

## CHAPTER B

### TECHNICAL SPECIFICATIONS - CIVIL WORKS

#### Specification

Pole	: 490mm dia MS pipe 8mm thick
Beam	: 300mm dia MS pipe 8mm thick
Board support vertical	: 75mm X 40mm X 6mm channel
Support	: 75mm X 40mm X 6mm channel
Runner	: 65mm X 65mm X 6mm angle
Base plate	: 20mm Ms plate
Foundation bolt	: 25mm TMT rod
Ladder	: 45mm X 45mm X 5mm angle
Letter and Logo	: 3mm Acrylic
Lightning	: SMD LED IP65 protected
RCC Foundation work	: 1800 mm X 1800mm X 2400mm

#### **EARTH WORK:**

- The Contractor shall, at his own expense and without extra charges, make provision for all shoring without any extra payment.
- Filling in plinth shall be consolidated with water and compacted with pneumatic rammers, to achieve 90% relative density on testing. One test is to be carried out for 1000 sq.ms. of compacted area.

#### **PLAIN CEMENT CONCRETE AND REINFORCED CEMENT CONCRETE WORK:**

##### **STONE AGGREGATE:**

- Stone aggregate used in the work shall be of hard broken stone to be obtained from approved source and shall conform to relevant provision in the Latest CPWD Specifications for works.

##### **SAND/ M Sand**

- Sand/ M Sand to be used for the work shall be of as specified in CPWD Specifications. Sand/ M Sand shall be obtained from the source to be got approved by the Engineer in charge and washed if required, with appropriate equipment to bring down the chemical, inorganic and organic impurities within the permissible limits as per the direction of the

Engineer in charge. The same shall consist of hard siliceous materials.

Note: Where only one variety of sand is available the sand will be sieved for use in finishing work as directed by the Engineer – in – charge in order to obtain smooth surface and nothing extra will be paid on this account.

- Nothing extra shall be paid for screening or washing the sand/ M Sand as prescribed above.

#### **FLYASH**

- Flyash conforming to grade 1 of IS 3812 (Part 1) may be used as part replacement of OPC provided uniform blending with cement is ensured in accordance with clauses 5.2 and 5.2.1 of I.S.456-2000 in the items of BMC and RMC. However this shall not override the provisions of the respective items.

#### **CENTERING SHUTTERING AND SCAFFOLDING:**

- All Scaffolding centering for RCC shall be with properly designed system and brought to site well in advance so that the progress of the work is not hampered for non-availability of the same.
- All shuttering for RCC work except soffits of slab shall be in water proof shuttering Ply (marine ply). Shuttering for slab and soffits shall be in water proof shuttering ply or in good quality mild steel plates free of dents, bends or warping and rusting as approved by the Engineer in charge.
- Contractor should deploy complete one set of shuttering materials for minimum one complete floor and the shuttering material for beam bottom shall be minimum for two complete floors.

#### **REINFORCEMENT:**

- TMT reinforcement steel shall be used as per design and conforming to IS: 1786 pertaining to Fe 500D grade of steel.
- TMT steel bars manufactured by main producers, as per list of makes, shall be allowed in the work. Contractor shall produce manufacturer Test Report for each dia and each lot Tests. Rate is inclusive of straightening, cutting, bending, placing in position, binding and rock anchoring.
- The actual average sectional weight for dia up to 10 mm shall be arrived at from one meter long samples (minimum 3 from each dia) taken from each lot of steel. The discretion of the Engineer – in – charge shall be final for the procedure to be followed for determining the average sectional weight of each lot. Quantity of each diameter of steel received at site of work each day will constitute the single lot for this purpose.
- The weight of each lot of a particular diameter of 10mm and below shall be reckoned as the weight as per actual issue multiplied by a factor equal to the standard sectional weight of the particular diameter divided by the average sectional weight of the particular dia in a particular lot worked out as per above para. Adjustment for the steel shall be effected on the basis of the weight as modified above for quantity payable.

- Measurement of all diameters of steel be on linear basis and will be converted into weight on the basis of standard sectional weight coefficients given in relevant CPWD specifications mentioned in schedule 'F' of General Conditions of Contract.
- Measurement of reinforcement shall be as per procedure described in the relevant CPWD specifications mentioned in schedule 'F' of General Conditions of Contract.

**CEMENT:**

- The contractor shall procure 43/ 53 grade ordinary Portland cement [grade as per design/ drawings/ decision of Engineer-in-charge] conforming to IS 8112/Portland Pozzolana Cement conforming to IS:1489 (Part-I) as required in the work, from approved manufacturers of cement having a production capacity not less than one million tonnes per annum as approved by the Engineer –in -charge. The tenderers may also submit a list of names of cement manufacturers which they propose to use in the work. The tender accepting authority reserves right to accept or reject name(s) of cement manufacturer(s) which the tenderer proposes to use in the work. No change in the tendered rates will be accepted if the tender accepting authority does not accept the list of cement manufacturers, given by the tenderer, fully or partially. The supply of cement shall be taken in 50 kg. bags bearing manufacturer's name and ISI marking. Samples of cement arranged by the contractor shall be taken by the Engineer-in-charge and got tested in accordance with provisions of relevant BIS codes. In case the test results indicate that the cement arranged by the contractor does not conform to the relevant BIS codes, the same shall stand rejected, and it shall be removed from the site by the contractor at his own cost within a week's time of written order from the Engineer- in-charge to do so.
- The cement shall be brought at site in bulk supply of approximately 50 tonnes or as decided by the Engineer-in-charge. The cement godown of the capacity to store a minimum of 2000 bags of cement shall be constructed by the contractor at site of work for which no extra payment shall be made.
- Double lock provision shall be made to the door of the cement godown. The keys of one lock shall remain with the Engineer-in-Charge or his authorized representative and the keys of the other lock shall remain with the contractor. The contractor shall be responsible for the watch and ward and safety of the cement godown. The contractor shall facilitate the inspection of the cement godown by the Engineer-in-Charge at any time.
- The cement shall be got tested by the Engineer-in-charge and shall be used on the work only after satisfactory test results have been received. The contractor shall supply free of charge the cement required for testing including its transportation cost to testing laboratories. The cost of tests shall be borne by the contractor/Department in the manner indicated below: (a) By the contractor, if the results show that the cement does not conform to relevant BIS codes. (b) By the Department, if the results show that the cement conforms to relevant BIS codes.
- The actual issue and consumption of cement on work shall be regulated and proper accounts maintained as provided in clause 10 of the contract. The theoretical consumption of cement shall be worked out as per procedure prescribed in clause 42 of the contract and shall be governed by conditions laid therein. In case the cement consumption is less than theoretical

consumption including permissible variation, recovery at the rate so prescribed shall be made. In case of excess consumption no adjustment need to made.

- The cement brought to the site and the cement remaining unused after completion of the work shall not be removed from site without the written permission of the Engineer-in-charge.
- The damaged cement shall be removed from the site immediately by the contractor on receipt of a notice in writing from the Engineer-in-charge. If he does not do so within 3 days of receipt of such notice, the Engineer-in charge shall get it remove at the cost of the contractor.
- Engineer –in- charge may change the brand of Cement depending upon availability in local market, if needed. Instructions in this respect can be issued by them at regular intervals.

### **CEMENT PLASTER: -**

- The cement plaster shall be 6mm, 12 mm, 15 mm or 20 mm thick as specified in the item. The use of PP Cement shall be preferred.
- Finish: The plaster shall be finished to a true and plumb surface and to the proper degree of smoothness as required. The work shall be tested frequently as the work proceeds with a true straight edge not less than 2.5 m long and with plumb bobs. All horizontal lines and surfaces shall be tested with a level and all jambs and corners with a plumb bob as the work proceeds. Precaution : Any cracks which appear in the surface and all portions which sound hollow when tapped, or are found to be soft or otherwise defective, shall be cut out in rectangular shape and redone as directed by the Engineer-in-Charge. (i) When ceiling plaster is done, it shall be finished to chamfered edge at an angle at its junction with a suitable tool when plaster is being done. Similarly when the wall plaster is being done, it shall be kept separate from the ceiling plaster by a thin straight groove not deeper than 6 mm drawn with any suitable method with the wall while the plaster is green. (ii) To prevent surface cracks appearing between junctions of RCC column/beam and walls, 150 mm wide chicken wire mesh should be fixed with U nails 150 mm centre to centre before plastering the junction. The plastering of walls and beam/column in one vertical plane should be carried out in one go. The rate for plastering items shall be inclusive of this.

### **STEEL WORK**

Providing and fixing inserts in concrete works

Inserts are required to be fixed/embedded as indicated in construction drawings and/or as directed by Engineer-in-charge in foundations, columns and other miscellaneous concrete works. These inserts comprise plates, angles, pipe sleeves, anchor bolt assemblies, etc.

The rate quoted by the Tenderer shall hold good for accurately fixing the inserts at the correct levels/alignment and shall include for the cost of any temporary or permanent supports/anchors such as bars including cutting, bending, welding, etc. as required.

Steel templates shall be used by Contractor to locate and very accurately position bolts, group of bolts, inserts, embedded parts, etc. at his cost. Such templates shall be previously approved by the Engineer. Templates shall invariably be supported such that the same is not disturbed due to vibration, movement of labourers, materials, shuttering work, reinforcement, etc. while concreting. The Contractor will have to suitably bend, cut or otherwise adjust the reinforcement in concrete at the locations of inserts as directed by the Engineer at no extra cost to OWNER. If the Engineer so directs, the inserts will have to be welded to reinforcement to keep them in place. Contractor shall be responsible for the accuracy of dimensions, levels, alignments and centre lines of the inserts in accordance with the drawings and for maintenance of the same until the erection of equipment/structure or final acceptance by Owner.

Contractor shall ensure proper protection of all bolts, inserts, etc. from weather and other damages by greasing or other approved means such as applying white lead putty and wrapping them with gunny bags or canvas or by other means as directed by Engineer to avoid damage due to movement of his labourers, material, equipment, etc. No extra claim from the Contractor on this account shall be entertained. Contractor shall be solely responsible for all the damages caused to bolts, inserts, etc. due to his negligence and in case damages do occur, they shall be rectified to the satisfaction of Engineer at the Contractor's cost

#### **STEEL WORK IN BUILT UP SECTION (WELDED)**

- The steel work in built up sections (welded) such as in trusses, form work etc. is specified in this clause.
- Laying out
- It shall be as specified
- Fabrication

Straightening, shaping to form, cutting and assembling, shall be as per 10.3.2 as far as applicable, except that the words "riveted or bolted" shall be read as "welded" and holes shall only be used for the bolts used for temporary fastening as shown in drawings.

- *Welding* : Welding shall generally be done by electric arc process as per IS 816 and IS 823.
- The electric arc method is usually adopted and is economical. Where electricity for public is not available generators shall be arranged by the contractor at his own cost unless otherwise specified. Gas welding shall only be resorted to using oxyacetylene flame with specific approval of the Engineer-in-charge. Gas welding shall not be permitted for structural steel work Gas welding required heating of the members to be welded along with the welding rod and is likely to create temperature stresses in the welded members. Precautions shall therefore be taken to avoid distortion of the members due to these temperature stresses. The work shall be done as shown in the shop drawings which should clearly indicate various details of the joint to be welded, type of welds, shop and site welds as well as the types of electrodes to be used. Symbol for welding on plans and shops drawings shall be according to IS 813. As far as possible every

efforts shall be made to limit the welding that must be done after the structure is erected so as to avoid the improper welding that is likely to be done due to heights and difficult positions on scaffolding etc. apart from the aspect of economy. The maximum dia of electrodes for welding work shall be as per IS 814. Joint surfaces which are to be welded together shall be free from loose mill scale, rust, paint, grease or other foreign matter, which adversely affect the quality of weld and workmanship.

- *Precautions* : All operation connected with welding and cutting equipment shall conform to the safety requirements given in IS 818 for safety requirements and Health provision in Electric and gas welding and cutting operations.
- Operation, Workmanship and process of Welding is described in Appendix B,
- Inspection and testing of welds shall be as per IS 822.
- *Assembly* : Before welding is commenced, the members to be welded shall first be brought together and firmly clamped or tack welded to be held in position. This temporary connection has to be strong enough to hold the parts accurately in place without any disturbance. Tack welds located in places where final welds will be made later shall conform to the final weld in quality and shall be cleaned off slag before final weld is made.
- *Erection*: The specification shall be as described except that while erecting a welded structure adequate means shall be employed for temporary fastening the members together and bracing the frame work until the joints are welded. Such means shall consists of applying of erection bolts, tack welding or other positive devices imparting sufficient strength and stiffness to resist all temporary loads and lateral forces including wind. Owing to the small number of bolts ordinarily employed for joints which are to be welded, the temporary support of heavy girders carrying columns shall be specially attended.
- Different members which shall be fillet welded, shall be brought into as close contact as possible. The gap due to faulty workmanship or incorrect fit if any shall not exceed 1.5 mm if gap exceeds 1.5 mm or more occurs locally the size of fillet weld shall be increased at such position by an amount equal to the width of the gap.
- *Painting*: Before the member of the steel structures are placed in position or taken out of the workshop these shall be painted as specified .
- *Measurements*
- The mode of measurements shall be the same as specified except that weight of welding material shall not be added in the weight of members for payment and nothing extra shall be paid for making and filling holes for temporary fastening of members during erection before welding.
- *Rate*
- The rate shall include the cost of all labour and materials involved in all the

operations described above.

### **PRELIMINARY PROGRAMME**

The tenderer shall also submit a preliminary programme of the contract works showing the various stages of design sampling, testing, fabrication, delivery and installation of the works.

Upon approval of the shop drawings, at least 4 copies shall be submitted by the Contractor.

The Contractor/Sub-contractor shall submit a maintenance manual for the curtain wall/structural glazing system inclusive of all metal parts, glass and finish etc.

During detailed design and execution any details may increase as per actual requirement at site, these variations shall be executed without any extra cost implications to the HITES.

### **PERFORMANCE GUARANTEE**

The tenderer shall provide a performance guarantee of requisite value to be indicated in the General Conditions of Contract for a period of mentioned in the GCC, to provide for expenses, to cover the risk and cost of rectification of defect, noticed during the five years guarantee period. Guarantee period to start from the date of completion of the project

### **SAMPLES OF MATERIALS:**

- Sample of all materials/ fittings and fixture to be used in the work such as doors, windows, tiles, sanitary, water supply, drainage fittings and fixtures shall be submitted well in advance by the contractor for approval from the Engineer-in charge of work in writing before placing orders for the entire quantity required for completion of work. Samples approved by the EIC shall be kept in Sample Room under the charge of Engineer-in-Charge and shall retain till completion of work.
- Finished items in respect of typical portion of works of repetitive nature such as typical room, toilet, railing, door, window or any other work desired by the engineer-in- charge shall be prepared by the contractor to the satisfaction of Engineer-in-charge and got approved from him in writing before the commencement of these items for the entire work.
- The requirements for preparation of samples shall be observed and fulfilled by the contractor well in advance to avoid any detriment to the general progress of work. In other words, this will not be allowed to have any effects on the general progress of work or on any of the terms and conditions of the contract. No claims of any kind whatsoever including the claims of extension of time will be entertained due to the incorporation of this requirement.

### **VARIATION IN CONSUMPTION OF MATERIALS:**

- The variation in consumption of material shall be governed as per CPWD specification and clauses of the contract to the extent applicable.

### **MISCELLANEOUS:**

- Materials manufacture by reputed firms and approved by Engineer – in charge shall only be used. Only articles classified as “First Quality” by the manufactures shall be used unless otherwise specified. Preference shall be given to those articles which bear ISI certification marks. In case articles bearing ISI certification marks are not available the quality of sample brought by the contractor shall be judged by the standards laid down in the latest CPWD specifications. For items not covered by the latest CPWD specification, relevant ISI standards shall apply.

**TESTS:**

- Materials brought at site of work shall not be used in the work before getting satisfactory test results for Mandatory tests as per relevant provisions in Latest CPWD/PWD Specifications for works. Normally, part rate payment shall be allowed in the running account bills only if the materials are tested and test results are found to be satisfactory to by the Engineer-in-charge. These tests shall be got done from laboratories approved by Engineer-in - charge or the laboratory set up by the contractor at site as per directions of Engineer-in - charge.
- The Engineer-in - charge of work shall check the test results and satisfy himself before allowing any payment in the running/ final bill.

**LIST OF APPROVED MAKE**

1.	Cement	Malabar, Ultra Tech, Zuari, Ramco, ACC, India Cements, Dalmia, Ambuja, J.P. Rewa, Vikram, Shri Cement, Birla Jute and Cement Corporation of India, Chettinadu, JSW Cement, Penna cement etc. or any other approved Brand
2.	Steel (TMT)	Tata, Vizag, SAIL, TISCO, IISCO, RINL , Jindal Steel and Power Ltd, JSW Steel Ltd or equivalent as Approved
3.	Structural Steel	Tata, Vizag, SAIL, Jindal Steel & Power Ltd, or equivalent as approved
4.	Welding rode	ESAB, Advani, Best Arc, Solar or equivalent as Approved
5.	Protective Paints	AkzoNobel, Jotun India Private Limited, Berger Paints India Limited, Asian Paints Ltd, Grand Polycoats Co. (P) Ltd, Euro Build, Hempel Paints, CIPY Polyurethanes Pvt Ltd, MYK Schomburg or equivalent as approved.

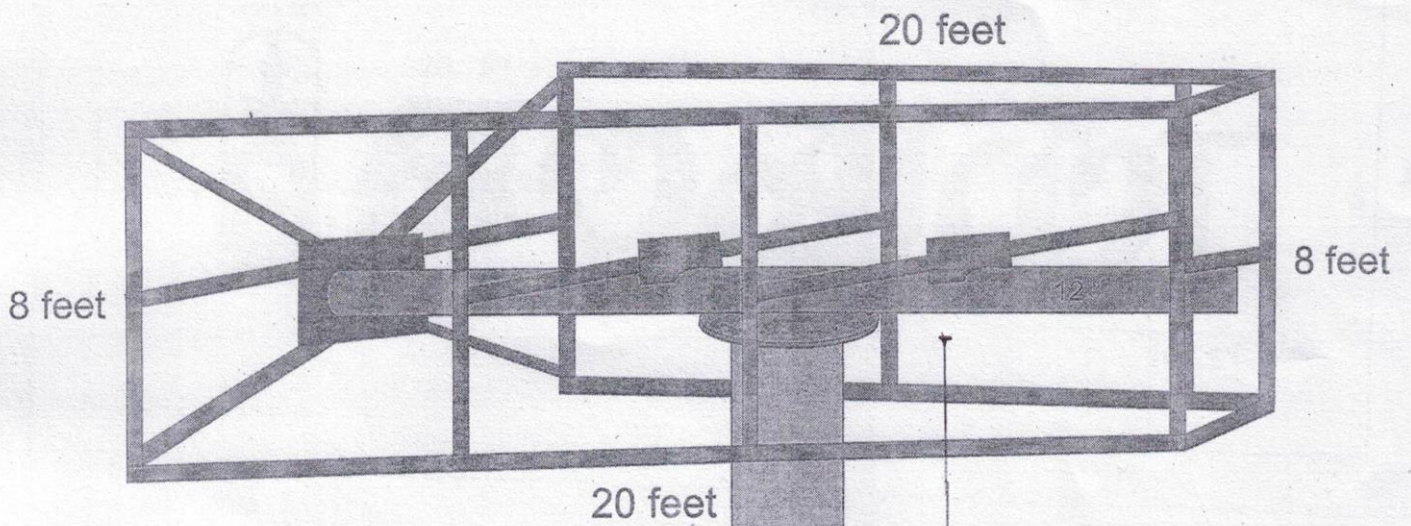


6	Paints - Other Paints / Primer	ICI Dulux/ Asian / Nerolac/ Berger/ Nippon/ Jotun
7	Bolts /Screws (SS 316)	HILTI, Fischer,MKT (Germany) or equivalent as approved
8	Paints - Synthetic Enamel Paints	ICI Dulux (Gloss)/ Asian (Apolite)/ Berger/ Nerolac/ Jotun

Note:-

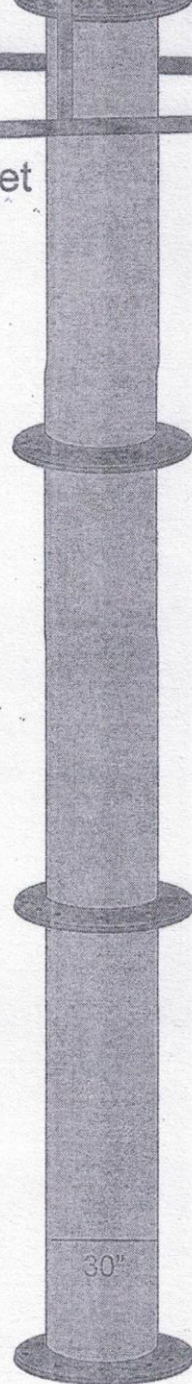
- The contractor will use one of the approved makes as approved by the Oushadhi/ Engineer -in-charge.
- In case of different quality / pattern of same make, the pattern/ quality shall be approved by the Oushadhi / Engineer – in – charge
- All the items included in the list or otherwise to be used in the work should confirm to CPWD/PWD and relevant BIS specifications/ relevant codes, GRIHA V 2019, ECBC, EDGE as applicable.
- If any item is missing in the above list, its make will be decided by the Oushadhi/ Engineer –in-charge.





Specification

- Post : 490mm dia MS pipe 8mm thick
- Beam : 300mm dia MS pipe 8mm thick
- Board support vertical : 75mm X 40mm X 6mm channel
- Support : 75mm X 40mm X 6mm channel
- Runner : 65mm X 65mm X 6mm angle
- Base plate : 20mm Ms plate
- Foundation bolt : 25mm TMT rod
- Ladder : 45mm X 45mm X 5mm angle
- Letter and Logo : 3mm Acrylic
- Lightning : SMD LED IP65 protected
- RCC Foundation work : 1800 mm X 1800mm X 2400mm



48"X18"

28.75"



# **Ushadhi**

167.5"

(A Kerala Government Undertaking)

