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**SPEED POST/REGISTERED ACK DUE**

Dte Gen Md Accn project  
E-in-C's Branch,  
Integrated HQ of MoD (ARMY)  
Kashmir House, Rajaji Marg,  
New Delhi – 110011

No. 82827/MAP/PH-II/PKG-3A/ /E8

Feb 2011

M/s \_\_\_\_\_

**CA NO. DG MAP/PHASE-II/BASOLI, MAMUN & DAMTAL/PKG-3A OF 2008-09 : CONSTRUCTION OF RESIDENTIAL ACCOMMODATION AT BASOLI, MAMUN (POCKET-1 & 3) AND DAMTAL**

1. Reference this HQ letter No. 82827/MAP/PH-II/PKG-3A/45/E8 dated 24 Sep 2010, copy by post telegram bearing No. 82827/MAP/PH-II/PKG-3A/52/E8 dated 19 Oct 2010 and letter No. 82827/MAP/PH-II/PKG-3A/72/E8 dated 24 Jan 2011.

2. Following further amendments / errata are hereby issued to the tender documents for the subject work, issued vide this HQ letter quoted under reference:-

<b>Srl No.</b>	<b>Sl. Page No.</b>	<b>Reference to item, clause, para, line etc.</b>	<b>Particulars of amendments / errata.</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
5	8	<b><u>NOTICE OF TENDER</u></b>  (i) Para 1c, Name of PM, Line 4	For "Project Manager (MAP) C/o Station Headquarter, Mamun"  Read "Project Manager (MAP) C/o Station Headquarter, Mamun and Project Manager (MAP) C/o HQ 21 Sub Area, PIN-908621 C/o 56 APO"
6	10	<b><u>APPENDIX 'A' TO NOTICE OF TENDER</u></b>  (i) Sl. No.8, Name of Project Manager	For "Project Manager (MAP) C/o Station Headquarter, Mamun"  Read "Project Manager (MAP) C/o Station Headquarter, Mamun and Project Manager (MAP) C/o HQ 21 Sub Area, PIN-908621 C/o 56 APO"

3. Srl page Nos. 1, 209, 216, 219, 229, 230, 236 to 238, 240 to 244, 248 to 250, 252, 255 to 257, 260, 261, 263 to 265, 267, 269 to 272, 274 to 276 & 290 are hereby cancelled and replaced with revised Sl. Page Nos. 1(R), 209(R), 216(R), 219(R), 229(R), 230(R), 236(R) to 238(R), 240(R) to 244(R), 248(R) to 250(R), 252(R), 255(R) to 257(R), 260(R), 261(R), 263(R) to 265(R), 267(R), 269(R) to 272(R), 274(R) to 276(R) & 290(R) respectively. Revised pages are enclosed herewith. These revised pages shall be considered and provisions therein shall be taken into account before quoting the tender. All revised & cancelled pages shall be returned alongwith tender documents.

4. Additional page Nos. 209-A, 228-A & 237-A are forwarded herewith. These page shall also form part of tender documents & these shall be considered and provisions therein be taken into account before quoting the tender.

5. This letter alongwith amendments, revised pages and additional pages shall form part of the tender documents and shall be returned alongwith tender documents.

6. The date & time for receipt of tender remains unchanged ie upto 1230 hrs on 10 Feb 2011. Tender shall be received upto **1230 hrs on 10 Feb 2011**.

7. Please acknowledge receipt.

Yours faithfully,

**Encls:** - As Above

Signature of Contractor  
Dated \_\_\_\_\_

DEPMC

(N K Rajpal)  
Asstt. Director Contracts)  
for Accepting Officer

**DIRECTOR GENERAL  
MARRIED ACCOMMODATION PROJECT  
NEW DELHI – 110 011**

**CONSTRUCTION OF RESIDENTIAL ACCOMMODATION AT BASOLI, MAMUN (POCKET- 1 & 3)  
AND DAMTAL**

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Drawings : \_\_\_\_\_ Sheets

Signature of Contractor  
Dated \_\_\_\_\_

DEPMC

Asstt. Director (Contracts)  
For Accepting Officer

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

- 1.11.4 Care shall be taken to ensure that all subsequent works are carried out as per the approved shop drawings only.
- 1.11.5 Shop drawings shall be prepared by the contractor for the following works unless specified otherwise: -
- (i) Structural steel works
  - (ii) Internal and External Plumbing Works.
  - (iii) Internal Electrical Works.
  - (iv) Tile works
  - (v) Solar Water Heater

**1.12 SOIL INVESTIGATION REPORT**

A soil investigation has been carried out at site through some specialist agency. To have a general idea of the soil condition at site, Soil Investigation Report can be seen by interested tenderers with prior appointment from the P.M / Accepting Officer. However, it should be clearly understood that the data given in the report is for general guideline only and no claim / payment shall be based on this data.

**2. SCOPE OF WORK**

The scope of work under this contract includes for the full, final and entire completion of the items of works described in Schedule 'A' Section I to X including notes thereof & as catered for in General summary and all as specified in these Particular Specifications and all as shown in drawings including notes thereon.

**3 EXCAVATION AND EARTHWORK**

**3.1 GENERAL**

Soil, where buildings under this contract are to be constructed is soft / loose / hard / dense soil.

**3.1(A) Surveying & Leveling, Fixing of Benchmark and ground level records:** Immediately after taking over of site, a spot level sheet of each site shall be prepared by the contractor including the following and the cost of the same shall be deemed to be included in the quoted lump sum for the respective building:-

(a) **Benchmark** : A BM shall be established depending upon on the vicinity of permanent structure as given below:

(i) Vicinity of Permanent Structure : BM shall be established near the permanent structure specifying the Building No. and the cardinal direction of the corners where BM i.e --- corner of Building No.----

(ii) Non Availability of Permanent Structure : If Permanent structure is not available in the vicinity, then a temporary BM linked to a permanent structure shall be established near the site. It will have a PCC platform of at least 1.5m x 1.5m on which a pillar of 30 cms x 30cms of required height shall be constructed. It will not be destroyed/ disturbed till the closure of the project, both physical and financial.

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

- (b) **Marking of BM:** Steel plate of size 80 mm x 80 mm and 3 mm thick shall be embedded in concrete. The BM reference number shall be engraved/painted with red paint on white background and the BM details shall be documented accurately.
- (c) **Grid Interval:** The level sheet shall be prepared at an interval of minimum 3 mtrs. square and shall be less as the gradient increases (at the discretion of PM).
- (d) **Survey:** Before start of the work at any site, a level sheet shall be prepared jointly after ground survey by the PM, DEPMC and contractor at the cost of the Contractor. Five copies shall be prepared in ink then signed by the Contractor, Consultant and PM.
- (e) **Checking:** A team of officers from HQ DG MAP may be detailed for surprise check of the records being maintained. In addition local Engineer Regiment/MES representatives may also be detailed to check the records as detailed by Stn HQ. Records of checks carried out shall be maintained at site.
- (f) **Distribution:** One copy of each set of levels prepared shall be kept in safe custody of PM, DEPMC, Contractor, Nodal officers & Contract Section at HQ DG MAP.
- (g) The level sheets shall be distributed immediately on completion of survey at a particular site i.e it shall be distributed immediately in parts on handing over of individual sites and completion for full packages will not be awaited.
- (h) A record of founding level of all structures and services shall be maintained in a separate register including works diary and signed by Contractor, DEPMC and PM.
- (j) The record of formed up levels shall also be maintained as mentioned above and jointly signed by DEPMC, Contractor and PM. The distribution will also be as per the spot level sheets mentioned above and will again be immediately carried out in parts on completion at individual sites.
- (k) The spots levels, formed up levels and founding levels will be the basis of earth work calculations and valuation of deviation if any."

3.2 Preparatory work, surface excavation : Before setting out the building and commencing the construction, the contractor shall carry out the preparatory work such as removal of grass, vegetation etc. and shall also carry out surface excavation not exceeding 30 cm deep and averaging 15 cm deep over the entire area covered by the respective items of Schedule 'A' Section-I and dispose off the spoil to a distance exceeding 250 metre and not exceeding 500 metre spread and levelled all as directed by the Project Manager. The cost of such works shall be deemed to be included in the lump sum quoted by the contractor against respective items of Schedule 'A' Section-I. The ground level shown on drawings shall be considered as the ground level after surface excavation. The area referred to imply the entire area occupied by the building including plinth protection, saucer drain, ramp, platform, steps, shaft and the like.

3.2A In case the existing ground is undulated (i.e. if the average difference in levels at different places exceeds 30 cm) it shall be excavated to a level as directed by the Project Manager and relevant items shall be measured and paid under relevant measurable Section of Schedule 'A'. The ground level thus obtained shall be considered as average GL. In such cases, the surface excavation for building/structure, which is deemed to be included in unit rates/lump sums quoted in Schedule 'A' Section-I, shall be omitted through Deviation Order.

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

- 4.3.3 **TESTING OF CEMENT** : The contractor shall submit the manufacturer's test certificate in original or authenticated copy thereof alongwith the Test Sheet giving the result of each physical test as applicable and the chemical composition of the cement, duly signed by the manufacturer with each consignment clearly bringing out lot No. The Project Manager shall record these details in the cement acceptance register (Appx 'B') after due verification. The PM shall also organize independent testing of random samples of cement drawn from various lots from the National Test House, SEMT, Regional Research Laboratories, Government approved laboratories as per IS: 3535 - 1986 (Method of sampling Hydraulic cement), IS: 4031 (Method of Physical test for Hydraulic Cement) and IS: 4032-1985 (Method of chemical analysis of Hydraulic cement). In case cement test result does not fall within the acceptable limits, respective consignment of cement shall be rejected and shall be removed by the contractor within 24 hrs from the site. The cost of tests shall be borne by the contractor irrespective of status of the results and no claim shall be entertained on this account.
- 4.3.4 Following mandatory tests shall be carried out for cement procured by the contractor for each lot: -
- (i) Initial and final setting time.
  - (ii) Soundness test.
  - (iii) Compressive strength test at 3, 7 & 28 days as specified in relevant IS code.
- 4.3.5 The cement shall conform to chemical requirements and physical requirements as specified in relevant IS. The tests carried out as per provisions of IS codes specified hereinbefore shall be the criteria for acceptance of cement by Project Manager. If samples from a lot/lots are not within the acceptance limits of Indian Standard, the lot/lots shall be rejected without any claims or compensation to the contractor for the lot/lots purchased. The contractor shall replace the lot/lots with the fresh one, which shall be tested again for acceptance. The cost of all tests carried out on cement before acceptance for incorporation in the work shall be borne by the contractor whether the results are acceptable or not.
- 4.3.6 **STORAGE OF CEMENT**
- (a) Refer clause 4.3.1 on page-51 of SSR Part-I.
  - (b) Cement shall be stored over dry platform of at least 20 cm height in such a manner as to prevent deterioration due to moisture or intrusion of foreign matter. In case of store rooms, the stacks should be at least 20 cm above from floors and away from walls. Inspections shall be carried out once a day by the DEPM Consultant and every week by the PM. It shall be ensured by the Project Manager that tested and untested cement are segregated and stored separately with distinct identification. The cement godown shall be provided with two locks on each door. The key of one lock at each door shall remain with the Project Manager or his representative and that of the other lock with the contractor's authorised representative at site of works so that cement is removed from the godown only according to daily requirements with the knowledge of both the parties. Cement for not more than two months requirement for structural works and three months requirement for all other works shall be procured and held in stock to avoid its deterioration. Any cement which is held in stock for more than two months shall not be used for structural works and any cement which is held in stock for more than three months shall not be used for all other works and shall be removed from site at the Contractor's cost.

**PARTICULAR SPECIFICATIONS (CONTD...../-)****5.1.11 REJECTION OF BRICKS**

In case the samples of bricks fail to meet the requirement of characteristics during testing, the lot brought at site shall be rejected by the Project Manager and removed from the site immediately by the contractor. The cost of removal of such rejected lots shall be borne by the contractor.

**5.2 CEMENT**

Refer Clause 4.3 of Particular Specification here-in-before.

**5.3 SAND**

Sand for mortar shall be as specified in Clause 5.4 of MES Schedule (Part-I).

**5.4 WORKMANSHIP**

All brick work unless mentioned otherwise in particular specifications shall be built in cement and sand mortar (1:6) except half brick walls, brick on edge walls, brick bands, brick pillars (Isolated), brick steps, brick fins which shall be built in cement and sand mortar (1:4).

5.4.1 Unless otherwise shown on drawings all brick work in half brick walls shall be built from sub floor level in ground floor and from RCC slabs in subsequent floors. All half brick thick walls shall be reinforced with 2 Nos, 8 mm dia TMT deformed bars at every fourth course starting from 20cm above DPC/floor slab. Where height of wall exceeds lintel level, a continuous 75mm thick lintel band with 2 Nos, 8 mm TMT deformed bars shall be provided. Brickwork in panels shall be jointed with RCC columns by means of wall ties of MS flat iron 30mm x 3mm at every fourth course. The bonding length of reinforcement and MS flat iron shall be as under unless otherwise shown on drawings: -

- (i) Junction of 11.5 cm thick walls - 10cm.
- (ii) Junction of 11.5cm thick wall with those of 23cm thick wall - 20cm
- (iii) Junction of 11.5cm/23cm thick wall and RCC column etc- 20cm

5.4.2 Nominal width of brick shall be considered 115mm.

5.4.3 For half brick walls more than 3000 mm in length, vertical RCC bands of size 115 mm x thickness of the wall shall be provided at maximum 3000 mm c/c spacing. The vertical bands shall be reinforced with 4 nos. 8mm HYSD (TMT) reinforcement bars with 8mm HYSD(TMT) links at 100 mm/cc. No foundation shall be provided for these vertical bands. The vertical 8mm bar shall, however, be anchored into the slabs / beams / lintels both at the top and at the bottom. The anchorage length shall be 200 mm minimum.

5.4.4 2 nos. 12mm HYSD (TMT) bars shall be provided longitudinally in RCC floor slabs where half brick walls are supported on them.

5.4.5 Bearings of all slabs on load bearing masonry walls shall be for the full thickness of wall.

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

**13.2.6 DISTEMPERING WITH OIL BOUND DISTEMPER –**

- 13.2.6.1 Where indicated on drawings, oil bound distemper in two coats over a coat of primer shall be provided over one coat of ready mixed water resistant cement based wall putty not less than 1 mm thick on plastered surfaces.

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

13.3 Blank

13.4 Blank

13.5 Blank

**PARTICULAR SPECIFICATIONS (CONTD.....)****14 GLAZING**

14.1 **GENERAL-** Glazing shall be as per the drawings and as per manufacturer's instructions for doors, windows, CSW's, vents, north light etc.

**14.2 MATERIALS**

14.2.1 **FLOAT GLASS:** Refer Para 16.2 of MES Schedule Part-I. The float glass shall be of good quality/ordinary quality for glazing purpose. The glass sheet shall be free from specks, bubbles, smoke wanes, air holes and other defects.

14.2.2 **OBSCURED / PIN HEADED GLASS:** Refer Para 16.3 of MES Schedule Part-I. The window/vents, CSWs panes of toilets/WCs and baths shall be of figured glass, 4 mm thick unless otherwise indicated on drawings.

14.2.3 **WIRED GLASS:** Refer Para 16.3 of MES Schedule Part-I. Unless otherwise mentioned on drawings, the nominal thickness of wired glass shall be 6.4 mm.

14.2.4 **GLASS FOR ALUMINIUM JOINERY (EXCEPT IN TOILETS / WCs AND BATHS):** Glass shall be of selected quality. Unless otherwise mentioned on drawings, the nominal thickness of float glass shall be 5 mm. Where tinted glass mentioned in the drawings, the same shall be of shade approved by the PM.

14.2.5 **PUTTY:** Refer Para 16.5 of MES Schedule, Part-I.

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

- 9.9.3 All aluminium windows, vents shall be of aluminium alloy, glazed / gauged shutter with frame as per drawing made completely water proof to the satisfaction of the PM and necessary silicon sealants etc. shall require to be provided for which no extra payment shall be made. The finish shall be aluminium anodized. The minimum thickness of anodizing shall be 15-20 microns.
- 9.9.4 The items of aluminium glazing , windows, vents & louvers window work shall include the provision of Mullions, coupling Bars, as required to join various units of glazing, windows & louvers etc to form larger glazing, windows vents or louvers cum window/glazing area as per drawings. Also the necessary jointing through cleats, glazing clips, rubber packing, anodized aluminium snap beading, screws etc. complete all as specified. No extra payment shall be made for coupling members Mullions etc.
- 9.9.5 Aluminium Sections used for windows, vents, louvers and fixed glazing shall be anodized of make Jindal/Indalco/Hindalco sections of weight as specified on drawing or 0.55 Kg per running metre, whichever is more. This shall be suitable for use to meet Architectural designs of relevant works and shall be subject to approval of Project Manager (PM) who would require to be satisfied about their being appropriate on technical, structural functional and visual considerations.
- 9.9.6 The aluminium extruded sections shall conform to IS Designation HE/HV9WP Alloy with chemical composition and mechanical properties as per IS 733. Hollow section shall conform to IS HV – 9 – WP of IS 1285-1975.
- 9.9.7 All joints shall be accurately fabricated and be hair line in appearance. The finished surface shall be free from visible defects.
- 9.9.8 Each Aluminum frame shall be tailor – made as per openings at site. No cutting and making good of concrete surfaces shall be permitted.
- 9.9.9 Frames shall be fixed to concrete or brick work with approved dash fasteners. Method of fixing shall be got approved by the PM before installation.
- 9.9.10 Samples of typical glazing shall be made and got approved from PM before mass fabrication.
- 9.9.11 All hardware items used shall be ISI marked. Design, quality type, number and fixing of hardware shall be got approved by the PM.
- 9.9.12 No visual variation in shade shall be permitted. The fabricator shall clearly indicate the shade variation tolerance as measured by standard equipment.
- The requirements, provisions, for all aluminium work shall conform to requirements and specifications and parameters given in this tender drawings / instructions and shall at least provide for or conform to fabrication, finishing, erection installation etc.
- 9.10 **STEEL WINDOWS / VENTS**
- 9.10.1 Steel windows/ vents shall be provided in servant quarters (servant rooms, their wash & WC) and other locations all as shown on drawings.
- 9.10.2 Standard steel windows/vents of overall sizes as shown on drawings shall be provided where shown on drawing. Minor variation in overall sizes to suit the standard practice of the manufacture will however be accepted without any price adjustment.

**PARTICULAR SPECIFICATIONS (CONTD...../-)****9.10 Contd.../-**

- 9.10.3 Steel windows/vents shall conform to IS-1038 & IS-7452-1990 and shall be procured from any of the approved firms/manufacturers specified in Appendix 'E'. Process of flush butt-welding may be adopted for fabrications. However the contractor is permitted to use electric arc welding in lieu of flash butt welding without any price adjustment. Fixing of steel windows/vents shall be done in accordance with IS-1081. However instead of mastic filling specified in IS, cement and sand mortar (1:1) mixed with 5% crude oil by weight of cement can be used. Lugs to steel windows/vents shall be provided as shown in drawings and specified in IS. However no lug will be provided in lintels and cills. Sub dividing bars of units shall be tennoned & riveted to the frame. Before fixing, both the steel windows (fly proof and glazed shutter) shall be jointed with spacer bars of 10 mm dia MS bar if not otherwise shown on drawings.
- 9.10.4 Side hung shutters shall be provided with projecting type/non projecting type steel hinges as shown on drawings. Handle for stay arms and casement stays shall be mild steel stove enamelled black japanned. For fly proof shutter the hinges shall also be projected/non projected type steel hinges as shown on drawings but the handles shall be of one point type. Hardware fittings/iron mongery for steel windows/vents shall be provided as shown on drawings/specified in relevant IS.
- 9.10.5 Samples for each type of window/vents with complete fittings shall be produced for approvals of the PM.
- 9.10.6 Manufacturer's certificate to the effect that their product conforms to IS specifications, shall be produced by the contractor at the time of submitting samples for approval before procurement of bulk quantity of the materials for incorporation in the works. Samples shall be retained by the PM till completion of the work.
- 9.10.7 Steel windows/vents shall be obtained from the firms of which the samples have been approved by the Project Manager.
- 9.11 **MS GRILLS**
- Mild steel grills shall be provided to all aluminium and steel windows / vents all as shown on drgs. Mild steel grills shall be painted with 2-coats of synthetic enamel paint over a coat of red oxide primer all as specified.
- 9.12 **PRESSED STEEL CHOWKHATS FOR DOORS**
- 9.12.1 Wherever shown on drawings, pressed steel frame chowkhats to be provided shall be made out of mild steel sheet (PBI) of 1.25 mm thick and shall comply with requirements of IS-4351 of 2003 (specification for steel doors frames). The threshold to the feet of frames shall be provided & PCC (1:3:6) type C-1 shall be filled in the back portion of doors frames complete including providing shock absorbers all as specified in clause 10.27 on page 212 of SSR Part – I (2009) and as shown on drawings. The exposed steel surfaces shall be painted with 2 coats of synthetic enamel paint over a coat of red oxide primer after preparation of surfaces. The internal surfaces in contact with PCC shall be given a coat of bituminous paint. To avoid bulging of frame during back fill, 2 Nos flat iron 25 x 3mm horizontal member and 3 Nos each in vertical member to be provided in each frame & shall be 200 mm long.
- 9.12.2 Frames of pressed steel chowkhats shall be of cold framed section manufactured by standard rolling mills.
- 9.12.3 Pressed steel framed chowkhats shall be factory made from any of the make as specified in Appendix 'E' here-in-after.
- 9.12.4 A piece of 50 mm long MS pipe 20mm bore shall be welded inside door frame to accommodate / or smooth functioning of the bolt of sliding door bolt.

**PARTICULAR SPECIFICATIONS (CONTD.....)****9.13 MS GARAGE DOOR**

MS door shutter with frame to be provided in garage/ car garage/ scooter shed / scooter garage, shall be made/fabricated all as shown on drawings. MS sections shall conform to the relevant IS code as mentioned in SSR part-I.

Two coats of synthetic enamel paint over a coat of red oxide primer after preparation of surfaces shall be provided on all steel surfaces all as specified in clause 15.3.2 of particular specification here in after.

**10. ROOFING****10.1 ROOF SLABS**

RCC roof slabs shall be casted with 1:40 slope, unless a different slope is shown on drawings. Floor height as shown on drawings shall be considered as minimum height. The extra height due to slope in RCC slab shall be considered and added to the minimum height of floor as shown on drawings.

**10.2 WATER PROOFING TREATMENT TO RCC ROOF SLABS.**

10.2.1 Water proofing treatment to RCC roof slab shall be carried out as specified below.

- (a) Clean the RCC slab surfaces including sides up to 300mm high by wire brush raking & cleaning of construction joints, if any.
- (b) Apply a coat of neat cement slurry admixed with approved integral liquid water proofing compound confirming to IS 2645 as per manufacturer's recommendation over the RCC slab and sides upto 300mm high.
- (c) Lay a 20mm thick layer of cement mortar of mix 1:4 (1 cement :4 coarse sand) admixed with liquid water proofing compound and treating similarly the adjoining walls upto 300mm height including rounding of junctions of wall and slabs.
- (d) Lay a layer of broken bricks/brick bats (coba) 25mm to 80mm size with 50% cement mortar 1:4 (1 Cement : 4 coarse sand) admixed with integral liquid water proofing compound to required slope.
- (e) PCC benching of 80mm radius in cement concrete (1:2:4) type B-0 admixed with integral liquid water proofing compound and finished with cement mortar 1:4 (1 cement : 4 coarse sand) admixed with integral liquid water proofing compound is to be provided at the junction of horizontal surface & side walls.
- (f) After 2 days of curing, apply second coat of cement slurry admixed with approved integral liquid water proofing compound.
- (g) Finish the surface with 20mm thick jointless cement plaster 1:4 (1 cement : 4 coarse sand) admixed with integral liquid water proofing compound over the PCC benching and upto 300mm height on sides wall and finishing the surface with trowel with neat cement marking with 300x300mm false square.
- (h) Average thickness of the above treatment shall be 125mm and minimum thickness at khurras shall be 65mm.
- (j) Khuhrras shall be provided to all inlet points of rainwater spouts / holes. Size of Khuhrras shall be 450x450mm with a minimum thickness of 65mm in brick bat coba described herein before in para (a to g) including rounding the edges & making finishing the outlet complete.
- (k) The proportion of integral liquid water proofing compound to be used in respect of cement shall be as laid down by the manufacturer of the particular water proofing compound.
- (l) The whole treated portion shall be flooded with water for 2 weeks for curing. In case any leakage /seepage is noticed then the affected area shall be rectified & retested to the satisfaction of the Project Manager.

**PARTICULAR SPECIFICATIONS (CONTD...../-)****10.2.4 (CONTD...../-)**

- (g) The sunken floor and sides of walls upto bottom of the skirting shall be plastered with minimum 20mm thick cement mortar 1:4 mixed with integral water proofing compound as per manufacturer's specifications including rounding of corners and junctions sloping towards spout.
- (h) All pipes laid in sunken portion shall be covered with 50mm thick PCC 1:3:6 type C-0 all round after painting with anticorrosive paint (Black Japan).
- (j) The sunken portion shall be filled with PCC 1:5:10 type E-2 (1 cement : 5 coarse sand : 10 graded brick aggregate 40 mm nominal size) as specified.
- (k) Provide floor finish and under layer of floor finish as specified.

**10.2.4A WATER PROOFING TREATMENT TO CHAJJAS**

10.2.4A.1 RCC slab surface shall be cleaned by wire brushes.

10.2.4A.2 Coving of radius 80mm in cement concrete 1:2:4 admixed with integral liquid water proofing compound shall be provided at the junction of wall and chajja and the same shall be finished with cement mortar 1:4 (1 cement : 4 coarse sand).

10.2.4A.3 12mm plaster in cement mortar 1:4(1 cement : coarse sand) mixed with integral water proofing compound shall be provided on top surface of chajja.

**10.3 DEFECTS LIABILITY PERIOD OF WATER PROOFING TREATMENT**

10.3.1 The defects liability period of water proofing treatment of RCC roof slabs including sunken floors shall be 10 years and the contractor shall be responsible to keep the entire buildings free from leakage/seepage for a period of 10 years from the certified date of completion. The Guarantee shall be given in the proforma as per Appendix 'F'.

10.3.2 Security deposit for water proofing treatment shall be withheld from the contractor's payments during the guarantee period. The amount of security deposit shall be calculated as given below. The said amount shall be released only after satisfactory expiry of defects liability period of 10 years. The contractor may however furnish a fixed deposit receipt in lieu from a Nationalized / Indian Scheduled banks in favour of Project Manager.

<b>Sl.</b>	<b>Amount of water proofing treatment at Contract Rates</b>	<b>Amount to be retained from Contractor's dues</b>
(i)	Upto Rs. 5 Lac	2% of amount subject to minimum of Rs. 2000/- and enhanced by 25%
(ii)	Over Rs. 5 Lac and upto Rs. 10 Lac	2% of amount and enhanced by 25%.
(iii)	Over Rs. 10 Lac and upto Rs. 20 Lac	Rs. 20,000/- plus 1.5% of amount in excess of Rs. 10 Lac subject to a maximum of Rs. 30,000/- and enhanced by 25%.
(iv)	Over Rs. 20 Lac and upto Rs. 40 Lac	1.5% of the amount and enhanced by 25%.
(v)	Over Rs. 40 Lac	1.5% of the amount and enhanced by 25%.

**PARTICULAR SPECIFICATIONS (CONTD.....)****4.15.10 (Contd...../-)**

The quantity of mortar that comes out of the delivery end of the pipeline shall not be used in place of the concrete work. However, with the approval of PM, this mortar may be used as bedding mortar against construction joints. The rest of the mortar shall be wasted. Lubrication shall be maintained as long as the pumping of concrete continues.

Proper planning of concrete supply, pump locations, line layout, placing sequence and the entire pumping operation will result in savings of time and expense.

The pump shall be placed as near the placement area as practicable. The surrounding area of the pump shall be free of obstructions to allow for movement of concrete delivery trucks. The surface must be strong enough to withstand the loaded trucks operating on it. If the surface is a suspended slab, the truck route shall be adequately supported in consultation with the PM.

Pipe lines from the pump to the placing area shall be laid with minimum number of bends. For large placement areas, alternate lines shall be installed for rapid connection when required. A flexible pipe at the discharge end will permit placing over a large area directly without rehandling of pipelines. The pipeline shall firmly supported.

If more than one size of pipe must be used, the smaller diameter pipe shall be placed at the pump end and the larger diameter at the discharge end.

When pumping downwards, an air release valve shall be provided at the middle of the top bend to prevent vacuum or air buildup. Similarly, while pumping upwards, a no-return valve shall be provided near the pump to prevent the reverse flow of concrete during the fitting of clean up equipments or when working on the pump.

It is essential that direct radio/telecommunication be maintained between the pump operator and the concrete placing crew. Good communication between the pump operator and the batching-plant is also essential. The placing rate shall be estimated by the pump operator so that concrete can be ordered at an appropriate delivery rate.

The pump shall be started for a check run and operated without concrete to ensure that all moving parts are in operation properly. Before placing concrete, the pump shall be run with some grout/l mortar for lubricating the line.

When concrete is received in the hopper, the pump shall be run slowly until the lines are completely full and the concrete is steadily moving. A continuous pumping must be ensured, because, if the pump is stopped, concrete in the line may be difficult to move again.

When a delay occurs because of concrete delivery or some form repair works or for any other reason, the pump shall be slowed down to maintain some movement of concrete in the pipeline. For long en delays, concrete in the receiving hopper shall be made to last as possible by moving the concrete in the lines occasionally with intermittent strokes of the pump. It is sometimes essential to run a return line back to the pump so that concrete can be re-circulated during long delays.

If after a long delay, concrete cannot be moved in the line, it may be necessary to clean out the entire line. However, quite often only a small section of pipeline may be plugged and required cleaning. The pump operator who know such details as the length of line, age of concrete in the line etc., should be, dependent upon to aid in deciding the appropriate section to be cleaned.

**PARTICULAR SPECIFICATIONS (CONTD...../-)****4.15.10 (Contd...)**

When the form is nearly full, and there is enough concrete in the line to complete the placement, the pump shall be stopped and a "go-devil" inserted at the appropriate time so that concrete ahead of the go-devil shall be forced completion of the work. The go-devil shall be forced through the pipeline to clean it out. Use of water pressure is a safer method. The go-devil shall be stopped at the - discharge end to ensure that water does not spill on the placement area. If air pressure is used, extreme care shall be taken and the pressure must be carefully regulated. A trap shall be installed at the end of the line to prevent the go-devil being ejected as a dangerous projectile. An air release valve shall also be installed in the line to prevent air pressure build up.

It is essential to clean the line after concrete placing operation is complete. Cleaning shall be done in the reverse direction from the form work end to the pump-end where the concrete in the line can be dumped in a bucket. After removal of all concrete, all pipe lines and other equipments shall be cleaned thoroughly and made ready for the next use.

**4.16 CONCRETE SURFACING**

4.16.1 Exposed surfaces of all RCC work such as soffit of roof/floor slab, slabs & bottom of beams, lintels, seismic bands, shelves & RCC railing / parapets etc. unless otherwise specified hereinafter in particular specification shall be provided with a coat of 5mm thick plaster in cement and sand mortar (1 :3) finished even and smooth. In case this thickness of plaster exceeds 5mm at places due to local unevenness, no extra payment is admissible. The exposed surfaces of columns, beams, lintels and the like coming in conjunction with plastered surfaces shall be plastered as specified in plastering section. Sand for plaster shall be as specified. The term exposed surfaces does not include the surfaces hidden under earth filling etc. and in such cases irregularities, protruding form work marks shall be removed and air holes, if any, shall be stopped with cement and sand mortar (1: 3). Cost of above provisions shall be deemed to be included in the contractor's quoted rates and nothing extra shall be admissible on this account.

4.16.2 Drip course of 20mmx10mm size on outer edge of bottom of PCC cill, chajja projection, balconies etc. shall be provided irrespective of whether shown on drawings or not.

**4.17 STONE CILL**

Polished Kota stone cill shall be provided for JCOs / OR DUs in all window cills all as shown on drawings. For Officers / Major DUs, marble stone cill shall be provided in all window cills all as shown on drawings. The edges of kota stone and marble stone shall be rounded and mirror polished.

**4.18 PLINTH PROTECTION**

4.18.1 Plinth protection shall be 75mm thick in cement concrete (1 :3:6) type C-2 over 75mm thick hard core of broken stone of gauge not exceeding 63 mm and well compacted over rammed earth and shall be finished even and fair with steel trowel without using extra cement. Plinth protection shall be laid to a slope of 1 in 24 in alternate bays system., Each bay shall not exceed 3 metre in length. 12mm wide and 7.5 cms deep joint shall be formed between the bays which shall be filled with mastic filling to full depth, comprising a mixture of one part of heated hot blown bitumen 85/25 penetration and two parts of heated coarse sand (by volume). The width of plinth protection shall be

**PARTICULAR SPECIFICATIONS (CONTD...../-)****4.18.1 (CONTD...../-)**

1500 mm all as shown on drawings. The toe of plinth protection of size 75mm deep and 75mm wide shall also be of PCC 1: 3:6 type C-2 and shall be provided in buildings irrespective of whether shown on drawings or not. Plinth protection shall be provided to all buildings irrespective of whether shown on drawings or not.

**4.19 CONSTRUCTION JOINTS/ EXPANSION JOINTS**

All construction joints/ expansion joints shall be as per clause 13.4 of IS:456-2000 and IS:11817. Concreting shall be carried out continuously upto the construction joint and prior to start of concreting, written approval shall have to be obtained from the PM.

**4.20 WORK IN EXTREME WEATHER CONDITIONS**

4.20.1 Work in extreme weather conditions (hot or cold) shall be carried out as per clause 14.2 of IS:456 - 2000. The provisions of SP-25 shall also be strictly adhered to while working in extreme weather conditions.

4.20.2 Concreting shall be avoided when temperature is more than 40°C.

4.20.3 The concreting done during summer shall be immediately protected against sun and hard blowing wind (approx after two to three hrs of mixing) using gunny bags etc so that water coming on top of concrete after bleeding is not evaporated before setting of concrete.

4.20.4 Curing shall be started soon after setting of the concrete (approx 8 to 10 hrs after mixing) through frequent sprinkling of water on gunny bags so that concrete remains constantly wet.

4.20.5 The following precautions shall be taken while concreting in hot weather (summer) :-

- (a) The most direct approach to keep concrete temperature down is by controlling the temperature of its ingredients. This shall be achieved by:-
  - (i) Keeping aggregate under shade.
  - (ii) Cooling aggregates by sprinkling water.
  - (iii) Using chilled water or mix ice (40 kg of ice per m<sup>3</sup> of concrete).
- (b) Mix shall be designed to have minimum cement content consistent with other functional requirement such as durability.
- (c) Use of plasticizers / Super Plasticisers and Retarders shall be beneficial during hot weather.
- (d) Ambient temperature shall be below 40°C at the time of placement. Concreting shall be planned during morning and evening hours if ambient temperature during day time exceeds 40°C.

**PARTICULAR SPECIFICATIONS (CONTD...../-)****7.3 (CONTD...../-)**

The Excise duty paid gate pass shall be submitted by the contractor to the PM for each consignment of flush door shutter dispatched by the factory holding valid BIS certification and brought at site for incorporation in the work.

On receipt of the shutters at site, the samples of door shutters shall be tested in any approved laboratory as instructed by the P.M. From each lot of approximately 700 shutters, one shutter shall be selected at random by the P.M. The cost of replacement of the door shutters selected as samples, their transportation to the laboratory and the cost of testing by the laboratory shall be borne by the contractor and shall be deemed to be included in the lump sum rates quoted in Schedule 'A' Section-I

Flush door shutters shall be provided with teakwood beading as per drawings and painted to match the door. Bottom of the flush door shutters shall be painted with two coats of synthetic enamel paint before fixing.

**7.4 TREATMENT WITH CHLOROPYRIPHOS**

7.4.1 All woodwork and joinery except plywood, block board, flush shutters, veneered particle boards and timber formwork shall be given treatment with Chloropyriphos. The quantity of Chloropyriphos to be used and method of application shall be as given in clause 7.4.2 and 7.4.3 herein after. The cost of Chloropyriphos treatment specified in this clause shall be deemed to be included in the unit rates of buildings in Schedule 'A' Section I.

7.4.2 The components of joinery and wood work shall be dipped completely in solution of Chloropyriphos and Kerosene oil in the proportion as mentioned in the relevant IS for at least one hour, before their assembling, as mentioned in clause 7.4.1 here-in-before.

7.4.3 After the operation as specified in clause 7.4.2 above, the components of the aforesaid joinery and wood work shall be assembled as required and planning and sand papering done if required, at any portion of the surface. A coat of the solution mentioned in 7.4.2 above shall be properly applied with brush on the assembled surfaces of joinery and wood work.

**7.5 FRP DOOR SHUTTERS WITH FRAMES**

FRP door shutters with frames shall be provided in locations all as shown on drawings.

**7.5.1 FRP DOOR SHUTTERS**

FRP door shutter 30 mm thick. Glass Fibre Reinforced Plastic (FRP) paneled door shutter, made with fire retardant grade unsaturated polyester resin, moulded to 3 mm thick. FRP laminate for forming hollow rails & styles with wooden frame & suitable blocks of seasoned wood inside at required places for fixing along with MS tube frame of 19 gauges all around the styles & middle rail duly coated with steel primer, cast monolithically with 5 mm thick. FRP laminate for panels & conforming to IS: 14856 – 2000 including fixing to frames. The shade & colour shall be as approved by PM. A 5 mm dia meter hole will be provided at the top rail hinge side to enable the PM to check the thickness of the laminate. The vendor from whom the door shutter / frame is purchased will make good by sealing the hole with FRP putty of the matching shade & colour.

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

**7.5.2 FRP DOOR FRAMES**

Fibre glass reinforced plastic (FRP) door frames of three legged of cross – section 90 mm x 45 mm having single rebate of 32 mm x 15 mm to receive shutter of 30 mm thick. The laminate door frame moulded with fire retardant grade unsaturated polyester resin and chopper mat. Door frame laminate shall be 2 mm thick and shall be filled with suitable wooden block of 2<sup>nd</sup> class hard wood in all the tree legs. The frame shall covered with fibre glass from all sides. Mild steel stay flat iron 25 x 3 mm shall be provided at the bottom to steady the frame. The shade and colour shall be as approved by PM.

7.5.3 Manufacturer's test certificates shall be produced by the contractor with each consignment of FRP door shutters and frames.

**8. BUILDER'S HARDWARE FITTINGS**

8.1.1 Iron mongery (hardware fittings) shall conform to the samples or shall be of approved make and as specified hereinafter. All iron mongery and hardware fittings (except hinges and other than those required for steel windows/vents) shall be of Aluminium alloy anodized. All fittings shall be ISI marked and as approved by PM. All screws for fixing of iron mongery shall be of chromium plated steel, unless otherwise specified.

8.1.2 Irrespective of whatever is shown on drawings, no safety chain shall be provided to the external doors.

**8.2 HINGES**

8.2.1 Butt hinges shall be cold rolled mild steel, medium weight 100 mm long for door shutters and shall be ISI marked (IS:1341) and as specified in SSR Part-I 2009 clause 9.7.2 on page 181 and approved by PM.

8.2.2 Hinges shall be fixed to wood and wood based members with CP steel screws. Hinges shall be welded to mild steel frames irrespective of what is shown on drawings.

8.3 **SLIDING BOLT:** Aluminium anodized sliding door bolts (type 3) 250 mm long with hasp and staple (bolt type) and fixing clips of sheet and bolt of extruded section of aluminium alloy, 16mm dia and shall be provided in all types of dwelling units. These shall be complied with IS 2681-1993 and with fixing bolts.

8.4 **TOWER BOLT:** Aluminium anodized tower bolts of sizes all as shown on drawings shall be provided in all types of dwelling units. The barrel and bolts shall be of extruded section of aluminium alloy. The aluminium tower bolt shall comply with IS 204 (Part-2) - 1992. However, the diameter of the bolts shall be 12mm.

8.5 **TIE HANGER:** The tie hanger in cupboards shall be of aluminium anodised pipe of 10mm internal diameter, 300mm long with standard aluminium anodized brackets as approved by PM. Wall thickness of aluminium pipe shall be more than 1mm.

8.6 **HANGING ROD:** Hanging rod for cupboards shall be as specified in clause 16.13 here in after.

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

**4.7 CASTING OF CONCRETE**

4.7.1 PCC cills, RCC lintels (except those with chajjas), RCC shelves and fins may be cast-in-situ or precast at the discretion of the contractor without any extra cost. In the event of any deviation with regard to these items, pricing shall be done at applicable rates in MES Schedule for cast-in-situ concrete.

**4.8 DESIGN MIX CONCRETE**

4.8.1 Where concrete is specified by grade that is M-25 & M-30, the same shall be of design mix all as per clause 9.2 of IS-456 - 2000, IS-10262-1982, SP-23 (S&T) 1982 and as specified here-in-after.

4.8.2 As soon as possible, after receiving the order to commence the work, the contractor shall procure sufficient quantities of the aggregate and cement and submit samples to any approved laboratory for testing and preparation of mix design. Also RMC plant be identified and design mix got approved from PM.

4.8.3 The optimum mix to achieve the target mean strength shall be determined in the laboratory conditions. The concrete shall conform to IS specifications:

4.8.4 The contractor shall provide all facilities such as materials and labour, tools / equipments for moulding, casting and conveyance of test cubes of concrete of design mix for testing to labs.

**4.8.5 MIXING BY VOLUME / WEIGHT**

For controlled quality concrete of mix M-25 & M-30 only weigh batching will be adopted. No volume batching will be allowed for design mix M-25 & M-30 grade of concrete.

**4.8.6 MINIMUM CEMENT CONTENT**

Minimum Cement content for M-25 grade concrete shall be as per mix design or 340 Kg/cum whichever is more. Minimum cement content for M-30 grade concrete shall be as per mix design or 370 Kg/cum, whichever is more. The minimum cement content as mentioned above shall be provided even if the laboratory mix design gives lesser quantity of cement. If actual quantity of cement used as per mix design is more than the above minimum required, no price adjustment shall be made.

**4.9 BATCHING**

4.9.1 In proportioning concrete, the quantity of both cement and aggregate shall be determined by mass and in accordance with clause 10.2 and sub clauses of IS-456: 2000.

**4.9.2 TRIAL MIXES**

The actual mix proportion will be arrived at by means of a number of trial mixes by changing the water cement ratio, proportions of fine and coarse aggregate, fineness module of aggregate by changing their grading and preparations etc. Attempts shall be made to make the mix design as economical as possible.

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

**5.5 THICKNESS OF BRICK WALL/PILLAR & CONCRETE MEMBERS**

- 5.5.1 Width of concrete lintels, beams, cills, columns and the like coming in conjunction with brick walls/pillars shall be kept to the actual width of brick work unless off sets have been specifically shown, in which case width as shown on drawings shall be maintained.
- 5.5.2 The walls shall be laid out strictly as per drawings. Before carrying out the brick work the layout shall be done and got approved from the Project Manager, and changes instructed, if any, shall be incorporated.
- 5.5.3 Mortar bed joints shall be such that four courses of brick work and three joints taken consecutively shall measure 3 to 4cm in addition to the combined height of the bricks. Accordingly, the provision under clause 5.27 on page 95 of SSR (Part I) shall not be made applicable to this contract and no price adjustment shall be done on this account. However, in the case of half brick walls where reinforcement has been specified here-in-above such four courses will be selected between the horizontal joints having the reinforcement.
- 5.5.4 Thickness of brick walls/pillars shown on drawings as 115mm, 230mm and 345mm for half brick wall, one brick wall and one and half brick wall respectively, shall be deemed to have been amended to the thickness obtainable with the use of bricks as specified herein before without adjustment in prices.
- 5.5.5 Centre line dimensions of rooms, verandah etc as shown in drawings shall be maintained. Internal and overall dimensions if at variance, then too, centre line dimensions shall be adhered to and drawings shall be deemed to have been amended accordingly.
- 5.5.6 All scaffolding for brick work shall be of double legged steel (Independent staging)

**5.6 STONE MASONRY**

Stone masonry works where indicated on drawing or specified in Schedule 'A' shall be provided with following specifications and shown on the drawings.

- 5.6.1 **STONE:** Stone shall be of best quality, locally available obtained from approved quarries or from boulders after chiseling and hammer dressing. Stone shall be hard, sound, durable and free from defects like cavities, sand holes or any other defect that may adversely effect its strength and appearance. It shall be uniform in colour and texture. Stone boulders (in their original rounded shape) shall not be used in the stone masonry work,
- 5.6.2 **SAND:** Refer clause 5.4 of the MES Schedule Part-I.
- 5.6.3 **WORKMANSHIP:**

Stone masonry work shall conform to the general requirements specified in clauses 6.2.1 to 6.2.4, 6.7.1(a), 6.8, 6.9 & 6.10.1 of the MES Schedule Part-I.

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

**5.6.4 TYPE OF STONE MASONRY :**

Random rubble masonry un-coursed where indicated or specified in the description of the item in Schedule 'A', shall be provided all as specified in clause 6.10.1 of the MES Schedule and in accordance with Figs 7 & 8 on page 125 of the MES Schedule (Part-I). The stone masonry work shall be built in cement mortar 1:4 unless otherwise specified elsewhere in these specifications or in Schedule 'A'. In case contractor does the superior quality masonry, as per local practice (other than the masonry as specified herein or in Schedule 'A'), nothing extra shall be admissible on this account to the contractor.

Dry random rubble masonry un-coursed where indicated shall be provided as specified in clause 6.17 of the MES Schedule (Part-I).

**5.6.5 BOND STONE:** Unless otherwise specified or described in the description of item in Schedule 'A' Bond stones of stone shall be provided as per details shown on the drawings at the rate of 2 Nos per sqm of the face area of wall and shall be staggered. If bond stones of stone are not available, pre cast PCC bond stone shall be provided.

**5.6.6** Sampling for carrying out the above tests, shall be done as per IS: 1121 Part I-1974 & IS: 1124-1974 at random according to the size of lot. The sample thus taken shall be stored in a dry place until tests are made.

**5.6.7** Samples shall be taken as per details given below:-  
Scale of sampling and criteria for physical characteristics shall be as per IS: 1121 Part I-1974 & IS: 1124-1974 The Lot, which has been found satisfactory in respect of visual and dimensional requirements, shall be next tested for physical characteristics like compressive strength, water absorption, and efflorescence.

**5.6.8** The physical requirements of the stones shall be tested as per per IS: 1121 Part I-1974 & IS: 1124-1974

**5.6.9** The general quality of stone shall be as per IS: 1121 Part I-1974.

**6. WOOD WORK (CARPENTER'S WORK)**

**6.1** The timber to be used in various situations (except flush shutters, veneered particle boards, block boards and timber for formwork) unless otherwise specified elsewhere in particular specifications shall be as under:

- |     |  |   |
|-----|--|---|
| (a) | Wooden frames/chowkhats (wherever shown on drawings) | : IInd class Hard wood<br>Hollock / Bonsum /Mirantee (BEN TEAK) |
| (b) | Cleats, chock stops, fillets, battens etc.           | : IInd class Hard wood<br>Hollock / Bonsum /Mirantee (BEN TEAK) |
| (c) | Edging Beading to particle board / block board etc.  | : 1 <sup>st</sup> class Hard wood Sheesham                      |

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

- 6.1.1 Maximum permissible moisture content in timber used for various purposes is 12%. The contractor shall get the timber (except that required for temporary use such as formwork etc.) kiln seasoned to ensure that permissible moisture content is not exceeded.
- 6.1.2 No price adjustment will be made to the unit rates quoted for the buildings in Schedule 'A' Section I while pricing any deviation on account of kiln seasoning as specified hereinbefore, as this element is deemed to be included in the rates.
- 6.2 **SURFACE FINISH**  
Exposed faces of carpenter's work shall be wrought except surfaces buried or in contact with concrete/brick work etc. which shall be left clean sawn.
- 6.3 **TOLERANCE**  
Tolerance upto ( $\pm$ ) 1.5mm for each wrought face for carpenter work shall be allowed except for fillets, beads and wooden shutters, which should be of specified thickness/size.
- 6.4 **PLY WOOD**  
Ply wood shall comply with IS-303 and shall be BWP superior grade and shall be as specified or shown on drawings. The bonding shall be done with phenol formaldehyde synthetic resin.
- 6.5 **VENEERED PARTICLE BOARD**  
Veneered particle board where shown on drawings shall be of exterior grade, solid core three layered flat pressed teak wood particle board with commercial or decorative veneer facing and bonded with BWP type phenol formaldehyde synthetic resin and shall conform to IS: 3097. Unless otherwise specified or shown on drawings, board shall be provided with decorative veneers on one face and commercial veneer on other face.  
  
Thickness of veneered particle board shall be 18 mm thickness unless otherwise shown on drawings. Edges of all boards shall be sealed with lapping / beading as directed by PM.
- 6.6 **PRE-LAMINATED PARTICLE BOARD**  
6.6.1 Pre-laminated particle board shall have one side decorative choice lamination and other side having balancing white lamination & these shall be three layered, exterior grade bonded with phenol formaldehyde synthetic resin and conforming to IS:12823 and shall be of approved make as approved by the PM. The pre-lamination shall be grade I type I conforming to IS:12823.
7. **JOINERY**
- 7.1 **TIMBER FOR JOINERY**
- 7.1.1 Wherever shown on drawings, flush shutters for wooden doors (except glazed/gauzed shutters) shall be provided. All shutters shall be factory made and shall be 35mm thick as specified here-in-after. All painting work including priming coat shall be applied after obtaining approval of unfinished shutter procured from factory and brought at site.
- 7.1.2 All other timber required for joiner's work not mentioned above or elsewhere in particular specifications shall be 1st Class Hard wood (Well seasoned Sheesham Wood).

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

- 8.7 **KNOBS:** Wherever knobs are specified or shown on drawings, the same shall be amended to read as 100 mm long powder coated aluminium handle.
- 8.8 **BLANK**
- 8.9 **DOOR STOPPER:** Irrespective of what is shown on drawings wooden door stopper of 1<sup>st</sup> class Hard Wood (Sheesham), of size as shown on drawing with and including one No. 50 mm long cold rolled mild steel butt hinge shall be provided to each door shutter.
- 8.10 **MAGNETIC CATCHER:** Magnetic catchers of suitable size shall be provided to each loft door and cabinets (including Kitchen Cabinets).
- 8.11 **HASP AND STAPLE:** Aluminium anodized hasp & staples safety type, 100 mm size, confirming to IS: 363-1993 in all Cupboards, kitchen cabinets and loft doors shall be provided in all type of dwelling units.
- 8.12 **BLANK**
- 8.13 **MAGIC EYE:** Irrespective of whether shown on drawings or not, magic eye shall be provided to each entrance door (one per DU) as directed by Project Manager and shall be as per sample approved by the PM. It shall be of brass body, with both sides lenses, and of approved make.
- 8.14 **PIANO HINGES:** Piano hinges shall be MS bright finish electro galvanized, 30 mm width of flaps (when opened) fixed to cupboard and kitchen cabinet. The continuous hinges shall be conforming to IS: 3818-1992. The hinge pin shall be of mild steel.
- 8.15 **HANDLES:** Extruded aluminum alloy handles, fabricated type anodized 150 mm size shall be provided in all type of dwelling units. Handle shall be ISI marked conforming to IS: 208-1996.
- 8.16 **PEG SETS:** Pegs wherever shown on drawings shall be of aluminium anodized, cast integral with base plate fixed on a wooden well finished plate.
- 8.17 **DRAPERY ROD:** Drapery Rod, wherever shown on drawings, shall be of high strength aluminium rod powder coated thickness 40-60 micron of outer dia 19/20 mm & inner dia 16 mm with plastic rings made of ABS plastics for JCO's & OR's DUs. For the officers/Major DUs the rod shall be of outer dia 28 mm & inner dia 24.5 mm. The brackets shall be of galvanized steel 1.6 mm thick. The drapery rod shall be of make MAC-Sleek Line type – I / Vista Levolor Soffio-I for JCO's / OR's DUs. For officers / Major DUs, the drapery rod shall be of make: MAC-Sleek Line type II / Vista Levolor Soffio-II.
- 8.18 **FLY PROOF WIRE MESH:** Wire mesh shall be of galvanized mild steel hot dipped wire having 0.63 mm nominal diameter of wire and 1.4mm average width of aperture irrespective of what is shown on drawings. The edges of wire gauge (in the case of wooden shutters) shall be bent over wooden beads and the beads pressed well into the angle of the rebate to hold the gauge on two faces. The wooden beads shall be fixed to the wooden members of the shutters with steel panel pins. In case of aluminium windows/ CSWs, the edges of wire gauge shall be bent over aluminium beads and beads pressed well into the angle of aluminium sections to hold the gauge on faces as shown on drawings.

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

**9.0 STEEL, IRON AND ALUMINIUM WORK.**

9.1 Following types of steel shall be used in all works: -

- (a) **Reinforcement steel.** High strength deformed steel bars produced by Thermo Mechanical Treatment Process (TMT) Steel bars of grade Fe 500 meeting all other requirements of IS: 1786-1985.
- (b) **Structural Steel.**
  - (i) Standard Quality – Conforming to IS: 2062.
  - (ii) Ordinary Quality – Conforming to IS: 1977.
- (c) **Galvanized Steel Sheets.** (Plain & Corrugated) confirming to IS: 277.
- (d) **Fabric Reinforcement for Concrete.** Conforming to IS: 1566.

9.2 **Procurement.** Entire steel required for use in the work shall be arranged by the contractor and shall comply with the above mentioned requirement. Following checks shall be carried out by PM before the steel supplied by the contractor is accepted and approved for incorporation in the works:-

- (a) The structural steel supplied by the contractor shall be procured from the producers namely SAIL, Rashtriya Ispat Nigam Ltd., TISCO or secondary producers who manufacture structural steel out of ISI marked billets and are having BIS certification of ISI marking on their products and approved by DG MAP.
- (b) The steel sections for railing, gates, fencing, guard bars, grills, steel chowkhat, hold fasts etc, which do not constitute structural members, can be procured from producers namely SAIL, Rashtriya Ispat Nigam Ltd. or TISCO / secondary producers / BIS marked manufacturers or their authorized dealers without any price adjustment.
- (c) The Galvanized Steel Sheets and fabric reinforcement for concrete to be supplied by the contractors shall be ISI marked and shall be procured from the producers namely SAIL, Rashtriya Ispat Nigam Ltd. or TISCO.
- (d) **TMT Steel.**
  - (i) TMT steel used in the work by the contractor shall be procured only from the producers / manufacturers namely **SAIL, Rashtriya Ispat Nigam Ltd. or TISCO.**
  - (ii) In case of non-availability of TMT reinforcement steel bars with the above mentioned producers / manufacturers, non-availability certificates shall be obtained and after approval of Accepting Officer, TMT steel for reinforcement may be procured from the secondary producers who manufacture TMT steel out of ISI marked billets and having Thermax,

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

**9.2 (CONTD...../-)**

Tempcore or Evcon Turbo Process subject to minus price adjustment on the basis of percentage price difference between above mentioned manufacturers and secondary producer. It shall be ensured that while submitting case for approval of Accepting Officer, the documents such as non-availability certificates from all the above mentioned producers / manufacturers with their rate lists and the rate lists of secondary producers shall be enclosed.

- (iii) The documents in support of the purchase of steel shall be verified by the Project Manager. The particulars of the producer / manufacturer of steel shall be obtained from the contractor for every lot of steel separately. The form given at Appendix 'D' will be used for this purpose.
- (iv) The contractor shall place their demand /requisition of TMT steel with adequate lead time. The demand shall be placed to the above mentioned producers / manufacturers of steel i.e. SAIL, Rashtriya Ispat Nigam Ltd and TISCO by 20<sup>th</sup> of preceding month. In case the supply of steel is not received by 30<sup>th</sup> of the next month, the same shall be considered as non-availability certificates from their end while approving procurement of TMT steel from secondary producer by the Accepting Officer.
- (v) The steel shall be procured from the depots of the above mentioned producers / manufacturers and not from their authorized agents / dealers.”

**9.3 TESTING OF STEEL**

The manufacturer is to carry out inspection and testing of steel in accordance with the relevant BIS provisions. The contractor shall submit the manufacturer's test Certificate in original or authenticated copy thereof alongwith the Test sheet giving the results of each mechanical test as applicable and the chemical composition of the steel, duly signed by the manufacturer with each consignment. The Project Manager shall record these details in Steel Acceptance Register, as given at Appendix 'D' after due verification. The PM shall also organize independent testing of random samples of steel drawn from various lots from a National Test House, SEMT CME, Regional Research Labs, Government approved Labs, Zonal Labs etc as per the recommended minimum frequency shown in Table at Appendix D1. Independent testing of steel by Project Managers shall be mandatory as covered under Note 2 of Appendix D1. Samples from each lot should be tested for quality and elongation. The elongation shall not be less than 18%. In order to undertake Departmental testing, requisite facilities shall be organized by the contractor. Cost of samples, transportation and cost of testing shall be borne by the contractor.

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

11.1.15 Size of various type of stone slabs have been specified in the clauses here-in-after. However, smaller size pieces may be provided to accommodate within the floor dimensions keeping as near as possible.

11.1.16 Where pattern of flooring is indicated on the drawings, the same shall be provided as per pattern indicated.

**11.2 MATERIALS**

11.2 **CEMENT:** cement shall be as specified in clause 4 here in before.

**11.2.2 AGGREGATES**

11.2.2.1 **BRICK AGGREGATE:** Refer clause 13.6 & 13.7 of MES schedule Part-I.

**11.2.2.2 STONE AGGREGATES AND SAND**

Stone aggregates & sand for flooring shall be as specified for concrete work here-in-before.

**11.2.3 MATT GLAZED AND POLISHED/ SATIN MATT FINISHED CERAMIC FLOOR TILES**

Matt glazed and Polished /Satin Matt finished coloured ceramic tiles (Rectified and Non – skid) for floors & skirting shall conform to IS - 15622 of 2006 / ISO: 13006. The shade and design shall be as shown on drawings and approved by Project Manager from makes as mentioned in Appendix 'E'. Irrespective of whatever is specified elsewhere or shown on drawings / schedule of finishes, the type and size of floor tiles for various rooms / locations shall be as under:-

- i) For floors of bed rooms, dress, lobbies, platforms, entrance verandah and dry out verandah of Major / Officers DUs, the tiles shall be Polished/Satin Matt finished coloured ceramic tiles of size 595 x 595 mm and 9 mm thick confirming to ISO – 13006 / EN 176(Gr B1a).
- ii) For floor of rooms, lobby, entrance lobby, verandah, platform and balcony of JCOs / OR DUs, the tiles shall be Matt glazed coloured ceramic tiles (Rectified) of size 400 x 400 mm and 8 mm thick confirming to ISO – 13006 (Gr-III).
- iii) For floor of toilet Nos.1 & 2, kitchen, balconies and dry out balconies of Major / Officers DUs and kitchen & toilet No.1 of JCOs / OR DUs and wash & WC of servant quarter, the tiles shall be matt glazed coloured ceramic tiles (Non-skid) of size 300 x 300 mm and 7 mm thick confirming to ISO – 13006 (Gr-III).
- iv) Matt finish floor tiles shall be provided in other rooms / locations also as shown in schedule of finishes, if the floor finish for any particular room / location has not been specifically specified in these particular specifications.
- v) The properties of tile shall be as under:-

No	Property	International Std. ISO 13006 / EN176 Group B1a	Method of Testing
1.	Deviation in length	+/- 0.6%	EN 98
2.	Deviation in thickness	+/- 5%	EN 98
3.	Mohs hardness	>6	EN101
4.	Water absorption	<0.50%	EN 99
5.	Flexural Strength	> 27 N / mm <sup>2</sup>	EN 100
6.	Abrasion resistance	<204 mm <sup>3</sup>	EN 102
7.	Stain resistance	Resistant	ISO 10545-14
8.	Chemical resistance	No damage	EN 106
9.	Breaking strength	1113N	ASTMC-648
10	Glossiness	Min 80% reflection	Gloss meter

**PARTICULAR SPECIFICATIONS (CONTD...../-)****11.2.4 ROUGH FINISH (SAND PAPER FINISH) CERAMIC TILES**

- (i) Irrespective of whatever is specified elsewhere or shown on drawings / schedule of finishes, rough finish (sand paper finish) ceramic coloured tiles of size 300 x 300 mm and 7 mm thick, confirming to IS – 15622:2006 / ISO – 13006 / EN 177 (Group B II a) shall be provided in toilet No.3 of Major / Officers DUs and toilet No.2, dry out verandah and dry out balcony of JCOs / OR DUs. The shade and design of tiles shall be as approved by PM.
- (ii) Rough finish (sand paper finish) ceramic coloured tiles shall be provided in other rooms / locations also as shown in schedule of finishes, if the floor finish for any particular room / location has not been specifically specified in these particular specifications.
- (iii) The properties of tiles shall be as under:-

No.	Property	European std EN-177 BIIa / ISO 13006 and IS: 15622:2006	Method of Testing
1.	Deviation in length	+/- 0.5%	EN 98 / IS: 13630 (Part-I)
2.	Deviation in thickness	+/- 5%	- do -
3.	Wedging warpage	+/- 0.5%	- do -
4.	Squareness	+/- 0.6%	- do -
5.	Water absorption	3 – 6 %	EN-99 / IS: 13630 (Part-II)
6.	Scratch Resistance (Moh's scale)	Min 5	EN-101 / IS: 13630 (Par-13)
7.	Abrasion resistance	As per the Abrasion class indicated by the manufacturer	EN-154/IS: 13630 (Part-11)
8.	Crazing Resistance	In conformity with the norms	EN-105 / IS: 13630 (Part-9)
9.	Chemical resistance	Resistant to all acids and alkalies (except hydraulic acid and its compounds).	EN-1221 / IS: 13630 (Part-8)
10.	Bending Strength	≥ 220 kgs / cm <sup>2</sup>	EN-100 / IS: 13630 (Part-6)
11.	Thermal shock	Resistant to 10 cycles	EN-104 / IS: 13630 (Part-5)

**11.2.5 GLAZED CERAMIC WALL TILES**

- 11.2.5.1 Glazed coloured ceramic tiles for dado shall conform to IS 15622 & 6 to 7 mm thick. Unless otherwise mentioned in drawings, the size of tiles shall be 300 x 200 mm. The shade & design for tiles shall be as shown on drawings and approved by Project Manager of make as mentioned in Appendix 'E'.

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

- 11.2.5.2 It shall be ensured that all types of tiles used in the work shall be not manufactured from outsourcing by the manufacturer. Tiles manufactured at company's own plant shall be procured and incorporated in the work.
- 11.2.6 **KOTA STONE:** Refer clause 13.47.1 & 13.47.2 of MES Schedule Part-I. Kota stone flooring shall be provided in Guard Room and also in Entrance, Servant Room, Covered passages and/or any other location as shown in Schedule of finishes of Major/Officers DUs. Although terrazzo tiles have been shown in Schedule of finishes for floor of servant room, the same shall be amended to read as Kota Stone. Kota stone for flooring shall be of size 55 x 55 cm with tolerance of  $\pm 5\%$  and 20 mm to 25 mm thick. The smaller sizes may be adopted to accommodate within the floor dimension keeping as near as possible. Kota stone shall be laid in straight pattern alongwith the length.
- In skirting, landings, treads & risers of main staircase and fire escape staircase and servant staircase in all the blocks, the thickness of kota stone shall be 18 mm to 22 mm irrespective of whatever is specified elsewhere or shown on drawings / schedule of finishes. In case of steps (risers & treads), kota stone shall be in a single piece to full length & width.
- 11.2.7 **MARBLE STONE:** Refer clause 6.2.3 & 6.20.3 of MES Schedule Part-I. Marble stone shall be Abu white "Makrana" 18 to 20 mm thick as specified, machine cut & polished.
- 11.2.8 **BARODA GREEN STONE:** Refer clause 6.2.3 of MES Schedule Part-I. Baroda green marble stone shall be dark green and 18 to 20 mm thick as specified, machine cut of size not less than 600 x 600 mm & polished.
- 11.2.9 **GRANITE STONE:** Refer clause 6.2.3 of MES schedule Part-I. Granite stone shall be black if not indicated otherwise on drawings, machine cut, polished. Unless otherwise mentioned on drawings the thickness of granite on any location shall be 18-20 mm.
- 11.2.10 **INTERLOCKING PRE-CAST TILES:** Wherever interlocking tiles have been shown in drawings / schedule of finishes precast PCC interlocking tiles / paving blocks type A-I (M-35 design mix) confirming to IS-15658 shall be provided. The thickness of interlocking tiles /blocks shall be 75 mm. The compressive strength shall not be less than 30 N/ Sq mm and same shall be checked from reputed laboratory from each lot and shall be kept on record.
- 11.2.11 **VITRIFIED TILES:**
- Irrespective of whatever is specified elsewhere or shown on drawings / schedule of finishes floor tiles for drawing and dining rooms/dining lounges of Major/officer's DUs shall be vitrified coloured tiles of size 595 x 595 mm and 9 mm thick confirming to IS – 13006 / EN – 176 Group B 1a. The shade and design of vitrified tiles shall as shown on drawings and approved by PM from makes given in Appendix 'E'.
- 11.3 **WORKMANSHIP**
- 11.3.1 **SUB BASE IN GROUND FLOORS:** Unless otherwise specified here in after, 75 mm thick PCC (1:4:8) type D2 sub base shall be provided over well rammed earth in all types of floors in ground floors except scooter garages and ramps etc where it shall be 100 mm thick PCC (1:4:8) type D2 over well rammed earth.
- 11.3.2 **PCC FLOORS**
- 11.3.2.1 Refer clauses 13.25 & 13.32 of MES schedule Part I. Topping / finishing layer of PCC flooring where indicated in schedule of finishes shall consist of 40 mm thick PCC (1:2:4) type B1 over sub base as specified. In case of garage floor & ramp, topping layer shall be of 75 mm thick PCC 1:2:4 type B-1.

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

**15.2 MATERIALS**

15.2.1 All synthetic enamel paint and primer shall be of first quality manufactured by the standard firms of make as per Appendix 'E'.

15.2.2 **ALUMINIUM PAINT:** Aluminium paint shall conform to IS: 2339.

**15.3 WORKMANSHIP**

15.3.1 **PAINTING-WOODWORK:** Refer clause 17.6 of MES Schedule, Part-I. Where painting with synthetic enamel paint is indicated on drawings it shall be given two coats of synthetic enamel paint over a coat of pink primer after preparation of surfaces.

15.3.2 **PAINTING-STEEL & IRON WORK:** Refer clause 17.8 of MES Schedule, Part-I. Where painting with synthetic enamel paint is indicated on drawings it shall be given two coats of synthetic enamel paint over a coat of red oxide primer after preparation of surfaces.

15.3.3 **ALUMINIUM PAINT:** Where aluminium paint is indicated on drawings it shall be done in two coats over a coat of red oxide primer after preparation of surfaces.

15.3.4 **FRENCH POLISH:** The wood work in railing and built in furniture if any where indicated to be polished shall be polished with French polish all as specified in clause 17.7.4 of MES Schedule, Part-I. All the French polished surfaces shall be treated with PU finish. French polish shall be ready made of make mentioned in Appendix 'E'.

15.3.5 **TARRING:** Refer clause 17.12 of MES Schedule, Part-I. The back of chowkats in contact with brick work/plaster etc. and also wooden/steel surfaces embedded in walls shall be given two coats of tar. Hold fast shall be given two coats of tar and sanded.

15.3.6 **CEMENT SLURRY:** Portions of MS bolts, lugs, anchor bolts and anchoring other than anchor bolts etc. embedded in concrete shall be treated with neat cement slurry.

**16. MISCELLANEOUS ITEMS**

16.1 **GENERAL:** Specifications for miscellaneous items are for guidance only. Drawings of respective items must be studied to avoid any ambiguity. All fittings and fixtures shown on drawings unless omitted specifically shall be provided as per details given in the drawings and their cost is deemed to be included in the lump sum cost of buildings in Schedule 'A' Section-I.

16.2 **STAINLESS STEEL SINK AND DRAINAGE BOARD:** Stainless steel sink with drainage board at situation where shown on drawings shall be provided. Stainless steel sink with drainage board shall be of glossy finish, ISI marked, of make as specified in Appendix 'E'. The sink with drainage board shall have over all size shall be 41" x 20" and bowl size 20" x 16" with 8" depth for Major/officer's DUs. For JCOs / OR DUs, the overall size shall be 37" x 18" and bowl size 16" x 14" with 8" depth. The grade of stainless steel shall be 304 AISI and thickness of steel sheet shall be 1 mm. Each sink shall be provided with a pair of suitable size brackets and 32 mm bore GI pipe medium grade waste pipe with coupling and one No. central hole CP brass sink mixer of 15 mm bore of cast copper alloy chromium plated complete all as specified here-in-before and the cost of the same shall also be deemed to be included in the unit rate / lump sum quoted for respective building.

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

- 16.10 **PVC SHEET IN SHAFT COVER:** 1.5 mm thick PVC sheet as approved by the PM to cover shaft as shown on drawings shall be fixed to walls with chromium plated screws and PVC rawl plugs.
- 16.11 **LETTER BOX:** Factory made letter box of mild steel of size as per details & on location as shown on drawings shall be provided in each block. Each letter box shall be provided with suitable locking arrangement. All steel surfaces shall be painted with 2-coats of synthetic enamel paint over a coat of red oxide primer all as specified. The quarter No. shall be painted on the front side of letter box and the cost of the same shall be deemed to be included in quoted lump sum.
- 16.12 **LOFT DOORS:** Door for each entry to loft shall be provided irrespective of whether shown in drawings or not. The shutters and frame of door shall be same as specified for cupboard herein after with piano hinges. Hasp & staple, magnetic catcher and 100 mm long powder coated aluminium handle shall be provided to each loft door irrespective of whatever is shown on drawings. However knobs shall not be provided even if shown on drawings.
- 16.13 **CUPBOARDS:** Cupboard shall be provided where shown on drawings and as per details therein. Cupboard shutters shall be of 18 mm thick pre-laminated particle board one side decorative choice lamination and other side having balancing white lamination & these shall be three layered, exterior grade bonded with phenol formaldehyde synthetic resin and conforming to IS:12823 and shall be of approved make as approved by the PM. The pre-lamination shall be grade I type I conforming to IS: 12823. The internal shelves and partitions shall be of 18mm thick block board exterior grade, commercial type. All edges shall be properly sealed with 6 mm thick teak wood edging with width equal to the thickness of board fixed with water resistant adhesive. GI medium grade hanging rod of 19 mm dia with bracket, 10 mm dia tie hanger, One barrel Bolt, two Nos. 100 mm long powder coated aluminium handles, hasp & staple and cup-board lock shall be provided irrespective of whatever is shown on drawings. However knobs shall not be provided even if shown on drawings. GI continuous piano hinges shall be provided with chromium plated screws. All wood and wood based surfaces except pre-laminated surfaces shall be painted with two coats of synthetic enamel paint over a coat of primer after preparation of surfaces.
- 16.14 **KITCHEN CABINETS:** Various type of kitchen cabinets where shown on drawings shall be provided as per details given therein. Cabinet shutters shall be of 18 mm thick pre-laminated particle board exterior grade bonded with phenol formaldehyde synthetic resin conforming to IS-12823, having one side decorative choice lamination and other side having balancing white lamination. The make of particle board shall be as per list given in Appendix 'E'. All shelves and partitions of cabinets shall be of 18 mm block board exterior grade, commercial type. All edges of particle boards shall be provided with 6 mm thick teak wood edging with width equal to the thickness of board fixed with water resistant adhesive. Shutters shall be fixed with GI continuous piano hinges with chromium plated screws. 100 mm long powder coated aluminium handles shall be provided irrespective of whatever is shown on drawings. However knobs shall not be provided even if shown on drawings. All other fittings and fixtures shall be provided all as shown on drawings. All wooden surfaces except pre-laminated surfaces shall be painted with two coats of synthetic paint over a coat of primer after preparation of surfaces.

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

- 16.15 **STUDY ALCOVE** : Study Alcove shall be provided where shown on drawings and as per details shown there in. Particle board for various members i.e. table top, shelves, drawer, partitions etc. shall be 18 mm thick pre-laminated particle board, one side decorative choice lamination and other side balancing white lamination of exterior grade bonded with phenol formaldehyde synthetic enamel resin and confirming to IS-12823. 100 mm long powder coated aluminium handles shall be provided irrespective of whatever is shown on drawings. However knobs shall not be provided even if shown on drawings. All steel work and other fittings (except as clarified here-in-before) shall be as shown on drawings. All edges of particle board shall be provided with 6 mm thick teak wood edging with width equal to thickness of board fixed with water resistant adhesive. All wooden surfaces except pre-laminated surfaces shall be painted with two coats of synthetic paint over a coat of primer after preparation of surfaces.
- 16.16 **LOCKER** : Locker shall be provided in Master Bed Room of Major/Officers DUs and Bed Room No. 1 of JCOs/OR DUs cup-board with locking arrangement complete all as per details shown on drawings. All exposed surfaces shall be painted with two coats of synthetic enamel paint over a coat of primer after preparation of surfaces.
- 17 **SANITARY AND TOILET FITTINGS**
- 17.1 **GENERAL**
- 17.1.1 All sanitary fittings / appliances shall be of vitreous china (in superior white colour) of makes / manufactures as given in Appendix 'E', first quality and shall confirm to IS-2556 and the specific requirement as mentioned in relevant clause of MES schedule. However flushing cisterns for water closets shall be of PVC as specified.
- 17.1.2 Flush pipe and socket of flushing rim of WC shall be jointed with white and red lead cement (white & red lead in equal portion by weight) and linseed oil added to form paste.
- 17.1.3 'P' & 'S' traps shall be of UPVC and shall be jointed as specified in MES Schedule.
- 17.1.4 The sizes given here-in-after are approximate sizes. The size of sanitary fittings to be provided shall be the nearest size as per manufacturer's catalogue as approved by PM.
- 17.2 **WATER CLOSETS**
- 17.2.1 **WATER CLOSET PEDESTAL PATTERN (EWC)**: Pedestal pattern water closet (EWC) shall be provided where shown on drawings. Long arm trap should be provided to avoid joints inside floor or wall. The closet shall be fixed in position with brass screws of suitable size. It shall consist of the following and the cost of the same shall be deemed to be included in the lump sum amount / unit rate quoted by the contractor for the respective buildings and nothing extra shall be admissible on this account: -
- (a) Water closet wash down pattern 1st quality, white colour of height 40 cm vitreous china with concealed 'P' or 'S' trap.
  - (b) Plastic seat and cover with flat underside solid moulding closed from pattern shall be as per IS-2548 (Pt-I) and shall be of shade as approved by PM, fixed with chromium plated brass hinging device.

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

**17.2.1 (CONTD...../-)**

- (c) Low level PVC flushing cistern of 3/6 litres dual capacity 'ISI' marked with IS-7231 including 32 mm bore PVC flush pipe of sufficient length, internal fittings (Valveless syphonic), brass handle etc.
- (d) A pair of cast iron brackets with painting as specified.
- (e) The WC in Major / Officers DUs, shall be fitted with health faucet chromium plated brass rising spray with wall bracket with 1.5 mtr long flexible metallic tube, of make GEM Cat No 350083 or approved equivalent complete with C.P. angle valve. The WC in JCOs / OR DUs, shall be fitted with chromium plated brass jet spray with PVC pipe with adopter, complete with C.P. brass angle valve 15 mm bore.

**17.2.2**

**WATER CLOSET ANGLO INDIAN TYPE:** Water closet Anglo Indian Type shall be provided where shown on drawings. Water closet (Anglo Indian type) shall be vitreous china First quality, UNIVERSAL with 'P' trap catalogue No. 2061 white or catalogue No. 200120 of Hindware make or equivalent from the make given in Appendix 'E' and as approved by the PM. WC with 'P' trap shall be screwed to hard wood plug embedded/fixed to floor. Low level flushing cistern PVC 3/6 litre dual flush, feather touch operated bearing IS-7231 with plastic seat cover bearing number IS-2548 (Part I) 1996. Seat shall be screwed to WC and shall be of solid PVC/ fibre. Low level flushing cistern shall be of make as per the list of approved list of makes/agencies and as approved by the PM. Cisterns shall be fixed to walls by means of suitable size screws and wooden plugs. The WC shall be fitted with chromium plated brass jet spray with PVC pipe with adopter complete with C P brass angle valve 15 mm bore. Cost of providing all the items mentioned in this clause, shall be deemed to be included in the lump sum amount / unit rate quoted by the contractor for the respective buildings and nothing extra shall be admissible on this account.

**17.3**

**WASH HAND BASIN:**

- (a) All rectangular wash hand basins shall be flat back of size 550 x 400 mm wall mounting type of shape as per Hindware Cat No. 10001 or equivalent of other makes as specified in Appendix 'E'. All oval wash basins shall be as per Hindware Cat No. 10016 of size 560 x 410 or equivalent of other makes as specified in Appendix 'E' including all necessary arrangements. Each Wash Hand Basin shall consist of following and the cost of the same shall be deemed to be included in the lump sum amount / unit rate quoted by the contractor for the respective buildings and nothing extra shall be admissible on this account: -
  - (i) CP brass waste fitting 32 mm dia with over flow.
  - (ii) CP brass bottle trap 32 mm with CP brass pipe to wall with CP brass cast wall flange.
  - (iii) GI Waste pipe 32 mm dia (medium grade).
  - (iv) A pair of CI bracket duly painted. The brackets shall be embedded in walls in cement concrete (1:2:4) type B1 block of size 10 cm x 10 cm x 23 cm. Necessary counter shall be provided where shown on drawing.
  - (v) Mirror of size 600 mm x 600 mm for JCOs & OR DUs & mirror of size 900 mm x 600 mm for Major / Officers DUs.
  - (vi) One No. CP brass Central hole basin mixer, 15 mm dia cast copper alloy chromium plated all as specified here-in-after.
- (b) In Major / Officers DUs, the wash hand basin shall be mounted on 18 mm thick granite topping stone of ruby red colour.

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

- 17.4 **SOAP DISH:** Irrespective of what is shown on drawings, soap dish one number shall be provided in each toilet. Soap dish shall be of stainless steel and of size & make as approved by PM. It shall be fixed with chromium plated brass screws & PVC rawl plugs.
- 17.5 **LOOKING MIRROR:** Irrespective of whatever is specified elsewhere or shown on drawings, the mirror shall be of polished float glass of size 900 mm x 600 mm x 6 mm thick for Major / Officers DUs and of size 600 mm x 600 mm x 6 mm thick for JCOs and ORs DUs. Mirror shall be beveled edged, mounted on 2 mm thick HIPS (an engineering thermo plastic) sheet pasted with vaccum pressure technique and beveled edges shall be covered with silicon coating. It shall be fixed with 4 Nos round steel studs of 7 mm thick in 19 mm dia on front side to support 2 Nos steel wall hanging hooks with plastic washers on the back side. The make of mirror shall be Modigaurd / Swastic / Atul.
- 17.6 **TOWEL RING**  
One number towel ring with bracket of brass chromium plated shall be provided near each wash hand basin in all the DUs. The outer diameter of brass pipe for towel ring shall be 12 mm and having wall thickness 25 gauge. The minimum weight of the towel ring shall not be less than 250 gms. The towel ring shall be open at one side.
- 17.7 **TOWEL RAIL / RACK**  
**FOR OR / JCOs DUs:** Brass chromium plated 20 mm dia tubular towel rail 60 cm long including its bracket shall be provided in each toilet. Wall thickness of towel rail shall be 1.6 mm.  
**FOR MAJOR / OFFICERs DUs:** Brass chromium plated 20 mm dia tubular towel rack 60 cm long including its bracket shall be provided in each toilet. Wall thickness of towel rail shall be 1.6 mm.
- 17.8 **FLUSHING CISTERN:** Flushing cistern 3 / 6 Ltr dual capacity ISI marked, white, feather touch PVC low level of make as listed in Appendix 'E' and as approved by PM with 32 mm bore polythene flush pipe of sufficient length, including internal fitting (valveless syphonic) ,brass handle, ISI marked (IS: 7231).
- 17.9 **TOILET PAPER HOLDER:** Refer clause 18.39 & 18.92 of MES Schedule Part-I (2009). Toilet paper holder shall be of stainless steel. It shall be fixed with chromium plated brass screws & PVC rawl plugs.
- 17.10 **GLASS SHELVES:** Two corner shelves with 8 mm thick float glass shall be provided in one corner of each toilet in each DU as directed by PM. The radius of each shelf shall be 300 mm.
- 17.10A **SHOWER CURTAIN RODS:** Irrespective of whether shown on drawings or not, Shower Curtain Rod alongwith rings shall be provided in Toilet No. 1 & Toilet No. 2 of Major / Officers DUs. Shower Curtain Rods shall be of 20 mm dia G I pipe light grade. Five Nos. plastic curtain rings shall be provided with each curtain rod.
- 17.11 **GLASS TRAY:** Glass tray shall consist of an assembly of glass shelf placed on anodized aluminium angle frame fixed with chromium plated brass screws to plugs in the wall. The size of glass shelf shall be 60 x 12 cm unless otherwise specified elsewhere or shown on drawings. The shelf shall be of 5.5 mm thick sheet glass, ordinary quality with edges rounded off.
18. **PLUMBING**
- 18.1 **GENERAL:** The contractor shall employ qualified and licensed plumber for supervision of installation and testing of the sanitary fitting and plumbing. The connection shall be provided as indicated in drawings. The layout of soil, waste, vent and anti syphonage pipes shall be marked on the walls in coloured chalk and approved by the PM before execution of work. The unit rates of buildings given in Sch 'A' Sec-I also include inter-alia the provision of the following: -

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

18.2.8 Irrespective of what is shown on drawings, sizes of pipes shall be as follows: -

- |     |                                   |   |          |
|-----|-----------------------------------|---|----------|
| (a) | Soil pipes                        | - | 110mm OD |
| (b) | Waste pipes                       | - | 110mm OD |
| (c) | Anti syphonage pipes & vent pipes | - | 110mm OD |

**18.3 FLOOR TRAP**

18.3.1 Floor traps shall be of UPVC conforming to relevant IS with stainless steel grating. The outlet of floor trap shall be 110 mm diameter. The outlet of floor trap shall be with long arm and shall be jointed to connecting pipes/ branch pieces.

18.3.2 **COCKROACH TRAP:** In kitchen, stainless steel cockroach trap shall be provided. The material of trap should be of good quality so that it does not get rusted.

18.3.3 **GULLY TRAP:** Gully trap shall be salt glazed stone ware with rebated top and 100mm dia (bore) outlet and cast iron or mild steel grating of size 15 cm x 15 cm. It shall be set in cement concrete (1:3:6) Type C-1 foundation of size 53 cm x 53 cm with overall depth equal to depth of gully trap and (10 cm below gully trap) and kerb of P.C.C. (1:2:4) Type B-1 on top of PCC foundation block around CI or MS grating of size 32.5 cm x 32.5 cm. Gully trap shall be provided in the situations where shown on the drawings.

18.4 **TRENCHES FOR PIPE LINES UPTO FIRST MANHOLES:** The excavation in trenches in soil (mentioned in Particular Specifications clause 3 here in before) shall be done as per the width given in MES SSR Part-I and depth as required at site. The trenches shall be back filled after testing of pipes with excavated earth in layers not exceeding 250 mm and surplus spoil disposed to a distance not exceeding 500 metre.

18.5 **GLAZED STONWARE PIPES AND FITTINGS :** Glazed stone ware pipes and fittings shall be ISI marked IS-651, and shall be laid and jointed as specified. These pipes shall be laid on PCC beds laid to falls including packing under, haunching against the sides of the pipes after they are laid and tested. Thickness and width of PCC beds, packing, haunching etc shall be all as mentioned in MES Schedule Part II. Also refer clause 18.28, 18.68 to 18.70.1 of MES Schedule Part-I.

**18.6 MANHOLES**

First manhole shall be provided as shown on drawings with following specifications: -

- |    |                         |   |  |
|----|-------------------------|---|--|
| a) | Excavation & earth work | - | Soft / loose soil  |
| b) | Foundation Concrete     | - | PCC 1:4:8 type D2 using 40 mm graded aggregate.  |
| c) | Masonry work/Brick work | - | Precast solid building blocks 10 cm thick in CM 1:4  |
| d) | Plastering              | - | 15 mm thick in CM (1:4) with wpc. External surfaces embedded in earth shall be flush pointed as the work proceeds. |

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

**18.6 (CONTD...../-)**

- e) Manhole slab shall be in RCC 1:2:4 type B1 as shown on drawings.
- f) Manhole covers & frames shall be as specified here-in-after
- g) Floor of manhole shall be finished with PCC 1:2:4 type B1 as shown as drawings using extra cement

**18.7 WORKMANSHIP**

18.7.1 **GENERAL REQUIREMENTS:** Refer clause 18.40 of MES Schedule Pt-I.

18.7.2 **JOINTING & FIXING OF UPVC PIPES:** Refer clause 18.52 & 18.67.7A of MES Schedule Part-I.

18.7.3 **TESTING:** All soil, waste & Vent pipes and all fittings shall be tested as specified in clause 18.67.7 of MES Schedule. Record of Testing shall be maintained separately for each building.

18.8 **MANHOLE COVER:** Refer clause 18.30 of MES Schedule Part-I. Manhole cover and frames shall be of Precast SFRC (Steel fibre reinforced concrete) Grade designation MD-10 Medium duty, ISI marked with IS : 12592-2002. The size of manhole cover & frame shall be all as shown on drawings.

18.9 **WASTE FITTINGS:** Refer clause 18.20 of MES Schedule Part-I. Waste fittings shall be of brass chromium plated and shall confirm to IS-2963. Waste fitting shall be of nominal size 32 mm for wash hand basin & 40 mm for sinks.

18.10 **WASTE PLUG:** Refer Clause 18.21 of MES Schedule Part-I. Waste plugs and its accessories shall confirm to IS-3311 and shall be of rubber of hard and durable quality. Waste plug shall have a loose hackle for anchoring chain plug.

18.11 **BOTTLE TRAP:** Refer clause 18.22.1 of MES Schedule Part-I. The traps shall be chromium plated. The minimum depth of seal shall be 35mm.

18.12 **FLUSH PIPE:** Refer clause 18.35 of MES Schedule Part-I. Flush pipe shall be of PVC 32mm dia for low level cistern all as specified and shown on drawings.

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

- 18.13 **JET SPRAY:** Refer Clause 18.107 of MES Schedule Part-I.
- 18.14 **TESTING**
- 18.14.1 All plumbing work and sewage disposal works shall be tested as per IS provisions in the presence of Project Manager and DEPMC. The test result shall be recorded and signed by the Contractor, the Project Manager and DEPMC. The cost of all the tests shall be borne by the contractor. Any items failing during the tests shall be replaced by the contractor at his own cost.
19. **INTERNAL WATER SUPPLY**
- 19.1 **MATERIALS**
- 19.1.1 **GENERAL:** Materials for water supply works shall be of make mentioned in Appendix 'E'.
- 19.2 **MILD STEEL GALVANISED TUBE (PIPES) & FITTINGS):** Refer Para 18.4 of MES Schedule Part-I. Pipes and fittings shall be ISI marked.
- 19.3 **POLYETHYLENE PIPE CONNECTIONS:** Refer Para 18.5 of MES Schedule Part-I.
- 19.3.1 Weight of chromium-plated adopter for connection of polyethylene pipe/GI pipe shall be not less than 40 Gram each.
- 19.4 **BIB TAPS, PILLAR TAPS, STOP VALVES, ANGLE VALVES, BASIN MIXER, SINK MIXER & WALL MIXER:** All bib taps, pillar taps, stop valves, angle valve, basin mixer, sink mixer, wall mixer shall be of cast copper chromium plated conforming to IS:8931-1993 with following technical specifications: -
- (a) The minimum wall thickness of the casted body shall not be less than 2.0 mm at any section and minimum 0.6 mm for tube wherever used.

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

**20.5.8.8.2 RESISTANCE**

The electrical resistance of metallic enclosures for cables and conductors measured between earth connection at the main switch board and any other point on the completed installation shall be low enough to permit the passage of current necessary to operate fuse, circuit breaker or the earth leakage release of the circuit breaker protecting the circuit and shall not exceed 1 ohm.

**20.5.8.9 EARTHING CONDUCTOR**

Every earthing conductor shall be either stranded, flat strips or circular or rectangular bar. Protection against mechanical injury shall be provided where necessary. The earth conductor may be of high conductivity copper or aluminium or galvanised solid iron.

**20.5.8.10 INSTALLATION OF EARTHING CONDUCTOR**

- a) Position, fixing and protection of earth conductors : Earthing conductors shall be so placed and connected that it shall not be accidentally damaged or cut. It shall be fixed over its entire length by clamps, clips, saddles, staples, clouts etc. which in no way will damage the conductor. Aerial earthing conductor shall be supported on suitable insulators and shall be clearly identified.
- b) Buried earthing conductor – It shall be protected against mechanical damage.
- c) Earth connections – Any connection between an earthing conductor and electrode or the metallic sheathing of under ground supply cables shall be accessible, shall in no case be in a damp situation and shall be suitably protected where likely to be exposed to mechanical damage.
- d) Joints – Joints in main earthing conductors shall be made by soldering, brazing or welding for conductors of size up to 7/1.70mm; for larger main earthing conductors, mechanical clamping may be used. Joints in either earthing conductors shall be made by soldering or by mechanical clamping.

**20.5.8.11 EARTH CLIPS**

Paint, enamel compound, corrosion and other non-conducting material shall be removed from the surface of the metal section to which earth clip is attached.

**20.5.8.12 EARTH ELECTRODES**

- a) Type:

Earth plate electrodes shall be provided and they shall not be less than 60cm x 60cm x 6.3mm in case of galvanised plate or 60cm x 60cm x 12mm in case of galvanised cast iron or 60cm x 60cm x 3.15mm in case of copper as per clause 9.2 of IS 3043, unless otherwise indicated in Schedule 'A'.

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

12.1.5 Contractor's attention is invited to local practices and the local availability of materials like bricks, form work etc., and cater for any extra dubbing required for touching up properly and for smooth and even surfaces. This shall be deemed to have been included in the lump sum or the item rate quoted for plasterwork as applicable.

12.1.6 External finish shall be taken 15 cms below the ground level except where plinth protection/ramp & the like is provided. In which case, it shall be taken upto the bottom of the plinth protection/ramp etc.

12.1.7 **GROOVE AT JUNCTION OF RCC WORK AND BRICK WORK:** Groove in plaster shall be provided only at inside surfaces of building at the junctions of RCC work with brick work to indicate the location of junctions. Groove shall be uniform in shape and size. The groove shall be 10 mm wide and depth upto thickness of plaster. No groove shall be provided on external surfaces of building. Chicken wire mesh 150 mm wide (75 mm on both sides of junction) of size 0.71 mm dia wire with size of mesh 25 mm shall be provided with tinned tacks/black shoe nails at junction of masonry and RCC slab/columns/ lintels/beams etc. on untreated external surfaces of building and then plastered as specified.

12.2 **MATERIALS**

12.2.1 **CEMENT:** Cement shall be as specified in clause 4 of Particular Specification here in before.

12.2.2 **SAND:** Refer clause 14.5 of MES Schedule Part-I.

12.3 **WORKMANSHIP**

12.3.1 **INTERNAL PLASTER**

Cement plaster on internal surface above skirting/dado shall be done in cement and sand mortar (1:6) in one coat and shall be 12 mm thick at the proudest part, unless specified otherwise elsewhere in Particular Specification or shown on drawings. Mortar for dubbing out and rendering shall be of same type and mix. Dubbing out may be executed as separate coat or along with the rendering coat.

12.3.2 **EXTERNAL PLASTER (WASHED GRIT)**

Washed grit plaster shall be provided on external surfaces in two layers with following specifications: -

- (i) Under layer shall be 12 mm thick in cement mortar (1:4) mixed with water proofing compound liquid grade as per manufacturer's instructions and shall be brought to true level and plumb by using wooden float after thoroughly wetting the surface. The surface shall be further roughened by furrowing with a scratching tool. The surface shall be kept wet till top layer is applied. Irrespective of what is shown on drawings, GI chicken wire mesh 22 gauge and 20 mm mesh shall be fixed all along RCC and brick work joints in a width of 300 mm with cement slurry and nails before providing under layer of plaster as aforesaid.

**PARTICULAR SPECIFICATIONS (CONTD...../-)**

**12.3.2 (CONTD...../-)**

- (ii) Grooves of size 20 x 15 mm or as specified shall be provided as directed by the Project Manager to form a design pattern on the external face as shown on drawing. Tapered wooden battens to match the size and shape of the grooves shall be fixed over the under layer with nails before the application of the top layer. It shall be fixed to ensure that top panels are not damaged.
- (iii) All white or coloured marble chipping shall be washed in clean water before use.
- (iv) Top layer shall be 15 mm thick comprising of mixed white & grey cement (using approximately 35% white cement and 65% grey cement) with reflectance  $50 \pm 1\%$  or silver Cement of Companies like M/s Shriram Cement works with reflectance  $50 \pm 1\%$ , marble powder and white/approved coloured marble chips in proportion of 1:0.5:2 (1 mixed white & grey cement or Silver cement :0.5 marble powder and 2 marble chipping of 12 mm and down size including pattern using white cement with pigments as shown on drawings as approved by Project Manager. Before application of top layer, the surface of the under layer shall be cleaned and a coat of grey cement slurry @ 2 Kg of cement per sqm shall be applied. The top layer shall be applied in uniform thickness and sufficiently pressed with wooden float for proper bonding with the under layer and finished to a true and plumb surface. Finished surface of top layer after the mix has taken the initial set shall be scrubbed and washed with suitable brushes and water mixed with  $H_2SO_4$  @ 5% Scrubbing and washing shall continue till the stone chippings are sufficiently exposed to its natural colour.
- (v) Marble stone chippings of size 12 mm down size of approved colours, marble powder of approved quality and pigment of approved colour shall be used.
- (vi) Before application of under layer of plaster, the surfaces shall be prepared by raking out joints properly and brushing out the dust and loose mortar and washed thoroughly with water and kept wet. For the portion of under plaster below plinth level, integral water proofing compound shall be mixed in mortar.
- (vii) Grooves shall be finished with cement slurry mixed with approved water proofing compound.
- (viii) A sample shall be got approved by the contractor from the Project Manager prior to start of work.
- (ix) The Reflectance test shall be carried out as directed by Project Manager / DEPMC before approval of sample.
- (x) Necessary equipment and materials required for carrying out reflectance test shall be arranged by the contractor at his own cost.

12.3.3 All exposed surfaces of beams, columns, lintels, cills and the like coming in conjunction with plastered surfaces shall be plastered/finished as per adjoining surfaces and to the thickness required to bring them in the same plane as that of adjoining plaster/finish.