TECHNICAL SPECIFICATIONS
NIT NO: ERO/MMD/PC/0957 DATED: 16/08/2012

1. The work shall be executed as per the description of item given in the 'Bill of Quantities', Specifications, Drawings, General Conditions of Contract, Additional Conditions of Contract, CPWD Specifications, New Delhi, for civil works (updated with correction slips issued upto last date of submission of tender) and latest CPWD specification, New Delhi, for electrical works (updated with correction slips issued upto last date of submission of tender), instructions & orders to the contractor from time to time during pendency of work.

2. For items not covered under latest CPWD specification, for civil works/ latest CPWD specification for Electrical works and in particular specification or nomenclature of the individual item as above, the work shall be done as per latest relevant BIS codes of practice.

3. In case of non availability of any specification in the above paras or any overlapping provisions, non-clarity on any issue, applicability of particular provision out of above, shall be decided by Engineer-in-charge whose decision shall be final & binding on the contractor.

4. **THERMO MECHANICALLY TREATED BARS:**
Thermo mechanically treated bars conforming to IS:1786 from preferred manufacturers from enclosed list of make or approved by MZU/EPI shall be used. The other provisions of clause 45.2 of GCC remain unchanged.
5. **CEMENT:**

The Portland Pozzolona Cement (PCC) as per IS: 1489: 1991 or Ordinary Portland Cement (OPC) as per IS: 8112 shall be used on the works. The other provisions of clause 45.1 of GCC remain unchanged.

6. **CONCRETING:**

Concreting shall be machine mixed with equipment approved by the Engineer-in-charge.

7. **BRICK WORK**

The brick should be minimum class designation 75 conforming to IS 1077: 1992.

The brick work for all external walls should be done from outside. The contractor shall be responsible for providing and maintaining sufficiently strong scaffolding so as to withstand all loads likely to come upon it. Due care shall be taken by contractor to ensure the execution of brick masonry walls in plumbs from outside. The contractor shall arrange sufficient quantity of scaffolding for this purpose so as to complete the project within stipulated time.

8. **TRAPEZOIDAL POLYSTER COATED GALVANISHED STEEL SHEET ROOFING**

The specification of trapezoidal polyester coated galvanished steel sheet shall be as under:-

I. Bare metal thickness = 0.50 mm (tolerance as per relevant ASTM/Indian standard)

II. Minimum yield strength –As per standard.

III. Coating:- As per standard

IV. Width- 1.06 m
• Fastening for profile: Profile fixing using tight frame fabricated from 0.80mm GI sheet having 120 gsm & inbuilt stud profile shall be fixed on the structural purlin using stainless steel SDST screws. The sheet shall be fixed to the respective purlins / runners with self drilling, self-tapping fasteners as per provision mentioned in relevant ASTM/ IS approved by Engineer-in-charge.

9. INSTALLATION PROCEDURES OF THE ROOFING SHEET

Design and workmanship:

I. Before laying and fixing of sheets, the Contractor will check and satisfy himself about the straightness of the Purlins and also check for mutual variations in levels of top surfaces of all the Purlins along the roof slope at 2.0 M intervals along the length of the building. The Contractor shall carry out similar observations to satisfy him about the line and level of the outer surface of all side girds along a plumb line held at 3.0 M intervals along the length of the building. Any deviation of purlins/ side girds by more than ± 2 mm from the reference straight line shall be brought to the notice of the Engineer-in-charge for modification.

II. Laying of sheets shall start only from one end of the roof and shall be continued along building longitudinally towards the other direction to avoid mismatching of profile along lap joints. Fixing of roof sheets shall be carried out from the bottom of the slope keeping maximum projection of 300 mm from the edge of last purlin. Similarly, side/gable sheeting work is to be started from one end of the wall and from bottom most side/gable runner keeping about 300 mm projection from the edge of the lowest girth or as shown in the approved drawing. The prospective sheeting contractor shall prepare working drawing.
III. Sheet installation shall be carried as per standard practice

IV. The end lap between two sheets on roof shall be 150 mm or more, depending upon roof slopes. Long sheets shall generally be used to minimize end laps.

Sealing of laps and cut-outs

I. Wherever the cutouts like truss bracing, opening like ducts, chimneys etc. or where the portable machine (seamer) can’t be moved or reached easily, manual bending up to 180° will be allowed with special hand tools otherwise side lap is to be seamed with full 360 degree double lock system using electric portable seamer at site.

II. The end laps of roof and side laps of wall are to be sealed for preventing water entry with mastic tape or sealing beads of approved make applied along laps at positions directed by Employer/ Consultant. Such sealing material shall have more 15 years of expected service life and shall be capable of withstanding a service temperature of 95° C. The sealants shall be soft enough to not interfere with the installation of the sheets and resilient enough to accommodate any variation of installation that may occur during lying.

III. Foam fillers (flute closures) or equivalent approved materials, which shall be capable of withstanding temperature of 95°C and having an expected service life of 15 years, of matching profile to be adopted at interfaces of roof ridge, valley gutters etc. to be adopted along with flashing material, as directed by employer/ Consultant.
IV. Gun applied sealant or sealing beads shall be used to seal joints between individual pieces of flashing. The sealant should be positioned near midpoint of the overlap.

V. Gaps at notches and cut outs made in wall sheeting for allowing through the sheeting passage of structural members, pipes etc. shall be closed with suitably shaped flashing and sealed for preventing ingress of rain water by applying flexible sealants of approved make capable of withstanding a service temperature of 95°C and having an expected service life of 15 years.

**Fasteners:**

I. Using special size clip made of galvanized steel with clip of stainless steel fixed to perlins using 5.5 mm dia SDST Screws

II. To fill gaps in ridge special made steel fillers matching the profile will be used

III. Mastic tape sealants having longer life used to seal the metal joints

IV. Special A1 rebits of different & suitable size used whenever required

V. The surface of the sheets shall be made free of dust, dirt and oil immediately before fixing of fasteners.

VI. Power tool driven self tapping / drilling, galvanized steel screws of suitable size approved make, having steel washers built monolithically with the screw head and with bonded EPDM washers are to be installed.

Signature of Contractor

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coating of the screws should have good corrosion performance and a service life of not less than 15 years in polluted inland environment. All screws shall be driven at right angles to the sheet and the tightening of the screws shall be just enough to properly compress the EPDM washers without signs of over tightening. The screw end shall penetrate through top flange of the purlin/runner after installation.

VII. Fasteners at end laps of sheets are to be fixed along a straight line over the purlins/runners. On purlins and runners over which sheets are continuous, fasteners [pop rivets] shall be fixed as recommended by manufacturer of sheets/ or as per approved drawings.

VIII. Stitch fastening at the side laps of profiled steel sheets shall be placed at the center of the crest and carried out with pop rivets. The spacing of these rivets shall not exceed 450 mm for side laps on roof and 500 mm for side laps on wall.

IX. All plain flashing shall be stitched on crest of profiled sheeting with pop rivets at positions indicated on approved drawing prepared by prospective contractor and as directed by the Engineer in charge.

Shop Drawings:

The Contractor should prepare the necessary cutting plan of sheets, details of fixing sheets including flashing and sealing arrangement for total water tightness. The cutting of sheets should be by machine as far as possible.
10. **GENERAL**

10.1 The Materials/products used on the works shall be one of the preferred Make/Brands/Manufactures given in the tender documents/approved by EPI/MZU.

10.2 Flooring shall be of Kota stone as per drawing/design & specification. The pattern shown in the drawing if any, can be modified as per site requirement by Engineer-in-charge and nothing extra shall be payable over and above the rate quoted.

10.3 Mosquito proof shutters shall be provided on all external openings (doors & windows etc.)

10.4 Due care shall be given to HEL of the area while fixing plinth level of structures.

10.5 Built in cupboards shall be provided.

10.6 Glaze the dados on kitchen & toilets

10.7 Movable fixtures to be provided in the barracks.

10.8 Plumbing & sanitary work to be executed by licensed/expert plumber and the plumbing scheme/drawing to be got approved from Engineer-in-charge.

10.9 The contractor shall be responsible for all protection of sanitary, water supply, electrical fittings & fixture against pilferage, breakage during period of installation unit, the completion of work and handed over to MZU.
10.10 The electrical works shall be executed only through licensed electrician and the agency shall have to submit the valid license of electricians before starting the work.

10.11 It will be the sole responsibility of contractor to obtain all statutory approvals/ compliance required, if any for construction/ implementation of the project including forest clearance and completion clearance from the all relevant statutory bodies for plumbing, sewerage, sanitary and PHE work, fire department for fire protection, fire fighting, electrical works, pollution control authorities etc. and for all other services as included in the scope of contract etc. from the concerned department as required within the stipulated time frame, only statutory charges shall be borne by the owner.

10.12 The contractor shall have to execute the work in place and in such a way to facilitate other agency, if any engaged simultaneously for execution of other works required for completion of the MZU.

10.13 Unless otherwise specified in the schedule of quantities, the rates tendered by the contractor shall be all inclusive and shall apply to all heights, leads, depths & nothing extra shall be payable on this account.

10.14 On completion of work, the tenderer shall submit four prints of “As built” drawings to Engineer-in-charge at no extra payment.