

INDIAN NEWS PAPER SOCIETY
I.N.S BUILDING, RAFI MARG, NEW DELHI -110001, India

No.:

Sealed item rate tender are invited from the registered firms / companies having similar work experience of at least three years for the following works:-

TENDER NUMBER	NAME OF WORK	EMD	TIME LIMIT
	UPLIFT/ RENOVATION	RS 200000	150 DAYS

Tender documents can be obtained from the Office of SECRETARY GENERAL/Downloaded on Payment-of Rs. 2500.00 through IPO or crossed Demand Draft payable to I.N.S of BUILDING NEW DELHI upto 11 AM PM Hrs. TILL 23-03-2020

Date & Time of receipt of Tender : 31-03-2020 (4 PM)

Date & Time of opening of Tender :

EMD in form of crossed DD in favour of (INDIAN NEWS PAPER SOCIETY,) DELHI must be submitted along with the tender, failing which the tender will be rejected outright. I.N.S reserves the right to reject any or all the tenders without assigning any reason whatsoever.

SECRETARY GENERAL

SCHEDULE A

- Annexure A : Detailed notice inviting Tender
- Annexure B : Instruction to Tenderer
- Annexure C : Agreement Form
- Annexure D : Appendix refer to
- Annexure E : Special condition of Contracts
- Annexure F : Technical Specifications and Drawings

SCHEDULE B Bill of Quantities Special Annexure

For any clarification on this tender document, please contact:

- 1) I.N.S DELHI

- 2) Sanjay Bhat & Associates
Architects & Interior Designer
992, Housing Board Colony
Gurgaon, Haryana
Tel.: 9810071945
Office: 0124-4301691

TENDER

FOR

**RENOVATION OF VARIOUS FLOORS AT INS,
BUILDING RAFI MARG NEW DELHI**

AT

I.N.S BUILDING RAFI MARG

NEW DELHI -110001 , INDIA

**Office of Secretary General
I.N.S Building Rafi marg
New Delhi**

DETAILED NOTICE INVITING TENDER

Tenders are hereby invited on behalf of the I.N.S, work for Renovation on **VARIOUS FLOORS AT I.N.S BUILDING N. DELHI**

- 1) Contract documents consisting of the details specifications, the schedule of quantities of the various classes of work to be done, and the set of conditions of contract to be complied with by the person whose tender may be accepted, which will also be found printed in the form of tenders can be seen at the above mentioned office between hours 11 AM to 4 PM every day except on Saturday, Sunday and Public holidays. No tender paper will be issued after the last date and time of issue of tenders, unless modified.
- 2) Tenders, which should always be placed in sealed cover, with the name of the work written on the envelopes will be received by the secretary general, I.N.S Building Rafi Marg- 110001, India up to 1600 hrs on 31-03-2020
- 3) Date of sale of tenders will be upto 23-03-2020
- 4) Tenders are to be submitted in the prescribed form which can be obtained from the above mentioned office on payment of Rs.2500 by crossed Indian Postal Order or Bank draft in the name of the INDIAN NEWS PAPER SOCIETY The bidder must submit Forwarding Letter/Acceptance of Tender Document along with Tender.
- 5) The tender in sealed cover should contain the following:
 - a) Earnest money in the form of demand draft/Pay order payable to I.N.S, NEW DELHI.
 - b) Supporting documentary proof as per NIT requirements i.e. LOI/work orders, completion certificate.
 - c) Rates quoted both in words and figures in the item rate tender in the

format of schedule of quantities as per Schedule "B" of tender document.

- d) The tenderer shall have to submit their price offer (Schedule B) in duplicate one in original and another photocopy duly signed by the contractor which should be done after quoting all the rates in words and figures worked out and rebate, if any.
- 6) All the documents shall be signed by the tenderer on each page. When a contractor signs a tender, in an Indian language, the rate and total amount tendered should be written in the same language.
- 7) Earnest money, as specified must accompany each tender in the form of Bank draft/ Pay order of a Scheduled Bank in favour of I.N.S BUILDING RAFI MARG NEW DELHI - 110001. Tender received without earnest money in the manner prescribed above is/are liable to be summarily rejected. Each tender must be properly sealed in a cover prescribed the tender for the above said work and addressed to the Secretary General, I.N.S BUILDING RAFI MARG NEW DELHI - 110001
- 8) The contractor whose tender is accepted will be required to furnish security for the due fulfillment of his contract by way of deduction of 10% (ten percent) from the each bill of work done during R.A./Final payment till the whole amount is realized. The earnest money on acceptance of tender will be treated as part of the security deposit and shall be adjusted accordingly, right from 1st R.A. bill payment.
- 9) The acceptance of tender will rest with the Secretary General who does not bind himself to accept the lowest tender and reserves to himself the authority to reject any or all the tenders received, without assigning any reasons whatsoever. All tenders, in which any of the prescribed conditions are not fulfilled, may be rejected by him at his sole discretion.
- 10) The tender containing uncalled for words or any additions(s) or containing any extraneous conditions or incomplete in any respect is liable for summarily

rejection.

- 11) Canvassing in connection with tenders is strictly prohibited and the tenders submitted by the contractors who resort to canvassing will be liable for rejection.
- 12) All rates shall be quoted only on the proper form of the tender issued, which are nontransferable.
- 13) Special care should be taken to write the rates in figures as well as in words and the amounts in figures in such a way that interpolation is not possible. The total amounts should be written both in words and figures. The contractor should sign all the corrections in the tender.
- 14) Sales Tax or any other tax royalty on material etc. whatsoever, in respect of this contract shall be payable by the contractor and nothing extra whatsoever in this respect shall be entertained for payment.
- 15) The tenderer is advised to visit and inspect the site at his own cost and responsibility and to secure all necessary information which may be required for completing the work. Tenderer shall be deemed to have full knowledge of all the site conditions etc. whether he has inspected them or not. All costs, charges and expenses in tendering shall be borne by him and this department will not accept any liability whatsoever in this regard.
- 16) Time is the essence of the contract and the tenderers are required to complete the day to day work in all respects from the reported time of complaint and the same should be completed to the full satisfaction of employer/Engineer-in-charge and as per the terms & conditions and instructions from time to time. The scheduled date of commencement shall be reckoned from the date of issue of written order to commence the work.
- 17) In case of delay in completion of the job beyond the period stipulated in 16 above, I.N.S shall be at liberty to recover pre-determined compensation/

damages/penalty @ 0.5% per week or part thereof subject to a maximum of 10% of the total value of this work order/contract. Under the provisions of this clause, these recoveries towards pre-determined compensation/damages/penalty will be made on the final (actual) value of the jobs executed under or in connection with this work order/contract.

- 18) A schedule of approximate quantities for various items accompanies this tender. It must be definitely and clearly understood that this schedule is liable to alteration by omission, deductions or additions to any extent at the discretion of Engineer-in-charge, as per the terms of the contract.
- 19) The rates must be quoted for complete work at site. The rates shall include G.S.T, Sales Tax, Octroi, and Royalty, Toll Tax, Excise duty or any other taxes levied or leviable by Central and State Government or by any local authorities/bodies. No part of such taxes on contractor's labour, material or works shall be paid by the department and no claims in this regard whatsoever, shall be entertained.
- 20) No alteration which is made by the tenderer in the Notice of Tender, Instructions to the Tenderer, Agreement Form, General and Special Conditions of Contract, Technical Specifications and Drawings etc. accompanying the same shall be recognized and if any such alternations are made the tender is liable to be rejected.
- 21) Any defect(s) found in the material and workmanship and/or construction during the period of one year from the date on which the duly completed job has been handed over to I.N.S will have to be rectified by the contractor at his cost and nothing extra whatsoever on this count shall be payable by I.N.S An amount equivalent to 10% of the total value of this work order shall be deducted from each running bill and shall be released as soon as the liability period is over.
- 22) The tender for the work shall remain open for acceptance for a period of 60 days from the date of receipt of the tender. If any tenderer withdraws his

tender before the said period or makes any modifications in the terms and conditions of the tender, then I.N.S shall, without prejudice to any other right or remedy be at liberty to forfeit the Earnest Money. Extension of validity period beyond 60 days is subject to mutual agreed terms only, if so necessary.

- 23) Contractor will be submitting maximum 6RA bills against the work done of value more than Rs. 30 Lakhs each and one final bill. In case, any claim with regard to the wages of any labour employed by the contractor for the subject job is pending/reported, I.N.S shall be fully entitled/competent to withhold payment of your bill pending finalization of such claim of the contract-labour. Contractor will intimate his PF number to I.N.S. All payments due to contractor shall be subject to deductions of Income Tax Act and any other statutory tax.
- 24) If the execution of the subject work order/contract is delayed or impeded by circumstances of force majeure as herein defined, the contractor shall immediately but not later than 48 hours give notice in writing to I.N.S, of the existence of such circumstance(s) of force majeure together with the evidence relied upon and I.N.S, shall grant to you, such postponement of the date of completion as may in all the circumstances, be considered reasonable.
- 25) For the purposes of this clause/article, force majeure shall mean and be limited to the following:
- i) Any war or hostilities
 - ii) Any riot or civil commotion
 - iii) Any earthquake, flood, tempest, lightning or other natural physical disaster.
 - iv) Any accident fire or explosion on the site not caused by the negligence of the contractor.
 - v) Any strike exceeding 10 days in duration affecting the performance of the contractual obligation by you in respect of the subject work order/contract.
 - vi) Any law or order or any government or government department or other authority, which delays or impedes the contractor in the execution of the

work.

vii) Non availability of site.

26) a) A sole arbitrator to be appointed by the I.N.S, shall adjudicate upon any dispute arising under or in connection with the subject work order/contract between the contractor and I.N.S, which cannot be settled by mutual negotiations. The governing law for the said adjudication shall be the Arbitration and Conciliation Act, 1996. The Arbitrator shall pass a speaking award. The venue of all the arbitration proceeding will be DELHI.

b) It is a specific term of the work order/contract that the execution of the subject work order/contract shall not stop for any reason whatsoever during the said dispute/arbitration proceedings, unless the contractor is specifically directed by I.N.S, to desist from executing the work order/contract.

c) This work order/contract shall be in all respect construed and operated as an Indian Contract and shall be governed in accordance with the Indian Laws in force including the amendments/modifications thereto.

d) Arbitration proceedings are not required to be resorted to for termination of the work order/contract.

27) I.N.S, shall have recourse to you for any cost(s) demand(s) proceeding(s), damage(s) and expense(s) whatsoever arising out of or in connection with contractors failure to perform any of his obligations under the terms of this work order/contract.

28) I.N.S, may at any time terminate this work order/ contract without assigning any reason whatsoever. In that case, the value of the work-executed upto such date/point of time by the contractor will be paid for in full at the rates specified in the contract, subject to the same being, found satisfactory.

In the event of termination pursuant to paragraph(s) or this clause/article:

- I) The contractor shall carry out instructions of I.N.S, in connection with such termination including the cancellation of this work order/contract and the termination of the order/contracts, which he may have placed with others.
 - II) I.N.S, shall pay to the contractor all the satisfactorily executed jobs pursuant to this work order/contract, but I.N.S, shall not be liable for any business loss or damage suffered by him as result of such termination.
 - III) The contractor on receiving notice from I.N.S, in accordance with clause 28 shall notify I.N.S, within a week of the amount towards the value of the executed jobs.
- 29) Contractor will be bound to executed any extra item, which crop up during the execution of job. The rate for the extra/substituted item will be decided based on the rate analysis to be submitted by the contractor. Rate analysis will include reasonable cost of material and labour + 15% towards contractors profit and overheads. Prior to execution of any extra item, contractor will obtain approval of I.N.S, in principle.
- 30) No alteration which is made by the tenderer in the Notice of Tenderer, Instructions to the Tenderer, Agreement Form, General and Special Conditions of Contract Technical Specifications and Drawings etc. accompanying the same shall be recognized and if any such alterations are made the tender is liable to be rejected.
- 31) The tender for the work shall remain open for acceptance for a period of 60 days from the date of receipt of the tender. If any tenderer withdraws his tender before the said period or makes any modifications in the terms and conditions of the tender, then I.N.S, shall, without prejudice to any other right or remedy be at liberty to forfeit the Earnest money, Extension of validity period beyond 60 days is subject to mutual agreed terms only, if so necessary.
- 32) The agreement for this acceptance shall be executed as per Annexure 'C' on

a non-judicial stamp paper of requisite value for which the stamp duty shall be borne by the contractor.

- 33) Deduction towards income tax as per rules shall be made from the Contractors bills, beside other recoveries and deductions as per terms and conditions of the contract.

SIGNATURE OF THE CONTRACTOR

SIGNATURE OF
SECRETARY GENERAL

**(GENERAL RULES AND DIRECTIONS FOR
THE GUIDANCE OF CONTRACTORS)**

- 1) All works proposed for execution by contractor are hereby notified in this form of invitation to tender and signed by the Secretary General on behalf of I.N.S, who is designated as In-Charge Officer of the entire project, proposed to be taken up under this tender.

This form state the work to be carried out as well as the date for submitting and opening of tenders and the time to be allowed for carrying out the work also the amount of earnest money to be deposited with the tender and amount of the security deposit to be deposited by the successful tenderer and the percentage, if any to be deducted from bills. Copies of the specification, design and drawing and any other documents required in connection with the work as signed for the purpose of identification by the Registrar shall also be open for inspection by the contractor at the office of Registrar during office hours.

- 2) In the event of the tender being submitted by a firm, it must be signed separately by each member thereof or in the event of the absence of any Partner, it must be signed on his behalf by a person holding a power of attorney authorizing him to do so, such power of firm is duly registered under the Indian Partnership Act.
- 3) Receipt for payments made on account of a work, when executed by a firm, must also be signed by several partners, except where the contractors are described in their tender as a firm, in which case the receipt must be signed in the name of the firm by one of the partners or by some other person having authority to give effectual receipts for the firm.
- 4) Any person who submits a tender shall fill up the usual printed form, stating at what rate he is willing to undertake each item of the work. Tenders, which

propose any alternation in the work specified in the said form of invitation to tender, or in the time allowed for carrying out the work or which contain any other conditions of any sort, will be liable to rejection. No single tender shall include more than one work, but contractors who wish to tender for two or more works shall submit a separate tender for each. Tenders shall have the name and number of the work to which the reference written outside the envelopes.

- 5) The Secretary general or his duly authorized assistant will open tenders and will enter, the amount of several tenders in a Comparative Statement in a suitable form. In the event of a tender being accepted a receipt for the earnest money forwarded therewith shall thereupon be given to the contractor who shall thereupon for the purpose of identification sign copies of the specifications and other documents mentioned in Rule 1. In the event of a tender being rejected the earnest money forwarded with such unaccepted tender shall thereupon be returned to the contractor remitting the same.
- 6) The officer inviting tender shall have the right of rejecting all or any of the tenders without assigning any reason, and will not be bound to accept the lowest tender.
- 7)
 - a) The rate quoted in words will be the correct basis and not the rate shown in figures.
 - b) When there is a difference between the rates in figure and words, the rate, which corresponds to the amount worked out by the contractor, shall be taken as correct.
 - c) When the rate quoted by the contractor in figures and words tallies but the amount is not worked out correctly, the rate quoted by the contractor shall be taken as correct and not the amount.
- 8) It is found that the tender is not submitted in the proper manner or contained

to many corrections or absurd rates or amounts, it will be open to the I.N.S, to take suitable action against the contractor and/or summarily reject such offers.

- 9) I.N.S, will not have any liability of workman provided by Contractor for any services.and contractor should take a CAR policy
- 10) Agency must deploy qualified engineers having minimum qualification i.e. B.E or Diploma in Civil Engineering along with ten years of experience for supervision of similar work.
- 11) Contractor must have experience of minimum three years for similar volume of work. Details of such contract indicating order detail & telephone of contact person should be indicated in the bid refer to tender notice

Payments Condition	After completion of work/maximum 6 RA Bills with value not less than Rs 30 lacks each
Completion Period	150 days
Validity	Offer must be valid for 60 days from the date of submission of the offer.

Annexure 'C'

AN AGREEMENT made on the _____ Day of _____ between the INDIAN NEWS PAPER SOCIETY RAFI MARG NEW DELHI, -110001 India, of the ONE PART and _____ (here in after called 'The Contractor) on the OTHER PART.

WHEREAS the I.N.S, being desirous of doing work at _____ (hereinafter referred to as 'The Work) had invited tenders for the same.

AND WHEREAS the contractors tender has been accepted by the competent authority on behalf of the I.N.S, for the execution of the said work at the rate quoted by him/them without negotiations.

AND WHEREAS the contractor has deposited a sum of Rs. _____ in the shape of Bank pay order in the name of I.N.S, DELHI or agree to deduct 10% from running bill/final bill as security deposit for the due and faithful performance of the contract and further agreed to execute the said work according to the General Conditions of the Contract, special conditions of contract and Additional conditions of Contract, plans, specifications schedule giving description of work to be supplied, items of work, Bill of quantities and Tendered Rates (hereinafter referred to as 'The documents').

Now, it is hereby agreed as follows:

THAT in pursuance of the agreement and in consideration of the payment to be

made by the I.N.S, the contractor shall duly perform the said work and shall execute the same with promptness, care and accuracy in a workman like manner and with best materials to the satisfaction of the I.N.S, in accordance and in

all respect with the said documents within a period of 150 days unless extended with or without imposition of liquidated damages at the sole discretion of Secretary General of I.N.S.

In witness of the parties here to have signed this agreement _____ day of _____ of the day and rear first above written.

Work order value Rs. _____

Completion period 150 days

Witness 1.

Signature of the contractor

Witness 2.

Secretary General
INDIAN NEWS PAPER SOCIETY

Annexure 'D'

Period of final Measurement	:	30 days
Date of Commencement	:	Ten days from the date of issue of Acceptance Letter
Time of Completion	:	150 days
Value of Work for Interim Certificate	:	30 lacks (Minimum)
Retention Percentage from Every Bill	:	10% from each RA Bill and final bill
Penalty for non-completion of work in Specified time	:	As per tender conditions
Period for honoring Interim Certificate of Payment i.e. RA Bill	:	20 working days
Defects & liability period	:	1 Year from date of final Acceptance by department.

CONTRACTOR

SIGNATURE OF
Secretary General

SPECIAL CONDITIONS OF THE CONTRACT

- i) **CLAUSE/SPECIAL CONDITION:-** where by contractor has to ensure that the existing building is not damaged during course of contract execution or if so any damage caused to the building, the same has to be rectified to the direction/satisfaction of M/s I.N.S, at no extra cost.

- ii) **CLAUSE SPECIAL CONDITION: -** Regarding instructions to the contractor. Instructions to the contractor from the architect /consultant appointed by the I.N.S, for this work shall become the instruction from Engineer-in-charge only after written approval to such instructions, clarifications etc is given by the Engineer-in-charge and shall be enforceable only after accord of such written approval by Engineer-in-charge.

- iii) The Institute is a working institute. The contract needs to be executed to the convenience of I.N.S, administration.

GENERAL TECHNICAL SPECIFICATIONS

1.0 GENERAL

1.0 Wherever the specifications are not definitive the latest I.S. specifications shall hold good.

1.1 Wherever reference has been made to Indian standard or any other specifications the same shall mean to refer to the latest specifications irrespective of any particular edition of such specification being mentioned.

2.0 WORKMANSHIP:

The workmanship shall be the best of its kind and shall conform to the specification given. Nook In case nothing is specified in these specifications the Indian standard specifications in every respect and where I.S.I, is also silent latest trade practices shall prevail subjects to approval.

3.0 MATERIALS:

All materials shall be best of its kind and shall conform to the latest Indian standard. All materials shall be of approved quality as per samples and from origins approved.

3.1 Timber:

Timber shall be of good quality and well seasoned. It shall have uniform colour, reasonably straight grain and shall be free from dead knots, cracks, shakes and sapwood. The moisture contents shall be within the limits prescribed.

a. Teak Wood:

(Tectona Grandis) Teakwood shall mean First class C.P. Teakwood (Sagwan type) adequately seasoned with moisture content within permissible limits. Individual hard and sound knot shall not be more than 12 mm. in diameter

and the aggregate area of all the knots shall not exceed one-half percent of the area of the piece. It shall be close grained.

b. Steam Beech:

Steam Beech wood shall mean natural First class Steam Beech wood i.e. European White Beech wood steam treated at source with moisture content within permissible limits. Individual hard and sound knot shall not be more than 8 mm. in diameter and the aggregate area of all the knots shall not exceed one-half percent of the area of the piece. It shall be even grained and of even shade.

c. Hollack-Hardwood:

(Terminalia Myriocarpa) It shall be readily treated with wood preservatives and finished to a fairly good surface.

d. Maximum Moisture Content for Woodwork:

For sections thinner than 50 mm. the maximum moisture content shall not be more than 12%

e. Medium Density Fiber board (MDF)

It shall conform to IS: 12406-1989, the Indian Standard specification for MDF Boards. The density should be between 700-850 kg/cum. It shall be made from small diameter wood/chips converted into fibre. These fibres shall than be bonded with the help of exterior grade resin. The internal bond shall be 8-10 Kg/sqcm. The modulus of elasticity shall be 30.000 Kg/sqcm. Water absorption shall be low i.e. 6% after soaking in water for 2 hours and 12% after a 24 hour soak. Screw holding capacity on the face shall be 150 kg and on the edge shall be 125 kg.

f. Plywood & veneers

Plywood shall be formed by three or more layers of veneer glued and hot pressed together with the grain of adjacent veneers running at right angles to each other. The veneers for all grades shall be either rotary cut or sliced. The thickness of all veneers shall be uniform within a tolerance of +/- 5%.

Corresponding veneers on either side of the centre one shall be of the same thickness and species. In a 3 ply-board upto 6 mm. thick the combined thickness of the face veneers shall not exceed twice the thickness of center ply. In a multiply board, the thickness of any veneer shall not be more than thrice the thickness of any other veneer.

g. Block board

Block boards shall have a solid core made of uniform strips of wood each not exceeding 25 mm. In width laid separately between two or more outer veneers, with the direction of the grain of the core block running at right angles to that of the adjacent veneers. In any one block board, the core strips shall be of the species of pre treated timber only. Face veneers may be decorative or commercial as mentioned in the detailed item specifications. The adhesives used for bonding shall be synthetic resin conforming to IS: 848 - 1974. Tolerance in thickness shall be +/- 5% only. Each board shall be of uniform thickness.

h. Surface Treatment:

Wherever mentioned in the specifications, decorative Italian veneer or plastic laminate shall be bonded under pressure to the surface to be finished. The adhesive used shall be of approved brand and brought to site in sealed container.

i. Finish

All carpentry works after finishing shall be sand papered smooth. A priming coat shall be applied to all surfaces other than those, which shall be subsequently polished or covered with Italian veneer or plastic laminate.

3.2 Painting

- a. Surfaces to be painted shall be dry, free from dust and dirt and rubbed by means of sand paper. The paint shall be ready mixed synthetic enamel paint of approved make. The primary coat of approved make shall be applied and perfectly dried, all holes, cracks etc. shall be filled with putty and the surface sand papered even. Then a second coat of approved shade shall be evenly

applied and allowed to dry. The third and final coat shall be carefully applied as and when required.

b. Spirit polish:

The surface shall be first cleaned and scrapped thoroughly with sandpaper. It shall then be painted with a Filler compound of whiting and Methylated spirit and sand papered. Subsequent coat of spirit polish shall be applied till proper Finishing is achieved. A Final coat of melamine shall be applied to form a hard & shining crust.

c. Alkyd Amino paint:

All alkyd amino paint for sheet steels in Filing cabinets, book stacks etc. should be painted with an anti corrosion element added to it baked at a uniformly high temperature (135 deg. C to 165 deg C) done by using airless electrostatic automatic painting equipment and the dry Film the thickness should be 30 microns.

3.3 Product makes & description

S. NO.	DESCRIPTION	MAKE / BRAND	REMARKS
1.	Teakwood (Tectonia Grandis)		Teakwood shall mean first class C.P. teakwood (sagwan type). Individual hard and sound knot shall not be more than 12mm. In diameter and the aggregate area of all the knots shall not exceed one-half percent of the area of the piece. It shall be close grained.
2.	Kailwood (Pinus Walli Chiana)		No individual hard and sound knot shall be more than 25mm. Diameter and the aggregate area of all the live knots shall not exceed 1% of the area of the piece.
3	Hollack – Hardwood (Terminalia Myriocarpa)	Duro / Century / Green	Plywood shall be formed by three or more layers of veneer glued and hot

S. NO.	DESCRIPTION	MAKE / BRAND	REMARKS
			pressed together with the grain of adjacent veneers running at right angles to each other. The veneers for all grades shall be either rotary cut or sliced. The thickness of all veneers shall be uniform within a tolerance of +5%. Corresponding veneers on either side of the center shall be of the same thickness and species. In a 3 ply-board upto 6mm. Thick, the combined thickness of the face veneers shall not exceed twice the thickness of center ply. In a multi-ply board, the thickness of any veneer shall not be more than thrice the thickness of any other veneer.
5	MDF Board	Nuwud / Duratuff	
6.	Plastic Laminate	Formica	
7.	Natural Veneer	Century / Duro (Sharda Plywood Industries)	
8.	Block board	Duro/century/green	
9.	Fibre Board	Cellotex	
10.	Gypsum Board / GI Ceiling frame	India Gypsum	
11.	Perforated Gypsum Board	India Gypsum	
12.	Glasswood	Punj Lloyd	
13.	Fabric	Floor & Furnishing / Fabindia	
14.	Latex Rubber Form	MM Foam	
15.	Synthetic Carpet	Mohawk / Salisbury	
16.	Ceramic Tiles	Kajaria	
17.	Vinyl Flooring	Royal Cushion House	
18.	Plastic Emulsion Paint	Dulux / Berger	

S. NO.	DESCRIPTION	MAKE / BRAND	REMARKS
19.	Wood Polish	Dark / Light natural spirit polish	
20.	Powder Coating Paint	Berger	
21.	Waterproofing compound	CICO	
22.	Anti Termite Chemical	Aldrin / Lethal	
23.	Vertical Blinds	Vista Levelor / Mac Blinds	
24.	Venetian Blinds	Vista Levelor / Mac Blinds	
25.	Glass	Modi Float Glass / TATA Ashai / St. Goabin	
26.	Drawer Channels	Elbco / Flyrail	
27.	Cup Off Hinges	Elbco	
28.	Brass hinges and fittings	Flora	
29.	Locks	Godrej / Icra	
30.	Door closer / floor spring	Doorking / Everite	
31.	Aluminum Section	Hindalco	

Note: Incase of unavailability of any material of specific make an equivalent make can be used only after a written approval of the Architect.

3.5 List of important relevant applicable codes

- i. IS:204 Specifications for Tower Bolts
- ii. IS:287 Recommendations for max. permissible moisture content of timber
- iii. IS:303 Specification for plywood for general purposes
- iv. IS:451 Technical supply condition for wood screws
- V. IS:513 Specifications for Sheet steel components
- vi. IS:729 Specifications for drawer locks, cupboard locks & box locks

- vii. IS:848 Specifications for Synthetic resin, adhesive for plywood (phenolic and amino plastics)
- viii. IS: 1200 (P14) method of measurement of building and civil engineering works
- ix. IS: 1200 (P21) Wood work and Joinery
- x. IS: 1328 Specifications for veneered decorative plywood
- xi. IS: 1659 Specifications for block board
- xii. IS:1734 Determination of density and moisture contents
- xiii. IS:2338 Code of Practice for finishing of wood and wood based materials (Part – 1)
- xiv. IS:2932 Specifications for enamel, synthetic, type-1 (a) undercoating, (b) finishing, colour as required
- xv. IS:3087 Specifications for wood particle boards
- xvi. IS:3097 Specifications for veneered particle boards
- xvii. IS:3618 Phosphate treatment for anti rust treatment
- xviii. IS:5807 Method of tests for clear finishes for wooden furniture
- xix. IS:6005 Degreasing, Pickling and Passivation for anti rust treatment
- xx. IS:8756 Specifications for mortise ball catches

Note: Only latest editions of above referred codes shall be followed.

4.0 Aluminum Work

4.1 Aluminum anodized used in the manufacture of extruded doors, windows, ventilators or glazing shall be as per Indian Standards and of designation HE 9-wp or IS-733-1967. All coupling sections shall also be based upon the above mentioned standards. Any approved metal used for erection brazing or gas welding or other means shall be of modern techniques and shall be got approved from the Architect.

The Tube, overall sizes, side opening and position of doors, windows and ventilators shall be as indicated on drawings.

Both the fixed and opening frames shall be constructed of sections, which

have been cut to length and mitred. The corners of fixed and openable frames shall be electrically flash butt welded to form a solid and true right angle and all frames shall be square and flat.

Where sub-dividing members come, they shall be tenoned and riveted into the frame. No face welding shall be done which shall spoil the outlook. The joints shall be made with hydraulic pressure. Only where necessary welding shall be done. The sizes of doors, windows and ventilators frame shall not vary by more than + 1.5mm.

The hinges shall be cast or extruded aluminum alloy hinges and shall be of 50mm projecting type. Non projecting type hinges may also be used, refer drawings and get confirmation from the Engineer in Charge. The handles and suitable type of lock for door openable either from outside or inside shall be provided.

In double door shutter the first closing shutter shall have a concealed aluminum alloy bolt at top and bottom. It shall be so constructed as not to work loose or drop by its own weight. Single and double shutter may be provided with a three-way holding device. Where this is provided, in case of double door shutter concealed aluminum bolts may not be necessary.

The kick panel in case of aluminum anodized shutters shall be of 1.25mm aluminum alloy sheet conforming to IS designation NS 3-1/2 H of IS:737-1964.

Aluminum alloy sheets and strip (for general engineering purposes) shall be screwed to glazing bar. For fixing aluminum alloy hinges, slots shall be cut in the fixed frame and the hinges inserted inside and may be rivetted to the frame. Only suitable type pin of an aluminum alloy shall be used.

Friction hinges maybe provided for side hung shutter windows or aluminum in which case peg stay may not be required. In case on non-friction type hinges, peg stay which shall be either cast aluminum, conforming to IS designation A-

5M of IS: 6127-1959 or folded from IS designation NS4 Aluminum alloy sheet conforming to IS: 735-55 shall be used. It shall be 300 mm long complete with peg and locking bracket. It shall have holes for keeping the shutter open bracket. It shall have holes for keeping the shutter open in three different positions. The peg and locking bracket shall be rivetted or welded to the fixed frame.

The handles or side hung window shutters shall be cast aluminum conforming to IS designation A-5-M of IS: 617-1959 and mounted on a handle plate or welded or riveted to the opening frame in such a way that it could be fixed before the shutter is glazed the handle should have anodized finish with aluminum anodized film thickness of .015 m. The handle shall have a two-point nose, which shall engage with an aluminum striking plate on the fixed frame in a slightly open as well as in a fast position.

In case of ventilators the aluminum hinges for top hung shall be either cast or fabricated out of extruded sections and shall be rivetted to the fixed rail after cutting a slot in it. The aluminum alloy for cast hinges shall conform to IS designation AA.M of IS: 617-1959 and for the extruded section of hinges to IS designation HE 10 WP of IS: 733-1967. The peg stay shall be 3000 mm long inside hung shutter. The locking bracket shall either be fitted to the fixed frame or to the ventilator.

In case of centre hung ventilators two pairs of cup pivots of aluminum alloy of IS designation NS-A of IS :737-1955 and IS designation A-5-M of IS : 617-1959 and rivetted to the inner and outer frames of the ventilator to permit the ventilator to swing, through an angle of approximately 85 degrees shall be provided.

The opening portion of ventilator shall be so balanced that it remains open at any desired angle under normal weather conditions.

Cast aluminum conforming to IS designation A-5-M of IS: 617-1959, spring catch shall be fitted in the centre of the top bar of the ventilator. Aluminum

cord pulley wheel in an aluminum bracket shall be fitted at the sill of the ventilator with aluminum or screws or alternatively welded together with an aluminum cord eye rivetted or welded to the bottom inner frame bar of the ventilator in a position corresponding to that of the pulley.

Outer frames shall be provided with fixing holes centrally in the web of the section in the position indicated in Figure 3I of IS: 1948-1961.

Aluminum doors windows and ventilators may be supplied in either matt scratch brush or polished finish. They may additionally also be anodized.

A thick layer of clear transparent lacquer based on methacrylates or cellulose butyrate shall be applied on aluminum doors, windows and ventilators to protect the surface from wet cement during installation. This lacquer coating shall be removed after installation is completed.

4.2 Precaution:

All aluminum doors, windows, ventilators, glazing shall not be used for centering etc. Scaffolding shall not be rested on the frames or glazing bars.

All fittings and hinges shall be covered with Hessian cloth etc. so that these may not be damaged during construction.

4.3 Submit shop Drawings and Samples for Approval

- (i) All sizes and shapes shall be verified at site by the Agencies before fabrication.
- (ii) Glass for glazing for all items will be supplied by the Agencies in thickness and quality specified in the item.

4.4 Measurements:

The unit of measurement shall be square metre correct to two decimals. All work shall be measured on the basis of finished dimension net. A composite unit of various designations shall be first measured overall as a unit of predominant designations and measurements and for the remaining

designations, deducted from the overall measurements in the composite unit in order to arrive at quantities for various designations.

4.5 Rates:

The rates for various items shall include the cost of all materials, labour, erection hoisting, scaffolding, protective measures required for proper completion of the item of work as given in the respective nomenclature in accordance with the specification given above.

5.0 **Flush Door Shutters**

5.1 General: These Shutters shall be of two grades namely exterior grade and interior grade, as per design and of the thickness as specified by the Engineer in Charge. These shall consist of a solid (fully filled) core covered on each face with cross bands and face veneers and lipped on all the edges. The specifications in general shall conform to Indian Standard Specifications IS : 2202-1962.

The shutters shall be of approved quality and as directed by the Engineer in Charge. The Agencies shall be required to bring a full size sample door and fittings and get these approved in writing by the Engineer in Charge. He shall then arrange the supply in accordance with the approved sample.

5.2 Core: The core shall be of the one of the following types: -

a) Block Board Core: The block board core shall conform to the requirements specified in Indian Standard Specification IS: 1659-1960. The wooden strips for the core shall not exceed 25 mm in width. The length of the majority of strips shall extend to the full length of the board but end joints are permissible provided the jointed strips are distributed between full-length strips; and the joints are staggered. In any one-block board, the core strips shall be of one species of timber only.

A wooden frame prepared from stiles and rails of well-seasoned and treated good quality wood shall be provided for holding the core. The width of the

members shall be not less than 50 mm and not more than 100 mm.

Alternatively, the core shall be of solid board with slots extending for about two third depth and at approximately 20 mm spacing. The slots shall be made alternatively on two faces of the board.

- b) Particle board and Block Board core: The core shall be a combination of block board and particle board. The block board and the frame shall be as specified. The particleboard shall be either of flat platen pressed type or extrusion type conforming to the relevant Indian Standards.
- c) Particle board core: The particle board core shall be either of flat plate pressed type or extrusion type as specified in (b) above. The frame for holding the core shall be as specified in (a) above.
- d) Laminated core: It shall be constructed by gluing together under pressure plywood strips in a limited way. The frame for holding the core shall be as specified in (a) above.

5.3 Lipping: If so specified, edges of the core shall be lipped with 1st class teakwood battens of 25mm minimum depth or of any other matching hardwood of class I, specified in Appendix

“A” of IS: 1659-1960 glued under pressure and the lipping shall be internal. In the case of the double shutter doors, the depth of the lipping at the meeting of styles shall not be less than 30 mm and the meeting of the styles shall be rebated 20 mm. the rebating shall be of either splayed or square type.

5.4 Face Panels: The face panels shall be formed by gluing under pressure on both faces of the core with plywood or cross bands and face veneers. The thickness of the cross bands on each face shall be between 1 mm and 3 mm. The thickness of the face veneers on each face shall be between 0.5 mm and 1.0 mm. The combined thickness of cross bands and face veneers on each face shall not be less than 2.5 mm. The cross bands shall be laid with their

grains at right angles to those of the core. Face veneers shall then be laid with their grains at right angles to those of the cross bands. The cross bands shall be of good quality, durable and well seasoned wood, conforming to IS Specification is : 303/1960 and shall not be inferior to those specified for grade BWR plywood exterior grade and shall not be inferior to those specified for grade WWR plywood for interior grade. The class teak wood or other decorative wood conforming to Grade I decorative plywood as per Indian Standard Specifications IS:1955.

All cross bands and face veneers shall be treated in accordance with Indian Standard Specification IS: 303-1960 before assembly. Trimmed and cut ends shall be given a protective treatment.

- 5.5.1 Tolerances: Tolerance on width and height shall be + 3 mm, tolerance on thickness shall be + 1.2 mm. The thickness of shutter shall be uniform throughout with a variation not exceeding 0.8 mm, when measured at any two points.
- 5.6 Opening for Vision Panel: Where specified or otherwise shown in the drawing, opening for glazing shall be provided. The opening shall be 25 cm in height and 20 cm in width unless directed otherwise. The bottom of the opening shall be at a height of 150 cm from the bottom of the shutter. Opening for shutter shall be lipped internally with solid timber.
- 5.7 Adhesives only synthetic resin adhesives conforming to Indian Standard Specification IS: 851- 1964 shall be used for bonding core members to one another, including core frame and for lipping, vision panel and other exposed parts. The adhesive used for bonding cross band to core and face veneers to cross band shall conform to Indian Standard Specifications IS: 848-1957 (Phenolic and Amino plastic).
- 5.8 Fittings: Details of fittings to be provided shall be as per the schedule of fittings supplied by the Engineer in Charge in each case. The cost of providing and fixing shutters shall include the cost of hinges and necessary screws for

fixing the same.

- 5.9 Measurements: Shutters shall be measured in sqm nearest to two places of decimal in closed position covering the rebates of the frame. Overlap of two shutters shall not be measured. The width and the height of shutters shall be measured correct to a cm. All work shall be measured net as fixed that is no except in the following case.

Circular or segmental portions of doors, windows and ventilators shall be measured net and kept separate.

- 5.10 Rate: It includes the cost of materials and labour involved in all the operations described above.

6.0 Finishing:

6.1 Dry and Oil Bound Distemping

6.1.1 Materials:

Oil bound washable distemper of approved brand and manufacture shall be used. The primer where used as on new work shall be cement primer or distemper primer as described in the item.

These shall be of the same manufacturer as oil bound distemper.

The distemper and primer shall be brought by the Agencies in sealed tins in sufficient quantities at a time to suffice for a fortnight's work and the same shall be kept in the joint custody of the Agencies and the Engineer in Charge. The empty tins shall not be removed from the site of work, till this item of work has been completed and passed by the Engineer in Charge.

6.1.2 Application

6.1.2.1 Primer Coat:

The primer coat shall be with distemper primer or cement primer, as required

in the description of the item. The application of the distemper primer shall be in the same manner as described below:

Note: If the wall surface plaster has not dried completely cement primer shall be applied before distemping the walls. But if the distemping is done after the wall surface is dried completely, distemper primer shall be applied.

However, oil bound distemper is not recommended to be applied within six months of the completion of wall plaster. For old work no primer coat is necessary. Distemper primer or cement primer shall be applied as required in the description of item.

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

6.1.2.2 Distemper Coat:

For new work after the primer coat has dried for at least 48 hours, the surface shall be lightly sand papered, taking care not to rub out the priming coat. All loose particles shall be dusted off after rubbing. One coat of distemper properly diluted with thinner (water or other liquid as stipulated by the manufacturer) shall be applied with brushes in horizontal strokes followed immediately by vertical ones, which together constitute one coat. The subsequent coats shall be applied in the same way. Two or more coats of distemper as are found necessary shall be applied over the primer coat to obtain an even shade. A time interval of at least 24 hours shall be allowed between consecutive coats to permit of the proper drying of the proceeding coat.

For old work the distemper shall be applied over the prepared surface in the same manner as in new work. One or more coats of distemper as are found

necessary shall be applied to obtain an even and uniform shade.

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

6.2 Wall Painting with Plastic Emulsion Paint:

6.2.1. General: Plastic emulsion paints are not suitable for application on external wood and iron surfaces and surfaces which are liable to heavy condensation and are to be used generally on masonry or plastered surfaces. No priming coat is required for the latter.

6.2.2. Paint: Plastic Emulsion paint of approved brand and manufacture and of the required shade shall be used.

6.2.3 Preparation of surface: The surface shall be thoroughly cleaned of dust, old white or colour wash by washing and scrubbing. The surface shall then be allowed to dry for at least 48 hours. It shall then be sand papered to give a smooth and even surface. Any unevenness shall be made good by applying putty, made of Plaster of Paris mixed with water on the entire surface including filling up the undulation and then sand papering the same after it is dry.

6.2.4 Application: The number of coats shall be as stipulated in the item. The paint will be applied in the usual manner with brush or roller.

The paint dries by evaporation of the water content and as soon as the water has evaporated the Film gets hard and the next coat can be applied. The time of drying varies from one hour on absorbent surfaces to 2 to 3 hours on non-absorbent surfaces.

The thinning of emulsion is to be done with water and not with turpentine.

Thinning with water will be particularly required for the undercoat, which is applied on the absorbent surface. The quality of thinner to be added shall be as per manufacturer's instructions.

The surface on Finishing shall present a flat velvety smooth Finish. If necessary more coats will be applied till the surface presents a uniform appearance.

6.2.5 Precautions:

- a) Old brushes if they are to be used with emulsion paints should be completely dried of turpentine or oil paints by washing in warm soap water.

Brushes should be quickly washed in water immediately after use and kept immersed in water during break period to prevent the paint from hardening on the brush.

- b) In the preparation of walls for plastic emulsion painting, no oil base putties shall be used in filling cracks, holes etc.
- c) Splashes on floors etc. shall be cleaned out without delay, as they will be difficult to remove after hardening.
- d) Washing of surfaces treated with emulsion paints shall not be done with 3 to 4 weeks of applications.

6.3 Painting with Synthetic Enamel Paint:

6.3.1 Paint: Synthetic enamel paint of approved brand and manufacture and of the required shade shall be used for the top coat and an undercoat of shade to match the top coat as recommended by the manufacturer shall be used.

6.3.2 Preparation of Surface:

- a) Wood Work: The surface shall be cleaned and all unevenness removed.

Knots if visible shall be covered with preparation of red lead. Holes and indentations on the surface shall be filled in with glazier's putty or wood putty and rubbed smooth before painting is done. The surface should be thoroughly dry before painting.

- b) Iron and Steel Work: The priming coat shall have dried up completely before painting is started. Rust and scaling shall be carefully removed by scraping or by brushing with steel wire brushes. All dust and dirt shall be carefully and thoroughly wiped away.
- c) Plastered Surface: The priming coat shall have dried up completely before painting is started. All dust or dirt that has settled on the priming coat shall be thoroughly wiped away before painting is started.

6.3.3 Application: The number of coats including the undercoat shall be as stipulated in the item.

- a) Under Coat: One coat of the specified paint of shade suited to the shade of the top coat shall be applied and allowed to dry overnight. It shall be rubbed next day with the finest grade of wet abrasive paper to ensure a smooth and even surface, free from brush marks and all loose particles dusted off.
- b) Top Coat: Topcoats of specified paint of the desired shade shall be applied after the under coat is thoroughly dry. Additional finishing coats shall be applied if found necessary to ensure properly uniform glossy surface.

6.3.4 Commencing: Painting shall not be started until the Engineer in charge has inspected the items of work to be painted, satisfied himself about their proper quality and given his approval to commence the painting work. Painting, except the priming coat, shall generally be taken in hand after all other builders work is practically finished.

The rooms should be thoroughly swept out and the entire building cleaned up, at least one day in advance of the paintwork being started.

6.3.5 Measurement: All painting work shall be measured in sqm, Length and Breadth should be measured to a nearest cm.

6.3.6 Rates: Rate and shall include cost of material, labours, scaffolding, etc. and other equipments etc.

6.4 Plaster of Paris punning

3 mm thick P.O.P. punning (calcium sulphate semi-hydrate variety) over old and new wall surface shall include rounding, chamfering of corners, angles, junctions etc. M.S. angle heading shall be provided at corners wherever required giving a smooth surface in true line and level.

7.0 **ELECTRICAL WORK**

7.1 The materials, equipment and workmanship shall conform to the following Indian standards, unless otherwise called for:

Switchgear

IS:375 Markings and arrangements for switchgear bus-bars, main connections and Auxiliary wirings.

Cables:

IS: 1554 Specification for PVC insulated (Heavy duty) electric cables part -1 for voltage upto 1100 volts.

IS: 694 II Specification for PVC insulated cables (for voltage upto 1100 V) (Part - 11) with aluminum conductors

IS: 1653 Specification Rigid Steel conduits for electrical wiring.

IS: 3837 Specification for accessories for rigid steel conduits for electrical wiring.

IS:5133 Boxes for the enclosure of electrical accessories (Part -1, Steel & C.I. Boxes).

IS: 1293 3 pin plugs & socket outlets

IS: 371 Ceiling roses

- IS: 2448 Adhesive insulating tapes for Electrical purposes (Part I & 11)
- IS: 191 General & safety requirements for electric lighting fitting.
- IS: 374 Electric ceiling fans and regulators
- IS: 2312 Propeller type AC ventilating fans
- IS: 3043 Code of practice for earthing.
- IS: 1885 Glossary of terms for Electrical cables and conductors.
- IS: 1646 Code of practice for safety of buildings (General) electrical installation.
- IS: 2309 Protection of buildings & allied structures against lightning

List of approved makes of materials for Electrical Work

S. No.	Item Description	Make / Brand
1.	PVC insulated / copper wire 650 V grade conforming to IS:694/1977	Finolex, Skyline, Grandlay, National Rkabel
2.	PVC conduit pipe (ISI Marked)	BEC, Steel Krafts, AKG
3.	Switches and Sockets	North West, MK, LK
4.	MCB & DB	Standard, MDS, Schneider
5.	ELCB & MCCB	MDS, Schindler, Siemens, L&T
6.	Metal Clad Sockets	MDS, Schindler, MK
7.	Telephone outlet sockets / computers	CPL, Precision, North West, Anchor, Roma
8.	Telephone Wires	Finolex
9.	UTP Cable	Avaya (AT&T USA)
10.	GI pipe for earthing	TATA, Gujarat Steel Tube, Jindal
11.	Armoured Cable	Finolex, CCI, Fort Giloster
12.	Ceiling / wall / exhaust fan	GEC, Crompton, Khaitan
13.	FI fittings / CFL	Philips, Wipro, Crompton
14.	Incandescent Lights	Philips, Wipro, Decon

Note: Incase of unavailability of any material of specific make an equivalent make

can be used only after a written approval of the Architect. Also the preference of make/ brand of the material listed above will be decided by the Architect. The make/ brand of any other item will be as mentioned in the drawings issued by the Architect.

5.0 Sanitary and Plumbing work

5.1 General requirements:

5.1.1 All exposed G.L, C.I. or lead pipes and fittings shall be painted with approved quality of paint and shade as specified.

5.1.2 All sanitary and plumbing work shall be carried out through licensed plumbers.

5.1.3 On completion of work, the site shall be cleaned and all rubbish disposed off.

5.1.4 Painting: The brackets shall be painted with 2 coats of white synthetic enamel paint of approved manufacture over and including a priming coat of red lead.

5.1.5 Floor traps: shall be of self cleansing design 'P' or 'S' type with min. 50 mm seal of approved make with C.P. brass gratings The traps shall be placed in position and encased around with 150 mm thick concrete 1: 2: 4; wherever necessary vertical pieces with sockets shall be joined to traps to accommodate C.P. brass grating at floor level.

5.2 Water supply

5.2.1 Galvanized Iron pipes and fittings: The pipes shall be galvanized mild conforming to IS 1239:1968. All pipes shall be electric resistance welded screwed with taper, threads and sockets with parallel threads. The pipes and sockets shall be cleanly finished, well galvanized in and out and free from cracks, surface flaws, laminations and other defects.

All screw heads shall be clean and well cut. The ends shall be cut cleanly and square with axis of the tube. The Fittings shall be designated by the

respective nominal bores of the pipes for which they are intended.

- (i) Cutting, laying and jointing of pipes and fittings: Where pipes have to be cut or re-threaded, ends shall be carefully filed out so that no obstruction to bore is offered. The end of the pipes shall then be threaded conforming to requirements of IS 5541955 with pipe dies and tapes carefully in such a manner as will not result in stickiness of joints when two pieces are screwed together. The pipes shall be cleaned and cleared of all foreign matters before being laid. All pipes and fittings shall be properly joined to make the joints completely watertight and all pipes kept free from dust. Burr shall be removed from the joints after screwing. Pipes passing through wall or floor shall be provided with M.S. tube sleeves.
- (ii) Clamps and Holder Bats: All pipes and fittings shall be fixed truly vertical and horizontal unless unavoidable. The pipes shall be fixed to walls with standard pattern holder bat clamps of required shape and size so as to fit tightly on the pipes when tightened with screwed bolts. These clamps shall be embedded in brickwork in cement mortar 1: 3 (1 cement: 3 coarse sand). All pipes shall be provided with unions at the location of fixing valves, pumps or any other fixed equipment.
- (iii) Testing: After laying and jointing the pipes and fittings shall be inspected under working conditions of pressure and flow. Any joint found leaking shall be redone and all leaking pipes removed and replaced. The pipes shall be slowly and carefully charged with water so that all air is expelled from the lines. The draw of taps and stopcocks shall then be plugged and hydraulic pressure of 6Kg./sqcm shall be applied gradually. Pressure gauge shall be accurate and recalibrated before the test. The test pump having been stopped, the pressure shall maintain itself without measure able loss for atleast half and hour.
- (iv) Cleaning and Disinfection of supply system: All water lines shall be thoroughly disinfected before being taken into use and also after very

major repair.

Approved Makes of Sanitary Materials

S. No.	Item Description	Make / Brand
1.	Sanitary fixtures	Cera / Neycer / Hindustan
2.	Sanitary fittings	Parko / Dripless / Kingston
3.	GI pipes and fittings	Jindal
4.	CI pipes and fittings	RIF
5.	PVC tank	Sintex
6.	Geyser	Racold
7.	Mono block pumping set	Crompton