction of Engineer-in- charge (Payment for providing grooves shall be made separately).	Sqm	454.00
13.67	Forming groove of uniform size in the top layer of washed stone grit plaster as per approved pattern using wooden battens, nailed to the under layer including removal of wooden battens, repair to the edges of panels and finishing the groove complete as per specifications and direction of the Engineer-in-charge :		
13.67.1	15 mm wide and 15 mm deep groove	meter	26.00
13.67.2	20 mm wide and 15 mm deep groove	meter	27.00
13.68	Extra for washed grit plaster on exterior walls of height more than 10m from ground level for every additional height of 3 m or part thereof.	Sqm	73.00
13.69	Extra for washed stone grit plaster on circular work not exceeding 6m in radius (in two coats).	Sqm	37.00

S.No.	Description of Items	Unit	Rate (in Rs)
13.70	Forming groove of uniform size from 12x12mm and upto 25x15mm in plastered surface as per approved pattern using wooden battens, nailed to the under layer including removal of wooden battens, repairs to the edges of plaster panel and finishing the groove complete as per specifications and direction of the Engineer-in-Charge.	meter	27.00
13.71	Extra for using white cement in place of ordinary cement in the top layer of the item of washed stone grit plaster.	Sqm	75.00
13.72	Providing and applying 12 mm thick (average) premixed formulated one coat gypsum lightweight plaster having additives and light weight aggregates as vermiculite/ perlite respectively conforming to IS: 2547 (Part - 1 & II) 1976, applied on hacked / uneven background such as bare brick/ block/ RCC work on walls & ceiling at all floors and locations, finished in smooth line and level etc. complete.	Sqm	180.00
13.73	Providing and fixing chicken mesh as per ISI specification and in the required width with 50mm long Bombay nails on vertical and horizontal junctions of RCC and brick wall including scaffolding and all lead and lift etc. complete before plastering upt 10 meter height.	Sqm	65.00

CHAPTER - 14
REPAIRS TO BUILDINGS

Notes:

IS 419 Specifications for Putty for use in Window Frames
IS 14900 Specifications for Transparent Float Glass

1 Repairs to plaster work include cutting the patch and preparing the wall surface. Patches of 2.50 square meters and less in area shall be covered under this chapter. Plastering in patches over 2.50 square meters in area shall be paid for at the rate as applicable to new work.

2 Doors, windows and ventilators in existing opening shall be conveniently erected in position. The hold fasts of overall lenght of 40cm. shall be embedded all round in cement concrete block of size 30x10x20cm. where necessary. Masonry shall be chipped carefully and uniformly to admit easy insertion of frame in opening.

3 Before making opening in the masonry, it is necessary to examine that the wall exclusive of opening is adequate to take the load coming on the structure. All precautions as explained in chapter of demolishing & dismentaling should be followed.

4 Renewing glass panes with putty and nails or with wooden fillets:
Materials shall conform to I.S. 1761-1960.

5 Fixing fan clamps in existing R.C.C. slabs shall be done without any damage to adjoining portion of the ceiling. The fan clamps to be fixed in R.C.C. shall be not less than 16mm. in diameter M.S. bar. The fixing shall be done by making chases of size 15x7.50cm. in ceiling to R.C.C. surfaces. The two arms at the ends of the clamps shall be passed through the space over the reinforcement bar from the bottom of the slab. The chase in the ceiling filled with cement concrete M 15 grade & curing shall be done as per specifications.

6 R.C.C. columns and beams which have cracked or where reinforcements have deteriorated, shall be repaired by guniting, where necessary, centering for the beams and slabs and shoring for the columns in both the planes shall be provided before guniting is started. Curing shall be done as per specifications.

7 Repairs to flooring shall be done with proper slope as per the existing floor slope, no damage shall be done to the existing floor panel edges of adjoining panels.

8 The rates include, unless otherwise specified, cost of all materials, labour, scaffolding, T & P and hire, running charges of machineries etc. for all leads and lifts required for the work.

(For Detail Specification Refer Chapter of Repairs of Buildings specification)

CHAPTER - 14
REPAIRS & MAINTENANCE OF BUILDINGS

S.No.	Description of Items	Unit	Rate (in Rs)
14.1	Repairs to plaster of thickness 12mm to 20mm in patches of area 2.5 sq. meter and under including cutting the patch in proper shape, raking out joints and preparing and plastering the surface of the walls complete including disposal of rubbish to the dumping ground with in 50 meters lead :		
14.1.1	With cement mortar 1:4 (1 cement : 4 fine sand)	Sqm	186.00
14.1.2	With cement mortar 1:4 (1cement: 4 coarse sand).	Sqm	169.00
14.2	Fixing chowkhats in existing opening including embedding chowkhats in floors or walls cutting masonry for holdfasts embedding hold fasts in cement concrete blocks with cement concrete grade M-10 (Nominal Mix with 20mm maximum size of stone aggregate) painting two coats of approved wood preservative to sides of chowkhats and making good the damages to walls and floors as required complete including disposal of rubbish to the dumping ground within 50 meter lead :		
14.2.1	Door chowkhats	Each	560.00
14.2.2	Window chowkhats	Each	352.00
14.2.3	Clerestory window chowkhats	Each	254.00
14.3	Fixing chowkhat in existing opening in brick / RCC wall with dash fasteners of appropriate size/ chemical fastener (3nos on each vertical member of door chowkhat and 2 nos. on each vertical member of window 1.20 meter height as per UADD/CPWD specification including Cost of dash fasteners/ chemical fastener.	Each	148.00
14.4	Making the opening in brick masonry including dismantling in floor or walls by cutting masonry and making good the damages to walls, flooring and jambs complete to match existing surface i/c disposal of mulba/ rubbish to the nearest municipal dumping ground.		
14.4.1	For door/ window/ clerestory window.	Sqm	333.00
14.5	Renewing glass panes, with putty and nails wherever necessary:		
14.5.1	Float glass panes of thickness 4 mm	Sqm	577.00
14.5.2	Float glass panes of thickness 5.5 mm	Sqm	732.00
14.6	Renewing glass panes, with wooden fillets wherever necessary:		
14.6.1	Float glass panes of thickness 4 mm	Sqm	719.00
14.6.2	Float glass panes of thickness 5.5 mm	Sqm	875.00
14.7	Renewing glass panes and refixing existing wooden fillets:		
14.7.1	Float glass panes of thickness 4 mm	Sqm	606.00
14.7.2	Float glass panes of thickness 5.5 mm	Sqm	762.00

S.No.	Description of Items	Unit	Rate (in Rs)
14.8	Supplying and fixing new wooden fillets wherever necessary:		
14.8.1	2nd class teak wood fillets	meter	32.00
14.8.2	Hard wood fillets.	meter	27.00
14.9	Renewal of old putty of glass panes (length)	meter	16.00
14.10	Refixing old glass panes with putty and nails	Sqm	214.00
14.11	Fixing old glass panes with wooden fillets (excluding cost of fillets)	Sqm	175.00
14.12	Providing and fixing 16 mm M.S. Fan clamps of standard shape and size in existing R.C.C. slab including cutting chase, anchoring clamp to reinforcement bar, including cleaning, refilling, making good the chase with matching concrete, plastering and painting the exposed portion of the clamps complete.	Each	190.00
14.13	Regrading terracing of mud phaska covered with tiles or brick, in cement mortar by dismantling tiles or bricks, removing mud plaster preparing the surface of mud phaska to proper slope relaying mud plaster gobri leaping and tiles or bricks, grouted in cement mortar 1:3 (1cement : 3 fine sand) including replacing unserviceable tiles or bricks with new ones and disposal of unserviceable material the dumping ground (the cost of the new tiles or brick excluded) upto 50 meters lead.	Sqm	205.00
14.14	Replacing sand stone slabs in roofing laid in cement mortar 1:4 (1 cement : 4 coarse sand) including necessary repairs and cement pointing with same mortar complete including disposal of rubbish to dumping ground within 50 meters of lead :		
14.14.1	Red/ white sand stone slabs 30 to 50 mm thick.	Sqm	492.00
14.15	Supply and replacing wooden battens in old roofs, including making good the holes in wall and painting with oil type wood preservative of approved brand and manufacture complete including removal of rubbish within 50 meters lead :		
14.15.1	Other then teak wood battens.	Cum	56756.00
14.16	Supply and replacing wooden beams in old roofs including making good the holes in walls and painting with oil type wood preservative of approved brand and manufacture complete including removal of rubbish to the dumping ground within 50 meters lead :		
14.16.1	Not exceeding 4.00 meters in length.		
14.16.1.1	Other then teak wood beams (Sal Wood)	Cum	63108.00
14.16.1.2	Hollock wood beams	Cum	40763.00
14.16.2	Above 4.00 meters and upto 5.00 meters length.		
14.16.2.1	Other then teak wood beams (Sal Wood)	Cum	59108.00
14.16.2.2	Hollock wood beams	Cum	41554.00

S.No.	Description of Items	Unit	Rate (in Rs)
14.17	Raking out joints in lime or cement mortar and preparing the surface for re-pointing or replastering including disposal of rubbish to the dumping ground within 50 meters lead.	Sqm	19.00
14.18	Taking out wind ties from roof including cutting out rusted bolts, nuts etc. and removing materials to any distance within compound and stacking.	Kg.	2.00
14.19	Fixing of old wind tie with new fittings including painting two or more coats with anticorrosive bitumastic paint of approved brand & manufacturer over and including priming coat of ready mixed zinc chromate yellow primer of approved brand.	meter	56.00
14.20	Supply and replacing bottom rail of collapsible gate including making good all damages and applying priming coat of zinc chromate yellow primer of approved brand and manufacturer.	Kg	127.00
14.21	Supply and replacing wrought iron or M.S. Wheel or roller of old steel door or gate and fitting and fixing the same with necessary clamps, nuts and bolts/welding and erection etc. complete.		
14.21.1	Wheel 50 mm dia. and below.	per wheel	145.00
14.21.2	Wheel above 50 mm dia.	per wheel	219.00
14.22	Brick work with open bhtta bricks of class designation 25 in mud mortar.	Cum	3525.00
14.23	Providing and fixing 25 mm thick shutters for cup board etc. :		
14.23.1	Panelled or panelled & glazed shutters of :		
14.23.1.1	Superior class teak wood including nickel plated bright finished M.S. piano hinges with necessary screws.	Sqm	2907.00
14.23.1.2	1st class teak wood including nickel plated bright finished M.S. piano hinges with necessary screws.	Sqm	2524.00
14.23.2	Glazed shutters of :		
14.23.2.1	Superior class teak wood including nickel plated bright finished M.S. piano hinges with necessary screws.	Sqm	2965.00
14.23.2.2	1st class teak wood including nickel plated bright finished M.S. piano hinges with necessary screws.	Sqm	2553.00
14.24	Providing and fixing plain jaffri door and window shutters including bright or/and black enamelled M.S. butt hinges with necessary screws 35x10mm laths placed 35mm apart (frames to be paid separately) including fixing 50x12mm beading complete .		
14.24.1	Second class teak wood.	Sqm	2645.00
14.24.2	Hard wood finger	Sqm	1288.00
14.25	Providing and fixing curtain rods of 1.25mm thick brass plates with two brass brackets fixed with brass screws and wooden plugs etc. wherever necessary complete.		

S.No.	Description of Items	Unit	Rate (in Rs)
14.25.1	20 mm diameter.(18 gauge)	meter	221.00
14.25.2	25 mm diameter. (18 gauge)	meter	284.00
14.26	Providing and fixing M.S. round or square bars with M.S. flats at required spacing in wooden frames of windows and clerestory windows.	Kg	62.00
14.27	Providing joists (karries) including hoisting fixing in position and applying wood preservative on unexposed surface etc. complete with:		
14.27.1	Other then teak wood.	Cum	55754.00
14.27.2	Hollock wood.	cum	38398.00
14.28	Providing and fixing bright finished brass single acting spring hinges with necessary screws etc. complete :		
14.28.1	150mm	Each	377.00
14.28.2	125mm	Each	278.00
14.28.3	100mm	Each	210.00
14.29	Providing and fixing bright finished brass double acting spring hinges with necessary screws etc. complete :		
14.29.1	150mm	Each	475.00
14.29.2	125mm	Each	388.00
14.29.3	100mm	Each	385.00
14.30	Providing and fixing bright finished brass flush bolts with necessary screws etc. complete :		
14.30.1	250mm	Each	155.00
14.30.2	150mm	Each	125.00
14.30.3	100mm	Each	89.00
14.31	Providing and fixing 150 mm bright finished floor brass door stopper with rubber cushion, screws etc. to suit shutter thickness complete.	Each	156.00
14.32	Providing and fixing bright finished brass hard drawn hooks and eyes :		
14.32.1	300mm	Each	57.00
14.32.2	250mm	Each	59.00
14.32.3	200mm	Each	55.00
14.32.4	150mm	Each	42.00
14.32.5	100mm	Each	35.00
14.33	Providing and fixing bright finished brass fan light pivot with necessary screws etc. complete.	Each	25.00
14.34	Providing and fixing 300 mm long bright finished brass chain with hook for fan light including necessary screws etc. complete.	Each	32.00

S.No.	Description of Items	Unit	Rate (in Rs)
14.35	Providing and fixing bright finished brass quadrant stay 300mm long with necessary screws etc. complete.	Each	115.00
14.36	Providing and fixing bright finished brass helical door spring (superior quality).	Each	317.00
14.37	Providing and fixing chromium plated brass butt hinges with necessary screws etc. complete.		
14.37.1	125x70x4 mm (ordinary type)	Each	107.00
14.37.2	100x70x4 mm (ordinary type)	Each	93.00
14.37.3	75x65x4 mm (heavy type)	Each	107.00
14.37.4	75x40x2.5 mm (ordinary type)	Each	51.00
14.37.5	50x40x2.5 mm (ordinary type)	Each	26.00
14.38	Providing and fixing 85x42mm chromium plated brass pull bolt lock with necessary screws, nuts, bolts and washers etc. complete.	Each	164.00
14.39	Removing white or colour wash by scrapping and sand papering and preparing the surface smooth including necessary repairs to scratches etc. complete	Sqm	6.00
14.40	White washing with lime to give an even shade :		
14.40.1	Old work (two or more coats)	Sqm	8.00
14.40.2	Old work (one or more coats)	Sqm	5.00
14.41	Removing dry or oil bound distemper, water proofing cement paint and the like by scrapping, sand papering and preparing the surface smooth including necessary repairs to scratches etc. complete.	Sqm	8.00
14.42	Distempering with oil bound washable distemper of approved brand and manufacture to give an even shade : Old work (one or more coats)	Sqm	25.00
14.43	Distempering with 1st quality acrylic washable distemper (ready made) of approved manufacturer and of required shade and colour complete. as per manufacturer's specification. One or more coats on old work.	Sqm	26.00
14.44	Painting on G.S. sheet with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade : Old work (one or more coats)	Sqm	30.00
14.45	Painting (one or more coats) on rain water, soil, waste and vent pipes and fittings with black anticorrosive bitumastic paint of approved brand and manufacture on old work :		
14.45.1	75 mm diameter pipes	meter	10.00
14.45.2	100 mm diameter pipes	meter	13.00
14.45.3	150 mm diameter pipes	meter	18.00

S.No.	Description of Items	Unit	Rate (in Rs)
14.46	Painting (two or more coats) on rain water, soil, waste and vent pipes and fittings with aluminium paint of approved brand and manufacture over a priming coat of ready mixed zinc chromate yellow primer on new work :		
14.46.1	75 mm diameter pipes	meter	23.00
14.46.2	100 mm diameter pipes	meter	32.00
14.46.3	150 mm diameter pipes	meter	46.00
14.47	Painting (one or more coats) on rain water, soil, waste and vent pipes and fittings with synthetic enamel paint of approved brand and manufacture and required colour on old work :		
14.47.1	75 mm diameter pipes	meter	11.00
14.47.2	100 mm diameter pipes	meter	14.00
14.47.3	150 mm diameter pipes	meter	20.00
14.48	Painting with oil type wood preservative of approved brand and manufacture : Old work (one or more coats)	Sqm	19.00
14.49	Wall painting with plastic emulsion paint of approved brand and manufacture to give an even shade : One or more coats on old work.	Sqm	41.00
14.50	Painting with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade : One or more coats on old work.	Sqm	36.00
14.51	Painting with aluminium paint of approved brand and manufacture to give an even shade : One or more coats on old work.	Sqm	32.00
14.52	Painting with acid proof paint of approved brand and manufacture of required colour to give an even shade : One or more coats on old work.	Sqm	41.00
14.53	Painting with black anti-corrosive bitumastic paint of approved brand and manufacture to give an even shade : One or more coats	Sqm	29.00
14.54	French spirit polishing : One or more coats on old work.	Sqm	56.00
14.55	Polishing on wood work with ready made wax polish of approved brand and manufacture : Old work	Sqm	30.00
14.56	Re-lettering with black Japan paint of approved brand and manufacture.	Per letter per cm height	1.00
14.57	Painting (one or more coats) with black Japan paint of approved brand and manufacture to give an even shade.	Sqm	31.00

S.No.	Description of Items	Unit	Rate (in Rs)
14.58	Providing and fixing C.P. brass chain and rubber plug complete for sink or wash basin :		
14.58.1	32mm dia	Each	56.00
14.58.2	40mm dia	Each	56.00
14.59	Finishing walls with water proofing cement paint of required shade		
14.59.1	Old work (one or more coats applied @ 2.20 kg/10 sqm) over priming coat of primer applied @ 0.80 litrs/10 sqm complete including cost of Priming coat.	Sqm	41.00
14.59.2	Old work (one or more coats @ 2.20 kg/10 sqm) complete.	Sqm	28.00
14.60	Finishing walls with textured exterior paint of required shade :		
14.60.1	Old work (Two or more coats on existing cement paint surface applied @ 3.28 ltr/10 sqm.	Sqm	108.00
14.60.2	Old work (One or more coats) applied @ 1.82 ltr/10 sqm.	Sqm	66.00
14.61	Finishing walls with Acrylic Smooth exterior paint of required shade		
14.61.1	Old work (Two or more coat applied @ 1.67 ltr/ 10 sqm) on existing cement paint surface).	Sqm	53.00
14.61.2	Old work (One or more coat applied @ 0.90 ltr/10 sqm).	Sqm	36.00
14.62	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade		
14.62.1	Old work (Two or more coats applied @ 1.43 ltr/ 10 sqm) over existing cement paint surface.	Sqm	45.00
14.62.2	Old work (one or more coats applied @ 0.83 ltr/10 sqm).	Sqm	28.00
14.63	Varnishing with varnish of approved brand and manufacture:		
14.63.1	One or more coats with copal varnish.	Sqm	35.00
14.63.2	One or more coats with spar varnish.	Sqm	36.00
14.64	Melamine polishing on wood work (one or more coat).	Sqm	72.00
14.65	Varnishing with flatting varnish of approved brand and manufacture one or more coats on old work.	Sqm	36.00

CHAPTER - 15
DISMANTLING AND DEMOLISHING

Notes

IS 1200 (Pt-XVIII) Method of Measurements of Building and Civil Engineering Works (Part - XVIII) Demolition and Dismantling

IS 4130 Demolition of Buildings-Code of Safety

1 In dismantling, the articles shall be carefull removed and passed by hand, where necessary, lowered to the ground and not thrown. Iron and A.C. sheets, wooden planks etc. shall be removed with proper tools and not torn off by force.

2 All dismantled materials shall form the Government property.

3 During dismantling, every precaution shall be taken to prevent damage to any part of strucutre and also to any adjoining structure, which are to be left intact.

4 The rates are applicable to all types Buildings.

5 An inventory of all possbile serviceable materials shall be prepared. This record shall be kept for proper control during execution of work.

Portions required to be retained shall be marked before starting dismantling.

A register shall be kept at the work site in which day to day account of the turn out and the salvaged materials shall be maintained. This register shall also show weather -dismantled material is properly stacked or wasted.

6 All the materials obtained from the removal of the structure shall be the property of Government Serviceable materials shall be stacked neatly in such a manner as to avoid deterioration and a places directed by Engineer-in-Charge with in specified lead. Different categories of materials shall be stacked separately.

Unless otehrwise provided, excavated materials shall be used in back filling the execavation made in removing the structure in levelling ground or otherwise disposed off as directed with in specified lead.

Non serviceable materials shall be disposed off without causing any damage or incovenience.

7 Measurements

(i) Measurement of all works shall be recorded before dismantling.

(ii) All measurements shall be measured along the existing slopes.

8 Rates :-

The rate include the cost of all labour involved and tools used in demolishing and dismantling including scaffolding. The rate shall also include the charges for separating out and stacking the serviceable material properly and disposing off unserviceable material within a distance of 50 meters.

The rates also include for temporary shoring for the safety of portions not required to be pulled down, or of adjoining property, and providing temporary enclosures or partitions, where considered necessary.

(For Detail Refer Chapter of Dismantling and Demolishing specification)

CHAPTER - 15
DISMANTLING AND DEMOLISHING

S.No.	Description of Items	Unit	Rate (in Rs)
15.1	Demolishing lime concrete manually / by mechanical means and disposal of material within 50 meters lead as per direction of Engineer in charge.	Cum	218.00
15.2	Demolishing cement concrete manually/by mechanical means including disposal of material within 50 meters lead as per direction of Engineer-in-charge.		
15.2.1	1:3:6 or richer mix	Cum	534.00
15.2.2	1:4:8 or leaner mix	Cum	389.00
15.3	Demolishing R.C.C. work manually/ by mechanical means including stacking of steel bars and disposal of unserviceable material within 50 meters lead as per direction of Engineer-in-charge.	Cum	786.00
15.4	Extra for cutting reinforcement bars manually/by mechanical means in R.C.C. (Payment shall be made on the cross sectional area of R.C.C. or as per direction of Engineer -in-charge.	Sqm	291.00
15.5	Extra for scrapping, cleaning and straightening reinforcement from R.C.C.	Kg	3.00
15.6	Demolishing brick work manually/by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 meters lead as per direction of Engineer-in-		
15.6.1	In lime mortar	Cum	218.00
15.6.2	In cement mortar	Cum	437.00
15.7	Removing mortar from bricks and cleaning bricks including stacking within a lead of 50m (stacks of cleaned bricks shall be measured):		
15.7.1	From brick work in lime mortar	1000 Nos	1217.00
15.7.2	From brick work in cement mortar	1000 Nos	1653.00
15.8	Demolishing stone masonry manually/by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50meters lead as per direction of Engineer-in-charge:		
15.8.1	In lime mortar	Cum	282.00
15.8.2	In cement mortar	Cum	560.00
15.9	Removing mortar from and cleaning stones and concrete articles (net quantity of stacks of cleaned materials will be measured) :		
15.9.1	In lime mortar	Cum	126.00
15.9.2	In cement mortar	Cum	167.00
15.10	Dismantling doors, windows and clerestory windows (steel or wood) shutter including chowkhats, architrave, holdfasts etc. complete and stacking within 50 meters lead.		
15.10.1	Of area 3 sq. meters and below	Each	99.00
15.10.2	Of area beyond 3 sq. meters	Each	127.00

S.No.	Description of Items	Unit	Rate (in Rs)
15.11	Taking out doors, windows and clerestory window shutters (steel or wood) including stacking within 50 meters lead:		
15.11.1	Of area 3 sq. meters and below	Each	36.00
15.11.2	Of area beyond 3 sq. meters	Each	47.00
15.12	Dismantling wood work in frames, trusses, purlins and rafters upto 10 meters span and 5 meters height including stacking the material within 50 meters lead:		
15.12.1	Of sectional area 40 square centimeters and above.	Cum	940.00
15.13	Extra for dismantling trusses, rafters, purlins etc. of wood work for every additional span of one meter or part thereof beyond 10 meters :		
15.13.1	Of sectional area 40 square centimeters and above.	Cum per meter span	159.00
15.13.2	Of sectional area below 40 square centimeters.	Meter Per mtr. Span	0.50
15.14	Extra for dismantling trusses, rafters, purlins etc. of wood work for every additional height of one meter or part thereof beyond 5 meters :		
15.14.1	Of sectional area 40 square centimeters and above.	Cum per meter height	223.00
15.14.2	Of sectional area below 40 square centimeters.	meter per meter height	1.00
15.15	Dismantling steel work in single sections including dismembering and stacking within 50 meters lead in:		
15.15.1	R.S. Joists	quintal	91.00
15.15.2	Channels, angles, tees and flats	quintal	63.00
15.16	Dismantling steel work in built up sections in angles, tees, flats and channels including all gusset plates,bolts,nuts,cutting rivets,welding etc. including dismembering and stacking within 50meters lead.	Kg	1.00
15.17	Dismantling steel work manually/ by mechanical means in built up sections without dismembering and stacking within 50 meters lead as per direction of Engineer-in-charge.	Kg	1.00
15.18	Extra for dismantling trusses, rafters, purlins etc. of steel work for every additional span of one meter or part thereof beyond 10 meters	quintal	19.00
15.19	Extra for dismantling trusses, rafters, purlins etc. of steel work for every additional height of one meter or part thereof beyond 5 meters.	quintal	19.00

S.No.	Description of Items	Unit	Rate (in Rs)
15.20	Extra for marking of structural steel work required to be re-erected.	Kg.	1.00
15.21	Dismantling tile work in floors and roofs laid in cement mortar including stacking material within 50 meters lead.		
15.21.1	For thickness of tiles upto 25 mm	Sqm	27.00
15.21.2	For thickness of tiles above 25 mm and up to 40 mm	Sqm	33.00
15.22	Demolishing dry brick pitching in floors, drains etc. including stacking serviceable material and disposal of unserviceable material within 50 meters lead :	Cum	385.00
15.23	Dismantling stone slab flooring laid in cement mortar including stacking of serviceable material and disposal of unserviceable material within 50 meters lead.	Sqm	79.00
15.24	Demolishing brick tile covering in terracing including stacking of serviceable material and disposal of unserviceable material within 50 meters lead.	Sqm	30.00
15.25	Demolishing mud phaska in terracing and disposal of material within 50 meters lead.	Cum	264.00
15.26	Dismantling roofing including ridges, hips valleys and gutters etc., and stacking the material within 50 meters lead of:		
15.26.1	G.S. Sheet	Sqm	49.00
15.26.2	Asbestos sheet	Sqm	23.00
15.27	Dismantling stone slab roofing over wooden karries or R.C.C. battens (dismantling karries and battens to be paid for separately) including stacking of serviceable material and disposal of unserviceable material within 50 meters lead.	Sqm	788.00
15.28	Dismantling tiled roofing with battens boarding etc. complete including stacking of serviceable material and disposal of unserviceable material within 50 meters lead.	Sqm	62.00
15.29	Dismantling wooden ballies in posts and struts including stacking within 50 meters lead.	meter	6.00
15.30	Dismantling and stacking within 50meters lead,fencing posts or struts including all earth work and dismantling of concrete etc.in base of:		
15.30.1	T' or 'L' iron or pipe	Each	82.00
15.30.2	R.C.C.	Each	99.00
15.31	Cutting ballies or wooden posts of fencing at the point of projection above the concrete or ground and stacking the same within 50 meters lead.	Each	10.00
15.32	Dismantling barbed wire or flexible wire rope in fencing including making rolls and stacking within 50 meters lead.	Kg	11.00

S.No.	Description of Items	Unit	Rate (in Rs)
15.33	Dismantling wooden trellis work excluding frames but including stacking the serviceable material within 50 meters lead.	Sqm	18.00
15.34	Dismantling expanded metal or I.R.C. fabrics with necessary battens and beading including stacking the serviceable material within 50 meters lead.	Sqm	22.00
15.35	Dismantling wooden boardings in lining of walls and partitions, excluding supporting members but including stacking within 50 meters lead :		
15.35.1	Up to 10 mm thick	Sqm	18.00
15.35.2	Thickness above 10 mm up to 25 mm	Sqm	23.00
15.35.3	Thickness above 25 mm up to 40 mm	Sqm	27.00
15.36	Dismantling precast concrete or stone slabs in walls, partition walls etc. including stacking within 50 meters lead:		
15.36.1	Thickness up to 40 mm	Sqm	86.00
15.36.2	Thickness above 40 mm up to 75 mm	Sqm	129.00
15.37	Dismantling cement asbestos or other hard board ceiling or partition walls including stacking of serviceable materials and disposal of unserviceable materials within 50 meters lead.	Sqm	16.00
15.38	Dismantling C.I. or asbestos rain water pipe with fittings and clamps including stacking the material within 50 meters lead :		
15.38.1	75 to 80 mm dia pipe.	meter	22.00
15.38.2	100 mm dia pipe	meter	22.00
15.38.3	150 mm dia pipe	meter	23.00
15.39	Dismantling G.I. pipes (external work) including excavation and refilling trenches after taking out the pipes, manually/ by mechanical means including stacking of pipes within 50 meters lead as per direction of Engineer-in-charge :		
15.39.1	Upto 40 mm nominal bore	meter	44.00
15.39.2	Above 40 mm nominal bore	meter	48.00
15.40	Dismantling C.I. pipes including excavation and refilling trenches after taking out the pipes, manually/ by mechanical means breaking lead caulked joints, melting of lead and making into blocks including stacking of pipes, lead at site within 50 meter lead as per direction of Engineer- in-charge:		
15.40.1	Up to 150 mm diameter	meter	123.00
15.40.2	Above 150 mm dia up to 300 mm dia.	meter	161.00
15.40.3	Above 300 mm diameter	meter	218.00
15.41	Dismantling of road gully chamber of various sizes including C.I. grating with frame including stacking of useful materials near the site and disposal of unserviceable materials into municipal dumps within 50 meters lead including refilling the excavated gap.	Each	275.00

S.No.	Description of Items	Unit	Rate (in Rs)
15.42	Dismantling of flushing cistern of any size including stacking of useful materials near the site and disposal of unserviceable materials within 50 meters lead.	Each	287.00
15.43	Dismantling of C.I. sluice valve including stacking of useful materials within a lead of 50 meters		
15.43.1	Up to 150 mm diameter	Each	106.00
15.43.2	Above 150 mm diameter	Each	364.00
15.44	Dismantling of spindle fire hydrant including stacking of useful materials within 50 meters lead.	Each	215.00
15.45	Dismantling old plaster or skirting upto 15 mm thickness, raking out joints and cleaning the surface for plaster upto two floor level including disposal of rubbish within 50 meters lead and including scaffolding etc.	Sqm	19.00
15.46	Dismantling aluminium/ Gypsum partitions, doors, windows, fixed glazing and false ceiling including disposal of unserviceable surplus material and stacking of serviceable material with in 50 meters lead as directed by Engineer-in-charge.	Sqm	17.00

CHAPTER - 16
PILE WORK

Notes for Specification :-

IS Codes

Bentonite shall be as per IS 2720 (Part V).

Pile boring equipments shall be IS 14362.

Design and Construction of pile foundation (Driven cast-in-situ piles) shall be as per IS-2911 (Part 1/Sec. 1)

Design and Construction of pile foundation (Bored Cast-in-situ piles) shall be as per IS-2911 (Part 1/Sec. 2)

Design and Construction of pile foundation (Driven pre-cast concrete piles) shall be as per IS· 2911 (Part 1/Sec. 3)

Design and Construction of pile foundation (Bored pre-cast concrete piles) shall be as per IS· 2911 (Part 1/Sec. 4)

Design and Construction of pile foundation (Under reamed piles) shall be as per IS-2911 (Part 3)

Design and Construction of pile foundation Load test on piles shall be as per IS 2911 (Part-4)

1 Load :- It is load which is applied to a pile after taking into account its ultimate load capacity pile spacing, Overall bearing capacity of the ground, the allowable settlement, negative skin friction including reversal of loads.

2 Bearing Pile :- A pile formed in the ground for transmitting load of a structure to the soil by the resistance developed at its tips and or along its surface. It is either vertical of batter pile. It may be 'End bearing pile' or friction pile if it suports the load primarily along the surfaces.

3 Cast-in-situ :- Cast-in-situ piles shall be installed by driving a metal casing with a shoe at the tip and displacing the material laterally. Driven cast-in-situ pile is formed by driving a casing, permanent or temporary and subsequently filling the hole with plain or reinforcement concrete.

4 Installation of Piles : Installation of piles shall be as accurate as possible and as per design and drawings. The vertically or the required batter should be correctly maintained. Particular care shall be taken in respect of installing either single pile or piles in two pile groups.

5 Curing :- As per IS 456 - 2000, exposed surfaces of concrete shall be kept continuously in a damp or wet condition by ponding or by covering with a layer of sacking, canvas, Hessian or similar materials and kept constantly wet for a least 10 days from the date of placing concrete. The period of curing shall not be less than 14 days for concrete exposed to dry and hot weather conditions.

6 Measurement

6.1 Dimension shall be measured nearest to a cm. Measurement of length on completion shall be along the axis of pile and shall be measured from to of shoe to the bottom of pile cap.

7 Rates:

The rate includes the cost of materials and labour involved in all the operations described above including pile embedded in pile cap, except soil investigation, reinforcement, pile cap and grade beam.

(For Detail Refer Chapter of Pile work specification)

CHAPTER - 16
PILE WORK

S.No.	Description of Items	Unit	Rate (in Rs)
16.1	Boring, Providing and installing cast in situ single under reamed piles of specified diameter and length in M 20 cement concrete, excluding the cost of steel reinforcement but including the cost of boring, cement concrete, all complete. (Length of pile for payment shall be measured upto to the bottom of pile cap) :		
16.1.1	250 mm dia piles	meter	523.00
16.1.2	300 mm dia piles	meter	652.00
16.1.3	400 mm dia piles	meter	1202.00
16.1.4	450 mm dia piles	meter	1609.00
16.1.5	500 mm dia piles	meter	1883.00
16.1.6	600 mm dia piles	meter	2570.00
16.2	Providing, driving and installing driven cast-in-situ reinforced cement concrete piles of specified diameter and length below the pile cap M 35 in cement concrete, to carry safe working load not less than specified, excluding the cost of steel reinforcement but including the cost of shoe and the length of pile to be embedded in the pile cap etc. all complete. (Length of pile for payment shall be measured from top of shoe to the bottom of pile cap) :		
16.2.1	400 mm dia piles	meter	1619.00
16.2.2	450 mm dia piles	meter	1995.00
16.2.3	500 mm dia piles	meter	2428.00
16.2.4	550 mm dia piles	meter	2685.00
16.2.5	750 mm dia piles.	meter	4663.00
16.2.6	1000 mm dia piles.	meter	7855.00
16.2.7	1200 mm dia piles.	meter	10393.00
16.2.8	1500 mm dia piles.	meter	15087.00
16.3	Boring, providing and installing bored cast-in-situ reinforced cement concrete pile of specified diameter and length below the pile cap M 35 in cement concrete, to carry a safe working load not less than specified, excluding the cost of steel reinforcement but including the cost of boring with, bentonite solution and temporary casing of appropriate length for setting out and removal of same and the length of the pile to be embedded in the pile cap etc. all complete, including removal of excavated earth with all lifts and leads (Length of pile for payment shall be measured upto bottom of pile cap).		
16.3.1	300 mm dia piles	meter	1223.00
16.3.2	400 mm dia piles	meter	1601.00
16.3.3	450 mm dia piles	meter	2086.00
16.3.4	500 mm dia piles	meter	2443.00
16.3.5	600 mm dia piles	meter	3248.00
16.3.6	750 mm dia piles.	meter	4728.00
16.3.7	1000 mm dia piles.	meter	8007.00
16.3.8	1200 mm dia piles.	meter	10706.00
16.3.9	1500 mm dia piles.	meter	15552.00

S.No.	Description of Items	Unit	Rate (in Rs)
16.4	Providing,driving and installing driven Pre-cast reinforced cement concrete piles of specified diameter and length below the pile cap in M 35 cement concrete to carry safe working load not less than specified.With a central through preformed hole with M.S. black pipe of dia, 40mm for grouting with cement sand grouting of mix 1:2 (1 cement : 2 coarse sand) under sufficient positive pressure to ensure complete filling including centring,shuttering, driving and removing the steel casing pipe and lifting casing etc. complete but excluding the cost of steel reinforcement. (Length of pile for payment shall be measured from top of the shoe to the bottom of pile cap).		
16.4.1	400 mm dia piles.	meter	1721.00
16.4.2	450 mm dia piles.	meter	2096.00
16.4.3	500 mm dia piles.	meter	2236.00
16.4.4	550 mm dia piles.	meter	2598.00
16.4.5	750 mm dia piles.	meter	3953.00
16.4.6	1000 mm dia piles.	meter	6378.00
16.5	Vertical load testing of piles in accordance with IS 2911 (Part IV) including installation of loading platform and preparation of pile head or construction of test cap and dismantling of test cap after test etc. complete as per specification & the direction of Engineer in-charge.		
16.5.1	Single pile upto 50 tonne capacity		
16.5.1.1	Initial test.	per test	40366.00
16.5.1.2	Routine test	per test	15180.00
16.5.2	Single pile above 50 tonne and upto 100 tonne capacity		
16.5.2.1	Initial test.	per test	45781.00
16.5.2.2	Routine test	per test	23082.00
16.5.3	Group of two or more piles upto 50 tonne capacity		
16.5.3.1	Initial test.	per test	51058.00
16.5.3.2	Routine test	per test	30444.00
16.6	Cyclic vertical load testing of pile in accordance with IS Code of practice IS: 2911(part IV) including preparation of pile head etc for.		
16.6.1	Single pile.		
16.6.1.1	Upto 50 tonne capacity pile.	per test	15180.00
16.6.1.2	Above 50 tonne and upto 100 tonne capacity pile.	per test	23082.00
16.6.2	Group of two piles.		
16.6.2.1	Upto 50 tonne capacity each.	per test	30444.00
16.7	Lateral load testing of single pile in accordance with IS Code of practice IS : 2911 (Part IV) for determining safe allowable lateral load on pile :		
16.7.1	Upto 50 tonne capacity pile.	per test	14761.00
16.7.2	Above 50 tonne and upto 100 tonne capacity pile.	per test	23428.00

S.No.	Description of Items	Unit	Rate (in Rs)
16.8	Deduct for casing pipe and bentonite solution in 16.3		
16.8.1	300 mm dia piles	meter	111.00
16.8.2	400 mm dia piles	meter	94.00
16.8.3	450 mm dia piles	meter	114.00
16.8.4	500 mm dia piles	meter	121.00
16.8.5	600 mm dia piles	meter	132.00
16.8.6	750 mm dia piles.	meter	223.00
16.8.7	1000 mm dia piles.	meter	355.00
16.8.8	1200 mm dia piles.	meter	432.00
16.8.9	1500 mm dia piles.	meter	447.00

CHAPTER - 17
ALUMINIUM WORK

Aluminium sections used for fixed/openable windows, ventilators, partitions, frame work and doors etc. shall be suitable for use to meet architectural designs to relevant works and shall be subject to approval of the Engineer-in-Charge for technical, structural, functional and visual considerations. The aluminium extruded sections shall conform to IS 733 and IS 1285 for chemical composition and mechanical properties. The stainless steel screws shall be of grade AISI 304. The permissible dimensional tolerances of the extruded sections shall be as per IS 6477 and shall be such as not to impair the proper and smooth functioning/operation and appearance of door and windows. Aluminium glazed doors, windows etc. shall be of sizes, sections and details as shown in the drawings. The details shown in the drawings may be varied slightly to suit the standards adopted by the manufacturers of the aluminium work, with the approval of Engineer-in-Charge. Before proceeding with any fabrication work, the contractor shall prepare and submit, complete fabrication and installation drawings for each type of glazing doors, windows, ventilators and partition etc. for the approval of the Engineer-in-Charge. If the sections are varied, the contractor shall obtain prior approval of Engineer-in-Charge and nothing extra shall be paid on this account.

17.2 Powder Coating

The powder used for powder coating shall be Epoxy/polyester powder of make approved by the Engineer-in-Charge. The contractor shall give detailed programme for powder coating in advance, to facilitate the inspection by Engineer-in-Charge or his authorized representative.

17.3 Performance Requirements for the Finish

(i) Surface appearance: The finish on significant surfaces shall show no scratches when illuminated and is examined at an oblique angle, no blisters, craters; pinholes or scratches shall be visible from a distance of about 1 m. There shall not be any visible variation in the colour of finished surfaces of different sections and between the colours of different surfaces of same section.

(ii) Adhesion: When a coated test piece is tested using a spacing of 2 mm between each of the six parallel cuts (the cut is made through the full depth of powder coating so that metal surface is visible) and a piece of adhesive tape, approximately 25 mm x 150 mm approved by the Engineer-in-Charge is applied firmly to the cut area and then removed rapidly by pulling at right angles to the test area, no pieces of the finish other than debris from the cutting operation shall be removed from the surface of the finish.

17.4 PANELING MATERIAL

Physical and Mechanical Properties of paneling material are given in the as under :

TABLE 17.1
Physical and Mechanical Properties

Sl.No.	Properties	Flat Pressed Three Layer, Multilayer and Graded	
		Grade-I	Grade-II
(i)	Density variation (Max.) Percent	10	10
(ii)	Water absorption (Max)		
	(a) 2 hours	7	15
	(b) 24 hours	15	30
(iii)	Thickness swelling (Max.), percent, 2 hours	5	8
(iv)	Modulus of rupture (Min) N/mm2		
	(a) Up to 20 mm thickness	15	11
	(b) Above 20 mm thickness	12.5	11
(v)	Tensile strength perpendicular to surface (Min.) N/m2		
	(a) Up to 20 mm thickness	0.45	0.3
	(b) Above 20 mm thickness	0.4	0.3
(vi)	Tensile strength perpendicular to surface (Min.) N/mm2		
	(a) After cyclic test*	0.2	-
	(b) After accelerated water resistance test**	0.15	-
(vii)	Screw withdrawal strength (Min.), N:		
	(a) Face	1250	1250
	(b) Edge	850	750
(viii)	Abrasion resistance (Min.) in number of revolutions		
	(a) Type I	450	450
	(b) Type II	250	250
	(c) Type III	80	80

Drying in air at 27 ± 2o C for 24 hours and then heating in dry air at 70o C for 72 hours. Three such cycles are to be followed and then specimens are tested for tensile strength perpendicular to the surface.

** Accelerated Water Resistance Test: Specimens are immersed in water at 27±2o C and water is brought to boiling and kept at boiling temperature for two hours. Specimens are then cooled in water to 27±2o C and tested for tensile strength perpendicular to the surface.

17.5 Float Glass

The glass shall be clear float glass and should be approved by the Engineer in Charge. It shall be clear, float transparent and free from cracks subject to allowable defects. The float glass shall conform to the IS 14900.

Allowable Defects: The allowable defects shall be as per Table below

Table 17.2

Sl.No.	Defects	Central	Outer	Remarks
1	Gaseous inclusion. Max size,	3	6	Separated by at least 30.0
2	Opaque gaseous inclusion.	3	6	Separated by at least 60.0
3	Knots, dirt and stones, Max	1	1	Separated by at least 30.0
4	Scratches, Rubs and Crush	Faint	Light	Separated by at least 30.0
5	Bow, percent. Max	0.5	0.5	See 21.2.4.3
6	Reams, Strings and lines	Light	Light	See 21.2.4.4
7	Waviness	Nil	Nil	See 21.2.4.5
8	Sulphur stains	Nil		
9	Corner breakage and chip	Not more than nominal thickness of float glass		

17.6 Scratches, Rubs and Crush(Float Glass) :

Place the sample of float glass in a vertical position approximately 50 cm from the viewer's position and look through it using either day light without direct sunlight or a background light suitable for observing each type of defect.

17.7 Bow

Depending on the side on which bow is present, stand the sample vertically on a wooden plank. Stretch a thread edge to edge. Measure the longest perpendicular. Distance from the thread to the surface of float glass facing the thread and express it as percentage of the length of float glass from edge along the thread.

17.8 EPDM- GASKETS

The EPDM gasket shall meet the requirements as given in Table below

Table - 17.3

Sl. No.	Description	Standard Follow	Specification
1	Tensile strength Kg.f/cm2	ASTM-D 412	70 Min.
2	Elongation at break %	ASTM-D 412	250 Min.
3	Modulus 100% Kgf/cm2	ASTM-D 412	22 Min.
4	Compression set % at 0o CC 22 Hrs.	ASTM-D 395	50 Max.
5	Ozone resistance	ASTM-D 1149	No visible cracks

17.9 SEALANT

The sealants of approved grade and colour shall only be used. The silicone for perimeter joints (between Aluminium section and RCC/Stone masonry) shall be of make approved by the Engineer in Charge.

17.10 Method of Application

Surface Preparation : Clean all joints and glazing pockets by removing all foreign matter and contaminants such as grease, oil, dust, water, frost, surface dirt, old sealants or glazing compounds and protective coatings.

17.11 Masking

Areas adjacent to joints shall be masked to ensure neat sealant lines. Masking tape shall not be allowed to touch clean surfaces to which the silicone sealant is to adhere. Tooling shall be completed in one continuous stroke immediately after sealant application and before a skin forms and masking shall be removed immediately after tooling.

17.12 Application

Install backer rod of appropriate size and apply silicone sealant in a continuous operation using a positive pressure adequate to properly fill and seal the joint. The silicone sealant shall be tooled with light pressure to spread the sealant against backing material and the joint surfaces before a skin forms. A tool with convex profile shall be used to keep the sealant within the joint. Soap or water shall not be used as a tooling aid. Remove masking tape as soon as silicone joint is tooled.

Tolerance: A tolerance of + 3 mm shall be allowed in the width of silicone joints. The depth of the joints at throat shall not be less than 6 mm.

CHAPTER - 17
ALUMINIUM WORK

S.No.	Description of Items	Unit	Rate (in Rs)
17.1	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS: 733 and IS : 1285, fixed with rawl plugs and screws or with fixing clips, or with expansion hold fasteners including necessary filling up of gaps at junctions, at top, bottom and sides with required PVC/neoprene felt etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminium snap beading for glazing / paneling, C.P. brass / stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge. (Glazing and paneling to be paid for separately) :		
17.1.1	For fixed portion		
17.1.1.1	Anodised aluminium(anodised transparent or dyed to required shade according to IS:1868,Minimum anodic coating of grade AC15)	Kg	322.00
17.1.1.2	Powder coated aluminium (minimum thickness of powder coating 50 micron)	Kg	342.00
17.1.1.3	Polyester powder coated aluminium (minimum thickness of polyester powder coating 50 micron)	Kg	352.00
17.1.2	For shutters of doors, windows & ventilators including providing and fixing hinges/ pivots and making provision for fixing of fittings wherever required including the cost of PVC / neoprene gasket required (Fittings shall be paid for separately).		
17.1.2.1	Anodised aluminium(anodised transparent or dyed to required shade according to IS:1868,Minimum anodic coating of grade AC15)	Kg	343.00
17.1.2.2	Powder coated aluminium (minimum thickness of powder coating 50 micron)	Kg	364.00
17.1.2.3	Polyester powder coated aluminium (minimum thickness of polyester powder coating 50 micron)	Kg	373.00
17.2	Providing and fixing 12mm thick prelaminated particle board flat pressed three layer or graded wood particle board conforming to IS: 12823 Grade I Type II, in panelling fixed in aluminum doors, windows shutters and partition frames with C.P. brass / stainless steel screws etc. complete as per architectural drawings and directions of Engineer-in-charge		
17.2.1	Pre-laminated particle board with decorative lamination on one side and balancing lamination on other side.	Sqm	858.00
17.2.2	Pre-laminated particle board with decorative lamination on both sides.	Sqm	931.00

S.No.	Description of Items	Unit	Rate (in Rs)
17.3	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM Rubber neoprene gasket etc. complete as per the architectural drawings and the directions of engineer-in- charge (Cost of aluminium snap beading shall be paid in basic item):		
17.3.1	With float glass panes of 4.0 mm thickness	Sqm	648.00
17.3.2	With float glass panes of 5.50 mm thickness	Sqm	806.00
17.3.3	With float glass panes of 8 mm thickness	Sqm	1083.00
17.4	Add extra for providing and fixing froasted glass instead of float glass		
17.4.1	With glass panes of 4.0 mm thickness	Sqm	128.00
17.4.2	With glass panes of 5.50 mm thickness	Sqm	248.00
17.4.3	With glass panes of 8 mm thickness	Sqm	513.00
17.5	Providing and fixing double action hydraulic floor spring of approved brand and manufacture IS : 6315 marked, for doors including cost of cutting floors as required, embedding in floors and cover plates with brass pivot and single piece M.S. sheet outer box with slide plate etc. complete as per the direction of Engineer-in-charge.		
17.5.1	With stainless steel cover plate	Each	1695.00
17.5.2	With brass cover plate	Each	1860.00
17.6	Providing and fixing powder coated aluminium work (minimum thickness of powder coating 50 micron) consisting of tee/ angle sections, of approved make conforming to IS : 733 in frames of false ceiling including aluminium angle cleats with necessary C.P. brass/ stainless steel sunk screws, aluminium perimeter angles fixed to wall with rawl plugs @ 450 mm centre to centre and fixing the frame work to G.I. level adjusting hangers 6 mm dia. with necessary cadmium plated machine screws all complete as per approved architectural drawings and direction of the Engineer-in-charge (level adjusting hangers, ceiling cleats and expansion hold fasteners to be paid for separately).	Kg	500.00
17.7	Providing and fixing 6 mm dia. G.I. level adjusting hangers (upto 1200mm length), fixed to roof slabs by means of ceiling cleats made out of G.I. flat 40x3mm size 60 mm long and stainless steel expandable dash fastener of 12.5 mm dia and 50 mm long, complete as per direction of Engineer -in-charge.	Each	50.00

S.No.	Description of Items	Unit	Rate (in Rs)
17.8	Providing and fixing machine moulded aluminium covering of approved pattern & design, made out of machine cut aluminium sheet and machine holed for receiving screws, over expansion joints on vertical surfaces/ceilings with full threaded, cadmium plated steel screws 4mm dia. stem, 30mm long and aluminium washers 2mm thick, 15mm dia. at a staggered pitch of 200mm centre to centre including drilling holes in the receiving surface and providing expandable plastic sleeves in holes etc. complete.		
17.8.1	Anodised aluminium sheet 2.5mm thick (anodised transparent or dyed to required shade according to IS: 1868, Minimum anodic coating of grade AC 15)	Kg	384.00
17.8.2	Powder coated aluminium sheet 2.5mm thick (minimum thickness of powder coating 50 micron)	Kg	405.00
17.9	Filling the gap in between aluminium frame & adjacent RCC/ Brick/ Stone work by providing weather silicon sealant over backer rod of approved quality as per architectural drawings and direction of Engineer-in-charge complete.	meter	65.00
17.10	Extra for applying additional anodic coating AC 25 instead of AC 15 to aluminium extruded sections. For fixed portion, shutters of doors, windows & ventilators	Kg	15.00
17.11	Providing and fixing double glazed hermetically sealed glazing in aluminium windows, ventilators and partition etc. with 6 mm thick clear float glass both side having 12 mm air gap including providing EPDM gasket, perforated aluminium spacers, desiccants, sealant (Both primary and secondary sealant) etc. as per specification drawings and direction of Engineer-in-charge complete.	Sqm	3125.00
17.12	Providing and fixing stainless steel (SS 304 grade) adjustable friction windows stays of approved quality with necessary stainless steel screws etc. to the side hung windows as per direction of Engineer-in- charge complete.		
17.12.1	205 X 19 mm	Each	177.00
17.12.2	255 X 19 mm	Each	226.00
17.12.3	355 X 19 mm	Each	371.00
17.12.4	510 X 19 mm	Each	518.00
17.12.5	710 X 19 mm	Each	836.00
17.13	Providing and fixing aluminium tubular handle bar 32 mm outer dia, 3.0 mm thick & 2100 mm long with SS screws etc .complete as per direction of Engineer-in-Charge.		
17.13.1	Anodized (AC 15) aluminium tubular handle bar	Each	465.00
17.13.2	Powder coated minimum thickness 50 micron aluminium tubular handle bar.	Each	497.00
17.13.3	Polyester powder coated minimum thickness 50 micron aluminium tubular handle bar	Each	512.00

S.No.	Description of Items	Unit	Rate (in Rs)
17.14	Providing and fixing 100mm brass locks (best make of approved quality) for aluminium doors including necessary cutting and making good etc. complete.	Each	306.00
17.15	Providing and fixing anodised aluminium (anodised transparent or dyed to required shade according to IS:1868. Minimum anodic coating of grade AC 15) sub frame work for windows and ventilators a with extruded built up standard tubular sections of approved make conforming to IS: 733 and IS :1285 fixed with rawl plugs and stainless steel screws etc.	Kg	345.00
17.16	Providing and fixing aluminium casement windows fastener of required length for aluminium windows with necessary screws etc. complete.		
17.16.1	Anodized (AC 15) aluminium	Each	47.00
17.16.1	Powder coated minimum thickness 50 micron aluminium.	Each	50.00
17.16.2	Polyester powder coated minimum thickness 50 micron aluminium.	Each	49.00
17.17	Providing and fixing aluminium round shape handle of outer dia 100mm with SS screws etc. complete as per direction of Engineer-in-charge		
17.17.1	Anodized (AC 15) aluminium	Each	55.00
17.17.2	Powder coated minimum thickness 50 micron aluminium.	Each	58.00
17.17.3	Polyester powder coated minimum thickness 50 micron aluminium.	Each	61.00
17.18	Providing and fixing anodised aluminium grill (anodised transparent or dyed to required shade according to IS: 1868 with minimum anodic coating of grade AC15) of approved design/pattern, with approved standard section and fixed to the existing window frame with C.P. brass/ stainless steel screws @ 200mm centre to centre, including cutting the grill to proper opening size for fixing and operation of handles and fixing approved anodised aluminium standard section around the opening, all complete as per requirement and direction of Engineer-in-charge. (Only weight of grill to be measured for payment).	Kg.	402.00
17.19	Providing and fixing 12 mm thick frameless toughened glass door shutter of approved brand and manufacture, including providing and fixing top bottom pivot spring type fixing arrangement and making necessary holes etc. for fixing required door fittings, all complete as per direction of Engineer-incharge (Door handle, lock and stopper etc.to be paid separately).	Sqm	3316.00
17.20	Providing and fixing 50 micron thick reflective one way type heat /light control film to window/door glazing as marketed under the brand name garware/3M or equivalent as approved.	Sqm	406.00

S.No.	Description of Items	Unit	Rate (in Rs)
17.21	Designing, fabricating, testing, protection, installing and fixing in position semi (grid) unitized system of structural glazing (with open joints) for linear as well as curvilinear portions of the building for all heights and all levels, including: (a) Structural analysis & design and preparation of shop drawings for the specified design loads conforming to IS 875 part III (the system must passed the proof test at 1.5 times design wind pressure without any failure), including functional design of the aluminum sections for fixing glazing panels of various thicknesses, aluminium cleats, sleeves and splice plates etc. gaskets, screws, toggles, nuts, bolts, clamps etc., structural and weather silicone sealants, flashings, fire stop (barrier)-cum-smoke seals, microwave cured EPDM gaskets for water tightness, pressure equalisation & drainage and protection against fire hazard including: (b) Fabricating and supplying serrated M.S. hot dip galvanised / Aluminium alloy of 6005 T5 brackets of required sizes, sections and profiles etc. to accommodate 3 Dimentional movement for achieving perfect verticality and fixing structural glazing system rigidly to the RCC/ masonry/structural steel framework of building structure using stainless steel anchor fasteners/ bolts, nylon seperator to prevent bimetallic contacts with nuts and washers etc. of stainless steel grade 316, of the required capacity and in required numbers. (c) Providing and filling, two part pump filled, structural silicone sealant and one part weather silicone sealant compatible with the structural silicone sealant of required bite size in a clean and controlled factory / work shop environment, including double sided spacer tape, setting blocks and backer rod, all of approved grade, brand and manufacture, as per the approved sealant design, within and all around the perimeter for holding glass. (d) Providing and fixing in position flashings of solid aluminium sheet 1 mm thick and of sizes, shapes and profiles, as required as per the site conditions, to seal the gap between the building structure and all its interfaces with curtain glazing to make it watertight. (e) Making provision for drainage of moisture/ water that enters the curtain glazing system to make it watertight, by incorporating principles of pressure equalization, providing suitable gutter profiles at bottom (if required), making necessary holes of required sizes and of required numbers etc. complete. This item includes cost of all inputs of designing, labour for fabricating and installation of aluminium grid, installation of glazed units, T&P, scaffolding and other incidental charges including wastages etc., enabling temporary structures and services, cranes or cradles etc. as described above and as specified. The item includes the cost of getting all the structural and functional design including shop drawings checked by a structural designer, dully approved by Engineer-in-charge. The item also includes the cost of all mock ups at site, cost of all samples of the individual components for testing in an approved laboratory, field tests on the assembled working	SQM.	2610.00

S.No.	Description of Items	Unit	Rate (in Rs)
	structural glazing as specified, cleaning and protection till the handing over of the building for occupation. In the end, the Contractor shall provide a water tight structural glazing having all the performance characteristics etc. all complete as required, as per the Architectural drawings, as per item description, as specified, as per the approved shop drawings and as directed by the Engineer-in-Charge. Note:- 1. The cost of providing extruded aluminium frames, shadow boxes, extruded aluminium section capping for fixing in the grooves of the curtain glazing and vermin proof stainless steel wire mesh shall be paid for separately under relevant items under this sub-head. However, for the purpose of payment, only the actual area of structural glazing (including width of grooves) on the external face shall be measured in sqm. up to two decimal places. Note:-2. The following performance test are to be conducted on structural glazing system if area of structural glazing exceeds 2500 Sqm from the certified laboratories accreditated by NABL(National Accreditation Board for Testing and Calibration Laboratories),Department of Science & Technologies, India. Cost of Testing is inclusive in Rates. Performance Testing of Structural glazing system Tests to be conducted in the NABL accredited lab. 1. Performance Laboratory Test for Air Leakage Test (-50pa to -300pa) & (+50pa to +300pa) as per ASTM E-283-04 testing method for a range of testing limit 1 to 200 mVhr. 2. Static Water Penetration Test. (50pa to 1500pa) as per ASTME-331-09 testing method for a range up to 2000 ml. 3. Dynamic Water Penetration (50pa to 1500pa) as per AAMA 501.01- 05 testing method for a range upto 2000 ml. 4. Structural Performance Deflection and deformation by static air pressure test (1.5 times design wind pressure without any failure) as per ASTME-330- 10 testing method for a range upto 50 mm. 5. Seismic Movement Test (upto 30 mm) as per AAMA 501.4-09 testing method for Qualitative test, Tests to be conducted on site. 6. Onsite Test for Water Leakage for a pressure range 50 kpa to 240 kpa (35psi) upto 2000 ML.		

CHAPTER - 18
WATER PROOFING WORK

LIST OF BUREAU OF INDIAN STANDARD CODES

S.No.	I.S. No.	Subject
1	IS 73	Paving Bitumen Specifications
2	IS 702	Specifications for Industrial Bitumen
3	IS 1322	Specifications for Bitumen felts for Water Proofing and Damp Proofing.
4	IS 2645	Specifications for Integral Cement Water Proofing Compounds
5	IS 3370 (Part -1)	Code of Practice for Concrete Structures for the Storage of Liquid: Part -1 General Requirements.
6	IS 3384	Specifications for Bitumen Primer for Water Proofing and Damp Proofing
7	IS 7193	Specification for Glass Fibre Bitumen Felts
8	IS 12200	Provision of Water Stops at Transfers Construction Joints in Masonry and Concrete Dams - Code of Practice.
9	IS 12432 (Part-3)	Application for Spray Applied Insulation - Code of Practice Part-3 Polyurethane/ Polyisocyarurate
10	Various water proofing treatment have been described in specification and shall be followed.	
11	Measurement - Length and breadth shall be measured along the finished surface correct to a cm and the area shall be worked out to nearest 0.01 sq.m.	
12	Rates - The rate include the cost of all labour & materials involved in all the operations. (For detail refer chapter of water proofing treatment specification)	

18.1 WATER PROOFING TREATMENT

Blending Cement/Water with Water Proofing Compound shall be as described hereunder The required quantity of cement bags to be used for a particular portion of work should be emptied on a dry platform. Water proofing compound bearing ISI mark and conforming to IS 2645 should then be mixed properly with the cement. The quantity of water proofing compound to be mixed should be as prescribed by the manufacturer but not exceeding 3% by weight of cement. The quantity of cement and water proofing compound thus mixed should be thoroughly blended and the blended cement should again be packed in bags. For the water proofing compound in liquid form, the blending is to be done with water. This can be done by taking the just required quantity of water to be mixed in the particular batch of dry cement mortar.

The required quantity of water thus collected per batch of dry cement mortar to be prepared should be mixed with liquid water proofing compound from sealed tins with ISI mark. The water thus mixed with water proofing compound shall be thoroughly stirred so that the water is blended with water proofing compound properly.

Where ever cement slurry is to used it shall be prepared by using 2.2 kg of blended cement per sqm. area. Each time only that much quantity shall be prepared which can be covered on the surface and the surface in turn would be covered with 25 mm thick cement mortar base within half an hour. Slurry prepared and remained unused for more than half an hour shall be totally rejected. Where ever cement mortar 1:3 (1 blended cement: 3 coarse sand) shall be prepared with cement/ water duly blended as specified. Only that much quantity of cement mortar which can be consumed within half an hour, shall be prepared. Any cement mortar that is prepared and remains unused for more than half an hour shall not be used in the work and shall be rejected.

The surface to be treated with felt shall have a minimum slope of 1 to 120. This grading shall be carried out with cement concrete or cement plaster with sand, as desired, to the average thickness required and finished smooth. Such grading shall be paid for separately In existing roof where gola and drip course are provided at the junction of roof and vertical face of parapet wall, these shall be dressed suitably and finished smooth so as to ensure an easy and gradual turning of the flashing. Any dismantlement or forming and finishing smooth the junction for forming the base of the flashing shall not be measured or paid for separately and shall be deemed to form part of the preparation of the surface in the water proofing treatment While the grading of roof surface is being done, it shall be ensured that the outlet drain pipe have been fixed and mouth at the entrance have been eased and rounded off properly for easy flow of water.

When any pipe passes through the roof to be treated, angular fillet shall be built around it for the water proofing treatment to be taken over it. These fillets shall not be measured or paid for separately.

Tucking in the water proofing felt will be required where the parapet wall exceeds 45 cm in the height from the graded surface. Where the height is 45 cm or less, no groove will be required as the water proofing treatment will be carried over the top of the parapet wall to its full thickness. In the case of low dividing walls of height 30 cm or less, outlets therein shall be cut open for full height and the bottom and sides shall be rendered smooth and corners rounded and such treatment shall not be measured and paid for separately.

For carrying over and tucking in the water proofing felts into the parapet walls, chimney stacks etc. a horizontal groove 6.5 cm deep, 7.5 cm wide section with its lower edge at not less than 15 cm above the graded roof surface shall be left on the inner face of the same during construction if possible.

When such groove has not been left, the same shall be cut out neatly and the base at rear of the groove shall be finished smooth with cement plaster 1:4 (1 cement: 4 sand). Such cutting of the groove and its finishing smooth shall be deemed to be part of the water proofing item and shall not be measured or paid for separately. No deduction shall be made either for not making the groove or when the later has already been left in the masonry by the construction agency. The graded surface of the roof and concrete fillets and the faces of walls shall be thoroughly cleaned with wire brushes and all loose scales etc. removed. The surface shall then be dusted off. Any crack in the roof shall be cut to ‘V’ section, cleaned and filled up flush with cement mortar slurry 1:4 (1 cement: 4 sand) or blown type petroleum bitumen of IS grade 85/25, or approved quality conforming to IS 702. Such cleaning of the surface or treating the cracks shall not be paid for separately.

When the first strip of felt has been bonded to the roof, Subsequent strips shall overlap the preceeding one by at least 7.5 cm at the longitudinal edges and 10 cm at the ends. All overlaps shall be firmly bonded with hot bitumen. Streaks and trailings of bitumen near edges of laps shall be levelled by heating the overlap with a blow lamp and levelling down unevenness.

CHAPTER - 18
WATER PROOFING

S.No.	Description of Items	Unit	Rate (in Rs)
18.1	Providing and laying integral cement based treatment for water proofing on horizontal surface at all depth below ground level for under ground structures as directed by Engineer-in-Charge and consisting of : (i) Ist layer of 22mm to 25mm thick Kota rough stone slab over a 25mm thick base of cement mortar 1:3 (1 cement : 3 coarse sand) mixed with water proofing compound conforming to IS:2645 in the recommended proportion over the leveling course (leveling course to be paid separately). Joints sealed and grouted with cement slurry mixed with water proofing compound. (ii) 2nd layer of 25mm thick cement mortar 1:3 (1 cement: 3 coarse sand) mixed with water proofing compound in ecommended proportions. (iii) Finishing top with stone aggregate of 10mm to 12mm nominal size spreading @ 8 cudm/sqm thoroughly embedded in the 2nd layer. (with 5 years guarantee)	Sqm	910.00
18.2	Providing and laying integral cement based treatment for water proofing on the vertical surface by fixing rought kota specified stone slab 22 mm to 25mm thick with cement slurry mixed with water proofing compound conforming to IS:2645 in recommended proportions with a gap of 20mm (minimum) between stone slabs and the receiving surfaces and filling the gaps with neat cement slurry mixed with water proofing compound and finishing the exterior of stone slab with cement mortar 1:3 (1 cement : 3 coarse sand) 20mm thick with neat cement punning mixed with water proofing compound in recommended proportion complete at all levels and as directed by Engineer-in-charge : (with 5 year Service guarantee).	Sqm	1039.00
18.3	Providing and laying water proofing treatment to vertical and horizontal surfaces of depressed portions of W.C., kitchen and the like consisting of : a) Ist course of applying cement slurry @ 4.4 Kg/sqm mixed with water proofing compound conforming to IS 2645 in recommended proportions including rounding off junction of vertical and horizontal surface. b) IInd course of 20mm cement plaster 1:3 (1 cement : 3 sand) mixed with water proofing compound in recommended proportion including rounding off junction of vertical and horizontal surface. c) IIIrd course of applying blown or residual bitumen applied hot at 1.7 Kg. per sqm of area. d) IVth course of 400 micron thick PVC sheet. (Overlaps at joints of PVC sheet should be 100 mm wide and pasted to each other with bitumen @ 1.7 Kg/sqm.) (with 5 years service guarantee)	Sqm	431.00

S.No.	Description of Items	Unit	Rate (in Rs)
18.4	Providing and Placing in position suitable PVC water stops conforming to IS:12200 for construction/ expansion joints between two RCC members and fixed to the reinforcement with binding wire before pouring concrete etc. complete : (with 5 years service guarantee)		
18.4.1	Serrated with central bulb (225mm wide, 8-11mm thick).	meter	321.00
18.4.2	Dumb bell with central bulb (180mm wide, 8mm thick).	meter	190.00
18.4.3	Kickers (320mm wide, 5mm thick).	meter	217.00
18.5	Providing and laying water proofing treatment in sunken portion of WCs, bathroom etc., by applying cement slurry mixed with water proofing cement compound consisting of applying : (a) First layer of slurry of cement @ 0.488 kg/sqm mixed with water proofing cement compound @ 0.253 kg/sqm. This layer will be allowed to air cure for 4 hours. (b) Second layer of slurry of cement @ 0.242 kg/sqm mixed with water proofing cement compound @ 0.126 kg/sqm. This layer will be allowed to air cure for 4 hours followed with water curing for 48 hours. The rate includes preparation of surface, treatment and sealing of all joints, corners, junctions of pipes and masonry with polymer mixed slurry.	Sqm	214.00
18.6	Providing and laying water proofing treatment on roofs of slabs by applying cement slurry mixed with water proofing cement compound consisting of applying: (a) after surface preparation, first layer of slurry of cement @ 0.488 kg/sqm mixed with water proofing cement compound @ 0.253 kg/sqm. (b) laying second layer of Fibre glass cloth when the first layer is still green. Overlaps of joints of fibre cloth should not be less than 10 cm. (c) third layer of 1.5 mm thickness consisting of slurry of cement @ 1.289 kg/sqm mixed with water proofing cement compound @ 0.670 kg/sqm and coarse sand @1.289 kg/sqm. This will be allowed to air cure for 4 hours followed by water curing for 48 hours. The entire treatment will be taken upto 30cm on parapet wall and tucked into groove in parapet all around.	Sqm	279.00

S.No.	Description of Items	Unit	Rate (in Rs)
18.7	Providing and laying integral cement based water proofing treatment including preparation of surface as required for treatment of roofs, balconies, terraces etc consisting of following operations: (a) Applying a slurry coat of neat cement using 2.75 kg/sqm. of cement admixed with water proofing compound conforming to IS. 2645 and approved by Engineer-in-charge over the RCC slab including adjoining walls upto 300mm height including cleaning the surface before treatment. (b) Laying brick bats with mortar using broken bricks/brick bats 25 mm to 115mm size with 50% of cement mortar 1:5 (1 cement : 5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge over 20 mm thick layer of cement mortar of mix 1:5 (1 cement :5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge to required slope and treating similarly the adjoining walls upto 300 mm height including rounding of junctions of walls and slabs. (c) After two days of proper curing applying a second coat of cement slurry using 2.75kg/sqm of cement admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge. (d) Finishing the surface with 20 mm thick jointless cement mortar of mix 1:4 (1 cement :4 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge including laying glass fibre cloth of approved quality in top layer of plaster and finally finishing the surface with trowel with neat cement slurry and making pattern of 300x300 mm square 3mm deep. (e) The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test. All above operations to be done in order and as directed and specified by the Engineer-in-Charge : (with 5 Year Service Guarantee)		
18.7.1	With average thickness of 120mm and minimum thickness at khurra as 65 mm.	Sqm	916.00
18.8	Providing and laying four courses water proofing treatment with bitumen felt over roofs consisting of first and third courses of blown bitumen 85/25 or 90/15 conforming to IS : 702 applied hot @ 1.45 Kg per square meter of area for each course, second course of roofing felt type 3 grade-I (hessian based self finished bitumen felt) and fourth and final course of stone grit 6mm and down size or pea-sized gravel spread at 6 cubic diameter per square meter including preparation of surface but excluding grading complete with : Bitumen felt (hessian base) type 3 grade I conforming to IS : 1322. (with 5 years Services Guarantee)	Sqm	277.00

S.No.	Description of Items	Unit	Rate (in Rs)
18.9	Providing and laying six courses water proofing treatment with bitumen felt over roofs consisting of first, third and fifth course of blown bitumen 85/25 or 90/15 conforming to IS : 702 applied hot @ 1.45, 1.20 and 1.45 Kg per square meter of area respectively, second and fourth courses of roofing felt type 3 grade I conforming to IS : 1322 (Hessian based self finished bitumen felt) conforming to IS : 1322 and sixth and final course of stone grit 6 mm and down size or pea sized gravel spread at 6 cubic dm per sqm including preparation of surface but excluding grading, complete. (with 5 years Services Guarantee)	Sqm	439.00
18.10	Providing and laying six courses water proofing treatment with bitumen felt over roofs consisting of first, third and fifth courses of blown or / and residual bitumen applied hot at 1.45, 1.20 and 1.70 kg per square meter of area respectively, second and fourth courses of roofing felt type 2 grade I (fibre base self finished bitumen felt) six and final courses of stone grit 6mm and down size or pea sized gravel spread at 6cu.dm per sqm including preparation of surface, excluding grading, compete. (with 5 years Services Guarantee)	Sqm	488.00
18.11	Providing and laying six courses water proofing treatment with bitumen felt over roofs consisting of first, third and fifth courses of blow or/ and residual bitumen applied hot at 1.45, 1.20 and 1.70 kg per square meter of area respectively, second and fourth courses of roofing felt type 2 grade II (glass fibre base self finished bitumen felt) and sixth and final course of stone grit 6mm and down size or pea sized gravel spread at 6 cubic dm per sqm including preparation of surface but excluding grading, complete. (with 5 years Services Guarantee)	Sqm	488.00
18.12	Supplying and applying bituminous solution primer on roof and or wall surface at 0.24 litre per sqm.	Sqm	27.00
18.13	Deduct for omitting in water proofing treatment final course of spreading stone grit 6mm down size or pea sized gravel : At 6 cudm per sqm.	Sqm	12.00
18.14	Grading roof for water proofing treatment with:		
18.14.1	Cement concrete grade M-15 (Nominal Mix with 20mm maximum size of stone aggregate)	Cum	4803.00
18.14.2	Cement mortar 1:3 (1 cement : 3 coarse sand)	Cum	8496.00

S.No.	Description of Items	Unit	Rate (in Rs)
18.15	Providing and laying in situ six course water proofing treatment with APP (Atactic poly-propylene) modified Polymeric memberane over roof consisting of first coat of bitumen primer @ 0.40Kg per sqm, 2nd, 4th & 6th courses of bonding material @ 1.20 Kg/sqm, which shall consist of blown type bitumen of grade 85/25 conforming to IS : 702, 3rd and 5th layers of roofing membrane APP modified Polymeric membrane 1.5mm thick of 2.25 Kg/sqm weight consisting of five layers prefabricated with centre core as 20micron HMHDPE film sandwiched on both sides with polymeric mix and the polymeric mix is protected on both side with 20micron HMHDPE film. (with 5 years service guarantee)	Sqm	397.00
18.16	Providing and laying in situ four course water proofing treatment with APP (Atactic Polypropylene) modified Polymeric memberane over roof consisting of first coat of bitumen primer @ 0.40Kg per sqm, 2nd & 4th courses of bonding material @ 1.20 Kg/sqm, which shall consist of blown type bitumen of grade 85/25 conforming to IS : 702, 3rd layer of roofing membrane APP modified Polymeric membrane 2.0mm thick of 3.00 Kg/sqm weight consisting of five layers prefabricated with centre core as 100micron HMHDPE film sandwiched on both sides with polymeric mix and the polymeric mix is protected on both side with 20micron HMHDPE film. (with 5 years Service Guarantee).	Sqm	269.00
18.17	Providing and laying in situ six course water proofing treatment with APP (Atactic Polypropylene) modified Polymeric memberane over roof consisting of first coat of bitumen primer @ 0.40Kg per sqm, 2nd, 4th & 6th courses of bonding material @ 1.20 Kg/sqm, which shall consist of blown type bitumen of grade 85/25 conforming to IS : 702, 3rd and 5th layers of roofing membrane APP modified Polymeric membrane 2.0mm thick of 3.00 Kg/sqm weight consisting of five layers prefabricated with centre core as 100micron HMHDPE film sandwiched on both sides with polymeric mix and the polymeric mix is protected on both side with 20micron HMHDPE film. (with 5 years service guarantee).	Sqm	431.00

S.No.	Description of Items	Unit	Rate (in Rs)
18.18	Providing and fixing APP (Atactic Polypropylene Polymer) modified prefabricated five layer 2mm thick water proofing membrance, black finished reinforced with glass fibre matt consisting of a coat of bitumen primer for bitumen membrane @ 0.40 ltr/sq. mtr. by the same membrance manufacture of density at 25°C, 0.87 - 0.89 kg/ ltr and viscocity 70 - 160 cps. Over the primer coat the layer of membrane shall be laid using Butane torch and sealing all joints etc., and preparing the surface complete. The vital physical and chemical parameters of the membrane shall be as under : Joint strength in longitudinal and transverse direction at 23°C as 350/300 N/ 5cm. Tear strength in longitudinal and transverse direction as 60/80N. Softening point of membrane not less than 150°C. Cold flexibility shall be upto -2°C when tested in accordance with ASTM, D - 5147. The laying of membrane shall be got done through the authorised applicator of the manufacture of membrane. (for corrugated roof sheets) with 5 years service guarantee.	Sqm	286.00
18.19	Providing and laying APP (Atactic Polypropylene Polymer) modified prefabricated five layer, 3mm thick water proofing membrane, black finished reinforced with glass fibre matt consisting of a coat of bitumen primer for bitumen membrane @ 0.40 ltr/sqm. by the same membrane manufactured of density at 25°C, 0.87 - 0.89 kg/ltr and viscocity 70 - 160 cps. Over the primer coat the layer of membrane shall be laid using butane torch and sealing all joints etc., and preparing the surface complete. The vital physical and chemical parameters of the membrane shall be as under : Joint strength in longitudinal and transverse direction at 23°C as 350/300 N/5cm. Tear strength in longitudinal and transverse direction as 60/80N. Softening point of membrane not less than 150°C. Cold flexibility shall be upto -2°C when tested in accordance with ASTM, D - 5147. The laying of membrane shall be got done through the authorised applicator of the manufacturer of membrane : (with 5 years service guarantee.)	Sqm	338.00
18.20	Providing and laying APP (Atactic Polypropylene Polymer) modified prefabricated five layer 3mm thick water proofing membrane, black finished reinforced with non-woven polyester matt consisting of a coat of bitumen primer for bitumen membrane @ 0.40 ltr/sqm. by the same membrane manufacture of density at 25°C, 0.87-0.89 kg/ltr and viscocity 70-160 cps. Over the primer coat the layer of membrane shall be laid using Butane Torch and sealing all joints etc., and preparing the surface complete. The vital physical and chemical parameters of the membrane shall be as under : Joint strength in longitudinal and transverse direction at 23°C as 650/450N/5cm. Tear strength in longitudinal and transverse direction as 300/250N. Softening point of membrane not less than 150°C. Cold flexibility shall be upto -2°C when tested in accordance with ASTM, D - 5147. The laying of membrane shall be got done through the authorised applicator of the manufacturer of membrane : (with 5 years service guarantee.)	Sqm	415.00

S.No.	Description of Items	Unit	Rate (in Rs)
18.21	Extra for covering top of membrane with Geotextile, 120 gsm non woven, 100 % polyester of thickness 1 to 1.25 mm bonded to the membrane with intermittent touch by heating the membrane by Butane Torch as per manufactures recommendation [for Item No. 18.19 to 18.20].	Sqm	63.00
18.22	Providing and laying second quality white ceramic tiles 300 x 300mm (6 to 7 mm thick) on roof jointed with white cement mortar 1:4 mixed with 2 percent integral water proofing compound laid over 20mm thick cement mortar 1:4.	Sqm	1130.00
18.23	Water proofing treatment over Roof, Wall, Chajjas, Balcony with Diamond Shield and Sealer coat or equivelent at leakage/ seepage area consisting of (i) Surface preparation roughening of surface, opening of cracks in 'V' groove in size of 5mmx10mm (WxD), filling of cracks with putty of Diamond shield with laying fiber glass mesh, Cleaning of surface by scrubbing with steel wire/ Nylon brush. Removing all dust particles and washing with adequate water to clean completely. (ii) Providing and applying 1st coat of diamond shield or equivelent (minimum thicknes 70-80 micron) (a two component flexible waterproof and protective modified mortar, dry powder 80% Chemical 20% acrylic resin having 30% solid contents) with mix proportion of Paart 1 and 2 with proper mixing with laying of fiber glass mesh (of weaving size of 10x10 yarn/inch duly coated with alkaline resistant polymer). Allow the coating to air cure for minimum 2 Hrs. (Diamond Shield or equivelent. After two hours minimum of 1st coat applying 2nd coat (minimum thickness 100 micron) of diamond shield or equivelent with mix proportion of part 1 and part 2 with proper mixing. Allow the coating to air cure for minimum 2 Hrs. Consumption of the diamond shild or equivelent should be @17.90 kg for 10sqm area. (After two coats of diamond shield, surface is to be cured properly minimum for 4 hrs.before application of third coat). (iii) Providing and applying 1st coat of sealer coat 50-60 micron (single component High build elastomeric, flexible, pure acrylic waterproofing membrans having solid content of 65%) and allow it to air cure for 4 Hrs minimum. After two hours minimum of 1st coat applying 2nd and final coat 120-140 micron of sealer coat and allow it to air cure for 4 Hrs minimum. Consumption of Sealer coar should be @ 5.40 kg per 10 sqm. area. (IV) The treated aarea should be cure with water for 48 hrs. by flooding the surface. (V) The final appearance of the coating will be milky white. All above operations to be done in order.	Sqm	409.00

S.No.	Description of Items	Unit	Rate (in Rs)
18.24	Providing and mixing integral crystalline admixture for water proofing treatment to RCC structures like basement raft, retaining walls, reservior, sewage & water treatment plant, tunnels / subway and bridge deck etc. at the time of transporting of concrete into the drum of the ready-mix truck , using integral crystalline admixture @ 0.80% (minimum) to the weight of cement content per cubic meter of concrete) or higher as recommended by the manufacturer's specification in reinforced cement concrete at site of work. The material shall meet the requirements as specified in ACI-212-3R-2010 i.e. by reducing permeability of concrete by more than 90%, compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure. The crystalline admixture shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the Engineer-in-charge. The product performance shall carry guarantee for 10 years against any leakage.	Kg.	336.00
18.25	Providing and applying fibre reinforced elastomeric liquid water proofing membrane with resilient acrylic polymers having Sun Reflectivity Index (SRI) of 105 on top of concrete roof in three coats @10.76 litre/ 10 sqm. One coat of self-priming of elastomeric waterproofing liquid (dilution with water in the ratio of 3:1) and two coats of undiluted elastomeric waterproofing liquid (dry film thickness of complete application/system not less than 500 microns). The operation shall be carried out after scrapping and properly cleaning the surface to remove loose particles with wire brushes, complete in all respect as per the direction of Engineer-in-Charge.	Sqm	308.00

CHAPTER - 19
FORM WORK

Notes for Specifications

1 Form Work shall include all temporary or permanent forms or moulds required for forming the concrete which is cast-in-situ, together with all temporary construction required for their support.

2 It shall be strong enough to withstand the dead and live loads and forces caused by ramming and vibrations of concrete and other incidental loads, imposed upon it during and after casting of concrete.

3 It shall be made sufficiently rigid by using adequate number of ties and braces, screw jactks or hard board wedges where required shall be provided to make up any settlement in the form work either before or during the placing of concrete.

4 Form shall be so constructed as to be removable in sections in the desired sequence.

5 The staging to be either of Tubular steel structure with adequate bracings as approved or made of built up structural sections made form rolled structural steel sections.

6 Shuttering used shall be of sufficient stiffness to avoid excessive deflection and joints shall be tightly butted to avoid leakage of slurry.

7 The completed form work shall be inspected and approved by the Engineer-in-Charge before the reinforcement bars are placed in position.

8 Measurement

Measurement shall be taken of the area of shuttering in contact with the concrete surfaces. Dimensions of the form work shall be measured correct to a cm. measurement shall be taken separately for each part of the construction.

9 Centering and shuttering where exceeding 3.5 meter height in one floor shall be measured and paid for separately.

10 Rates

Rates in this chapter are for the finished work including the cost of all materials labour, tools and plant required for design, construction and removal of formwork including properly supporting the members until the concrete is cured, set and hardened as required and also inclusive of lining with material approved by the Engineer-in-Charge so as to provide a smooth finish of uniform texture, apperance and to produce a finished concrete true to shape line, levels and dimension shown on the drawings.

(For Detail Refer Chapter of Form Work specification)

CHAPTER - 19
FORM WORK

S.No.	Description of Items	Unit	Rate (in Rs)
19.1	Centering and shuttering including strutting, propping stretching etc. complete for and removal of form work by sheet plate or ply wood shuttering for :		
19.1.1	Foundations, footings, bases of columns, etc. For mass concrete.	Sqm	160.00
19.1.2	Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc	Sqm	289.00
19.1.3	Suspended floors, roofs, landings, balconies and access platform.	Sqm	305.00
19.1.4	Shelves (Cast in situ)	Sqm	305.00
19.1.5	Lintels, beams, plinth beams, girders, bressumers and cantilevers.	Sqm	270.00
19.1.6	Columns, Pillars, Piers, Abutments, Posts and Struts.	Sqm	362.00
19.1.7	Stairs, (excluding landings) except spiral-staircases.	Sqm	330.00
19.1.8	Spiral staircases (including landing).	Sqm	296.00
19.1.9	Arches, domes, vaults up to 6 m span	Sqm	853.00
19.1.10	Extra for arches, domes, vaults exceeding 6 m span	Sqm	388.00
19.1.11	Chimneys and shafts	Sqm	293.00
19.1.12	Well steining	Sqm	438.00
19.1.13	Vertical and horizontal fins individually or forming box	Sqm	480.00
19.1.14	Extra for shuttering in circular work or any other geometrical shape (20% of respective centering and shuttering items).	Sqm	(20% of respective centering and shuttering items)
19.1.15	Small lintels not exceeding 1.5m clear span, moulding as in cornices, window sills, string courses, bands, copings, bed plates, anchor blocks and the like.	Sqm	160.00
19.1.16	Cornices and mouldings	Sqm	472.00
19.1.17	Small surfaces such as cantilever ends, brackets and ends of steps, caps and bases to pilasters and columns and the like.	Sqm	403.00
19.1.18	Weather shade, Chajjas, corbels etc., including edges	Sqm	413.00
19.2	Providing and fixing tie bolt, spring coil and plastic cone in wall shuttering complete as per the direction of Engineer-in-charge		
19.2.1	12 mm dia. & 100 mm length.	Each	105.00
19.2.2	12 mm dia. & 150 mm length.	Each	116.00
19.2.3	20 mm dia. & 150 mm length.	Each	126.00
19.2.4	20 mm dia.& 225 mm length.	Each	139.00
19.3	Extra for additional height of suspended floors, roofs, landing, beams & balconis in centering, shuttering where ever required with adequate bracing, propping etc. including cost of de-shuttering and decentering at all levels, over a height of 4.2 m, for every additional height of 1 meter or part thereof. (Plan area to be measured)	Sqm	159.00

S.No.	Description of Items	Unit	Rate (in Rs)
19.4	Providing and fixing double scaffolding system (cup lock type) on the exterior side, up to seven story height made with 40mm dia. M.S. tube 1.5m centre to centre horizontal & vertical tubes joining with cup & lock system with M.S. tubes, M.S. tube challies, M.S. clamps and M.S. staircase system in the scaffolding for working platform etc.and maintaining it in a serviceable condition for the required duration as approved and removing it there after. The scaffolding system shall be stiffened with bracings, runners, connection with the building etc wherever required for inspection of work at required locations with essential safety features for the workmen etc. complete as per directions and approval of Engineer-in-charge. The lavational area of the scaffolding shall be measured for payment purpose. The payment will be made once irrespective of duration of scaffolding.	Sqm	154.00

CHAPTER - 20
WATER HARVESTING, RECYCLE AND REUSE WASTEWATER

Notes for Specifications

1 There are two board approaches to harvesting water:-

(a) Storing rainwater for direct use

(b) Recharging groundwater aquifers

In Madhya Pradesh the total annual rainfall occurs only during 3 or 4 months of mansoon. The water collected during the mansoon has to be stored throughout the year; which means that huge volumes of storage containers would have to be provided. Hence it is more feasible in urban area to use rainwater for recharging groundwater aquifers rather then for storage.

1.2 Rainwater harvesting method for urban areas:-

(a) Recharge pit

(b) Recharge Trench

(c) Tube well

(d) Recharge Well

In urban areas, rain water available from roof tops of buildings, paved and unpaved areas goes waste. This water can be recharged to aquifer and can be utilized gainfully at the time of need. The rain water harvesting system needs to be designed in a way that it does not occupy large space for collection and recharge system. A few techniques of roof top rain water harvesting in urban areas are described below:-

1.3 Roof top rain water Harvesting Through Re-charge pit

(a) In alluvial areas where permeable rocks are exposed on the land surface or at very shallow depth, rooftop rain water harvesting can be done through recharge pit

(b) The technique is suitable for building having a roof area of 100 sq.m. and are constructed for recharging the shallow aquifers.

(c) Recharge pit may be of any shape and size and are generally constructed 1 to 2 m. wide and 2 and 3m. Deep which are back filling with boulders (5-20 cm), gravels (5-10 mm) and coarse sand (1.5-2mm) in graded from - Boulders at bottom, gravels in between and coarse sand at the top so that the silt content that will come with runoff will be deposited on the top of coarse sand layer and can easily be removed. For smaller roof area, pit may be filled with broken bricks/cobbles.

(d) A mesh should be provided at the roof so that leaves or any other solid waste/debris is prevented from entering the pit and a desilting/collection chamber may also be provided at the ground to arrest the flow of finer particles to the recharge pit

(e) The top layer of sand should be cleaned periodically to maintain the recharge rate.

(f) By-Pass arrangement be provided before the collection chamber to reject the first showers.

1.4 Roof top rain water Harvesting Through Recharge Trench

(a) Recharge trenches are suitable for buildings having roof area of 200-300 sq.m. and where permeable strata is available at shallow depths.

(b) Trench may be 0.5 to 1 m.wide, 1 to 1.5m. Deep and 10 to 20m. Long depending upon availability of water to be recharged.

(c) These are back filling with boulders (5-20 cm), gravels (5-10 mm) and coarse sand (1.5-2mm) in graded from - Boulders at bottom, gravels in between and coarse sand at the top so that the silt content that will come with runoff will be deposited on the top of coarse sand layer and can easily be removed.

(d) A mesh should be provided at the roof so that leaves or any other solid waste/debris is prevented from entering the pit and a desilting/collection chamber may also be provided at the ground to arrest the flow of finer particles to the recharge pit

(e) By-Pass arrangement be provided before the collection chamber to reject the first showers.

(f) The top layer of sand should be cleaned periodically to maintain the recharge rate.

1.5 Roof top Rain Water Harvesting through Existing Tube well.

(a) In area where the shallow aquifers have dried up and existing tube wells are tapping deeper aquifers, roof top rain water harvesting through existing tube well can be adopted to recharge the deeper aquifers.

(b) PVC pipes of 10cm dia are connected to roof drains to collect rain water. The first roof runoff is let off through the bottom of drain pipe. After closing the bottom pipe, the rain water of subsequent rain showers is taken through a T to an online PVC filter. The filter may be provided before water enters the tube well. The filter is 1-1.2m. in length and is made up of PVC pipe. It's diameter should very depending on the area of roof, 15cm if roof area is less then 150sq.m. and 20cm if the roof area is more. The filter is provided with a reducer of 6.25cm on both the sides. Filter is divided into three chambers by PVC screens so that filter material is not mixed up. The first chamber is filled up with gravel (6-10mm),middle chamber with pebbles(12-20mm) and last chamber with bigger pebbles (20-40mm).

(c) If the roof area is more, a filter pit may be provided. Rain water form roof is taken to collection/desilting chambers located on ground. These collection chamber are interconnected as well as connected to the filter pit through pipes having a slope of 1:15. The filter pit may very in shape and size depending upon available run off are back-filling with graded material, boulder at the bottom, gravel in the middle and sand at the top with varying thickness (0.30-0.50m.)and may be separated by screen. The pit is divided into two chambers, filter material in one chamber and other chamber is kept empty to accommodate excess filtered water and to monitor the quality of filtered water. A connecting pipe with recharge well is provided at the pit for recharging of filtered water through well.

1.6 Roof top Rain Water Harvesting through Trench with Recharge Well

(a) In area where the surface soil is impervious and large quantities of roof water or surface runoff is available within a very short period of heavy rainfall, the use of trench/pit is made to store the water in a filter media and subsequently recharge to groundwater through specially constructed recharge wells.

(b) The technique is ideally suited for area where permeable horizon is within 3m below ground level.

(c) Recharge well of 100-300 diameter is constructed to a depth of at least 3 to 5 m below the water level. Based on the litho logy of the area well assembly is designed with slotted pipe against the shallow and deeper aquifer.

(d) A lateral trench of 1.5 to 3m width and 10 to 30m length , depending upon the availability of water is constructed with the recharge well in the centre.

(e) The number of recharge wells in the trench can be decided on the basis of water availability and local vertical permeability of the rocks

(f) The Trench is backfilled with boulders, gravels and coarse sand to act as a filter media for the recharge wells

(g) If the aquifer is available at greater depth say more then 20m, a shallow shaft of 2 to 5 m diameter and 3 to 5 meters deep may be constructed depending upon availability of runoff. Inside the shaft a recharge well of 100-300mm dia is constructed of recharging the available water to the deeper aquifers. At the bottom of the shaft media is provided to avoid choking of recharge well.

1.7 PVC Pipe shall be as per IS 4985

1.8 Gravel : It shall consist of naturally occurring (uncrushed, crushed or broken) river bed shingle or pit gravel. It shall be sound, hard and clean. It shall be free from flat particles of shale or similar laminated material, powdered clay, silt, loam, adherent coating, alkali, vegetable matter and other deleterious substances.

1.9 Brick bats: Brick bats shall be obtained by breaking well burnt or over burnt dense brick/brick bats. They shall be homogeneous in texture, roughly cubical in shape and clean.

2 Domestic Waste Water

Types of waste water are given below:

1	Black Water	Water from flush toilets(faeces and urine with flush water)
2	Grey Water	Water from the kitchen, bathroom, washing machine (dose not contain faeces and urine)
3	Yellow Water	Urine from urinals (with or without water for flushing)
4	Brown Water	Black water without urine or yellow water

2.1 Black Water

Black Water is water from toilets with flush water, faeces (brown water) and urine (yellow Water). It consist a high concentration of organic carbon and concentration of nitrogen, phosphorus and pathogens.

2.2 Grey water

Grey water comes from activities like washing of clouths, bathing and cooking and contains synthetic detergents. Kitchen waste consist of food residues as well as type of grease (fat).

2.3 System of Treatment of waste water

Type of treatment

(i) DEWATS
(ii) Reed bed system
(iii) Septic tank with soak pit or
(iv) Soil biotechnology
(v) Improved septic tank

2.4 DEWATS Component of system

DEWATS applications are based on four basic treatment modules, which are combined according to specific requirements. These include two post- treatment methods in the reed bed system and in ponds.

(i) Primary treatment, which includes pre-treatment and sedimentation in settlement tank or septic tank.
(ii) Secondary anaerobic treatment in baffled reactors.
(iii) Tertiary aerobic/anaerobic treatment in reed bed system.
(iv) Aerobic treatment in ponds.

2.5 Grey water recycling

Treating household grey water

At the household level, grey water is treated by constructing plated filler. The amount of grey water output is estimated at 180 liter per day. A reed bed of 1 m width, 2 m length and 0.6 m depth (1 per cent slope at the bottom) provides retention for a volume of 1.2 cu m of wastewater. When filled with gravel with about 30 per cent pore space, the free volume available was 0.36 cu m or 360 liter. This is sufficient to provide a retention time of up to two days for the wastewater. However, actual retention time will depend on the frequency and the number of users.

The pit is lined with polythene and a brick wall is built around it to prevent the inflow of surface run-off into the unit. At the inlet, a plastic tub is placed to serve as the inlet chamber. Bath water is filled into this tub. The suspended particles become sediment and wastewater overflows from this tub to the inlet of the remediation chamber, where coarse gravel (3 cm) has been filled. The rest of the unit is filled with small gravel (1 cm) up to the outlet end of the bed. At the bottom, a perforated pipe is laid, to collect the treated water. At the outlet, the water is led into a small tank and stored for irrigation.

2.6 Improved septic tank: -

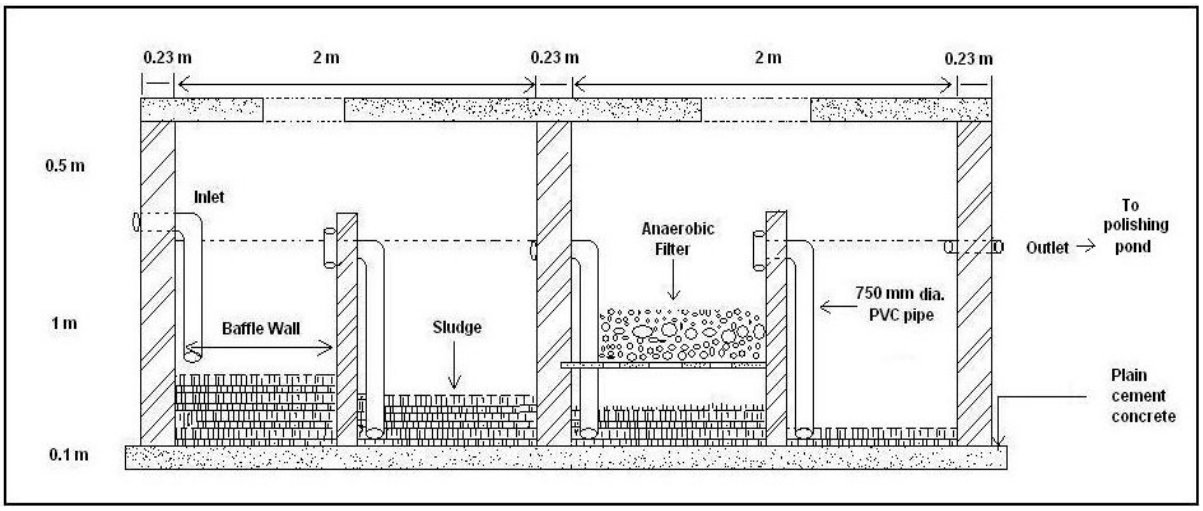
Screened (through a screen with bars 25-50 mm apart) wastewater is diverted to be septic tank which is collected in a serial of connection chamber is divert to the improved septic tank, which is provided with four chambers, each 1m in length and 1.5 m in depth.

The incoming raw sewage settles in the first chamber and the overflow moves to the next chambers through the 75 mm pvc pipe provide at the top of each chamber. The pipe helps to mix the raw sewage with already existing activated sludge, which is enriched in microorganisms for digesting it. In order to enhance the function of the microorganisms, a biocatalyst is added to the septic tank. The biocatalyst, which are in crystal from, speed up the reaction but are not affected themselves Apart from biocatalyst – in order to improved the treatment process – an anaerobic up flow filter is also installed.

Anaerobic filter are provided in the third chamber of the septic tank. The filter act as an ideal breeding ground for the microbes and result in effective treatment of incoming wastewater. Most of the treatment in the septic tank takes place under anaerobic condition .Hence by adding a polishing pond to the system, aerobic reaction is also incorporated. In the polishing pond the treated water is exposed to sunlight, which helps in reducing the pathogen count. Finally , this treated water is used for irrigation.

Above plant is sufficient for treatment of wastewater 600 liter per day

Improved Septic tank



3 Measurements :
The Gravel shall be measured in stacks and paid for after making a deduction of 7.5% of the gross measurements of stacks.

4 Rates
Rates include cost of material & labour.

(For Detail Refer Chapter of Water Harvesting, Recycle and Reuse Wastewater specification)

CHAPTER - 20

RAINWATER HARVESTING, RECYCLE AND REUSE OF WASTE WATER

S.No.	Description of Items	Unit	Rate (in Rs)
	ROOF TOP RAIN WATER HARVESTING		
20.1	Excavation of trench for laying of pipe for water harvesting at ground floor and refilling watering and ramming the average depth of trench is 0.65 meter.		
20.1.1	Excavation for 75mm	Meter	114.00
20.1.2	Excavation for 90mm	Meter	123.00
20.1.3	Excavation for 110mm	Meter	129.00
20.1.4	Excavation for 160mm	Meter	148.00
20.2	Providing & laying of P.V.C. pipe for roof top harvesting from roof slab to Ground floor including all fittings, jointing material with bypass arrangement with suitable valves.		
20.2.1	P.V.C. pipe 6kg/sqm (75 mm)	Sqm	1388.00
20.2.2	P.V.C. pipe 6kg/sqm (90 mm)	Sqm	1486.00
20.2.3	P.V.C. pipe 6kg/sqm (110 mm)	Sqm	2296.00
20.24	P.V.C. pipe 6kg/sqm (160 mm)	Sqm	3526.00
20.3	Boring holes with Auger upto depth of 3.6 m for water harvesting system.		
20.3.1	150 mm dia	RM	121.00
20.3.2	200 mm dia	RM	154.00
20.4	Add for ever 50 cm depth where depth is more than 3.6 m		
20.4.1	150 mm dia	RM	65.00
20.4.2	200 mm dia	RM	79.00
20.5	Providing PVC pipe slotted as per direction of Engineer-in-Charge and fixing in Rain water recharge pit/Percolation pit or Soakway with jute coir wrapping pipe.		
20.5.1	150 mm dia	RM	316.00
20.5.2	200 mm dia	RM	631.00
20.6	Providing and laying filter material as given below in recharge pit/ percolation pit or soak pit/ waste water treatment system.		
20.6.1	Course Sand (1.5 mm to 2.00 mm)	Cum	1585.00
20.6.2	Gravel/Pebbles (5 to 25 mm)	Cum	1331.00
20.7	Brick bats	Cum	948.00
20.8	Plantation of reed grass in waste water treatment system.	Sqm	7.00

S.No.	Description of Items	Unit	Rate (in Rs)
20.9	Providing and fixing of unplasticised rigid PVC rain water harvesting filter kit UV protected with filter, PVC valve, conforming to IS : 1392, working pressure 4 kg/sqcm Type B, minimum capacity 20 kilolitre/ hour, of approved make including all accessories like uplasicied PVC pipe clips of approved design with bombay nail of required length including making good the wall etc. complete for designed catechment area.		
20.9.1	75mm diameter PVC Pipe, having wall thickness 3.2 mm for 100 sqm catchment area.	Each	7103.00
20.10	Providing and fixing of unplasticised rigid PVC rain water harvesting filter kit including filter of 160mm diameter wall thickness 3.2mm with PVC valve, 110mm diameter UV protected conforming to ID : 13592 for working pressure 6 Kg/sqcm Type B capacity 40 kilo liter/hour of "Jal Santosh: make or equivalent and including all accessories like unplasticied PVC pipe cliips of approved design with bombay nail for required length including making good the wall etc. complete for catchment area upto 200 sqm.	Each	9602.00
20.11	Borewell adaptor for connecting Rain Water Harvesting pipe line to borewell.		
20.11.1	Borewell adaptor 75mm	Each	303.00
20.11.2	Borewell adaptor 110mm	Each	356.00
20.11.3	Borewell adaptor 160mm	Each	455.00

CHAPTER- 21
BUILDING WATER SUPPLY

1 GENERAL

1 Any damage caused to the building, or to electric, sanitary water supply or other installations etc. therein either due to negligence on the part of the contractor, or due to actual requirements of the work, shall be made good and the building or the installations shall be restored to its original condition by the contractor. Nothing extra shall be paid for it, except where otherwise specified.

2 All water supply installation work shall be carried out through licensed plumbers.

3 It is most important to ensure that wholesome water supply provided for drinking and culinary purposes, is in no way liable to contamination from any less satisfactory water. There shall, therefore, be no cross connection whatsoever between a pipe or fitting for conveying or containing wholesome water and a pipe or fitting for conveying or containing impure water or water liable to contamination or of uncertain quality of water which has been used for any purpose. The provision of reflux or non-return valves or closed and sealed valves shall not be construed a permissible substitute for complete absence of cross-connection.

4 Where the laying of any pipe through fouled soil or previous material is unavoidable, the piping shall be properly protected from contact with such soil or material by being carried through an exterior cast iron tube or by some other suitable means. Any piping or fitting laid or fixed which does not comply with the above requirements, shall be removed and re-laid in conformity with the above requirements.

5 The design of the pipe work shall be such that there is no possibility of backflow towards the source of supply from any cistern or appliance whether by siphonage or otherwise, and reflux or nonreturn valves shall not be relied upon to prevent such back flow.

6 All pipe work shall be so designed, laid or fixed, and maintained so that it remains completely watertight, thereby avoiding wastage of water, damage to property and the risk of contamination of the water conveyed.

(i) All pipe work shall be planned so that the piping is accessible for inspection, replacement and repair. To avoid its being unsightly, it is usually possible to arrange it in or adjacent to cupboards, recesses, etc. provided there is sufficient space to work on the piping with the usual tools. Piping shall not be buried in walls or solid floors. Where unavoidable, piping may be buried for short distances provided that adequate protection is given against damage and that no joints are buried. If piping is laid in ducts or chases, these shall be roomy enough to facilitate repairs and shall be so constructed as to prevent the entry of vermin. To facilitate removal of pipe casing, floor boards covering piping shall be fixed with screws or bolts.

(ii) When it is necessary for a pipe to pas through a wall or floor, a sleeve shall be fixed therein for insertion of the pipe and to allow freedom for expansion, contractor and other movement. Piping laid in wood floors shall, where possible, be parallel with the joists.

(iii) Where storage tanks are provided to meet overall requirements of water connection of service pipe with any distributing pipe shall not be permitted except on direct connection for culinary or drinking requirements.

(iv) No service pipe shall be connected to any water closet or urinal. All such supplies shall be from flushing cisterns which shall have supply from storage tank.

(v) No service or supply pipe shall be connected directly to any hot-water system or to any apparatus used for heating other than through a feed cistern thereof.

2 Galvanized mild steel tubes/pipes with threaded and screw ends, medium grade shall conform to I.S. 1239-2004 Part I, screwed both ends conforming to IS:544-1955, pipe threads shall be used. The G.I. filleting shall be conforming to IS 1239-2004 Part II.

2.1 Mass of medium class pipes

(a)

Nominal bore : in mm	Mass of Screwed & Socketed G.I. Pipes (in Kg per mtr.)
	Medium
6	0.407
8	0.645
10	0.845
15	1.22
20	1.57
25	2.43
32	3.13
40	3.6
50	5.1
65	6.54
80	8.53
100	12.5
125	16.4
150	19.5

(b) Tolrance Mass :

Single tube (medium and heavy series)	± 10 percent
For quantities per load of 10 tonnes, Min (medium and heavy series)	± 7.5 percent

(c) Tolrance Thickness :

Welded tubes	
Medium	+ not limited
	- 10 percent
Seamless tubes	+ not limited
	- 10 percent

3 Laying Jointing of GI pipes: -

The pipes shall be cleaned and cleared of all foreign matter before being laid. In jointing the pipes, the inside of the socket and the screwed end of the pipes shall be oiled and rubbed over. Teflon Tape should be used on threads instead of 'Dhaaga/Safeda'. The end shall then be screwed in the socket, Tee etc. with the pipe wrench.

For internal work the galvanized iron pipes and fittings shall run on the surface of the walls on ceiling (not in chase) unless otherwise specified. When it is found necessary to conceal the pipes, chasing may be adopted or pipes fixed in the ducts or recess etc. provided there in sufficient space to work on the pipes with the usual tools. The pipes shall not ordinarily be buried in walls or solid floors. Where unavoidable, pipes may be buried for short distances provided adequate protection is given against damage and where so required joints are not buried. Where directed by the Engineer-in-Charge, as M.S. tube sleeve shall be fixed at a place the pipe is passing through a wall or floor for reception of the pipe and to allow freedom for expansion and contraction and other movements. In case the pipe is embedded in walls or floors it should be painted with anticorrosive bitumastic paints of approved quality. Under the floors the pipes shall be laid in layer of sand filling as done under concrete floors.

For G.I. pipes 15 mm diameter, the holes in the walls and floors shall be made by drilling with chisel or jumper and not by dismantling the brick work or concrete. However, for bigger dimension pipes holes shall be carefully made of the smallest size as directed by the Engineer-in-Charge. After fixing the pipes the holes shall be made good with cement mortar 1:3 (1 cement: 3 coarse sand) and properly finished to match the adjacent surface.

3.A Measurements

The lengths shall be measured in running metre correct to a cm for the finished work. It shall include G.I. pipe and G.I. fittings such as bends, tees elbows etc, but exclude brass or gun metal taps (cocks), valves, unions, lead connection pipes and shower rose. All pipes and fittings shall be classified according to their diameters, method of jointing and fixing substance, quality and finish. In case of fittings of an equal bore the pipe shall be described as including all cuttings and waste. In case of fittings of unequal bore, the largest bore shall be measured. Pipes laid in trenches (or without supports) and pipes fixed to walls, ceilings, etc. with supports shall be measured separately.

4 The pipes and fittings after they are laid and jointed shall be tested to hydraulic pressure of 6 Kg/ sq. cm (60 meter). The pipes shall be slowly and carefully charged with water allowing all air to escape and avoiding all shock or water hammer. The draw off taps and stop cocks shall then be closed and specified hydraulic pressure shall be applied gradually. Pressure gauge must be accurate and preferably should have been recalibrated before the test. The test pump having been stopped, the test pressure should be maintained without loss for at least half an hour. Pipes or fitting which are found leaking shall be replaced and joints found leaking shall be redone, without extra payment.

5 Non-Return valve (Gun Metal) shall conform IS 778.

6 Sluice valves (Gun Metal) shall conform IS 780.

7 All brass fittings including valves, stop cocks, ferrules, bib cocks shall conform to relevant I.S. specifications.

8 Ball valves shall comply the requirements of IS 1703.

9 HDPE water storage tanks should (conform IS : 1270) be of approved make as approved by the Engineer-in-Charge.

10 All socket and spigot spun Iron pipes shall conform to I.S. 1534-1947.

11 Water supply lines shall be avoided at the openings and they shall also not run with the lines carrying waste materials. Water supply line shall also not cross each other as far as possible.

12 The rates include cost of all materials, labour, T & P, hire & running charges of machineries etc. complete with all leads & lifts for all materials required for the work.

13 POLYPROPYLENE RANDOM CO-POLYMER(PP-R) PIPES: -

(i) The pipe shall be conforming to the requirement to IS 15801.
(ii) The pipe should have smooth inner surface with non-contracting diameter.
(iii) The pipe shall be cleanly finished, free from crack and other defects.

13.A Jointing Procedure: -

The jointing of PP-R pipes and fitting are done by fusion welding by means of a welding machine.

(i) The pipe of the desired length is cut using the pipe scissors.
(ii) The proper heating piece is taken and mounted on the welding machine.
(iii) The welding device is switched on - control lamp and switch lamp will lit. when ready, control lamp gets off, which means that welding temperature of 260 degrees ± 10 degrees Celsius has been reached. The pipe end and the fitting to be welded are heated on the welding machine. When heated up the pipe and the fitting is removed from the welding machine and the two pieces connected together by applying a little pressure without twisting.
(iv) The joint is allowed to cool done for a few seconds.
(v) The same method shall be adapted for exposed as well as concealed fittings.

13.B Measurement: -

(i) The net length of pipes as laid or fixed shall be measured in running meters correct to a cm for the finished work, which shall include PP-R pipe and fittings including plain fittings and Chrome Plated Brass Threaded fittings.
(ii) Deductions for the length of valves shall be made.
(iii) The cost includes cutting chases in the masonry wall and making good the same, trenching, refilling and testing of joints.
(iv) The cost of gate valves/wheel valves/union shall be paid for separately.

14 CHLORINATED POLYVINYL CHLORIDE (CPVC) PIPES: -

(i) CPVC pipes and fitting shall conform to IS 15778.
(ii) The internal and external surfaces of the pipes shall be smooth, clean and free from grooving and other defects.
(iii) Hydrostatic Characteristics: -
When subject to internal hydrostatic pressure test in accordance with the procedure given in IS 12235 (part 8 / sec 1), the pipe shall not fail during the prescribed test duration.

14.A FITTINGS: -

The fitting shall be as follows:-

(i) Plain CPVC solvent cement fitting from size 15mm to 160 mm.
(ii) Brass threaded fitting.
(iii) Valve from size 15mm to 160mm.

14.B Measurement: -

The net length of pipes as laid or fixed shall be measured in running meters correct to a cm for the finished work, including CPVC pipe, fittings, plain & Brass threaded fittings and jointing solvent cement.

15 PE-AL-PE (Polyethylene-Aluminum-Polyethylene) PIPES : -

(i) PE-AL-PE shall be as per IS 15450-2004.

(ii) Pipes are bonded , multilayer pipes consisting os metal aluminium and polyethylene. It is bonded with adhesive bothe internally and externally by polyethylene coating. The layes of PE-AL-PE pipes are as below:-

(a) The interior layer of polyethylene
(b) The adhesive layer
(c) Aluminium tube
(d) The adhesive layer
(e) The external layer of polyethylene

15.A FITTINGS: -

Compraction joints fitting should be used for PE-AL-PE pipes which may be brass,composite and composite external sealing.Either of these fittings should be used. The external sealing fitting should be used for cold water application.

15.B JOINTING :-

For leak proof and strong joint of pipe following steps are taken.

(a) Cut the pipe square by cutter to the required and proper length.
(b) Select the fitting to be used and dismantle its nuts and split rings.
(c) Place the nut and split ring over the pipe. Ensure that “O” rings are in proper position of insert.
(d) Prepare the end of pipe to be jointed for roundness and chamfer by using beveling tool. Push the pipe over the insert and inside the support groove fully.
(e) Push the split ring and nut towards connector till split ring touches the support groove.
(f) Tighten the nut over connector with spanner.

15.C Measurement : -

The net length of pipes as laid or fixed shall be measured in running meters correct to a cm for the finished work, which shall including fittings.

16 Rates

Rates include labour material and equipments required for complete items.

Note:- Please refer for other items of water supply refer chapter number 1 to 7 of SSR volume "A" (Water supply Sewerage, Drainage & Tube well)

(For Detail Refer to Specification prepared by the Urban Administration and Development Department, IS Code & CPHEEO / CPWD Specifications)

CHAPTER 21
BUILDING WATER SUPPLY

S.No.	Description of Items	Unit	Rates (in Rs.)
21.1	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply including all CPVC plane and brass threaded fitting i/c fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and testing of joints complete as per direction of Engineer in Charge. Internal work - Exposed on wall.		
21.1.1	15 mm nominal outer dia .Pipes.	Meter	109.00
21.1.2	20 mm nominal outer dia .Pipes.	Meter	134.00
21.1.3	25 mm nominal outer dia .Pipes.	Meter	161.00
21.1.4	32 mm nominal outer dia .Pipes.	Meter	207.00
21.1.5	40 mm nominal outer dia .Pipes.	Meter	260.00
21.1.6	50 mm nominal outer dia .Pipes.	Meter	334.00
21.2	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings i/c fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and the cost of cutting chases and making good the same including testing of joints complete as per direction of Engineer in Charge. Concealed work including cutting chases and making good the walls etc.		
21.2.1	15 mm nominal outer dia .Pipes.	Meter	109.00
21.2.2	20 mm nominal outer dia .Pipes.	Meter	134.00
21.2.3	25 mm nominal outer dia .Pipes.	Meter	161.00
21.2.4	32 mm nominal outer dia .Pipes.	Meter	207.00
21.3	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings This includes jointing of pipes & fittings with one step CPVC solvent cement ,trenching ,refilling & testing of joints complete as per direction of Engineer in Charge. External work		
21.3.1	15 mm nominal outer dia .Pipes.	Meter	96.00
21.3.2	20 mm nominal outer dia .Pipes.	Meter	115.00
21.3.3	25 mm nominal outer dia .Pipes.	Meter	146.00
21.3.4	32 mm nominal outer dia .Pipes.	Meter	182.00
21.3.5	40 mm nominal outer dia .Pipes.	Meter	218.00
21.3.6	50 mm nominal outer dia .Pipes.	Meter	292.00
21.3.7	62.50 mm nominal inner dia Pipes.	Meter	1426.00
21.3.8	75 mm nominal inner dia .Pipes.	Meter	1854.00
21.3.9	100mm nominal inner dia .Pipes.	Meter	2335.00
21.3.10	150 mm nominal inner dia .Pipes.	Meter	5392.00

S.No.	Description of Items	Unit	Rates (in Rs.)
21.4	Providing and fixing medium grade G.I. pipes medium class (ISI mark) complete with G.I. fittings (ISI mark) and clamps, including cutting and making good the walls etc. Internal work – Exposed on wall.		
21.4.1	15 mm dia. nominal bore	Meter	144.00
21.4.2	20 mm dia. nominal bore	Meter	174.00
21.4.3	25 mm dia. nominal bore	Meter	227.00
21.4.4	32 mm dia. nominal bore	Meter	283.00
21.4.5	40 mm dia. nominal bore	Meter	338.00
21.4.6	50 mm dia. nominal bore	Meter	442.00
21.5	Concealed pipe including painting with anti corrosive bitumastic paint, cutting chases and making good the wall.		
21.5.1	15 mm dia nominal bore	Meter	217.00
21.5.2	20 mm dia nominal bore	Meter	241.00
21.6	Providing and fixing G.I. pipes medium class complete with G.I. fittings as per IS : 1239 (Part-2) including trenching and refilling etc. External work		
21.6.1	15 mm dia. nominal bore	Meter	126.00
21.6.2	20 mm dia. nominal bore	Meter	148.00
21.6.3	25 mm dia. nominal bore	Meter	194.00
21.6.4	32 mm dia. nominal bore	Meter	235.00
21.6.5	40 mm dia. nominal bore	Meter	268.00
21.6.6	50 mm dia. nominal bore	Meter	342.00
21.6.7	65 mm dia. nominal bore	Meter	426.00
21.6.8	80 mm dia. nominal bore	Meter	532.00
21.7	Making connection of G.I. distribution branch with G.I. main of following sizes by providing and fixing tee, including cutting and threading the pipe etc. complete :		
21.7.1	25 to 40 mm nominal bore	each	304.00
21.7.2	50 to 80 mm nominal bore	each	675.00
21.8	Fixing water meter and stop cock in G.I. pipe line including cutting and threading the pipe and making long screws etc. complete (cost of water meter and stop cock to be paid separately).	Each	198.00
	PP- R PIPES		
21.9	Providing and fixing 3 layer PP-R (Poly propylene Random copolymer) pipes SDR 7.4 U V stabilized & anti -microbial fusion welded, having thermal stability for hot & cold water supply including all PP - R plain & brass threaded polypropylene random fittings i/c fixing the pipe with clamps at 1.00 m spacing. This includes testing of joints complete as per direction of Engineer in Charge. Internal work – Exposed on wall.		
21.9.1	PN - 16 Pipe, 16 mm OD	Meter	102.00
21.9.2	PN - 16 Pipe, 20 mm OD	Meter	115.00
21.9.3	PN - 16 Pipe, 25 mm OD	Meter	155.00
21.9.4	PN - 16 Pipe, 32 mm OD	Meter	208.00
21.9.5	PN - 16 Pipe, 40 mm OD	Meter	282.00
21.9.6	PN - 16 Pipe, 50 mm OD	Meter	419.00

S.No.	Description of Items	Unit	Rates (in Rs.)
21.10	Providing and fixing 3 layer PP-R (Poly propylene Random copolymer) pipes SDR 7.4 U V stabilized & anti - microbial fusion welded, having thermal stability for hot & cold water supply including all PP - R plain & brass threaded polypropylene random fittings i/c fixing the pipe with clamps at 1.00 m spacing. This includes the cost of cutting chases and making good the same including testing of joints complete as per direction of Engineer in Charge. Concealed work including cutting chases and making good the walls etc.		
21.10.1	PN - 16 Pipe, 16 mm OD	Meter	174.00
21.10.2	PN - 16 Pipe, 20 mm OD	Meter	184.00
21.10.3	PN - 16 Pipe, 25 mm OD	Meter	230.00
21.10.4	PN - 16 Pipe, 32 mm OD	Meter	288.00
21.11	Providing and fixing 3 layer PP-R (Poly propylene Random copolymer) pipes UV stabilized &anti-microbial fusion welded, having thermal stability for hot & cold water supply including all PP-R plain & brass threaded polypropylene random fittings including trenching ,refilling & testing of joints complete as per direction of Engineer in Charge. External work		
21.11.1	PN - 16 Pipe, 16 mm OD (SDR – 7.4)	Meter	85.00
21.11.2	PN - 16 Pipe, 20 mm OD (SDR – 7.4)	Meter	102.00
21.11.3	PN - 16 Pipe, 25 mm OD (SDR – 7.4)	Meter	141.00
21.11.4	PN - 16 Pipe, 32 mm OD (SDR – 7.4)	Meter	184.00
21.11.5	PN - 16 Pipe, 40 mm OD (SDR – 7.4)	Meter	240.00
21.11.6	PN - 16 Pipe, 50 mm OD (SDR – 7.4)	Meter	377.00
21.11.7	PN - 16 Pipe, 63mm OD (SDR – 7.4)	Meter	417.00
21.11.8	PN - 16 Pipe, 75 mm OD (SDR – 7.4)	Meter	604.00
21.11.9	PN - 16 Pipe, 90 mm OD (SDR – 7.4)	Meter	793.00
21.11.10	PN - 10 Pipe, 110 mm OD (SDR - 11)	Meter	1176.00
21.11.11	PN - 10 Pipe, 160 mm OD (SDR - 11)	Meter	3336.00
	BRASS FITTINGS		
21.12	Providing and fixing brass bib cock of approved quality :		
21.12.1	15 mm nominal bore 0.40kg	each	223.00
21.12.2	20 mm nominal bore 0.75kg	each	247.00
21.13	Providing and fixing brass stop cock of approved quality :		
21.13.1	15 mm nominal bore 0.40kg	each	205.00
21.13.2	20 mm nominal bore 0.75kg	each	247.00
21.14	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end):		
21.14.1	15 mm nominal bore	each	157.00
21.14.2	20 mm nominal bore	each	245.00
21.14.3	25 mm nominal bore	each	282.00
21.14.4	32 mm nominal bore.	each	426.00
21.14.5	40 mm nominal bore	each	571.00
21.14.6	50 mm nominal bore	each	858.00
21.14.7	65 mm nominal bore	each	1609.00
21.14.8	80 mm nominal bore	each	2476.00

S.No.	Description of Items	Unit	Rates (in Rs.)
21.15	Providing and fixing ball valve (brass) of approved quality, High or low pressure, with plastic floats complete :		
21.15.1	15 mm nominal bore	each	255.00
21.15.2	20 mm nominal bore	each	301.00
21.15.3	25 mm nominal bore	each	347.00
21.16	Providing and fixing gun metal non- return valve of approved quality (screwed end) :		
21.16.1	25 mm nominal bore		
21.16.1.1	Horizontal	each	396.00
21.16.1.2	Vertical	each	474.00
21.16.2	32 mm nominal bore		
21.16.2.1	Horizontal	each	523.00
21.16.2.2	Vertical	each	611.00
21.16.3	40 mm nominal bore		
21.16.3.1	Horizontal	each	639.00
21.16.3.2	Vertical	each	798.00
21.16.4	50 mm nominal bore		
21.16.4.1	Horizontal	each	1023.00
21.16.4.2	Vertical	each	1097.00
21.16.5	65 mm nominal bore		
21.16.5.1	Horizontal	each	1598.00
21.16.5.2	Vertical	each	1822.00
21.16.6	80 mm nominal bore		
21.16.6.1	Horizontal	each	2281.00
21.16.6.2	Vertical	each	2912.00
21.17	Providing and fixing brass ferrule with C.I. mouth cover including boring and tapping the main :		
21.17.1	15 mm nominal bore	Each	229.00
21.17.2	20 mm nominal bore	Each	271.00
21.17.3	25 mm nominal bore	Each	373.00
21.18	Providing and fixing uplasticised PVC connection pipe with brass unions		
21.18.1	30 cm length		
21.18.1.1	15 mm nominal bore	Each	77.00
21.18.1.2	20 mm nominal bore	Each	99.00
21.18.2	45 cm length		
21.18.2.1	15 mm nominal bore	Each	103.00
21.18.2.2	20 mm nominal bore	Each	102.00
21.19	Providing and fixing C.P. brass shower rose with 15 or 20 mm inlet :		
21.19.1	100 mm diameter	Each	285.00
21.19.2	150 mm diameter	Each	357.00
21.20	Painting G.I. pipes and fittings with synthetic enamel white paint over a ready mixed priming coat, both of approved quality for new work :		
21.20.1	15 mm diameter pipe.	Meter	7.00
21.20.2	20 mm diameter pipe.	Meter	8.00
21.20.3	25 mm diameter pipe.	Meter	11.00
21.20.4	32 mm diameter pipe.	Meter	13.00
21.20.5	40 mm diameter pipe.	Meter	16.00
21.20.6	50 mm diameter pipe.	Meter	18.00

S.No.	Description of Items	Unit	Rates (in Rs.)
21.21	Repainting G.I. pipes and fittings with synthetic enamel white paint of approved quality :		
21.21.1	15 mm diameter pipe.	Meter	4.00
21.21.2	20 mm diameter pipe.	Meter	5.00
21.21.3	25 mm diameter pipe	Meter	6.00
21.21.4	32 mm diameter pipe	Meter	7.00
21.21.5	40 mm diameter pipe	Meter	9.00
21.21.6	50 mm diameter pipe	Meter	10.00
21.22	Painting G.I. pipes and fittings with two coats of anticorrosive bitumastic paint of approved quality :		
21.22.1	15 mm diameter	Meter	5.00
21.22.2	20 mm diameter pipe	Meter	6.00
21.22.3	25 mm diameter pipe	Meter	8.00
21.22.4	32 mm diameter pipe	Meter	9.00
21.22.5	40 mm diameter pipe	Meter	10.00
21.22.6	50 mm diameter pipe	Meter	12.00
21.22.7	65 mm diameter pipe	Meter	15.00
21.22.8	80 mm diameter pipe	Meter	18.00
21.23	Providing and fixing G.I. Union (ISI mark) in G.I. pipe line including cutting and threading the pipe and making long screws etc complete (new work) :		
21.23.1	15 mm nominal bore.	each	133.00
21.23.2	20 mm nominal bore.	each	157.00
21.23.3	25 mm nominal bore.	each	169.00
21.23.4	32 mm nominal bore.	each	205.00
21.23.5	40 mm nominal bore.	each	246.00
21.23.6	50 mm nominal bore.	each	303.00
21.23.7	65 mm nominal bore.	each	527.00
21.23.8	80 mm nominal bore.	each	661.00
21.24	Providing and fixing G.I. Union (ISI mark) in existing G.I. pipe line, cutting and threading the pipe and making long screws including excavation, refilling the earth or cutting of wall and making good the same complete wherever required :		
21.24.1	15 mm nominal bore.	each	236.00
21.24.2	20 mm nominal bore.	each	260.00
21.24.3	25 mm nominal bore.	each	271.00
21.24.4	32 mm nominal bore.	each	307.00
21.24.5	40 mm nominal bore.	each	349.00
21.24.6	50 mm nominal bore.	each	469.00
21.24.7	65 mm nominal bore.	each	718.00
21.24.8	80 mm nominal bore.	each	828.00
21.25	Providing and placing on terrace at all floor polyethylene water storage tank ISI : 12701 marked with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.	Ltr.	8.00

S.No.	Description of Items	Unit	Rates (in Rs.)
	C.P.BRASS FITTINGS.		
21.26	Providing and fixing C.P. brass bib cock of approved quality conforming to IS:8931 - 15 mm nominal bore.	Each	462.00
21.27	Providing and fixing C.P. brass long nose bib cock of approved quality conforming to IS standards and weighing not less than 810 gms. - 15 mm nominal bore.	Each	448.00
21.28	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms. - 15 mm nominal bore	Each	428.00
21.29	Providing and fixing C.P. brass stop cock (concealed) of standard design and of approved make conforming to IS:8931. - 15 mm nominal bore.	Each	458.00
21.30	Providing and fixing C.P. brass angle valve for basin mixer and geyser points of approved quality conforming to IS:8931 - 15 mm nominal bore	Each	407.00
21.31	Providing and fixing C.P. brass pillar cock approved quality and make conforming to IS:specification.- 15 mm nominal bore 125 mm long foam flow	Each	577.00
21.32	Providing and fixing C.P. brass base and mixer of approved quality and make conforming to IS: specification. - 15 mm nominal bore.	Each	1715.00
21.33	Providing and fixing C.P. brass wall mixer of approved quality and make conforming to IS: specification. - 15 mm nominal bore.	Each	1951.00
21.34	Providing and fixing C.P. brass sink mixer of approved quality and make conforming to IS: specification. 15 mm nominal bore.	Each	2003.00
21.35	Providing and fixing C.P. brass grating of approved quality and make conforming to IS: specification. - 100 mm dia.	Each	53.00
	Polytetra Methyline Tetraphthalate (PTMT) Fittings		
21.36	Providing and fixing PTMT bib cock of approved quality and colour.		
21.36.1	15mm nominal bore, 86mm long. Weighing not less than 88 gms.	Each	152.00
21.36.2	15 mm nominal bore, 122mm long. Weighing not less than 99 gms	Each	324.00
21.36.3	15 mm nominal bore, 165mm long. Weighing not less than 110 gms.	Each	235.00
21.36.4	15mm nominal bore, 90mm long. Weighing not less than 93 gms.	Each	173.00
21.37	Providing and fixing PTMT stop cock of approved quality and colour.		
21.37.1	15 mm nominal bore, 86mm long. Weighing not less than 88 gms	Each	152.00
21.37.2	20mm nominal bore, 89mm long. Weighing not less than 88 gms.	Each	185.00
21.37.3	Concealed stop cock, 15mm nominal bore, 108mm long. Weighing not less than 108 gms.	Each	241.00
21.38	Providing and fixing PTMT pillar cock of approved quality and colour .		
21.38.1	15mm nominal bore, 107mm long. Weighing not less than 110 gms.	Each	231.00
21.38.2	15mm nominal bore, 125mm long foam flow. Weighing not less than 120 gms	Each	328.00

S.No.	Description of Items	Unit	Rates (in Rs.)
21.39	Providing and fixing PTMT, push cock of approved quality and colour.		
21.39.1	15 mm nominal bore, 98mm long. Weighing not less than 75 gms.	Each	145.00
21.39.2	15 mm nominal bore, 80mm long. Weighing not less than 46 gms.	Each	123.00
21.40.1	A. Providing & fixing PTMT grating of approved quality and colour. Circular type.		
21.40.1.1	100 mm nominal dia.	Each	37.00
21.40.1.2	125 mm nominal dia with 25 mm waste hole	Each	48.00
21.40.2	B. Providing & fixing PTMT grating of approved quality and colour Rectangular type with openable circular lid.		
21.40.2.1	150 mm nominal size square 100 mm diameter of the inner hinged round grating.	Each	100.00
21.41	Providing and fixing PTMT angle stop cock 15 mm nominal bore. Wieghing not less than 85 gms.	Each	178.00
21.42	Providing and fixing PTMT swivelling shower,15mm nominal bore,wieghing not less than 40 gms.	Each	111.00
21.43	Providing and fixing PTMT soap dish holder having length of 138 mm, breadth 102 mm height of 75mm with concealed fitting arrangements, Weighing not less than 106 gms.	Each	86.00
21.44	Providing & fixing PTMT Ball cock of approved quality, colour and make complete with epoxy coated aluminum rod with LP/HDPE plastic ball.		
21.44.1	15 mm nominal bore,105 mm long weighing not less than 138 gms.	Each	267.00
21.44.2	20 mm nominal bore,120 mm long wieghing not less than 198 gms.	Each	373.00
21.44.3	25 mm nominal bore,152mm long weighing not less than 440 gms.	Each	668.00
21.44.4	40 mm nominal bore, 206 mm long.weighing not less than 690 gms.	Each	1183.00
21.44.5	50 mm nominal bore, 242 mm long ,weighing not less than 1240 gms.	Each	1714.00
21.45	Providing and fixing PTMT extension nipple for Water tank pipe fittings of approved quality and colour.		
21.45.1	15mm nominal bore, Weighing not less than 32 gms.	Each	43.00
21.45.2	20mm nominal bore, Weighing not less than 40 gms.	Each	383.00
21.45.3	25mm nominal bore, Weighing not less than 62 gms.	Each	472.00
	AIR VALVE AND WATER METER (BULK TYPE)		
21.46	Providing and fixing C.I. double acting air valve of approved quality with bolts, nuts, rubber insertions etc. complete (The tail pieces, tapers etc if required will be paid separately) :		
21.46.1	50 mm dia	Each	2462.00
21.46.2	80 mm dia	Each	3502.00
21.46.3	100 mm dia	Each	4285.00
21.47	Cutting holes up to 30x30 cm in walls of any thickness including making good the same.	per hole	196.00

S.No.	Description of Items	Unit	Rates (in Rs.)
21.48	Cutting holes up to 15x15 cm in R.C.C. floors and roofs for passing drain pipe etc. and repairing the hole after insertion of drain pipe etc. with cement concrete grade M-15 (Nominal Mix with 20mm maximum size of stone aggregate) including finishing complete so as to make it leak proof.	Each	145.00
21.49	Providing and fixing enclosed type water meter (bulk type) conforming to IS 2373 and tested by Engineer in charge complete with bolts & nuts rubber insertions etc.(the tail pieces if required will be paid separately)		
21.49.1	80 mm dia nominal bore	Each	2904.00
21.49.2	100 mm dia nominal bore	Each	4288.00
21.49.3	150 mm dia nominal bore	Each	6109.00
21.49.4	200 mm dia nominal bore	Each	6710.00
21.50	Providing and fixing C.I. dirt box strainer for bulk type water meter with bolts & nuts rubber insertions etc.complete conforming to IS 2373 :		
21.50.1	80 mm dia nominal bore	Each	3151.00
21.50.2	100 mm dia nominal bore	Each	4906.00
21.50.3	150 mm dia nominal bore	Each	6296.00
21.50.4	200 mm dia nominal bore	Each	8487.00
21.51	Making chases up to 7.5 x 7.5 cm in wallls including making good and finishing with matching surface after housing G.I.pipe etc.	Meter	56.00

CHAPTER- 22
BUILDING DRAINAGE

1 Work shall be done as per specification and as per IS code given below :-

S.No.	I.S. No.	Subject
1	IS 458	Pre-cast concrete pipes (with and without reinforcement)
2	IS 651	Specification for Salt Glazed Stoneware Pipes and Fittings.
3	IS 783	Code of Practice for Laying Concrete Pipes.
4	IS 1726	Specification for Cast Iron Manhole covers and Frames
5	IS 1729	Cast Iron/Ductile Iron Drainage Pipes and Pipe Fittings Socket and Spigot series for Over-ground Non-pressure pipe line.
6	IS 4127	Code of Practice for laying of Glazed Stone Ware Pipes
7	IS 4885	Specifications for Sewer Bricks
8	IS 12592	Pre-cast concrete Manhole Covers and Frames - Specifications.

2 General Requirements :-

2.1 In designing a drainage system for buildings, the aim shall to be provide a self cleansing conduit for the conveyance of soil, waste, surface or sub-surface waters and for the removal of such wastes speedily and efficiently to a sewer or other outlet, without risk of nuisance and hazard to health.

2.2 The discharge of water through a domestic drain is intermittent and limited in quantity and therefore, small accumulations of solid matter are liable to form in the drains between the building and the public sewer. There is usually a gradual shifting of these deposits as discharges take place. Gradients shall be sufficient to prevent these temporary accumulations building up and blocking the drains.

2.3 Normally, the sewer shall be designed for discharging three times the dry weather flow flowing half-full with a minimum self cleansing velocity of 0.75 meter per second. The approximate gradients which give this velocity for the sizes of pipes likely to be used in building drainage and the corresponding discharges when flowing half-full are given in Chapter 12 Table 12.2 of the specifications. The sizes and slopes shall conform to Local Municipal Bye-laws.

2.4 In cases, where it is practically not possible to conform to the minimum gradients, a flatter gradient may be used but the minimum velocity in such cases shall in no account be less than 0.61 meters per second.

2.5 On the other hand, it is undesirable to employ gradients giving velocity of flow greater than 2.4 meters per second. Where it is unavoidable, cast iron pipes shall be used.

3 All soil waste pipes and accessories shall be of grade 'A'.

4 In brick masonry manholes/chambers, the benching of inlets and outlet lines shall not cross each other for effective drainage.

5 Soak pits shall be constructed at least 3.00 m. apart from septic tank.

6 Cast Iron manhole covers and frames shall conform to I.S. 17276-1960.

7 Septic tanks shall be constructed conforming to I.S. 2470 (Part-I) 1963.

8 Centre to centre spacing of each manhole shall not exceed 6.00m.

9 Measurement :-
The lengths of pipes shall be measured in running meters nearest to a cm as laid or fixed, from inside of one manhole to the inside of the other manhole. The length shall be taken along the centre line of the pipes. All fittings such as bends, collars, junctions, etc. which shall not be measured separately.

10 Rates :-
The rate shall include the cost of materials and labour involved in all the operation described in the items.

(For Detail Refer to Specification prepared by the Urban Administration and Development Department, IS Code & CPHEEO Specifications)

CHAPTER 22
BUILDING DRAINAGE

S.No.	Description of Items	Unit	Rate (In Rs.)
22.1	Providing, laying and jointing glazed stoneware pipes class SP-1 with stiff mixture of cement mortar in the proportion of 1:1 (1 cement : 1 sand) including testing of joints etc. complete : Excavation to be paid seperataly		
22.1.1	100 mm diameter	Each	137.00
22.1.1	150 mm diameter	Each	250.00
22.1.1	200 mm diameter	Each	465.00
22.1.1	250 mm diameter	Each	631.00
22.1.1	300 mm diameter	Each	746.00
22.2	Providing and laying cement concrete 1:5:10 (1 cement : 5 sand : 10 graded stone aggregate 40 mm nominal size) all-round S.W. pipes including bed concrete as per standard design:		
22.2.1	100 mm diameter S.W. pipe	Meter	561.00
22.2.2	150 mm diameter S.W. pipe	Meter	687.00
22.2.3	200 mm diameter S.W. pipe	Meter	800.00
22.2.5	250 mm diameter S.W. pipe	Meter	925.00
22.2.6	300 mm diameter S.W. pipe	Meter	1240.00
22.3	Providing and laying cement concrete 1:5:10 (1 cement : 5 sand : 10 graded stone aggregate 40 mm nominal size) upto haunches of S.W. pipes including bed concrete as per standard design :		
22.3.1	100 mm diameter S.W. pipe	Meter	267.00
22.3.2	150 mm diameter S.W. pipe	Meter	432.00
22.3.4	200 mm diameter S.W. pipe	Meter	508.00
22.3.6	250 mm diameter S.W. pipe	Meter	592.00
22.3.7	300 mm diameter S.W. pipe	Meter	683.00
22.4	Providing and fixing square-mouth S.W. gully trap grade 'A'' complete with C.I. grating brick masonry chamber with water tight C.I. cover with frame of 300 x300 mm size (inside) the weight of cover to be not less than 4.50 kg and frame to be not less than 2.70 kg as per standard design : With Modular Bricks class designation 40.		
22.4.1	100 x 100 mm size P type	Each	1794.00
22.4.2	150 x 100 mm size P type.	Each	1840.00
22.4.3	180 x 150 mm size P type.	Each	1863.00
22.5	Dismantling of old S.W. pipes including breaking of joints and bed concrete stacking of useful materials near the site within 50 m lead and disposal of unserviceable materials into municipal dumps:		
22.5.1	100 mm diameter	Meter	22.00
22.5.2	150 mm diameter	Meter	23.00
22.5.3	200 mm diameter	Meter	25.00
22.5.4	250 mm diameter	Meter	27.00
22.5.5	300 mm diameter	Meter	29.00

S.No.	Description of Items	Unit	Rate (In Rs.)
22.5.6	350 mm diameter	Meter	31.00
22.5.7	400 mm diameter	Meter	33.00
22.5.8	450 mm diameter	Meter	36.00
22.6	Providing and laying non-pressure NP2 class (light duty) R.C.C. pipes with collars jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement : 2 fine sand) including testing of joints etc. complete :		
22.6.1	100 mm dia. R.C.C. pipe	Meter	279.00
22.6.2	150 mm dia. R.C.C. pipe	Meter	305.00
22.6.3	250 mm dia. R.C.C. pipe	Meter	499.00
22.6.4	300 mm dia. R.C.C. pipe	Meter	591.00
22.6.5	450 mm dia. R.C.C. pipe	Meter	977.00
22.6.6	500 mm dia. R.C.C. pipe	Meter	1176.00
22.6.7	600 mm dia. R.C.C. pipe	Meter	1400.00
22.7	Making connection of drain or sewer line with existing manhole including breaking into and making good the walls, floors with cement concrete grade M-15 (Nominal Mix with 20mm maximum size of stone aggregate) cement plastered on both sides with cement mortar 1:3 (1 cement : 3 sand) finished with a floating coat of neat cement and making necessary channels for the drain etc. complete :		
22.7.1	For pipes 100 to 230 mm diameter	Each	254.00
22.7.2	For pipes 250 to 300 mm diameter	Each	312.00
22.7.3	For pipes 350 to 450 mm diameter	Each	484.00
22.8	Constructing soak pit 1.20x1.20x1.20m filled with brickbats including S.W. drain pipe 100 mm diameter and 1.20 m long complete as per standard design. - 20 m long	Each	1752.00
22.9	Providing and fixing S.W. intercepting trap in manholes with stiff mixture of cement mortar 1:1 (1 cement : 1 fine sand) including testing of joints etc. complete :		
22.9.1	100 mm dia	Each	282.00
22.9.2	150 mm dia	Each	308.00
22.10	Providing and laying below ground unplasticised PVC pipe to with stand working pressure of 4 kg/cm2 soild waste pipes confirming to IS:13592 and IS:4985 including jointing with seal ring confirming to IS :5282 leaving 10mm gap for thermal expansion all necessary fittings etc. complete. Excavation to be paid seperataly.		
22.10.1	110 mm diameter OD	Meter	217.00
22.10.2	160 mm diameter OD	Meter	448.00
22.10.3	200 mm diameter OD	Meter	665.00

S.No.	Description of Items	Unit	Rate (In Rs.)
22.11	Making soak pit 2.5 m diameter 3.0 meter deep with 45 x 45 cm dry brick honey comb shaft with bricks of class designation 40 and S.W. drain pip 100 mm diameter, 1.8 m long complete. Over the filling shall be placed single matting which shall be covered with minimum layer of 7.5 cm earth. The shaft be covered with 7.5 cm thick stone or R.C.C. slab 10 cm wide and 10 cm deep brick edging with bricks of class designation 40 shall be provided round the pit. The connection of the open surface drain to the soak pit shall be made by means of 100 mm diameter S.W. pipe with open joints, as per standard design. (Fig 2.25)	Each	15948.00

CHAPTER- 23
SANITARY INSTALLATION

1 **Sanitary Material work shall be as per Specification of IS Code Listed below**

S.No.	Subject	I.S. Code No.
1	Specification for glazed fire clay sanitary appliances: Part 1 : General requirements.	IS 771 (Pt.1)
2	Specification for glazed fire day sanitary appliances : Part 2 : Specific requirements of kitchen and laboratory sink.	IS 771 (Pt.2)
3	Specific action for general requirements for enameled cast iron sanitary appliances.	IS 772
4	Flushing cisterns for water closets and urinals (Other than plastic cistern)- Specifications.	IS 774
5	Phenolic moulding materials - Specification	IS 1300
6	Water fittings - copper allow float valves (horizontal plunger type) - Specifications	IS 1703
7	Cast Iron/Ductile Iron Drainage Pipes and pipe fittings for Over ground non-pressure pipe line socket and spigot series.	IS 1729
8	Specification for pillar taps for water supply purposes.	IS 1795
9	Polystyrene moulding and extrusion materials - Specifications	IS 2267
10	Specification for Automatic Flushing Cisterns for Urinals (Other than plastic cisterns)	IS 2326
11	Plastic seats and covers for water closets Part 1 : Thermo set seats and covers - Specifications	IS 2548 (Part-1)
12	Plastic seats and covers for water closets Part 2: Thermoplastic seats and covers - Specifications	IS 2548 (Part-2)
13	Vitreous Sanitary appliances (Vitreous china) - Specifications	IS 2556
14	Part 1 : General requirements	IS 2556 (Part-1)
15	Part 2 : Specific requirements of wash-down water closets.	IS 2556 (Part-2)
16	Part 3: Specific squatting pans.	IS 2556 (Part-3)
17	Part 4: Specific requirements of wash basins.	IS 2556 (Part-4)
18	Part 5 : Specific requirements of laboratory sinks.	IS 2556 (Part-5)
19	Part 6: Specific requirements of Urinals & Partition Plates	IS 2556 (Part-6)
20	Part 7 : Specific requirements of accessories for sanitary appliances.	IS 2556 (Part-7)
21	Part 14: Specific requirements of integrated squatting pans.	IS 2556 (Part-14)
22	Part 15 : Specific requirements of universal water closets.	IS 2556 (Part-15)
23	Specifications for Copper alloy waste fittings for wash basins and sinks.	IS 2963
24	Specifications for low density polyethylene pipes for potable water supplies.	IS 3076
25	Urea formaldehyde moulding materials - Specifications	IS 3389
26	Specifications for centrifugally cast (spun) iron spigot and socket soil, waste and ventilating pipes fittings and accessories.	IS 3989
27	Specification for electroplated coating of nickel and chromium on copper and copper alloys.	IS 4827

28	Specifications for high density polyethylene pipes for potable water supplies.	IS 4984
29	Unplasticized P.V.C. pipes for potable water supply - Specifications.	IS 4985
30	Plastic flushing cisterns for water closets and urinals - Specifications	IS 7231
31	Stainless steel sinks for domestic purposes - Specifications.	IS 13983

The work shall be carried cut, complying in all respects with the requirements of relevant bye laws of the local body in whose jurisdiction the work is situated.

Any damage caused to the building, or to electric, sanitary, water supply or other, installations etc. therein, either due to negligence on the part of the contractor, or due to actual requirements of the work, shall be made good and the building or the installation shall be restored to its original condition by the contractor. Nothing extra shall be paid for such restoration works except where otherwise specified.

2 All joints shall be made with special care, particularly those between pipes of different material. All joints shall be perfectly air and water tight. No joint shall be embedded in wall at any cost.

3 Flushing Cisterns
The flushing cisterns shall be automatic or manually operated high level or low level as specified, for water closets and urinals. A high level cistern is intended to operate with minimum height of 125 cm and a low level cistern with a maximum height of 30 cm between the top of the pan and the under side of the cistern.

Cisterns shall be of following type (i) Vitreous China (IS 774) for Flushing type (ii) Automatic Flushing Cistern (IS 2326) and (iii) Plastic cisterns (IS 7231).

4 All exposed G.I., C.I. or lead pipes and fittings shall be painted with approved quality of paint.

5 All sanitary and plumbing work shall be carried out through licensed plumbers.

6 Fixing of Urinal Lipped, Half Stall (Single or Range)
Urinals shall be fixed in position by using wooden plugs and screws. It shall be at a height of 65 cm from the standing level to the top of the lip of the urinal, unless otherwise directed by the Engineer-in-Charge. The size of wooden plugs shall be 50 mm x 50 mm at base tapering to 38 mm x 38 mm at top and of length 5.0 cms. These shall be fixed in the wall in cement mortar 1:3 (1 cement : 3 fine sand). After the plug fixed in the wall, the mortar shall be cured till it is set.

6.1 Fixing of Stall Urinal (Single or Range)

The floor slab shall be suitably sunk to receive the stall urinal. Where the floor slab is not sunk, the stall urinal shall be provided over a platform. The lip of the stall urinal shall be flush with the finished floor level adjacent to it. The stall urinal shall be laid over a fine sand cushion of average 25 mm thickness. A space of not less than 3 mm shall be provided all-round, in front, side and filled with water proofing plastic compound. Care shall be taken that after the sub-grade for the floor is cast, one week should lapse before urinals are installed. The trap and fittings shall be fixed as directed by the Engineer-in-Charge. Payment for the floor and its sub-grade shall be made separately.

6.2 Fixing of Wash Basin

6.2.1 The installation shall consist of an assembly of wash basin, pillar taps, C.I. brackets, C.P. brass of P.V.C. union, as specified. The wash basin shall be provided with one or two 15mm C.P. brass pillar taps, as specified. The height of top of the rim of wash basin from the floor level shall be within 750mm to 800 mm.

6.2.2 The basin shall be supported on a pair C.I. cantilever brackets conforming to IS 775 and shall be embedded in cement concrete (1:2:4) block 100 x 75 x 150 mm. Use of M.S. angle or Tee section as bracket is not permitted. Brackets shall be fixed in position before dado work is done. The wall plaster on the rear shall be cut to rest over the top edge of the basin so as not to leave any gap for water to seep through between wall plaster & skirting of basin. After fixing the basin, plaster shall be made good and surface finished matching with the existing one. S.C.I. floor traps conforming to IS 1729 having 50 mm water seal (minimum 35 mm in two pipe systems with gully trap) should be used. Waste pipes laid horizontally should have gradient not flatter than 1 in 50 and not steeper than 1 in 10.

7 Inatallation of Squatting Pan & Water Closet shall be done as per Specifications.

8 Measurement

(i) The pipes shall be measured net when fixed in position excluding all fittings along its length, correct to a cm. When collars are used for jointing SCI pipes these shall be measured as fittings and shall be paid for separately. No allowance shall be made for the portions of the pipe lengths entering the sockets of the adjacent pipes or fittings. The above shall apply to both cases i.e. whether the pipes are fixed on wall face or embedded in masonry. No deduction shall be made in the former case from the masonry measurement for the volume of concrete blocks embedded therein. Similarly no deduction shall be made for the volume occupied by the pipes from the masonry when the former are embedded in the later.

(ii) Sinks, urinals, squatting pan, basins, water closets, foot rest (pair) etc. shall be measured in nos.

9 Rates :-

Rate include the cost of all the materials and labour involved for the completion of items.

(For Detail Refer to Specification prepared by the Urban Administration and Development Department, IS Code & CPHEEO Specifications)

CHAPTER-23
SANITARY INSTALLATION

S.No.	Description of Items	Unit	Rate (in Rs)
23.1	Providing and fixing white vitreous china water closet squatting pan (Indian type) P or S trap, complete including cutting and making good the walls and floors wherever required :		
23.1.1	Long pattern W.C. pan of size 580 mm	Each	841.00
23.1.2	Orissa pattern W.C. pan of size 580x440 mm	Each	1431.00
23.2	Extra for using coloured W.C. pan instead of white W.C. pan		
23.2.1	Orissa pattern W.C. pan 580x440 mm	Each	745.00
23.3	Extra for using coloured pedestal type W.C pan (European type) instead of white vitreous china W.C pan and cistern.	Each	451.00
23.4	Providing and fixing solid plastic seat with lid for pedestal type W.C. pan complete :		
23.4.1	White solid plastic seat with lid	Each	424.00
23.4.2	Black solid plastic seat with lid	Each	339.00
23.5	Providing and fixing P.V.C. low level flushing cistern with manually controlled device (handle lever) conforming to IS : 7231, with all fittings and fixtures complete.		
23.5.1	10 litre capacity - White	Each	664.00
23.5.2	10 litre capacity - coloured	Each	1233.00
23.6	Providing and fixing controlled flush, low level cistern made of vitreous china with all fittings complete.		
23.6.1	10 litre (full flush) capacity-white	Each	1517.00
23.6.2	10 litre (full flush) capacity-coloured	Each	2092.00
23.7	Providing and fixing white vitreous china flat back or wall corner type lipped front urinal basin of 430x260x350mm and 340x410x265mm sizes respectively with automatic flushing cistern with standard flush pipe and C.P. brass spreaders with brass unions and G.I clamps complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :		
23.7.1	One urinal basin with 5 litre white P.V.C. automatic flushing cistern.	Each	2583.00
23.7.2	Range of two urinal basins with 5 litre white P.V.C. automatic flushing cistern.	Each	4377.00
23.7.3	Range of three urinal basins with 10 litre white P.V.C. automatic flushing cistern.	Each	5438.00
23.7.4	Range of four urinal basins with 10 litre white P.V.C. automatic flushing cistern.	Each	7330.00

S.No.	Description of Items	Unit	Rate (in Rs)
23.8	Providing and fixing white vitreous china flat back half stall urinal of size 580x380x350mm with white PVC automatic flushing cistern, with fittings, standard size C.P. brass flush pipe, spreaders with unions and clamps (all in C.P. brass) with waste fitting as per IS : 2556, C.I. trap with outlet grating and other couplings in C.P. brass including painting of fittings and cutting and making good the walls and floors wherever required :		
23.8.1	Single half stall urinal with 5 litre P.V.C. automatic flushingcistern.	Each	4748.00
23.8.2	Range of two half stall urinals with 5 litre P.V.C. automatic flushing cistern.	Each	7213.00
23.8.3	Range of three half stall urinals with 10 litre P.V.C. automatic flushing cistern.	Each	8960.00
23.8.4	Range of four half stall urinals with 10 litre P.V.C. automatic flushing cistern.	each	10695.00
23.9	Providing and fixing one piece construction white vitreous china squatting plate with an integral longitudinal flushing pipe, white P.V.C. automatic flushing cistern, with fittings, standard size G.I. flush pipe for back and front flush with standard spreader pipes with fittings, G.I clamps and C.P. brass coupling complete including painting of fittings and cutting and making good the walls and floors etc. wherever required :		
23.9.1	Single squatting plate with 5 litre P.V.C. automatic flushing cistern.	Each	3709.00
23.9.2	Range of two squatting plates with 5 litre P.V.C. automatic flushing cistern.	Each	5745.00
23.9.3	Range of three squatting plates with 10 litre P.V.C. automatic flushing cistern.	Each	7474.00
23.9.4	Range of four squatting plates with 10 litre P.V.C. automatic flushing cistern.	Each	9103.00
23.10	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps,32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require :		
23.10.1	White Vitreous China Wash basin size 630x450 mm with a pair of 15 mm C.P. brass pillar taps.	Each	1746.00
23.10.2	White Vitreous China Wash basin size 630x450 mm with a single 15 mm C.P. brass pillar tap.	Each	1616.00
23.10.3	White Vitreous China Wash basin size 550x400 mm with a pair of 15 mm C.P. brass pillar taps.	Each	1476.00
23.10.4	White Vitreous China Flat back wash basin size 550x400 mm with single 15 mm C.P. brass pillar tap.	Each	1346.00
23.10.5	White Vitreous China Angle back wash basin size 600x480 mm with single 15 mm C.P. brass pillar tap.	Each	1606.00
23.10.6	White Vitreous China Angle back wash basin size 400x400 mm with single 15 mm C.P. brass pillar tap.	Each	1328.00
23.10.7	White Vitreous China Flat back wash basin size 450x300 mm with single 15 mm C.P. brass pillar tap.	Each	1329.00
23.10.8	White Vitreous China Surgeon type wash basin of size 660x460 mm with a pair of 15 mm C.P. brass pillar taps with elbow operated levers.	Each	2688.00

S.No.	Description of Items	Unit	Rate (in Rs)
23.10.9	White Vitreous China Surgeon type wash basin of size 660x460 mm with single 15 mm C.P. brass pillar taps with elbow operated levers ISI marked.	Each	2224.00
23.10.10	Stainless Steel AISI-304(18/8) Round basin 405x355mm with single 15 mm C.P. brass pillar tap.	Each	2238.00
23.10.11	Stainless Steel AISI-304(18/8) Wash basin 530x345 mm with single 15 mm C.P. brass pillar tap.	Each	2754.00
23.11	Providing and fixing white vitreous china pedestal for wash basin completely recessed at the back for the reception of pipes and fittings.	Each	1120.00
23.12	Providing and fixing kitchen sink with C.I. brackets, C.P. brass chain with rubber plug, 40 mm C.P. brass waste complete, including painting the fittings and brackets, cutting and making good the walls wherever required :		
23.12.1	White glazed fire clay kitchen sink of size 600x450x250mm.	Each	2013.00
23.13	Providing and fixing Stainless Steel A ISI 304 (18/8) kitchen sink as per IS 13983 with C.I. brackets and stainless steel plug 40 mm including painting of fittings and brackets, cutting and making good the walls wherever required :		
23.13.1	Kitchen sink with drain board		
23.13.1.1	510x1040 mm bowl depth 250mm.	Each	7503.00
23.13.1.2	510x1040 mm bowl depth 225mm.	Each	7088.00
23.13.1.3	510x1040 mm bowl depth 200mm.	Each	6417.00
23.13.1.4	460x915 mm bowl depth 178mm.	Each	4373.00
23.13.2	Kitchen sink without drain board		
23.13.2.1	610x510 mm bowl depth 200 mm.	Each	4228.00
23.13.2.2	610x460 mm bowl depth 200 mm.	Each	3941.00
23.13.2.3	470x420 mm bowl depth 178 mm.	Each	2720.00
23.14	Providing and fixing white vitreous china laboratory sink with C.I. brackets, C.P. brass chain with rubber plug 40mm C.P brass waste and 40mm C.P. brass trap with necessary C.P. brass unions complete including painting of fittings and brackets, cutting and making good the wall wherever required :		
23.14.1	Size 450x300x150mm	Each	2536.00
23.14.2	Size 600x450x200mm	Each	3502.00
23.15	Providing and fixing draining board with C.I. brackets including painting of rackets, cutting and making good the walls wherever required :		
23.15.1	White glazed fire clay draining board of size 600x450x25mm	Each	803.00
23.16	Providing and fixing a pair of white vitreous china foot rests of standard pattern for squatting pan water closet:		
23.16.1	250x130x30 mm	Pair	160.00
23.16.2	250x125x25 mm	Pair	175.00

S.No.	Description of Items	Unit	Rate (in Rs)
23.17	Providing and fixing G.I. inlet connection for flush pipe connecting with W.C. pan.	Each	88.00
23.18	Providing and fixing white vitreous china flat back or wall corner type lipped front urinal basin of 430x260x350mm or 340x410 x265mm sizes respectively.	Each	856.00
23.19	Providing and fixing white vitreous china squatting plate urinal with integral rim longitudinal flush pipe.	Each	1766.00
23.20	Providing and fixing white vitreous china wash basin including making all connections but excluding the cost of fittings :		
23.20.1	Flat back wash basin of size 630x450mm.	Each	904.00
23.20.2	Flat back wash basin of size 550x400mm.	Each	634.00
23.20.3	Angle back wash basin of size 600x480mm.	Each	893.00
23.20.4	Angle back wash basin of size 400x400mm.	Each	615.00
23.20.5	Flat back wash basin of size 450x300mm.	Each	616.00
23.20.6	Surgeon type wash basin of size 660x460mm.	Each	1177.00
23.21	Providing and fixing kitchen sink including making all connections excluding cost of fittings.		
23.21.1	White glazed fire clay sink of size 600x450x250mm.	Each	1893.00
23.22	Providing and fixing white vitreous china laboratory sink including making all connections excluding cost of fittings:		
23.22.1	Size 450x300x150 mm.	Each	1578.00
23.22.2	Size 600x450x200 mm.	Each	2439.00
23.23	Providing and fixing P.V.C. waste pipe for sink or wash basin including P.V.C. waste fittings complete.		
23.23.1	Semi rigid pipe		
23.23.1.1	32 mm dia	Each	48.00
23.23.1.2	40mm dia	Each	57.00
23.23.2	Flexible pipe		
23.23.2.1	32mm dia	Each	61.00
23.23.2.2	40mm dia	Each	64.00
23.24	Providing and fixing 100 mm sand cast Iron grating for gully trap.	Each	40.00
23.25	Providing and fixing 150 mm sand cast Iron grating.	Each	51.00
23.26	Providing and fixing in position 25mm diameter mosquito proof coupling of approved municipal design.	Each	42.00
23.27	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.	Each	827.00

S.No.	Description of Items	Unit	Rate (in Rs)
23.28	Providing and fixing mirror of superior glass (of approved quality) and of required shape and size with plastic moulded frame of approved make and shade with 6 mm thick hard board backing :		
23.28.1	Circular shape 450mm dia.	Each	677.00
23.28.2	Rectangular shape 453x357mm	Each	557.00
23.28.3	Oval shape 450x350mm (outer dimensions)	Each	606.00
23.28.4	Rectangular shape 1500x450 mm	Each	1044.00
23.29	Providing and fixing 600x120x5mm glass shelf with edges round of apported on anodised aluminium angle frame with C.P. brass brackets and guard rail complete fixed with 40 mm long screws, rawl plugs etc., complete.	Each	437.00
23.30	Providing and fixing toilet paper holder :		
23.30.1	C.P. brass	Each	285.00
23.30.2	Vitreous China	Each	230.00
23.31	Providing and fixing soil, waste and vent pipes :		
23.31.1	100 mm dia		
23.31.1.1	Sand cast iron S&S pipe as per IS : 1729	Meter	541.00
23.31.1.3	Centrifugally cast (spun) iron socketed pipe as per IS: 3989.	Meter	871.00
23.31.2	75 mm diameter		
23.31.2.1	Sand cast iron S&S pipe as per IS : 1729	Meter	466.00
23.31.2.2	Centrifugally cast (spun) iron socketed pipe as per IS: 3989.	Meter	750.00
23.32	Providing and filling the joints with spun yarn cement slurry and cement mortar 1:2 (1 cement : 2 fine sand) in S.C.I./ C.I. Pipes :		
23.32.1	75 mm dia pipe	Each	44.00
23.32.2	100mm dia pipe	Each	54.00
23.33	Providing and fixing M.S. holder-bat clamps of approved design to Sand Cast iron/cast iron (spun) pipe embedded in and including cement concrete blocks 10x10x10cm of cement concrete grade M-15 (Nominal Mix with 20mm maximum size of stone aggregate) including cost of cutting holes and making good the walls etc. :		
23.33.1	For 100mm dia pipe	Each	119.00
23.33.2	For 75mm dia pipe	Each	116.00
23.34	Providing and fixing bend of required degree with access door, insertion rubber washer 3 mm thick, bolts and nuts complete.		
23.34.1	100 mm		
23.34.1.1	Sand cast iron S&S as per IS - 1729	Each	309.00
23.34.1.2	Spun cast iron S&S as per IS - 3989	Each	353.00
23.34.2	75 mm dia		
23.34.2.1	Sand cast iron S&S as per IS - 1729	Each	255.00
23.34.2.2	Spun cast iron S&S as per IS- 3989	Each	281.00
23.35	Providing and fixing plain bend of required degree.		
23.35.1	100 mm		
23.35.1.1	Sand cast iron S&S as per IS - 1729	Each	274.00

S.No.	Description of Items	Unit	Rate (in Rs)
23.35.1.2	Spun cast iron S&S as per IS - 3989	Each	291.00
23.35.2	75 mm dia		
23.35.1.1	Sand cast iron S&S as per IS - 1729	Each	217.00
23.35.1.2	Spun cast iron S&S as per IS- 3989	Each	221.00
23.36	Providing and fixing heel rest sanitary bend		
23.36.1	100 mm		
23.36.1.1	Sand cast iron S&S as per IS - 1729	Each	300.00
23.36.1.2	Spun cast iron S&S as per IS - 3989	Each	351.00
23.36.2	75 mm dia		
23.36.1.1	Sand cast iron S&S as per IS - 1729	Each	250.00
23.36.1.2	Spun cast iron S&S as per IS- 3989	Each	304.00
23.37	Providing and fixing double equal junction of required degree with access door, insertion rubber washer 3 mm thick, bolts and nuts complete :		
23.37.1	100x100x100x100mm		
23.37.1.1	Sand cast iron S&S as per IS - 1729	Each	616.00
23.37.1.2	Spun cast iron S&S as per IS - 3989	Each	720.00
23.37.2	75x75x75x75 mm		
23.37.1.1	Sand cast iron S&S as per IS - 1729	Each	490.00
23.37.1.2	Spun cast iron S&S as per IS - 3989	Each	582.00
23.38	Providing and fixing double equal plain junction of required degree.		
23.38.1	100x100x100x100mm		
23.38.1.1	Sand cast iron S&S as per IS - 1729	Each	569.00
23.38.1.2	Spun cast iron S&S as per IS - 3989	Each	670.00
23.38.2	75x75x75x75 mm		
23.38.2.1	Sand cast iron S&S as per IS - 1729	Each	429.00
23.38.2.2	Spun cast iron S&S as per IS - 3989	Each	536.00
23.39	Providing and fixing single equal plain junction of required degree with access door, insertion rubber washer 3 mm thick, bolts and nuts complete.		
23.39.1	100x100x100x100mm		
23.39.1.1	Sand cast iron S&S as per IS - 1729	Each	453.00
23.39.1.2	Spun cast iron S&S as per IS - 3989	Each	588.00
23.39.2	75x75x75x75 mm		
23.39.2.1	Sand cast iron S&S as per IS - 1729	Each	342.00
23.39.2.2	Spun cast iron S&S as per IS - 3989	Each	438.00
23.40	Providing and fixing single equal plain junction of required degree :		
23.40.1	100x100x100x100mm		
23.40.1.1	Sand cast iron S&S as per IS - 1729	Each	394.00
23.40.1.2	Spun cast iron S&S as per IS - 3989	Each	534.00
23.40.2	75x75x75x75 mm		
23.40.2.1	Sand cast iron S&S as per IS - 1729	Each	305.00
23.40.2.2	Spun cast iron S&S as per IS - 3989	Each	402.00

S.No.	Description of Items	Unit	Rate (in Rs)
23.41	Providing and fixing double unequal junction of required degree with access door, insertion rubber washer 3 mm thick, bolts and nuts complete :		
23.41.1	100x100x75x75mm		
23.41.1.1	Sand cast iron S&S as per IS - 1729	Each	666.00
23.41.1.2	Spun cast iron S&S as per IS - 3989	Each	1004.00
23.42	Providing and fixing double unequal plain junction of required degree:		
23.42.1	100x100x75x75mm		
23.42.1.1	Sand cast iron S&S as per IS - 1729	Each	609.00
23.42.2	Spun cast iron S&S as per IS - 3989	Each	904.00
23.43	Providing and fixing single unequal junction of required degree with access door, insertion rubber washer 3 mm thick, bolts and nuts complete :		
23.43.1	100x100x75mm		
23.43.1.1	Sand cast iron S&S as per IS - 1729	Each	485.00
23.43.1.2	Spun cast iron S&S as per IS - 3989	Each	761.00
23.44	Providing and fixing single unequal plain junction of required degree :		
23.44.1	100x100x75mm		
23.44.1.1	Sand cast iron S&S as per IS - 1729	Each	425.00
23.44.1.2	Spun cast iron S&S as per IS - 3989	Each	661.00
23.45	Providing and fixing double equal plain invert branch of required degree:		
23.45.1	100x100x100x100mm		
23.45.1.1	Sand cast iron S&S as per IS - 1729	Each	608.00
23.45.1.2	Spun cast iron S&S as per IS - 3989	Each	597.00
23.45.2	75x75x75x75 mm		
23.45.2.1	Sand cast iron S&S as per IS - 1729	Each	454.00
23.45.2.2	Spun cast iron S&S as per IS - 3989	Each	481.00
23.46	Providing and fixing single equal plain invert branch of required degree:		
23.46.1	100x100x100x100mm		
23.46.1.1	Sand cast iron S&S as per IS - 1729	Each	470.00
23.46.1.2	Spun cast iron S&S as per IS - 3989	Each	476.00
23.46.2	75x75x75x75 mm		
23.46.2.1	Sand cast iron S&S as per IS - 1729	Each	352.00
23.46.2.2	Spun cast iron S&S as per IS - 3989	Each	362.00
23.47	Providing and fixing double unequal invert branch of required degree		
23.47.1	100x100x75x75mm		
23.47.1.1	Sand cast iron S&S as per IS - 1729	Each	645.00
23.47.1.2	Spun cast iron S&S as per IS - 3989	Each	792.00
23.48	Providing and fixing single unequal plain invert branch of required degree :		

S.No.	Description of Items	Unit	Rate (in Rs)
23.48.1	100x100x75mm		
23.48.1.1	Sand cast iron S&S as per IS - 1729	Each	536.00
23.48.1.2	Spun cast iron S&S as per IS - 3989	Each	600.00
23.49	Providing and fixing sand cast iron S&S off sets as per IS: 1729		
23.49.1	75 mm off sets		
23.49.1.1	With 75 mm dia. pipe	Each	194.00
23.49.1.2	With 100 mm dia. pipe	Each	320.00
23.49.2	114 mm off sets		
23.49.2.1	With 75 mm dia. pipe	Each	312.00
23.49.2.2	With 100 mm dia. Pipe	Each	403.00
23.49.3	152 mm off sets		
23.49.3.1	With 75 mm dia. pipe	Each	390.00
23.49.3.2	With 100 mm dia. Pipe	Each	500.00
23.50	Providing and fixing Spun cast iron S&S off sets as per IS: 3989.		
23.50.1	75 mm off sets		
23.50.1.1	With 75 mm dia. pipe	Each	253.00
23.50.2	150 mm off sets		
23.50.2.1	With 75 mm dia. pipe	Each	313.00
23.50.2.2	With 100 mm dia. Pipe	Each	429.00
23.51	Providing and fixing door piece, insertion rubber washer 3mm thick, bolts & nuts complete :		
23.51.1	100mm		
23.51.1.1	Sand cast iron S&S as per IS - 1729	Each	422.00
23.51.1.2	Spun cast iron S&S as per IS - 3989	Each	340.00
23.51.2	75mm		
23.51.2.1	Sand cast iron S&S as per IS - 1729	Each	303.00
23.51.2.2	Spun cast iron S&S as per IS - 3989	Each	259.00
23.52	Providing and fixing terminal guard:		
23.52.1	100mm		
23.52.1.1	Sand cast iron S&S as per IS - 1729	Each	215.00
23.52.1.2	Spun cast iron S&S as per IS - 3989	Each	220.00
23.52.2	75mm		
23.52.2.1	Sand cast iron S&S as per IS - 1729	Each	154.00
23.52.2.2	Spun cast iron S&S as per IS - 3989	Each	198.00
23.53	Providing and fixing collar:		
23.53.1	100mm		
23.53.1.1	Sand cast iron S&S as per IS - 1729	Each	163.00
23.53.1.2	Spun cast iron S&S as per IS - 3989	Each	228.00
23.53.2	75mm		
23.53.2.1	Sand cast iron S&S as per IS - 1729	Each	117.00
23.53.2.2	Spun cast iron S&S as per IS - 3989	Each	163.00

S.No.	Description of Items	Unit	Rate (in Rs)
23.54	Providing lead caulked joints to sand cast iron/centrifugally cast (spun) iron pipes and fittings of diameter:		
23.54.1	100mm	Each	216.00
23.54.2	75mm	Each	184.00
23.55	Providing and fixing M.S. stays and clamps for sand cast iron/centrifugally cast (spun) iron pipes of diameter :		
23.55.1	100mm	Each	83.00
23.55.2	75mm	Each	46.00
23.56	Providing and fixing trap of self cleansing design with screwed down or hinged grating with or without vent arm complete, including cost of cutting and making good the walls and floors :		
23.56.1	100 mm inlet and 100 mm outlet		
23.56.1.1	Spun cast iron S&S as per IS: 3989.	Each	823.00
23.56.1.2	Sand Cast Iron S&S as per IS: 1729.	Each	602.00
23.56.2	100 mm inlet and 75 mm outlet		
23.56.2.1	Spun cast iron S&S as per IS - 3989	Each	603.00
23.56.2.2	Sand Cast Iron S&S as per IS- 1729.	Each	540.00
23.57	Providing and fixing to the inlet mouth of rain water pipe PTMT (an Engineering Thermoplastic) grating square (Slit) 150 mm square with a height of 8 mm and weighing not less than 100 gms.	Each	65.00
23.58	Cutting chases in brick masonry walls for following diameter sand cast iron/ centrifugally cast (spun) iron pipes and making good the same with cement concrete grade M-10 (Nominal Mix with 20mm maximum size of stone aggregate) including necessary plaster and pointing in cement mortar 1:4 (1 cement : 4 coarse sand) :		
23.58.1	100mm dia	meter	253.00
23.58.2	75mm dia	meter	181.00
23.59	Painting sand cast iron/ centrifugally cast (spun) iron soil, waste vent pipes and fittings with paint of any colour such as chocolate grey, or buff etc. over a coat of primer (of approved quality) for new work :		
23.59.1	100 mm diameter pipe	Meter	23.00
23.59.2	75 mm diameter pipe	Meter	18.00
23.60	Repainting sand cast iron/ centrifugally cast iron (spun) iron, soil, waste, vent pipes and fittings with paint of any colour such as chocolate, grey or buff etc :		
23.60.1	100 mm diameter pipe	Meter	14.00
23.60.2	75 mm diameter pipe	Meter	10.00

S.No.	Description of Items	Unit	Rate (in Rs)
23.61	Providing and fixing unplasticised PVC soil and waste pipes conforming to IS: 13592 Type B including jointing with seal ring conforming to IS : 5382 leaving 10 mm gap for thermal expansion. Single socketed pipes for working pressure of 4 kg/sqcm.		
23.61.1	75 mm diameter (minimum wall thickness 3.2mm)	Sqm	183.00
23.61.2	110 mm diameter (minimum wall thickness 3.2mm)	Sqm	264.00
23.62	Providing and fixing on wall face unplasticised PVC moulded fittings/ accessories for unplasticised (PVC-u) soil and waste pipes conforming to IS: 13592 Type B including jointing with seal ring conforming to IS : 5382 leaving 10 mm gap for thermal expansion.		
23.62.1	Coupler		
23.62.1.1	75 mm	Each	80.00
23.62.1.2	110 mm	Each	112.00
23.62.2	Single pushfit Coupler		
23.62.2.1	75 mm	Each	62.00
23.62.2.2	110 mm	Each	89.00
23.62.3	Single tee with door		
23.62.3.1	75x75x75 mm	Each	106.00
23.62.3.2	110x110x110 mm	Each	165.00
23.62.4	Single tee without door		
23.62.4.1	75x75x75 mm	Each	98.00
23.62.4.2	110x110x110 mm	Each	145.00
23.62.5	Bend 87.50		
23.62.5.1	75 mm bend	Each	72.00
23.62.5.2	110 mm bend	Each	101.00
23.62.6	Shoe (Plain)		
23.62.6.1	75 mm Shoe	Each	64.00
23.62.6.2	100 mm shoe	Each	85.00
23.62.7	Vent Cowl (Self Fit)		
23.62.7.1	75 mm	Each	44.00
23.62.7.2	110 mm	Each	52.00
23.62.8	Single Y Bend		
23.62.8.1	75 mm	Each	112.00
23.62.8.2	110 mm	Each	177.00
23.62.9	Single Y with Door		
23.62.9.1	75 mm	Each	123.00
23.62.9.2	110 mm	Each	201.00
23.62.10	Multi Floor Trap		
23.62.10.1	110x75x40	Each	134.00
23.62.11	N-Trap without Jali		
23.62.11.1	110x75 mm	Each	91.00
23.62.11.2	110x110 mm	Each	102.00
23.63	Providing and fixing Unplasticised -PVC pipe clips of approved design to Unplasticised - PVC soil and waste pipes by means of bombay nail of required length including and making good the wall etc. complete.		
23.63.1	75mm dia	Each	139.00
23.63.2	110mm dia	Each	131.00

S.No.	Description of Items	Unit	Rate (in Rs)
23.64	Providing and fixing uPVC trap of self cleaning design complet. Including cost of cutting and making good the wall and floors.		
23.64.1	100 mm inlet and 75 mm outlet	Each	431.00
23.65	Providing and fixing vitreous china dual purpose closet suitable for use as squatting pan or European type water closet (Anglo Indian W.C pan) with seat lid with C.P. brass hinges and rubber buffers, 10 litre low level flushing cistern with fitting and brackets, 40mm flush bend 20mm over flow pipe with specials of standard make and mosquito proof coupling of approved municipal design complete, including painting of fittings and brackets, cutting and making good the walls and floors wherever required :		
23.65.1	White vitreous china dual purpose WC pan with white solid plastic seat and lid with white vitreous china flushing cistern and C.P. flush bend.	Each	4102.00
23.66	Providing and fixing PTMT Waste Coupling for wash basin and sink, of approved quality and colour.		
23.66.1	Waste coupling 31mm of 79mm length and 62mm breadth weighing not less than 45gms.	Each	76.00
23.66.2	Waste coupling 38mm of 83mm length and 77mm breadth, weighing not less than 60gms.	Each	102.00
23.67	Providing and fixing PTMT Bottle Trap for Wash basin and sink.		
23.67.1	Bottle trap 31mm single piece moulded with height of 270mm, effective length of tail pipe 260mm from the centre of the waste coupling 77mm breadth with 25mm minimum water seal, weighing not less than 260gms.	Each	344.00
23.67.2	Bottle trap 38mm single piece moulded with height of 270mm, effective length of tail pipe 260mm from the centre of the waste coupling 77mm breadth with 25mm minimum water seal, weighing not less than 263gms.	Each	356.00
23.68	Providing and fixing PTMT liquid soap container 109mm wide, 125mm high and 112mm distance from wall of standard shape with bracket of the same materials with snap fittings of approved quality and colour. weighing not less than 105 gms.	Each	122.00
23.69	Providing and fixing PTMT towel ring trapezoidal shape 215mm long, 200mm wide with a minimum distances of 37mm from wall face with concealed fittings arrangement of approved quality and colour. Weighing not less than 88 gms.	Each	164.00
23.70	Providing and fixing PTMT towel rail complete with brackets fixed to wooden cleats with CP brass screws with concealed fitting arrangement of approved quality and colour.		
23.70.1	450MM long towel rail with total length of 495mm, 78mm wide and effective height of 88mm, weighing not less than 170gms.	Each	399.00

S.No.	Description of Items	Unit	Rate (in Rs)
23.70.2	600mm long towel rail with total length of 645mm, width 78mm and effective height of 88mm, weighing not less than 190gms.	Each	433.00
23.71	Providing and fixing PTMT shelf 440 mm long, 124 mm width and 36 mm height of approved quality and colour. Weighing not less than 300 gms.	Each	425.00
23.72	Providing and fixing PTMT 15 mm Urinal spreader size 95x69x100 mm with 1/2" BSP thread and shapes. Weighing not less than 60 gms.	Each	130.00
23.73	Providing and fixing PTMT urinal cock of approved quality and colour.		
23.73.1	15 mm nominal bore, 80mm long. 42 mm high and 30mm wide with BSP female threads weighing not less than 48 gms.	Each	92.00
23.74	Providing and fixing PTMT soap Dish Holder having length of 138mm, breadth 102mm, height of 75mm with concealed fitting arrangements. Weighing not less than 106 gms.	Each	99.00
23.75	Providing and fixing M.S. holder bat clamp of approved design to sand cast iron/ cast iron (spun) pipes comprising of M.S. flat brackets made of 50x5mm flat of specified shape, projecting 75mm outside the wall surface and fixed on wall with 4nos, 6mm dia expansion hold fasteners including drilling necessary holes in brick wall/ CC/ RCC surface and the cost of bolts etc. The pipes shall be fixed to the already fixed brackets with the help of 30mm x1.6mm galvanised M.S. flats of specified shape and of total length 420mm and shall be fixed with M.S. nuts, bolts, & washers of size 25x6mm, one bolts on each side of the pipe.		
23.75.1	Total bracket length 580mm of approved shape and design (for single 100mm dia pipe).	Each	182.00
23.75.2	Total bracket length 810mm of approved shape and design (for two 100mm dia pipes).	Each	221.00
23.75.3	Total bracket length 1040mm of approved shape and design (for three 100mm dia pipes).	Each	277.00