PARTICULAR SPECIFICATIONS(CONTD…)

REPAIR/MAINT OF WATER SUPPLY DISTRIBUTION SYSTEM, GATE VALVE, LEAKAGE REPAIR, PUMP, MOTOR, CHLORINATION PLANT AND OTHER MISC WORKS AT AFTC & 2 DC AREA AND CQAE (WE) UNDER GE (M) AF JALAHALLI

1.0 GENERAL

1.1 The following specifications shall be read in conjunction with MES Schedule Part-I including errata/amendment there to. If these specifications are at variance with that of the aforesaid document the specification given in tender document shall take precedence there over.

1.2 Work under this contract shall be carried out in accordance with Schedule 'A', particular specifications, drawings and general specifications and other provisions in MES Standard Schedule of Rates Part I of 2009 and PART II of 2020 read in conjunction with each other.

1.3 Term "General Specification" referred to here-in-before as well as referred to in IAFW-2249 (1989 Print) (General Conditions of Contracts) shall mean the specifications contained in the MES Schedule Part-I.

1.4 Where specification for any item of work are not given in MES Schedule or in these particulars specifications, specifications as given in relevant Indian Standard or Code of practice shall be followed.

1.5 Any drawing which is mentioned in the drawings forming part of tender but not specifically, mentioned in the list of drawings shall also be deemed to be forming part of the tender. The tenderer shall see such drawings / details in the office of Accepting Officer.

1.6 Unit rate quoted for a particular item quoted by the tenderer shall be deemed to include for any minor details of work and/or constructions which are obviously and fairly intended and which may not have been included in these documents, but which are essential for the execution and entire completion of the work. Decision of the Accepting Officer as to whether any minor detail, items of work and/or construction is obviously and fairly intended to be included in the contract/unit rate or not shall be final, conclusive and binding.

1.7 General Rules, specifications, Special Conditions and all preambles in the MES Schedule shall be deemed to be applicable to the work under this contract, unless specifically stated otherwise in those documents in which case the provisions in these documents shall take precedence over the aforesaid provision in the MES Schedule. The term "as specified" wherever appears in tender documents relates to relevant particular specifications and in its absence general specifications. All references to MES Schedule (Standard Schedule of Rates) in these specifications relate to Part-I of MES Schedule unless otherwise mentioned. Reference to only some paragraphs of MES Schedule has been made in these particular specifications but other paragraphs and provision as applicable are also to be followed for all parts of Schedule 'A' even though not particularly mentioned here in after.

1.8 Any other item which is essential for the construction and completion of the entire work in a workman like manner conforming to normal engineering practices and BIS code can be treated as minor details at the absolute discretion of the Accepting Officer.

1.9 In all the above and other similar cases the details indicated elsewhere which are similar or near similar to the missed out items of work shall be followed. In the absence of any other similar or near similar details, minimum essential requirement for completion of the work from structural and utility point of view shall be deemed to be included in the rate quoted. In the event of any dispute, decision of the Accepting Officer shall be final, conclusive and binding.

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PARTICULAR SPECIFICATIONS(CONTD…)

2.0 DEMOLITION / DISMANTLING / TAKING DOWN

2.1 The term `Dismantling/Demolition' shall be all as specifiedvide clause 21.1 & 21.2 of MES Schedule Part I on Srl.Page No.21-1.

2.2 The contractor shall be responsible for the safe custody ofall serviceable material until the work is handed over to MES.

2.3 Contractor shall ensure that demolition operations do not at any stage endanger the safety of the structure or the workman carrying out the demolition.

2.4 Prior order of Engineer – in – charge shall be obtained before demolition/ dismantling/ taking down etc. The contractor's particular attention is drawn to section 21 of MES Schedule Part I and condition 47 of IAFW – 2249.

2.5 In case non compliance of safety precaution as notified by the Engineer-in-Charge from time to time and in the event of any casualty, the contractor shall be responsible for all the consequences and shall have to settle all damages and compensation at his own expense and risk..

2.6 Necessary safety appliances shall be issued to the workers before or prior to starting of the work by the contractor.

2.7 Any damage caused to the existing or adjacent structure due to contractors workman or due to contractor's negligence, the same shall be made good at his own expenses. AGE's decision as to whether the damage caused due to contractors negligence shall be final and binding.

2.8 All materials other than items mentioned in the schedule of credit having salvage value shall be handed over to department at MES store yard i.e. place of issue of Schedule 'B' stores. However the demolished materials which have no salvage value as decided by the Engineer – in – charge and rubbish shall be filled in low lying areas or disposed off at the site as directed by the Engineer – in – charge.

2.9 All dismantled materials as listed in schedule of credit shall become the property of the contractor. The materials will be removed from the site only after the recovery has been made from the contractor and after obtaining written instructions from Engineer – in – charge.

3.0 MATERIALS

3.1 All materials to be supplied by the contractor for incorporation in work shall conform to relevant specifications/IS.

3.2 In case of specification of materials needed for incorporation is not contained anywhere
in the contract documents, the specification of such materials proposed to be incorporated in work shall be got approved in writing from the GE before incorporation in the work. Contractor is advised to check availability, lead, time of procurement from these supplies before quoting.

3.3 As far as practicable all manufactured articles other than those manufactured in Contractor's workshop at site shall bear ISI certification mark and which are readily available in the market and are given in Special Condition. It is mandatory for the contractor that ISI certified marked items/articles as listed therein shall only be incorporated in the work. Names of manufactures/suppliers of certain items/materials are given in Appendix 'B'. The Contractor is advised to check availability lead time of procurement from these suppliers before quoting.

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PARTICULAR SPECIFICATIONS(CONTD…)

3.4 Local materials such as stone aggregate, sand, lime etc shall generally conform to the sample kept in GE's office in addition to their conformity with relevant specifications given in the tender documents. The samples of such materials shall be got approved from GE in writing before the materials are brought at site in bulk. The contractor shall submit samples of materials to GE through Engineer-in-Charge for approval.

3.5 Letters conveying approval of samples/materials byGE will mention source of supply /name of manufacturer, trade name/brand (if applicable) and reference to clause of the tender documents containing specification of particular materials.

3.6 The contractor and executives will ensure that the materials incorporated in the work are identical with the approved samples.

4.0 **EXCAVATION**

Excavation and earth work shall be in hard/dense soil / soft disintegrated rock and hard rock as described in Schedule 'A' items and depth and dimensions shall be as directed by Engineer – in- charge. Rate quoted for excavation shall include bailing out, pumping out for otherwise removing all water which may accumulate while excavation. If rock/boulder is met at site, Contractor shall immediately notify the fact to the GE / AGE in writing, who will after due verification, regularize the change through proper deviation order. The rock/boulder so obtained shall be sorted out and neatly stacked as directed by the Engineer-in-Charge, without any extra cost to Government. This rock/boulder should be neatly stacked at site and shall be entered in the measurement book duly signed by the contractor and Engineer-in-Charge. This rock/boulder shall become the property of the contractor for which necessary recovery will be affected at the rate of **Rs 450.00** per cubic metre.

4.1.0 **EARTH FILLING**

Filling around foundation & in other situation shall be done in layer's not exceeding 25 cm thick, each layers watered well & thoroughly compacted.

4.2 **TRENCHES FOR FOUNDATION AND PIPES**

4.2.1 The excavation shall be restricted to dimensions shown on the drawings and as specified in MES Schedule. Excavation made, if any, in excess of required depth/width shall be made good by the Contractor with cement concrete 1:7:12 type F2 without extra cost to the Government.

4.2.2 The beds of the trenches shall be watered and well rammed and any depressions thus formed shall be filled with approved earth as required to the level and slopes as directed by Engineer-in-Charge.

4.2.3 **REMOVAL OF SURPLUS SOIL**

4.2.3.1 Surplus/useless soil, if any remaining after filling back in foundation trenches etc., shall be removed to a distance as described in Schedule 'A' and as directed.

4.3 **HARD CORE**

4.3.1 The material for hardcore shall be locally available best quality and as per sample kept in GE's office.

4.3.2 Hard Core shall be of stones/boulders (broken of gauge) not exceeding 63mm. Hard core shall be deposited spread and leveled in layers not exceeding 15 cm thick and well watered, rammed to a true surface and compacted. The thickness of the hard core specified or as indicated in the drawings, is the thickness after consolidation.

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PARTICULAR SPECIFICATIONS(CONTD…)

5.0 **CONCRETE**

5.1 **CEMENT**

5.1.1 **GENERAL**

5.1.1.1 Cement required for the work under the contract shall be procured, supplied and incorporated in the works by the contractor under his own arrangement. Cement shall be of tested quality and shall comply with the requirements mentioned in the drawings, SSR, IS Specifications as amended and particular specifications given hereinafter.

5.1.1.2 Type of cement for the subject work shall be ordinary Portland cement grade 43 (forty three) in accordance with IS 8112-1989 unless otherwise mentioned in structural drawings forming part of the tender documents. Contractor may be permitted to use ordinary Portland cement grade 53 (Fifty three) also without any extra cost to the Govt.

5.2 **SOURCES OF PROCUREMENT**

5.2.1 Cement shall be procured by the contractor from any of main producers/ manufactures of cement as listed here-in-below.

NOTE:- (a) Any other manufacture and brand approved by E-in-C's branch up to the end date of submission of bids shall also deemed to be included in the below list.

(b) Irrespective of the above list of manufacturers, GE shall ensure validity of approval/renewal of manufacturer and brand at the time of sample approval.

SL NO.	COMPANY NAME	ADDRESS	TYPE OF CEMENT
1	M/s Cement Manufacturing Company Ltd. Brand:- STAR	Mayur Garden, 2nd Floor, Opp Rajiv Bhawan, GS Road, Gauwhati-781 005, Ph-0361-2462215/216/513 Fax-0361-2462217 Email:- cmclghy@cml.co.in	OPC Gde 43, Gde 53 & PPC
2	M/s Ultra Tech Cement Ltd. Brand:- ULTRATECH	"B" Wing, 2nd Floor, Mahakali Caves Road, Andheri (East), Mumbai-400 093,Ph-022-66917800	OPC-43&53 Gde , PSC
3	M/s OCL India Ltd. Brand:- KONARK	Rajgangpur,Dist-Sundargarh, Orissa, Pin- 770 017,Ph-0361-2668504, Fax-0361-2662131 Website: www.calcom.co.in	OPC Gde 43 & PPC
4	M/s Dalmia Cement (Bharat) Ltd. Brand:- DALMIA CEMENT	Dalmiapuram, Dist-Tiruchirappalli, Tamil Nadu-621 651	OPC Gde 43 & PPC
5	M/s Heidelberg Cement India Ltd. Brand:- MYCEM	9th Floor, Infinity Tower "C", DLF Cyber City, Gurgaon, Haryana – 122 002,Ph-0124-4503700 Fax-0124-4147698	PPC

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PARTICULAR SPECIFICATIONS(CONTD…)

5.2 **SOURCES OF PROCUREMENT(CONTD…)**

SL NO.	COMPANY NAME	ADDRESS	TYPE OF CEMENT
6	M/s Parasakti Cements Ltd. Brand:- PARASAKTI	123/3RT, Plot # 8-3-214/21, Srinivasa Nagar Colony(West),Hyderabad – 500 038Ph-040-44119100 / 200Fax-040-2374756	OPC Gde 43 & PPC
7	M/sZuari Cement Ltd.Brand:- ZUARI	No.6, MC Nichols Road, Chetpet, Chennai – 600 031Ph-044-28363958, 044-28365047	OPC Gde 43 & PPC
8	M/s Toshali Cements Pvt Ltd. Brand:- GAJAPATI	123/3RT, 2nd Floor, , Sanjeeva Reddy Nagar, Hyderabad – 500 038, Ph-040-2300675 **Corporate Office** 9-14-13, C B M Compound,Near MeharApartments,Visakhapatnam – 530 003	OPC Gde 43, PPC & PSC
9	M/s Saifco Cement Pvt Ltd. Brand:- SAIFCO	Opposite Post Office, Batwara, Srinagar-190004(J&K), Ph-0194-2466061	OPC Gde 43
10	M/s Prism Cement Ltd. Brand:- PRISM	3/113, VivekKhand, Gomto Nagar, Lucknow-226 010Ph-0522-2396847, 0522-2397589	OPC Gde 43 & PPC
11	M/s Shree Guru Kripa Cement (Pvt) Ltd. Brand:- SARTAJ	4/4 Trikuta Nagar Jammu Ph-0191-2472043	OPC Gde 43 & PPC
12	M/sDhruvIndustrialCompany Ltd. Brand:- DHRUV	49/27 Sinha Market General Ganj, Kanpur – 208 001	OPC Gde 43 &PPC
13	M/s Ramco Cements Ltd (Formely Madras Cements) Brand:- Ramco	Auras Corporate Centre, 98-A, Dr.RadhakrishnanSalai, Mylapore, Chennai-600004, Ph-044-28478666	OPC Gde 43 & PPC
14	M/s Saurashtra Cement Brand:- SAURASHTRA	Gala No.A-1, Ground Floor, UdyogSadan No.3, MIDC, Central Road, Andheri (East), Mumbai-400 093,Ph-022-32955557/67 Mob-9320290081	OPC Gde 43 & PPC
15	M/s Lafarge Cement(Lafarge IndiaPvt Ltd)Brand:- LAFARGE	Crescenzo, 1004, B-Wing, 10th Floor, C-38/39, G Block,BandraKurta Complex, Bandra (East), Mumbai-400 051	OPC Gde 43 & PPC
16.	The Associated Cement Companies Ltd. Brand:- ACC	414-421, Splendor Forum, (4th Floor), 3, District Centre, Jasola, New Delhi-110 044,Ph-011 46583600	OPC Gde 43 & PPC
17.	Grasim Industries Ltd. Brand:- GRASIM	Birlagram, Nagda,Madya Pradesh, Pin-456 331,Ph-07366-246760/246766	OPC Gde 43 & PPC

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PARTICULAR SPECIFICATIONS(CONTD…)

5.2 **SOURCES OF PROCUREMENT(CONTD…)**

SL NO.	COMPANY NAME	ADDRESS	TYPE OF CEMENT
18	The India Cement.	Dhun Building, 827, Anna Salai, Chennai- 600 002	OPC Gde 43 & PPC
19	Andhra Cement Ltd.	Durga Cement Works,Durgapuram, Dechepalli,Guntur, Andhra Pradesh, Pin-522 414, Ph-0863 257429	OPC Gde 43 & PPC
20	Century Cements. Brand:- CENTURY	Industry House, 159 Church Gate Reclamation, Mumbai-400 020, Ph-022 22023936	OPC Gde 43 & PPC
21	Binani Cement Ltd. Brand:- BINANI	Mercantile Chambers,12, J N Heredia Marg, Ballard Estate, Mumbai-400 001, Ph-022 22690506/10	OPC Gde 43 & PPC
22	Mangalam Cement Ltd.Brand:- MANGALAM	P O Adityanagar, Morak, Dist-Kota, Rajasthan-326 520, Ph-9351468076	OPC Gde 43 & PPC
23	Birla Corporation Ltd.Brand:- BIRLA	Birla Building (3rd& 4th Floor),9/1, R N Mukherjee Road,Kolkata-700 001, Ph-033 30573700	OPC Gde 43 & PPC
24	Orient Cement Brand:- ORIENT	5-9-22/57/D, 2nd& 3rd Floor, GP Birla Centre, Adarsh Nagar, Hyderabad-500 063,Ph-044 23688600	OPC Gde 43 & PPC
25	Shree Cement Brand:- SHREE	Bangur Nagar, Beawar,Dist-Ajmer, Rajasthan-305 901,Ph-01462 228101-06	OPC Gde 43 & PPC
26	J K Cement Brand:- JK		OPC Gde 43 & PPC
27	J K Lakshmi Cement Ltd.Brand:- JK LAKSHMI	Jaykapuram, Dist-Sirohi,Rajasthan Ph-02971 244409/10	OPC Gde 43 & PPC
28	JaypeeRewaCement. Brand:- JAYPEE		OPC Gde 43 & PPC
29	Ambuja Cement Ltd Brand:- AMBUJA	Kodinar, PO-Ambujanagar, Taluka-Kodinar, Dist-Junagadh, Gujarat – 362 715 Ph-02795 237000	OPC Gde 43 & PPC
30	Sanghi Industries Ltd Brand:- SANGHI	10th floor, Kataria Arcade Off S G Highway, PO - Makarba, Dist-Ahmedabad, Pin-380051.Mob:09825803690, Tel No: 079-26838000,Fax:079- 26-838111.Website:www.sanghicement.com	OPC Gde 53 & PPC
31	M/s Cement Corporation of India Ltd,Brand: MAHASHAKTI	PO-CCI Tandur, Distt-Ranga Reddy, Andhra Pradesh-501 158 Ph-08411-247240	OPC Gde 43 **(For AP & Adjoining States only)**

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PARTICULAR SPECIFICATIONS(CONTD…)

5.2 SOURCES OF PROCUREMENT(CONTD…)

5.2.2 The contractor shall furnish the particulars of the manufacturer of cement along with the date of manufacturing of cement to the Garrison Engineer for every lot of cement separately.

5.2.3 For each lot of cement brought by the contractor, before acceptance of the cement the following actions will be taken by the GE and Engineer-in-Charge:-

(a) Inspect the lot and verify the general conditions of the cement.

(b) Obtain the vouchers (IN ORIGINAL) of the manufacture of cement for each lot containing the date of manufacturing, from the contractor.

(c) Obtain from the contractor for each lot of cement the manufacturer's Test Certificate (IN ORIGINAL) along with Test Sheets giving the result of each physical test and chemical composition of cement or authenticated copy thereof duly signed by manufacturer. The Test Sheet should include the results of the following mandatory test:-

(i) Specific surface by Blains air Permeability method.

(ii) Soundness Test by Le" Chatlier method.

(iii) Initial setting time.

(iv) Final Setting time.

(v) Compressive strength test at 3, 7 & 28 days as specified in the relevant IS code.

(vi) The test report should also show the chemical properties of the cement as per relevant IS Codes.

(d) Verify the documents listed at Clause Nos**5.2.3(b) & (c)** above given by the contractor from the manufacturer.

5.2.4 The cement so brought shall be fresh and in no case older than 60 days from the date of manufacture. The GEaccordingly in consultation with the contractor will work out the Schedule of procurement and ensure that the same is adhered to. This Schedule should be vetted by CE from time to time. The document in support of the purchases of cement shall be verified by the Engineer-in-Charge. Before placing the order for supply of cement by the contractor, he shall obtain written approval from the GEregarding name of manufacturer, quantity of cement etc. Cement shall be procured for minimum requirement of one month and not procured for minimum requirement of more than two months at a time and should match with the physical progress of the work. The cement shall be consumed in the work within three months after receipt. Cement shall conform to the requirement of Indian Standard Specification and each bag of cement shall bear relevant ISI mark. The weight of each consignment shall be verified by the GE and recorded. The content of cement shall be checked at random to verify the actual weight of cement per bag. However, the content of cement per bag shall be 50 Kg only subject to tolerance given in relevant IS code.

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PARTICULAR SPECIFICATIONS(CONTD…)

5.3 SOURCE OF PROCUREMENT LESS THAN 1200 BAGS

5.3.1 For all contracts, where estimated requirements of cement is less than 1200 bags, contractor can procure cement from the authorised distributors / dealer of the approved firms. However contractor will have to submit test certificate for the batch issued by the firm.

5.4 TESTING OF CEMENT

5.4.1 The contractor shall submit the manufacturer's test certificate in original or attested true copy along with test sheets giving the results of each physical test as applicable in accordance with relevant IS provision and the chemical composition of cement or authenticated copy there of duly signed by the manufacture with each consignment, as per the following IS provision :-

(a) Method of sampling hydraulic cement as per IS-3535.
(b) Method of physical test for hydraulic cements as per IS-4031.
(c) Methods of chemical analysis of hydraulic cement as per IS-4032.

5.4.2 The test certificate and test sheet shall be furnished with each batch of manufacture. The Engineer-in-Charge shall record these details in cement acceptance register to be maintained by him which will be signed by Junior Engineer (Civil), Engineer-in-Charge, Garrison Engineer and the contractor as given in the format hereinafter for verification.

5.4.3 The contractor shall however organise, setting time and a compressive strength test of cement through designated approved laboratory on samples collected from the lot brought at site before incorporation in work. The contractor will be allowed to use the cement only after satisfactory compressive strength test results of three days & seven days. To meet this requirement contractor is required to keep minimum 10 days stock before any new lot brought at site which can be used in the work. The contractor shall be required to remove the cement not meeting the requirement from site within 24 hours. Seven days strength test will be relied upon to accept the lot of cement to commence the work. 28 days compressive strength test will be the final criteria to accept/reject the lot.

5.5 INDEPENDENT TESTING OF CEMENT BY GE / AGE

5.5.1 The GEshall carry out independent testing as per the tests mentioned in the 'CEMENT SUPPLY/ACCEPTANCE FORM' (Physical and Chemical requirement) of random samples of cement drawn from various lots. The testing shall be carried out through National test house, SEMT, CME, Regional Research Laboratories, Govt approved Laboratories, Zonal Laboratories from any GovtEngrCollege ,Govt aided college or NABL labs having NABL accreditation as per IS-3535 (method of sampling hydraulic cement), IS-4031 (method of physical test for hydraulic cement) and IS-4032 (Method of chemical analysis of hydraulic cement) referred to above. The decision as to where the testing of cement is to be done shall be taken by GE. In case the cement is not of requisite standard despite manufacturer's test certificate, the contractor shall remove the total consignment from the site within 24 hours at his own cost after written rejection order of the consignment by the GE. The cost of testing, transportation and of material used in testing etc. shall be borne by the contractor irrespective of the results of testing and no extra claim whatsoever shall be admissible.

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PARTICULAR SPECIFICATIONS(CONTD…)

5.6 SAMPLING FOR INDEPENDENT AND ADDITIONAL TESTS

5.6.1 Sample of cement from each lot should be collected by the Engineer-in-Charge and GEin accordance with IS 3535-1986, for independent or additional tests. Minimum of 2% of the cement bags shall be tested. The cement shall be tested within 1-3 weeks on supply but before incorporation of the same in works. The cost of testing, transportation and of material used in testing etc. shall be borne by the contractor irrespective of the results of testing and no extra claim whatsoever shall be admissible. The record of such samples selected by the GEfor testing shall be properly maintained in the 'Cement Testing Register' giving cross reference to relevant consignment of cement and quantity received etc.

5.6.2 Cost of transportation of samples to the approved laboratory/test house and all testing charges including cost of sample shall be borne by the contractor.

5.7 DOCUMENTATION

5.7.1 The following documents will be maintained by the Engineer-in-Charge/GE for cement supplied by the contractor in addition to the documents specified here-in-before:-

(a) Original vouchers of cement shall be kept in the concerned file of the contract in GE's office, serially numbered on each page.
(b) Original Test Certificate and Test Sheet should also be kept in the concerned file of the contract in the GE's office duly numbered.
(c) Cement Acceptance Register as per **Appendix 'A'**.
(d) In/Out Register for Cement as per **Appendix 'B'**.
(e) Register containing results of independent and additional testing by GE.
(f) Register containing records of surprise checks and BOO.
(g) Inspection Register.

5.7.2 The contractor shall submit original purchase vouchers for the total quantity of cement supplied under each consignment to be incorporated in the work. All consignments received at the work site shall be inspected by the GEalong with the relevant documents to ensure the requirements as mentioned hereinbefore, before acceptance. The original purchase vouchers and the test certificates shall be verified for subject contract and defaced by the Engineer-in-Charge and kept on record in the office of the Garrison Engineerduly authenticated and with cross reference to the consignment/control number recorded in the Cement Acceptance Register. The cement acceptance register shall be signed by the Junior Engineer (Civil), Engineer-in-Charge, GEand the contractor. The GEwill personally check the documents concerned with cement periodically at least once in a month and record of these checks will be kept in the cement Acceptance Registers. The contractor shall maintain schedule of supply of cement for each consignment.

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PARTICULAR SPECIFICATIONS(CONTD…)

5.8 STORAGE/ACCOUNTING/PRESERVATION OF CEMENT

5.8.1 Cement shall be stored in covered godown over dry platform at least 20cm high in such a manner as to prevent deterioration due to moisture or intrusion of foreign matter. In case of store room, the stack should be at least 60cm away from floors and walls. Different lots of cement received will be stacked separately displaying the control number and date of receipt of cement. It will be ensured that the tested and untested cement are segregated and stored with distinct identification. For proper accounting and control of cement brought by contractor a double lock system in the contractor's cement godown will be followed. The stacking of cement shall be done as specified in relevant IS. The storage accounting and preservation of cement supplied by the contractor shall be done as per standard engineer practice till the same is incorporated in the work and the cost of the same shall be deemed to be included in the unit rate/amount quoted by the tenderer. The Engineer-in-Charge shall inspect once a day to verify that cement lying at site is stored, accounted, preserved and maintained as per the norms. The cement shall be stored so as to differentiate each tested and untested consignment separately with distinct identification. If the GE is not satisfied with the storage/preservation of cement, he may order for any test(s) of cement as applicable for that consignment to ensure its conformity to the quality mentioned in the manufacturer's test certificate. The contractor shall bear the cost of necessary testing(s) in this regard and no claim whatsoever shall be entertained.

5.8.2 Stacking of cement shall be done as per relevant IS and as under :-

(a) Each cement consignment shall be stacked separately and shall be issued to work on the basis of 'First come First go".

(b) Adequate top cover will be provided.

(c) Stacks in no case shall be higher than 12 bags. The maximum width of each stack shall be 3.00 m. If the stack is to be more than 7 or 8 bags high, the bags shall be arranged in header and stretcher fashion, i.e., alternatively lengthwise and crosswise so as to tie the piles together and avoid danger of toppling over.

(d) Adequate space shall be kept between two stacks.

5.8.3 Cement godown shall be provided with two locks on each door. The key of one lock at each door shall remain with the Engineer-in-Charge or his representative and that of the other lock with the contractor's authorised agent at site of works so that cement is removed from the godown only according to daily requirement with the knowledge of both the parties. During the period of storage, if any cement bag(s) found to be in damaged condition due to whatsoever reasons, the same shall be removed from the cement godown on written orders of the GEand suitable replacement for the cement bag(s) so removed shall be made and no claims whatsoever shall be admissible on this account.

5.8.4 Cement shall be removed from the store only according to daily requirement with the knowledge of both parties and daily consumption of cement shall be recorded in cement consumption register which shall be signed by the Engineer-in-Charge and the contractor. Cement constants given in **Appendix 'C'** which shall form the basis of consumption of cement for various items of works (except for design mix concrete) unless specifically indicated otherwise which is enclosed herewith. For design mix concrete the cement constant shall be as mentioned here-in-after. For item not covered under **Appendix 'C'** the cement consumption for the same shall be worked out based on actual requirement at site through a Board convened for the purpose including a representative from the contractor. The design mix approved shall not be changed unless a fresh design mix is made due to change of source and quality of material.

5.8.5 In case the consumption of cement as per cement consumption register is found to be more than the estimated quantity of cement due to whatsoever reason, the contractor shall not have any claim, whatsoever, for such excess consumption of cement.

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PARTICULAR SPECIFICATIONS(CONTD…)

5.9 SCHEDULE OF SUPPLY

5.9.1 The contractor shall procure the cement timely as required in accordance with CPM chart agreed between GE and the contractor. The contractor will forfeit his right to demand extension of time if the supply of cement got delayed due to his failure in placing order in time to the manufacturer.

5.10 MEASUREMENTS AND PAYMENT OF CEMENT

5.10.1 The entire quantity of cement shall also be suitably recorded in the Measurement Book for record purposes as 'Not to be abstracted' before incorporation in the work and shall be signed by the Engineer-in-Charge and the contractor.

5.11 RELEASE OF PAYMENT

5.11.1 The payment shall only be allowed after production of original purchase vouchers, certified copies of test certificates from manufacturer for each consignment and results of testing carried out in laboratory on receipt of cement (7 days compressive test) are found satisfactory after testing as specified hereinbefore and taking action on points enumerated in Para **5.4** here-in-before and completing the documents in this regard as mentioned in Para **5.7** Cement shall be paid as material lying at site as per Condition 64 of IAFW-2249.

5.12 ACCEPTANCE/REJECTION OF CEMENT

5.12.1 The contractor will keep a separate stack of cement brought at site for inspection, away from the accepted lot of cement. In case the new lot is rejected by the GE it will be removed from the site within 24 hours, at the cost of the contractor. The cement may be rejected if it does not comply with any of the requirement as per relevant IS codes. The cement should be weighed and each bag shall be of nominal average net mass of 50 kgs. The tolerance on weight of the cement shall be as per the relevant IS Codes.

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PARTICULAR SPECIFICATIONS(CONTD…)

APPENDIX - "A"
CEMENT SUPPLY AND ACCEPTANCE REGISTER

1 CA No. and Name of work: _____

2 ControNo.*_____

3 Name of Manufacturer / Brand Name / Grade of Cement

(a)Manufacturer_____ (b)Brand Name_____ (c)Grade of Cement_____

4 Qty of Cement & Lot No./ Week No (In bags): (a)Qty_____ (b)Lot No. / Week No_____

5 Manufacturer's Test Certificates to_____

6 Random Test Details:
(a) Physical test report from_____ vide their letter No._____

(Name of approved Lab / Engg College)

(b) Chemical test report from_____ vide their letter No._____

(Name of approved Lab / Engg College)

7 Details of Physical & Chemical Properties

	Physical Requirements (As per IS 4031)									Chemical Requirements (As per IS 4032)							
	Specific Surface Area (Sqm / Kg)	Soundness by Le Chatelier	Soundness by Auto Clave	Initial Setting Time (Minutes)	Final Setting Time (Minutes)	Compressive Strengths (Mpa) 03 Days	07 Days	28 Days	Temp During testing (Deg Centigrade)	Standard Consistency(%)	Lime Saturation Factor (ratio)	Alumina Iron Ratio (Ratio)	Insoluble Residue (%)	Magnesium(%)	Sulphuric Anhydride (%)	Loss on Ignition(%)	Alkalies (%)	Chlorides(%)
As per relevant IS																		
As per manufacturer's test certificate																		
As per random test certificate																		

Remarks with Signature Accepted / Rejected

Contractor Junior Engineer Engineer-in-Charge Asst. Garrison Engineer

Remarks of BOO / Inspecting Officer / GE

* To be alloted serially by GE consignment wise

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PARTICULAR SPECIFICATIONS(CONTD…)

APPENDIX - "B"

IN/OUT CEMENT REGISTER

SL NO	DATE	CEMENT IN		CEMENT OUT			QTY BAL-ANCE (IN BAGS)	SIGNATURE		REMARKS
		QTY (IN BAGS)	CONTROL NO	QTY (IN BAGS)	REASONS *	AGE OF CEMENT		CONTR-ACTOR	AGE/GE	
1	2	3	4	5	6	7	8	9	10	11

NOTE 6 The following reasons may be mentioned for taking out cement from store.

(a) For testing purpose

(b)For use in work

(c) Rejected cement taken out of site.

(ii) All the transaction in the register shall be signed by Contractor / his representative and Engineer-in-Charge/JE.

5.13. **FINE AGGREGATE**

5.13.1 Fine aggregate for concrete work shall conform to materials specifications and grading within the limits of grading zones II to III all as specified in Clause 4.4 to 4.4.7.3 of MES Schedule Part – I.

5.14 **COARSE AGGREGATE**

5.14.1 Coarse aggregate for all cement concrete work shall be graded crushed/broken hard granite stone/basalt/ black trap etc. obtained from approved quarries all as specified in Clause 4.4 to 4.4.7.3 of MES Schedule Part – I. Mixture of two types shall however, not be used.

5.15 **GRADING OF COARSE AGGREGATE**

5.15.1 Graded aggregate of nominal sizes given here under, shall be used, unless specified otherwise, in the specifications here in after :-

(a)**All reinforced cement concrete**:-
Unless otherwise shown on drawing, the size of aggregate shall be as per IS-456, but in no case more than 20mm graded aggregate.

(b) **Plain cement concrete**:-

(i)	Upto and incl 30 mm thicknesses	:	12.5 mm.
(ii)	Over 30 and upto and incl 75mm thickness	:	20 mm.
(iii)	Exceeding 75mm thickness	:	40 mm.

5.15.2 **WATER:** Water shall conform to the requirement stipulated in IS-456-2000 and as per Clause 4.9 to 4.9.2 of MES Schedule Part – I.

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PARTICULAR SPECIFICATIONS(CONTD…)

5.0 **CONCRETE**

5.15.3 **Mix of concrete** :

Mix of cement concrete in various situations shall be as described in relevant Schedule 'A' items and as directed by Engineer-in-Charge

5.16 **IMPORTANT REQUIREMENT OF REINFORCED CEMENT CONCRETE/PLAIN CEMENT CONCRETE**

5.16.1 All the Materials, workmanship inspection and testing for the cement concrete shall be as per requirements given in IS-456-2000.

5.16.2 The contractor shall provide all facilities for casting, curing and conveyance of test cubes of cement concrete to authorised laboratory as approved by the GE for testing as laid down in IS-456-2000 at no extra cost to Government.

5.16.3 Engineer-in-Charge shall maintain a record of actual consumption of cement in properregister (other than the cement register mentioned in special condition) for all design mix and initial the entry for every change in quality of cement bag.

5.16.4 All concrete for RCC work shall be consolidated/ compacted by mechanical vibrators of approved type (plate type for slabs and needle type in other locations). Plain cement concrete may however, be rammed and consolidated by tamping and rodding as specified in MES Schedule.

5.16.5 All cement concrete, both plain and reinforced shall be mixed in mechanical mixer of Hopper type. However, in case of small quantity (i.e) the quantity of concrete required being less than one batch of mix, the contractor may, after obtaining written permission of the Engineer-in-charge, be allowed hand mixing without any price adjustment. Where hand mixing is permitted, it shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the concrete is uniform in colour and consistency.

5.17 **COMPACTION**

5.17.1 Concrete should be thoroughly compacted and fully worked around the reinforcement, embedded fixtures and into corner of the form work. Internal vibrators (needle vibrator) shall be used for compaction of RCC slabs of thickness more than 150mm. For slab of thickness up to 150mm, screed vibrator (surface vibrator) shall be used for effective compaction.

5.18 **FORM WORK**

5.18.1 Form work shall comply with requirements of clause No 4.11.6 (4.11.6.1 to 4.11.6.5) & 7.15 (7.15.1 to 7.15.10) of MES Schedule Part-I except that the form works to be provided under this contract shall be of steel only as specified here-in-after in lieu of timber formwork. Props shall be of only steel and bottom plates and side shuttering shall also be of steel only. For supporting small heights, wooden support may be used in lieu of steel support at the discretion of GE without any price adjustment. Similarly in small locations where steel shuttering is practically not possible, plywood shuttering may be used in lieu of steel shuttering at the discretion of GE without price adjustment.

5.18.2 Deformed steel sheet shall not be permitted for use as form work. In case of any deviation involving form work to surfaces exposed to view, the pricing shall be done at the rates of timber form work for rough finish and in case of unexposed concrete surfaces; the pricing shall be done at the rates of timber work, clean sawn subject to contractor's percentage. The contractor shall have no extra claim on account of this.

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6.0 BRICK WORK

6.1 BRICKS

6.1.1 Bricks shall be kiln burnt sub-class “B” best quality locally available conforming to the samples kept in GE’s office. Irrespective or whatever is specified in Schedule ‘A’/Notes on drawings, bricks shall have average compressive strength of not less than **35Kg/Sqcm.** Water absorption of bricks shall not exceed 20% when tested in accordance to IS-3495. Sampling and testing of bricks shall be carried out as per IS-5454 and IS-3495. The size of the brick shall be 230mm x 115mm x 75mm. The tolerance in size of bricks shall be ± 8%.

6.1.2 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 of that place.

6.1.3 Mortar bed joints shall be such that four courses of brick work and three joints taken consecutively shall measure 3 cm to 4 cm in addition to the combined height of bricks themselves. The provision regarding above made in Para 5.26 of MES Schedule Part-I shall be deemed to be modified accordingly and no price adjustment shall be done on this account. The vertical joints shall also be of the same thickness of bed joints.

6.2 LAYING AND BOND

6.2.1 Bricks shall be laid and bonded, all as specified in clauses of MES Schedule Part-I as applicable to old size bricks (FPS conventional bricks).

6.2.2 Half brick walls shall start from top of PCC sub base in ground floor and from top of RCC slabs in upper floors unless otherwise shown on drawing/specified. Half brick thick walls of height more than 90cm shall be reinforced with 2 Nos 8mm dia TMT bars horizontally at every 4th course starting from second course and anchored in walls at junctions. The anchorage length provided shall be not less the 100mm. Mortar bed joints shall be such that 4 courses of brick work and 3 joints taken consecutively shall measure 3 cm to 4 cm in addition to the combined height of bricks themselves. The provision regarding above made in para 5.26 of MES Schedule Part-I shall be deemed to be modified accordingly and no price adjustment shall be done on this account. The vertical joints shall also be of the same thickness to bed joints.

6.3 CEMENT

6.3.1 Cement shall be all as specified under Clause 4.1 to 4.13.1 here-in-before.

6.4 SAND

6.4.1 Sand for mortar shall be as specified in Clause 5.4 to 5.4.2 of MES Schedule Part – I . Also refer Sch’A’ Notes here –in-before.

6.5 CURING

6.5.1 Masonry work shall be kept constantly moist on all the faces for a minimum period of 7 days.

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7.0 WOOD WORK AND JOINERY

7.1 TIMBER

7.1.1 Timber for all joinery and wood work unless otherwise specified here-in-after shall be second class hard wood conforming to specifications given in Clause 7.3 to 7.3.1.1 of the MES Schedule Part- I and shall be within the permissible limits of defects defined in Clauses 7.4 to 7.5.2 of MES Schedule Part – I.

7.2 MOISTURE CONTENT

7.2.1 Attention is drawn to IS-287 and the map in the Indian Standard. The site of work lies under Zone II and the maximum percentage of moisture content permissible in timber to be used in the work for various purposes will be as given for this zone. It shall be ensured by the tenderer that the moisture content in timber to be used (before incorporation in the work) is within the maximum permissible limit as specified in MES Schedule. Adequate number of test shall be carried out by the Engineer-in-Charge to determine the moisture content in the timber to be used in the work and the contractor shall provide necessary facilities for test as required by Engineer-in-Charge without any extra cost to Government. Testing charges shall also be deemed to be included in rate quoted by the contractor against respective items of Schedule 'A' Part I

7.3 PRESERVATION OF TIMBER

7.3.1 Preservation treatment shall be carried out to all wood work and joinery fabricated by the contractor at site. Factory made shutters and ply boards are deemed to be provided with preservative treatment.

7.3.2 Chemical used for preservative treatment to wood work and joinery shall be organic solvent type 2 as specified IS-401 applied in any one of the manners specified in IS.

7.3.3 The species of timber for joinery item shall be as specified here under :-

(i) Flush door shutter	:	Factory made flush shutters shall be of second class hard wood of species as per IS 2202 (Part 2) 1983
(ii) Fully/Partly paneled/ Wire gauzed shutter	:	Factory made shutters with styles/ rails of second class hard wood of Species as per IS 1003(Part I) BIJASAL(HONNE), BENTEAK(NANDI), LAUREL (MATTI)
(iii) Wooden runner cleats/stoppers, beading and fillets for shutters and frames.		:Second class hard wood of species LAUREL / BIJASAL / BENTEAK / VENTEAK / SAL
(iv) All other wood work and Joinery not otherwise specified		: As in (iii) above.

7.4 FACTORY MADE PANELLED DOOR SHUTTERS

(a) Paneled door shutters and glazed/gauged shutters shall be factory made shutters conforming to IS-1003(Part-I). Styles and rails shall be kiln seasoned and chemically treated by pressure process as per Para 5.5 of IS-401(under vacuum pressure). The dimensions and overall sizes shall however be as shown on drawings.

(b) The thickness of door shutters shall be as shown on drawings and if not shown on drawings, the same shall be 35mm.

(c) Irrespective of what is indicated on drawings panels for paneled door shutters shall be with 9mm thick B.W.P commercial ply or 12mm veneered particle board with commercial veneering on both faces. Paneled shutter shall be provided with suitable size of beading all round the panel insert on both the sides of the shutter.

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7.5 WOODEN CHOWKATS TO DOORS/WINDOWS/VENTILATORS

7.5.1 Wooden chowkats to doors, windows and ventilators shall be provided at locations as directed by Engineer-in-Charge. The class of wood/timber to be used shall be as specified in schedule 'A'. Unless otherwise specified the wooden chowkats shall be of second class hard wood and conform to the species as specified in Clause No. 7.3 (i) here-in-above. The size and sections of Chowkats shall be provided as directed by Engineer-in-charge. Wooden Chowkats shall be as specified in Clause No. 8.18 of SSR Part – I and fixed in locations as specified in Clause No. 8.19 of SSR Part – I.

7.6 PVC DOOR FRAMES AND DOORS

7.6.1 Doors and frames for toilet /bath/WC shall be factory made PVC moulded doors. The door frame and shutter shall be as specified. However shutters shall be of wood free EPS core shutter. PVC moulded door shall be procured from any one of the firms mentioned in the list of manufacturers here in after.

7.6.2 STAINLESS STEEL WIRE CLOTH

7.6.4 Wire mesh to be used for wire gauzed shutters of windows / doors shall be of stainless steel mesh with average width of aperture of size 1.18 mm x 1.18 mm and of 26 gauge. The wire cloth shall be provided for mosquito proof doors / windows wherever required as specified in Clause No. 9.25.3 of SSR Part – I. Sample of wire mesh shall be got approved from the GE before incorporating in work.

7.7 PRESSED STEEL FRAMES FOR DOORS/WINDOWS/VENTILATORS

7.7.1 All door/window/ventilator frames except PVC shall be of pressed steel frames. Pressed steel frames shall be all made out of 1.25 mm thick MS Sheet and conforming to the specifications given in Clause No. 10.27.1 of SSR Part – I. Irrespective of what is shown on drawings the frames shall conform to IS-4351.

7.7.2 The void of the steel frames shall be filled with PCC 1:3:6 type C0 (using 12.5mm graded stone aggregate). Hold fasts for the frames shall be provided as per details shown on the aforesaid drawings.

7.7.3 MS tie bar of 10mm dia round bars shall be provided at the bottom of frames by welding to the frame and tie bar shall be embedded and left in door.

7.7.4 MS conduit not less than 19mm dia of 16 gauge closed at one end shall be welded to inner face of frame for receiving shoot of bolt. MS Socket for housing shoots of tower bolt shall also be provided as directed by Engineer-in-Charge.

7.7.5 Exposed surface of frames shall be given two coats of synthetic enamel paint over a coat of primer and surface in contact with masonry/concrete shall be sanded over two coats of tarring. Tarring shall be carried out all as specified in SSR Part-I.

7.8 PLYWOOD

7.8.1 Plywood shall be of grade as detailed in Sch "A" shall conform to to IS: 303.

7.8.2 PARTICLE BOARD

7.8.3 Particle board shall be commercial veneered on both sides bonded with BWR grade synthetic resin adhesive and shall conform to exterior grade conforming to IS :3097

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8.0 STEEL AND IRON WORK

8.1 GENERAL

8.1.1 All steel required for the work under the contract shall be procured, supplied and incorporated in the works by the contractor under his own arrangements. The reinforcement steel as well as the structural steel like angles, I sections, channels etc., shall be of tested quality and shall comply with the requirement mentioned in the drawings, SSR and particular specifications here-in-after. The specifications mentioned in the tender documents shall be read in conjunction with the provisions laid down in MES Schedule Part-I, Section 10 – Steel and Iron work. The contractor shall submit test certificate from the manufacturers.

8.2 TYPES OF STEEL

8.2.1 Steel supplied by the contractor shall conform to the following grades and quality:-

(a) **STEEL FOR CONCRETE REINFORCEMENT**

(i) High strength deformed steel bars produced by Thermo Mechanical Treatment process (TMT HCR/CRS Steel Bars of grade Fe-500 / Fe-500D/ Fe-550/ Fe-550D) meeting all other requirements of IS: 1786. In case drawings indicate steel of grade Fe 415, same shall be provided with Fe-500 / Fe-500D/ Fe-550/ Fe-550D without any price adjustment on plus side. Please note that Fe-415 grade stands discontinued for use.

(ii) Mild steel bars shall conform to IS-432 (Part-I) and Grade I.

(iii) Fabric reinforcement for concrete shall conform to IS: 1566.

(b) **STRUCTURAL STEEL**

(i) Definition of structural steel as given in clause 10.4 of SSR Part-I shall be applicable. Standard quality steel of grade E-250 (Fe-410 W quality A) conforming to IS-2062 for all types of steel structures including those subject to dynamic loading shall be used.

(ii) Ordinary quality structural steel wherever mentioned shall be conforming to IS-1977 of grade E-165(Fe-290) and shall be used for doors, windows, guard bars, grills, steel gates, hand railing, fencing posts etc.

(iii) Steel tubes for structural purposes shall conform to IS-1161 and shall be of Grade YST-240.

(c) **GALVANISED IRON SHEETS** Galvanised steel sheets (plain or corrugated) shall conform to IS: 277. Grade of zinc coating to be used shall be the one which is given in clause 10.29.1 of SSR Part-I which is dependent on thickness of sheet. Minimum coating of sheet shall be 450 gm / sqm.

(d) Steel tubes for structural purposes shall conform to IS-1161 and shall be of Grade YST-240.

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8.2.2 **SOURCE OF PROCUREMENT**

(a) **TMT HCR / CRS STEEL / TMT**

TMT HCR / CRS / TMT Steel bars of all sizes supplied by the contractor shall be procured directly from primary manufacturers as listed below.

	Name of Firm	**Remarks**
(i)	**RashtriyaIspat Nigam Limited (RINL)** Brand:- RINL Visakhapatnam Steel Plant Visakhapatnam- 530 031, India Tele –(91 891) 518226, 518376 Fax – (91 891) 518316 E-mail: cmdvsp@itpvis.ap.nic.in	For all types &dia of TMT bars
(ii)	**Tata Iron & Steel Company (TISCO or Tata Steel)** Brand:- TATA Bombay House, 2, 4 HomiModi Street, Mumbai – 400 001, IndiaTele –(91 22) 204 9131, Fax – (91 22) 204 9522, 287 0840 E-mail: corpcomm@jsr.tatasteel.com	For all types &dia of TMT bars
(iii)	**Steel Authority of India Limited** Brand:- SAIL Central Marketing Organisation, Northern Region,17th Floor, Scope Minar, Laxmi Nagar Distt Centre,Delhi-110092	For all types &dia of TMT bars
(iv)	**M/s Jai Balaji Industries Ltd** Brand:- BALAJI SHAKTI 5 Bentek Street, Kolkata-700001, Delhi Off 510.Block-b, Navaraung House,21 Kasturba Gandhi Marg , New Delhi-110001 011-43620219,43620220 Mob:- 7838272772/9958936103 E-mail : info@jaibalajigroup.com	TMT bars Fe-500 & Fe-500D
(v)	**M/s Shyam Steel Industries Limited** Brand:- SHYAM Shyam towers, EN-32, Sector – V, Salt Lake, Kolkata – 700091 Tele – 033-40074007, Fax – 033-40074010,E-mail: marketing@shyamsteel.com	TMT bars Fe-500 & Fe-500D CRS
(vi)	**M/s SPS Steels Rolling Mills Ltd** Brand:- ELEGANT TMT Elegant Towers,68A, Ballygunge Circular Road, Kolkata – 700 019, Ph : 033-2895160/67, Fax : 033-22894386, E-mail : spsdelhi@spsgroup.co.in	TMT Bars Fe-500/ Fe-500D& Fe-550
(vii)	**M/s Steel Exchange India Ltd** Brand:- SIMHADRI TMT My Home Laxmivilas Apartments, Ameerpet, Hyderabad-500 016, AP Ph : 040-23403725Fax : 040-23413267 E-mail : info@seil.co.in	TMT bars Fe-500 & Fe-500D HSCRM

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2.2.2 **SOURCE OF PROCUREMENT(CONTD…)**

(viii)	**M/s Jindal Steels and Power Ltd** Brand:- JINDAL PANTHER, OP Jindal Road, Hissar,Haryana, Pin-125005, .Ph : +91 1662 222471-84Fax :+91 1662 220476	TMT bars Fe-500/ Fe-500D, Fe-550 / Fe-550D.
(ix)	**M/s SRMB Srijan Ltd**. Brand:- SRMB,SRMB House,7, Khetra Das Lane, Kolkata-700 012.Ph : 033-6600 6600, Fax : 033-2211 0483.	TMT bars Fe-500 / Fe-500D, Fe-550 / Fe-550D (8mm to 32mm)
(x)	**M/s Concast Steel & Power Ltd, Kolkata**. Brand:- CONCAST MAXX 21 HemantBasuSarani, Suit Nos-511 & 512 5th Floor, Kolkata-700 001Ph : 91-33-2213 0481-87, 91-33-22130488 E-mail:- info@ concastgroup.com	TMT Bars Fe-500, Fe-500D (8mm to 32mm)
(xi)	**M/s ShriBajrang Power &Ispat Ltd** Brand :- GOEL TMTViII-Borjhara, Urla Industrial Area, Raipur – 493 221, ChhattishgarhPh. 0771-4288019/29/39	TMT Bars Fe-500 & Fe-500D (8mm to 32mm)`
(xii)	**M/s JSW Steel Ltd,** Brand:- NEOSTEEL JSW Centre, BandraKurla Complex, Bandra (EAST) Mumbai – 400 051, Maharashtra Ph-022-42861000 Fax- 022-42463000	TMT Bars Fe-500, Fe-500D CRS (8mm to 40mm)
(xiii)	**M/s Electrosteel steels Ltd,** Brand :- ELECTROSTEEL G K Tower, 2nd& 3rd Floor,19 Camac Street, Kolkata,West Bengal – 700 017 Website- www.electrosteel.com	TMT Bars Fe-500D (8 mm to 36mm)
(xiv)	**M/s ShyamMetalics& Energy Ltd.** Brand :- SEL, Viswakarma,Ist floor, 86 C, Topsia Road,Kolkata-700046,Ph:-+9133 2285 2212, Website: www.shyamgroup.com	TMT Bars Fe-500,Fe-500D (8mm to 32mm)
(xv)	**M/s Kamachi Industries Ltd.** Brand:- KAMACHI ABC Trade Centre, 3 rdFloor(inside Devi Theatre Complex) , Old No.50. New No.39, Anna Salai, Chennai- 600002, India. Tel:+91-044-42961100, Fax: +91-044-42961122, E-mail: sales@kamachitmt.com website: www. Kamachitmt.com	TMT Bars Fe-500, Fe-500D, Fe-550, Fe-550D, HCRM (8mm to 40mm)
(xvi)	**M/s BDG Metal & POWER Ltd** Brand:-BDG 6HMP House, 4 Fairlie Place, 5th Floor Kolkata-700001, India Tel: +91-33-4005-9005 Fax: +91-33-4005-9095 E-mail: info@goyalgroup.in Website: www.goyalgroup.in	TMT Bars Fe-500, Fe-500D, Fe-550D (8mm to 32 mm)

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PARTICULAR SPECIFICATIONS(CONTD…)

8.2.2 **SOURCE OF PROCUREMENT(CONTD…)**

(xvii)	**M/s Gallantt Metal Ltd Brand :- GALLANTT TMX** Ward 10BC, Plot No. 123, Ground Floor, Gandhi Dham Kutch, Gujarat-370201 Tel:+91-2836-228164 Fax: +91-2836-235787 E-mail: gml@galiantt.com Website: www.gallantt.com	TMT Bars Fe-500, Fe-500D, CRS (8mm to 32 mm)
(xviii)	**M/s RashmiMetaliks Ltd** Brand:- RASHMI TMT Premlata Building, 39, Shakespeare Sarani 6th Floor, Kolkata-700017 Tel-033-22894255/56, Fax-033-22894254 E-mail- mkt.domesticdip@rashmigroup.com Web site. www.rashmigroup .com	TMT Bars Fe-500, Fe-500D, Fe-550D (8mm to 25 mm)
(xix)	**M/s Real Ispat& Power Ltd Ltd** Brand:- G K TMT Vrindavan, Near IDBI Bank, Civil Lines Raipur-492 001 , CG Tel- +91-771-4224000 Fax- +91-771- E-mail- real@realispat.com Web site. www.realispat .com	TMT Bars Fe-500, Fe-500D, (8mm to 36 mm)
(xx)	**M/s Super Smelters Ltd** Brand:- SUPER SHAKTI Premlata,39, Shakespeare Sarani 3rd Floor, Kolkata-700017 Tel-+91-33-2289-2734/36 E-mail- info@supershakti.in Web site. www. supershakti.in	TMT Bars Fe-500, Fe-500D, Fe-550 (8mm to 32 mm)

(a) NOTE:-(i) Any other manufacturer and brand not included in the List, but approved by E-in-C's branch before end date of submission of bids shall also be incorporated in the work(ii) Each consignment shall be accompanied by a certificate from the billet plant that the TMT bars have been manufactured from the billets of its plant only.

(b) STRUCTURAL STEEL:-The contractor shall procure Structural steel sections directly from primary producers as listed here-in-after. In case on non-availability of structural steel with primary producers, the same can be procured from approved secondary producers given here-in-after with a reduction of 5%(five percent) of accepted rates of structural steel with prior approval of Accepting Officer. In case desired section of structural steel is not rolled / manufactured by primary producers, there is no price adjustment in case of structural steel procured from approved secondary producers given below:-

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PARTICULAR SPECIFICATIONS(CONTD…)

LIST OF PRIMARY PRODUCERS:-

(i) **RashtriyaIspat Nigam Limited (RINL)** Structural Steel (Angle, Beam, Column, Channel, Plate) Brand: "RINL"Visakhapatnam Steel Plant ,Visakhapatnam - 530 031, India. Tel: (91 891) 518226, 518376 Fax: (91 891) 518316
Email: cmdvsp(@itpvis.ap.nic.in

(ii) **Tata Iron & Steel Company (TISCO or Tata Steel)**
Brand:- TATA **-do-**
Bombay House, 2, 4 HomiModiStreet,Mumbai - 400 001, India,Tel: (91 22)204 9131, Fax: (91 22) 204 9522, 287 0840Email: corpcomm@jsr.tatasteel.com(Br office for North :Jeevan Tara Bldg,PatelChowk , New Delhi)

(iii) **Steel Authority of India Limited (SAIL)** **-do-**
Brand: "SAIL"Central Marketing Organization,
Northern Region17th Floor, scope Minar,
Laxmi Nagar Distt. Centre,Delhi -110092

(iv) **M/s Jindal Steels and Power Ltd, Brand: Jindal** **-do-**
Jindal CentrePlot No.2, Sector 32,
Gurgaon – 122 001, Haryana.,Ph : 0124 661 2000
Fax :0124 661 2125, Website :www.jindalsteelpower.com

LIST OF SECONDARY PRODUCERS

(i) M/s. K L Steel Pvt Ltd, Post Box No. 61, LalKuan,
Bulandshahar Road, Ghaziabad (UP).Tele : 0120-2867911, 2867915 Fax : 0120-2867917

(ii) SRMB Udyog Ltd, 46, BB Ganguli Street, Kolkata – 700 012,
Tele 2236 9999.

(iii) M/s ShriBadrinarain Alloys & Steels Ltd, 95,Stephen house,
4 B B D Bag, Kolkata 700 001 ,Tele : 033 22205381/22481601 Fax : 033 2248 8664

(iv) M/s Shree Parashanth Re-rolling Mills Ltd.14C, MaharshiDevendre Road, 3rd Floor Kolkata – 700 007, Phone – 033-22740045 / 4475 Fax – 033-22740039

(v) M/s Pushpak Steel Industries Pvt Ltd, Gate No.119, AlandiMarkal Road, Dhanore, TahKhed Pune, Tele – Fax 020-26444700/070

(vi) M/s Tata Steel Structural, Tata Steel – Tube Division,
Jeevan Tara Building, 1st floor, 5 SansadMarg, New Delhi – 110 001
Tele – 991112334, 264601734, 309983, 309986

(vii) M/s Amba Shakti Ispat Ltd, Plot No.6, Phase II Industrial Area,
Kala Amb, DistSirmour, 173030(HP),Tele 01734-309983, 309986 Fax 01702-238927

NOTE:-

(i) Any other manufacturer and brand not included in the List, but approved by E-in-C's branch before end date of submission of bids shall also be incorporated in the work.

(ii) Irrespective of the above list of manufacturers, GE shall ensure validity of approval/renewal of manufacturer and brand at the time of sample approval.

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PARTICULAR SPECIFICATIONS(CONTD…)

(c) **GALVANISED IRON SHEETS AND FABRIC REINFORCEMENT FOR CONCRETE**

These shall be ISI marked and shall be procured from SAIL / RINL /TISCO or BIS marked manufacturers at the option of the contractor without any minus price adjustment.

8.2.3 Steel section for railing, gates, fencing, guard bars, grills, steel chowkats, hold fasts etc, which do not constitute structural members, can be procured from main producers / secondary producers / BIS marked manufacturers or their authorized dealers at the option of Contractor without any minus price adjustment. Tests for such steel sections shall not be insisted by GE.

8.2.4 The steel will be procured from the storage depots of the main producers / approved secondary producers (as applicable) and not from their authorized agents / dealers as the authorized agents deal with the steel manufactured by more than one manufacturer. The GE will ensure that contractors place their demand / requisition of steel with adequate lead time.

8.2.5 All finished steel shall be well and clearly rolled to the dimensions, sections and weights specified. The finished material shall reasonable free from cracks, surface flaws, laminations, rough jagged and imperfect edges and any other harmful defects and shall be finished in a proper manner. Tolerance on size and weight of reinforcement bars shall not be more than as specified in clause 10.17.4 and 10.17.5 of MES Schedule Part-I and as specified in IS-1786-1985 and IS-2026 and as per relevant IS codes.

8.2.6 Contractor will give to GE manufacturer's test certificate (IN ORIGINAL) alongwith the test sheet giving result of each mechanical test and the chemical composition of steel (as per IS 1786-1985) for reinforcement steel or authenticated copy thereof duly signed by manufacturer with each consignment. The documents such as original purchase vouchers and test certificates in support of the purchase of steel shall be produced by the contractor to the site staff and GE.for verification and record.

8.3 **APPROVAL OF STEEL BROUGHT BY THE CONTRACTOR**

8.3.1 The following action shall be taken by GE.before incorporating steel procured by the contractor for the work:

(a) Physical verification of steel received to confirm the actual quantity of steel as well as to verify aspects brought out in **para8.2.5** here-in-before.

(b) GE will obtain original machine numbered purchase vouchers of manufacturer from the contractor.

(c) Verify the documents listed in Sl No.(b) and foregoing above given by the contractor from the manufacturer.

(d) No consignment or part thereof will be allowed to be incorporated in the work until and unless the test results of independent testing are obtained and the consignment is passed by GE. Schedule or procurement will be prepared keeping in view the time lost for testing etc.

(e) Three samples of pieces (3m long) of each section of consignment will be retained at the project site till completion of the work. These samples will be suitably marked and properly preserved.

Contd…

PARTICULAR SPECIFICATIONS(CONTD…)

8.4 TESTING OF STEEL

8.4.1 The manufacturers of steel are to carry out inspection and testing of steel in accordance with relevant BIS provisions. The contractor shall submit the manufacturer's test certificate in original or authenticated attested true copy by the manufacturers only along with the test sheet giving the result of each mechanical test as applicable in accordance with relevant IS provision and the chemical composition of steel or authenticated copy with each consignment. The Engineer-In-Charge shall record these details in a steel acceptance register which will be signed by JE(Civil), Engineer-In-Charge, GE and contractor as given in the format **(Appendix `D')** hereinafter after due verification and Engineer-in-Charge shall send a certified true copy of test sheet to GE for his records. Independent testing of steel / structural steel / GI sheets and fabric reinforcement for concrete by the GE shall be optional at the discretion of the GE in case of procurement of steel from main producers and testing charges shall be borne by the department if the test results are found in order otherwise these shall be borne by the Contractor.

8.4.2 For independent testing, random samples of steel shall be drawn from various lots and shall be got tested from a National Test House, SEMT Wing CME, Regional Research Labs or NABL etc., as per minimum frequency given below. Samples from each lot shall also be tested for quality and elongation. The elongation shall not be less than 18%.

8.4.3 Ultimate tensile strength, elongation, bend and re-bend test for reinforcement steel bars shall be carried out as per clause **8.5.1** and test specimen shall be as per clause 11 of IS-1786-1985 and delivery inspection shall be as per clause 12 of IS-1786. Bend tests and tensile tests for structural steel shall be carried out as per IS-2062.

8.4.4 In all cases mentioned above contractor at his cost shall provide all facilities required for the testing. Cost of materials consumed in tests shall also be borne by contractor. The records of such checks shall be maintained in steel test register.

8.5 FREQUENCY OF SAMPLING FOR INDEPENDENT TESTING BY GE

8.5.1 Frequency of nominal mass, tensile strength, bend and re-bend tests of steel for checking nominal mass, tensile strength, bend and re-bend tests , test specimen at random shall be selected by GE at the following frequency:-

(a) STEEL FOR CONCRETE REINFORCEMENT

(i)	Bars size less than 10mm	:	One sample (3 specimens) for each test for every 25 tonnes or part thereof.
(ii)	Bars Size 10mm to 16mm (inclusive)		One sample (3 specimens) for each test for every 35 tonnes or part thereof.
(iii)	Bars size over 16mm		One sample (3 specimens) for each test for every 45 tonnes or part thereof.

(b) STRUCTURAL STEEL

(i)	Tensile test	One test for every 25 tonnes of steel or part thereof.
(ii)	Bend test	One test for every 10 tonnes of steel or part thereof.

Note:- For various tests, acceptance criteria, tolerance etc., refer to **Appendix "D"** and relevant IS Codes.

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PARTICULAR SPECIFICATIONS(CONTD…)

8.5.2 The testing of GE as per above frequency is mandatory before payment is released to the contractor or steel in incorporated in the work. The frequency of number of samples/tests shall however be increased by the GE for his satisfaction. The cost of these additional tests shall be governed as per Condition 10(A) of IAFW-2249. However the coat of samples, transportation and other overheads shall be borne by the contractor irrespective of test results.

8.5.3 Test shall not be insisted upon for the ordinary quality structural steel required for guard bars hold fast, grill, hand railing/fencing posts, steel doors and windows, gates and such other allied items.

8.5.4 In case test results of testing pursuant to clause **8.4.3** are not within the acceptable limits, then that consignment of steel shall stand rejected and contractor shall remove the same from site at his own cost. The rejected material shall not be incorporated in the work. The contractor shall have no claim on this account.

8.5.5 Cost of test samples as per frequency given in clause **8.5.1** above shall be borne by the contractor irrespective of test results.

8.6 **DOCUMENTATION**

8.6.1 Original purchase vouchers from the manufacturer and original or authenticated test certificates of the manufacturers for the total quantity of steel supplied under each consignment to be incorporated in the work shall be produced to the Engineer-In-Charge of the work by the contractor. All consignments received at the work site shall be inspected by the GE along with the relevant documents before acceptance. The original vouchers and the test certificates shall be defaced and signed by the Engineer-In-Charge and kept on record in the office of the GE duly authenticated and with cross reference to the control number recorded in the steel acceptance register. The steel acceptance register shall be signed by JE, Engineer-in-Charge, GE and contractor. The entire quantity of all consignments shall also be suitably recorded in the measurement book for record purposes as `NOT TO BE ABSTRACTED' before incorporation in the work and shall be signed by the Engineer-In-Charge and contractor. The following provisions shall also be complied.

(a) All original vouchers will be kept in a file serially numbered and to be kept in GE office.
(b) Test certificates of each steel consignment will be kept in a file, serially numbered and to be kept in GE office.
(c) Steel acceptance register as per **Appendix "D"** will be maintained by the GE.
(d) In / Out register for details of receipt, acceptance / rejection and consumption of steel will be maintained as per **Appendix "E"** above.
(e) Register containing results of independent and additional testing by GE.
(f) Inspection register.

GE will check the documents personally, connected with the steel, at least once a month and record of these check will be kept in the Inspection Register **(Para 8.6.1(f) above).**

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PARTICULAR SPECIFICATIONS(CONTD…)

8.7 **STORAGE, ACCEPTANCE / REJECTION OF STEEL**

8.7.1 The steel procured by the contractor shall be stored in the site of work as directed by Engineer-In-Charge/GE neatly in separate stack for various sizes/consignments with distinct paint marks at least 15 cm above GL for identification. The steel as stacked shall be removed for incorporation in the work only in the presence of departmental representative. The quantity of steel of various sizes received at site and recommended for incorporation in the work shall be entered in the separate register and signed by the contractor and the Engineer-in-Charge daily.

8.7.2 Steel will be stored in a manner so as to prevent distortion and corrosion till it is consumed in the work. Any section that has deteriorated and corroded or if considered defective for any other reason, the same shall be removed from site by the contractor at his own cost.

8.7.3 The contractor will keep a separate stack of steel brought at site for inspection, away from the accepted stack of steel. In case, the consignment does not meet any of the requirements of the relevant IS codes, the steel will be rejected by the GE and it will be removed from the site within 24 hours at the cost of the contractor.

8.8 **STORAGE, ACCEPTANCE / REJECTION OF STEEL**

8.8.1 The steel procured by the contractor shall be stored in the site of work as directed by Engineer-In-Charge/GE neatly in separate stack for various sizes/consignments with distinct paint marks at least 15 cm above GL for identification. The steel as stacked shall be removed for incorporation in the work only in the presence of departmental representative. The quantity of steel of various sizes received at site and recommended for incorporation in the work shall be entered in the separate register and signed by the contractor and the Engineer-in-Charge daily.

8.8.2 Steel will be stored in a manner so as to prevent distortion and corrosion till it is consumed in the work. Any section that has deteriorated and corroded or if considered defective for any other reason, the same shall be removed from site by the contractor at his own cost.

8.8.3 The contractor will keep a separate stack of steel brought at site for inspection, away from the accepted stack of steel. In case, the consignment does not meet any of the requirements of the relevant IS codes, the steel will be rejected by the GE and it will be removed from the site within 24 hours at the cost of the contractor.

8.9 **CONVERSION WEIGHT OF STEEL**

8.9.1 The weight of steel shall be calculated as per the conversion factors specified in the SSR. For sections not listed on SSR, the ISI conversion table shall be followed or manufacturers certificate if the weights are not available in SSR/ISI tables.

8.9.2 Normal waste and off cuts shall be stacked neatly which shall be the property of the contractor. Contractor shall be allowed to remove such cut pieces after inspection and certification of the Engineer-in-Charge.

8.9.3 Advance on accounts of payments made towards these cut pieces shall be recovered from advance on account of payments immediately falling due and before removal of such cut pieces from site.

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PARTICULAR SPECIFICATIONS(CONTD…)

8.10 **PAYMENT IN RAR**

8.10.1 Payment of the steel brought by the contractor should only be released by the GE after taking action points enumerated in **para8.8 above** and after completing the documents hereinbefore in the regard.

8.10.2 Before payment of steel, contract and structural drawing shall be read thoroughly and various grades / types of steel to be incorporated in the work shall be identified by the contractor and got approved by GE. No overpayment shall be made on this account in the RAR. Steel shall be procured sufficiently in advance as mentioned here-in-after under **clause 8.12.**

8.11 **SAFETY OF STEEL**

8.11.1 It will be the responsibility of contractor to make sure that all possible arrangement are made for safe custody of the steel. In case of any loss of steel, only contractor will be responsible and the loss will be made good without any delay or claim whatsoever.

8.12 **SCHEDULE OF SUPPLY**

8.12.1 Contractor shall work out complete requirement of steel size wise and phase the same as per activities planned to be executed in terms of CPM networking. The contractor shall procure all the steel sections in accordance with this CPM chart. Schedule of supply of steel will be finalised by GE in consultation with contractor and the same will be incorporated in CPM chart so that supply of steel is monitored in a way to avoid any delay in completion of the work. The schedule of supply of steel will be vetted by GE from time to time.

8.13 **WELDING**

8.13.1 Welding wherever shown on drawing shall be by metal arc process in accordance with IS-816 and IS-822 unless specifically indicated otherwise on drawings.

8.14 **BINDING WIRE**

8.14.1 Binding wire for reinforcement shall be mild steel wire annealed not less than 0.9mm dia.

8.15 **COVER BLOCKS**

8.15.1 Cover blocks shall be pre cast factory made all as specified in clause 10.20.1 of SSR Part-I.

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PARTICULAR SPECIFICATIONS(CONTD…)

8.16 STEEL WINDOWS AND VENTILATORS

8.16.1 Steel windows/ventilators shall be provided at locations as specified in Schedule and shall be procured from any one of the manufacturer mentioned in the list of manufacturers given here-in-after. Fabrication, specifications and fixing of windows and ventilators shall be as specified in Clause No. 10.25 of MES Schedule Part – I.

8.16.2 The voids of steel frame shall be filled with PCC 1:3:6, type CO. using 12.5mm graded stone aggregate.

8.16.3 The process of welding adopted may be flash-butt welding or any other suitable method which gives a continuous and solid joint all along the place of meeting the members. Welds shall be properly ground with no protrusions of welding material at the joint.

8.16.4 Fittings shall be provided all as directed by Engineer in charge.

8.16.5 Machine screws as specified in IS 1038 shall only be used for fixing.

8.16.6 Provide glazing as specified here-in-before.

8.16.7 Steel windows manufactured by the firms mentioned in the list of manufacturers are considered to be of acceptable standards. Steel windows and ventilators may be obtained from any other manufacturer with prior written approval of the Accepting Officer, without price adjustment provided the same fulfill the following requirements:-

(a) Steel conforming to the specification given here- in –before and IS.

(b) Standard and quality are equal or superior to the product mentioned above and is factory made.

(c) Steel window fabricated/welded from standard sections by local contractors or tradesmen are not acceptable.

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PARTICULAR SPECIFICATIONS(CONTD…)

APPENDIX - "D"

STEEL SUPPLY AND ACCEPTANCE REGISTER

1 CA No. and Name of Work:_____

2 Control No._____

3 Name of Manufacturer's TC No:

4 Manufacturer_____

5 Random Test Details:

(a) Physical test report from_____ vide their letter No._____

(Name of NABL approved Lab / GovtEngg College)

(b) Chemical test report from_____ vide their letter No._____

(Name of NABL approved Lab / GovtEngg College)

6 Types of steel, dia and Qty

(a) Type : TMT / CRS

(b) Dia-mm

(c) Actual Wt-MT

(d) Conversion Wt-MT

	Chemical Test							Mechanical Test						
	Carbon %	Sulphur %	Phosphorous %	Sulphur + Phosphorous %	Manganese %	Silicon %	Corrosion resistant element	Wt per Metre	Yield Stress (N/Sqmm)	Tensile Strength (N/Sqmm)	Percent Elongation %(Min 18%)	Bend test	Rebend Test	Remarks
As per IS-1786														
As per manufacturer's test certificate														
As per independent certificate														

Remarks with Signature

Accepted / Rejected

Contractor Junior Engineer Engineer-in-Charge Asst.Garrison Engineer

Remarks of BOO / Inspecting Officer / GE

Contd…

PARTICULAR SPECIFICATIONS(CONTD…)

APPENDIX - "E"

IN/OUT STEEL REGISTER

SL NO	DATE	STEEL IN			STEEL OUT			QTY BALANCE
		QTY (TONS)	SECTION	CONTROL NO	QTY (TONS)	SECTION	REASONS*	
1	2	3	4	5	6	7	8	9

* **NOTE** (i)The following reasons may be mentioned for taking out steel from store.

(a) For testing purpose

(b) For use in work wc

(c) Rejected steel taken out of site.

(ii) All the transaction in the register shall be signed by Contractor / his representative and Engineer-in-Charge/JE.

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PARTICULAR SPECIFICATIONS(CONTD…)

8.17 **HOLD FASTS/LUGS**

8.17.1 Flat iron hold fasts/lugs shall be provided by welding as directed & as specified in Schedule 'A'. Hold fasts/lugs shall be embedded in PCC (1:2:4) type B1 (using 20mm graded stone aggregate) bed blocks of size as detailed in Sch "A". Hold fasts/lugs shall be hot tarred and sanded before fixing in position.

8.18 **MILD STEEL FOR GENERAL PURPOSE**

8.18.1 Ordinary quality structural steel wherever mentioned shall be conforming to IS-2062 of grade E-165 (Fe-290) and shall be used for doors, windows, guard bars, grills, steel gates, hand railing, fencing posts etc.

9.0 **BUILDERS HARDWARE**

9.1 **ITEMS AND QUANTITIES**

9.1.1 Hardware fittings shall be provided all as specified in Sch'A' .

9.2 **SIZES**

9.2.1 All articles of builder's hardware shall bear ISI marking. In case any item / fitting with ISI mark is not manufactured then it shall conform to the relevant IS specification and the specifications given in the MES Schedule for the relevant item.

9.2.3 Screws used for fixing items of builders hardware shall be as specified in clause 9.2.6 of MES Schedule.

9.2.4 Articles:- All the builders hardware except butt hinges shall be of aluminium powder coated unless otherwise specified.

9.3 **TOWER BOLT**

9.3.1 Tower bolts shall conform to specifications given in clauses 9.3.1 and 9.3.3 of MES Schedule Part-I. The dia of shoot shall be of 10mm for length upto 125mm and 12mm dia for length 150mm and above.

9.4 **SLIDING DOOR BOLTS**

9.4.1 Sliding door bolts shall conform to specifications given under clauses 9.5.2 of MES Schedule Part-I. Size shall be as indicated in Schedule.

9.5 **BUTT HINGES**

9.5.1 Brass butt hinges shall be type B-11 all as specified under clause 9.7.1 and 9.7.3 of MES Schedule Part-I.

9.5.2 Butt hinges shall be cold rolled mild steel of medium weight as specified in clause 9.7.1 and 9.7.2 of MES Schedule.

9.6 **HANDLES**

9.6.1 Handles shall conform to specifications given under clauses 9.11 of MES Schedule Part-I. Size shall be as indicated in drawings.

9.7 **TOWEL RAIL**

9.7.1 Towel rail shall be of brass chromium plated 20mm dia, 600mm long including brackets, wooden plugs and fixing accessories complete. The thickness of pipe shall be as specified..

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PARTICULAR SPECIFICATIONS(CONTD…)

10.0 FLOORING

10.1 GENERAL

10.1.1 Provisions contained in clause 13.25, 13.32, 13.38 and 13.39 of MES Schedule Part-I are to be adopted for laying floors and pavements.

10.1.2 Floors shall be laid to levels or to falls as directed by the Engineer-in-Charge. Floor finish shall be extended over dwarf walls, doors and other openings.

10.1.3 The floor levels of the bath, WC etc., shall be lower than the adjacent rooms as directed.

10.1.4 The dividing line between the floors of different types wherever so they meet between adjoining rooms, shall be determined on the basis of the finish visible when the doors are closed and applicable finish shall be accordingly be provided.

10.1.5 Sub floors/ sub base shall be laid all as specified in SSR Part-I.

10.1.6 Dividing strips shall be of glass 3mm nominal thickness and to the thickness of wearing course in case of PCC. Top of dividing strips shall be finished smooth with top surface of floor. However, the bays shall be laid alternatively.

10.2 CERAMIC TILES IN FLOORING

10.2.1 Ceramic tiles shall be of non – skid superior finish/ matt finished variety, light coloured, superior quality Grade B1 with water absorption conforming to IS-15622.Size of tiles shall be as shown in drawing. In case size of tiles not mentioned elsewhere the same shall be 400 x 400 mm 7-8mm thick. The tiles shall be procured from any one of the firms mentioned in list of manufacturers attached here-in-after. Colour of tiles shall be as approved by GE. Contractor shall submit necessary test certificate at his own cost as per IS-15622 and cost of same shall be deemed to be included in the lump sum. Lump sum quoted shall be deemed to include for provision of tiles in any pattern. The tiles shall be laid over screed as directed by GE. The under layers shall be as specified in Schedule of finishes.

10.2.2 Laying, jointing and finishing shall be done all as specified in clause 13.40.1 & 13.40.2 of MES Schedule ‘A’ Part-I.

10.3 CERAMIC TILES IN DADO/SKIRTING

10.3.1 Ceramic Coloured tiles wherever mentioned shall be of glossy economy finish, light coloured, superior quality, Grade B II b with water absorption conforming to IS-13712. Size of tiles shall be as shown on drawing. In case size of tiles not mentioned elsewhere the same shall be 300 mm x 200 mm x 8mm thick. The tiles shall be procured from any one of the firms mentioned in list of manufacturers attached here-in-after. Texture, tint and colour of tiles shall be as approved by GE. The tiles in skirting shall match with the adjacent flooring. Contractor shall submit necessary test certificate at his own cost as per IS-13712 and cost of same shall be deemed to be included in the lump sum. The tiles shall be fixed over backing coat as directed by GE.

10.3.2 Laying, jointing and finishing shall be done all as specified in clause 13.40.1 to 13.40.2 of MES Schedule ‘A’ Part –I.

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10.4 **KOTA STONE FLOORING**

10.4.1 **STONE SLABS**

The slab shall be of selected quality, hard, sound, dense and homogeneous in texture, free from cracks, decay, weathering and flaws. They shall be hand or machine cut to the requisite thickness as indicated and they shall be of uniform colour. The slabs shall have the top (exposed) face polished before being brought to site. Before starting the work, Contractor shall get the sample of slabs approved by the Engineer-in-Charge.

10.4.2 **DRESSING OF SLABS**

Every slab shall be cut to the required size and shape and fine chisel dressed on the sides to the full depth so that a straight edge laid along the side of the stone shall be in full contact with it. The sides (edges) shall be table rubbed with coarse sand or machine rubbed before paving. All angles and edges of the slabs shall be true, square and free from chippings and the surface shall be true and plane. For staircase treads, single piece slab to full length and width of treads shall be provided. The nosing shall be rounded off and two parallel grooves ten by ten (10mm x 10mm) immediately behind the nosing edge shall be provided to avoid skidding. Square or circular holes shall be made carefully to accommodate M.S. Baluster in position

10.4.3 Laying, jointing,curing,polishingetcshall be done all as specified in clause 13.47.3 & 13.47.4 of MES Schedule ‘A’ Part-I.

10.5 **GRANITE FLOORING**

10.5.1 Granite slab shall be pre-polished,selected quality all as specified in BOQ.

10.6 **CHEQUERED CEMENT CONCRETE AND TERRAZO FLOORING TILES**

10.6.1 Chequered cement concrete tiles and colouredchequered cement concrete tiles shall conform to IS 13801-1993 specification for Chequered cement concrete tiles**.**

10.6.2 Laying, jointing,curing,polishingetcshall be done all as specified in clause 13.17.2 of MES Schedule ‘A’ Part-I.

11.0 **PLASTERING**

11.1 Plaster and / or skirting / dado shall be returned to jambs, soffits or lintels and window cills etc.

11.2 Where plaster on concrete surface is shown to match the adjacent wall surfaces, the mix of plaster shall be as for the brick surfaces.

11.3 All plastered surfaces shall be trowelled to smooth and even surfaces without using extra cement and external plastered surfaces shall be finished even and fair.

11.4 All external plastering shall be carried out up to 15cm below the top level of plinth protection.

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PARTICULAR SPECIFICATIONS(CONTD…)

11.5 All corners, angle, junctions and edges shall be truly vertical or horizontal as the case may be and shall be carefully finished. Corners around jambs of openings and junction of walls shall be rounded to minimum radius of 5mm.

11.6 Particular attention of the contractor is invited to take note of local practices and local availability of materials like bricks, stones, form work etc. for any extra quantity of mortar required for rendering smooth, extra dubbing required, touching up properly and achieving smooth and even surfaces. This shall be deemed to have been included in the rates quoted.

11.7 Where dados / skirting are provided the internal plaster shall commence from the top of the dado / skirting.

11.8 Cement mortar in all situations shall be machine mixed or hand mixed at the discretion of the contractor. In case of deviation, the rate as given in MES schedule Part - II shall however apply subject to contractor's percentage.

11.9 Thickness of cement plaster mentioned here-in-after is the net thickness above the proudest part of masonry walls. Nothing extra shall be paid for dubbing.

11.10 **CURING**

11.10.1 Each coat of rendering shall be kept damp continuously for at least two days. Moistening shall commence after plaster is sufficiently hardened.

11.11 **MATERIALS**

11.11.1 **CEMENT AND SAND**

Please refer Clause **5.1 to 5.14.**herein before and Clause 14.5 of MES Schedule Part-I for sand.

11.12 **INTERNAL PLASTER**

11.12.1 Internal surfaces of walls of the buildings shall be plastered with 10 mm thick in Cement Mortar(1:6) above skirting/ dado finished even and smooth with out using extra cement.

11.13.1 External plastering shall be of 15 mm thick in Cement Mortar 1:4 (5mm thick setting coat mixed with water proofing liquid over 10 mm thick cement plaster) in two layers finished fair and even without using extra cement. Water proofing liquid shall conform to the requirements as specified here-in-after. Care shall be taken to ensure water proofing materials gets well and integrally mixed with cement and does not run out separately when water is added.

11.13 **EXTERNAL PLASTER**

11.14 **PREPARATORY OF BACK GROUND FOR APPLICATION OF PLASTER**

11.14.1 All dirt, dust and foreign matter on surfaces of masonry and laitance on the concrete surfaces shall be removed by watering or brushing as required. In case, background contains soluble salts particularly sulphates, only after efflorescence of the salts is complete, plastering shall be done.

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PARTICULAR SPECIFICATIONS(CONTD…)

11.14.2 Joints in masonry shall be raked to a depth of 10mm as the work proceeds. Local projections beyond the general wall surface shall be trimmed off to avoid variance in thickness of plaster.

11.14.3 For smooth surface of concrete it shall be roughened by wire brushing or hacking or bush hammering if surface is hard. All projecting burrs shall be removed. The surface shall be scrubbed by wire brushes. Further pock marks 3mm deep at spacing of 50mm shall be done.

11.14.4 Adequate drying intervals shall be allowed between erections and plastering to bring the surface suitable for suction adjustment. The wall surface shall be dampened evenly before plastering and spots dry shall be moistened. Excess water will lead to failure of bond between plaster and background.

11.14.5 Dubbing coat and rendering coat shall be same type and mix and dubbing coat shall be executed along with rendering coat.

11.14.6 Plastering shall not be done till door frames are firmly fixed. Provide protection to fittings fixed against splash of plaster. However, if any splash of mortar is noticed it shall be cleaned off immediately.

11.14.7 Screed 15cm X 15cm shall be laid vertically and horizontally not more than 2m apart to serve as guide in bringing the work to an even surface.

11.14.8 Plastering shall be done from top to bottom continuously without joints.

11.14.9 The finished work of plastering shall not show more than 4mm deviation where checked by straight edge of 2m length placed over it.

11.14.10 In one coat plaster, the mortar shall be firmly applied to the masonry walls and well pressed into the joints and forcing it into the surface depressions for obtaining permanent bond. The plaster shall be laid little more than the required thickness and leveled with wooden float. On concrete walls rendering shall be dashed on roughened surface to ensure adequate bond using strong whipping motion at right angle to face of wall.

11.15 **WATER PROOFING LIQUID**

11.15.1 Water proofing liquid to be used shall be 0.4% by weight of cement or as specified in manufacturer's instructions whichever is more. It is to be ensured that with the use of water proofing liquid overall chloride content when determined in accordance with IS-6925 shall not exceed 2%. liquid water proofing compound shall only be used for work and it shall be procured from any one of the firms mentioned in list of manufacturers here-in-after.

12.1 **PREPARATION AND APPLICATION OF WHITEWASH**

12.1.1 White wash shall be prepared and applied all as specified in Clause 15.12.1 to 15.12.3 and 15.12.5 to 15.12.5.2 of MES Schedule Part-I. Skirting is not to be white washed. For white washing on ceiling adequate quantity of zinc oxide shall be added to lime wash for achieving egg white wash. The lime shall be of ready mixed type and shall be procured from any one of the firms as listed hereinafter.

12.2 **WHITE WASHING**

12.2.1 White wash shall be prepared and applied all as specified in clause 15.12.1 to 15.12.3, and 15.12.5 of MES Schedule Part – I. For white washing on ceiling, adequate quantity of zinc oxide shall be added to lime wash for achieving egg white shade. Skirting and dado are not to be white washed. Lime shall be ready mixed type and shall be procured from any one of the firms mentioned in the list of manufacturers attached here-in-after.

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PARTICULAR SPECIFICATIONS(CONTD…)

12.3 **OIL BOUND DISTEMPER**

12.3.1 Where oil bound distemper has to be done, apply two coats of oil bound distemper over a coat of alkali resistant primer. The tint of the paint shall be as directed by GE. Preparation of surfaces and application of distemper shall be done as specified in clause 15.14.1, 15.14.3 to 15.14.5.3 of MES Schedule Part–I.

12.4 **CEMENT BASED PAINT**

12.4.1 Cement based paintingshall be all as described in BOQ (Schedule A) and as specified in SSR Part-I. Cement paint shall comply with IS 5410-1992, Specification for cement paint colour as required. The material shall be in the powder form, free from lumps that are not friable and when mixed with required volume of water shall be suitable for use on porous surfaces of masonry, concrete, bricks and rough plaster work. The tint of the paint shall be as directed by the GE. The paint shall be of first quality and shall conform to relevant IS. Primer shall be of the same manufacturer/make of cement base paint as approved by GE.

13.0 **PAINTING**

13.1 All synthetic enamel paint, shall be of superior quality manufactured by the standard firms of make as listed in list of manufacturers here-in-after.

13.2 The contractor shall inform the GE, within four weeks of the acceptance of the tender, the brand names of manufacturer of paint proposed to be used in the works and submit samples thereof well in time and obtain prior written approval of the GE before their use in work.

13.3 The contractor shall, when so required by the GE, produce certificate from the manufacturer or their representative to establish that the brands of paints purchased by the contractor from them satisfy the requirements of the relevant Indian Standard.

13.4 Paints for priming coat, under coat and finishing coat shall be of same manufacturer. Paint shall be procured in bulk in reasonable quantities as approved by GE.

13.5 Tint of paint, will be as approved by the GE.

13.6 Paints for priming coat, under coat and finishing coat shall be of same manufacturer. Paint shall be procured in bulk in reasonable quantities in buckets of 4 litres capacity for easy consumption without any deterioration in quality as approved by GE. Tint of paint, will be as approved by the Engineer-in-Charge. The painting of wood and steel surfaces shall be carried out as per clauses 17.3 to 17.5.4, 17.6.5 and 17.8.6 of MES Schedule Part-I.

13.7 Prepare surfaces and apply two coats of synthetic enamel paint over a coat of primer to all exposed faces of wood work in joinery etc., other than those covered with laminated sheets or surfaces for which other treatment is specifically indicated.

13.8 **WORKMANSHIP**

13.8.1 All wood work required to be painted shall be smoothened, sized and knotted and then applied with priming coat. Stopping and filling (filler coat) shall be done after priming coat and surface rubbed down to a level of smooth surface and thereafter under coat and finishing coat applied all as specified in Clause 17.6 of MES Schedule. Steel and iron work shall be painted in the manner as specified in clauses 17.8 of MES Schedule.

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PARTICULAR SPECIFICATIONS(CONTD…)

13.8.2 Steel and iron work shall be painted in the manner as specified in clauses 17.8 of MES Schedule Part-I.

13.8.3 No treatment shall be given to reinforcement.

13.8.4 Other steel surfaces (except GI Pipes) exposed to view or specified elsewhere, shall be given two coats of synthetic enamel paint over a coat of primer of tint as directed by the GE.

13.8.5 Irrespective of what is specified elsewhere, finishing coat and under coat shall be with synthetic enamel paint.

13.9 **EXTERIOR EMULSION PAINTING**

13.9.1 Exterior emulsion painting shall be provided at locations as directed by Engineer in charge.. Weather proof paint shall be of (first quality) exterior paint of approved paint manufacturers.

13.9.2 Paint for under coat and finishing coat shall be of same manufacturer and applied as per manufacturer's instructions. Colour and Tint shall be as approved by GE.The paint shall be 100% acrylic and semi acrylic shall not be used in the work. The primer shall be of the same manufacturer/make of acrylic paint as approved by GE .

13.10 **TARRING**

13.10.1 The back of wooden members in contact with brick work/plaster etc and also wooden /steel surfaces embedded in walls shall be given two coats of tar.

13.11 **CREOSOTING**

13.11.1 Creosoting shall be done for hidden wooden surfaces all as specified in clauses No17.11 to 17.11.2 of MES Schedule Part – I.

14. **GLAZING**

14.1 Glazing to windows / doors shall be all as specified in Sch'A' and as directed by Engineer in Charge..

14.2 Sheet glass shall be of select / ordinary glazing quality conforming to IS-2835-1977 and clause 16.2.2 and 16.2.3 of MES Schedule Part-I. Figured glass shall be of " Pin head pattern.

14.3 Glazing shall be all as specified in MES schedule. The glass to be fixed to steel frames shall be fixed with special spring glazing clips with oil putty as specified in MES Schedule. Glass to be fixed to aluminium doors and windows shall be with appropriate standard aluminium clips as per manufacturer's instructions.

14.4 **PVC WATER TANKS**

14.4.1 PVC water tanks of capacity shall be as specified. The tanks shall be of triple layered and shall be procured from approved manufacturers as specified. Water tank shall be placed on existing PCC platform by making good with cement concrete 1:2:4 as directed. Outlet and over flow pipe 15 cm long of 25 nut arrangement shall also be provided. PVC water spouts 4 Nos of 50 mm dia and 100mm long shall also be provided as directed by Engineer in charge.

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PARTICULAR SPECIFICATIONS(CONTD…)

15 WATER PROOFING TREATMENT TO ROOF/ FLOOR SLAB

15.1 Roof/Floor slab shall be cleaned thoroughly by using wire brush (mechanical / hand brush) to make it free from any loose particle, dirt / dust etc.

15.2 Makes of water proofing treatment shall be as per Sch'A'.

15.3 At the junction of parapet and RCC roof, PCC benching in 1:2:4 type B1 shall be provided to drain off rain water before laying water proofing treatment over the roof slab. The water proofing treatment shall be extended upto a height of 30 cms on wall. Water proofing treatment shall be carried out all as specified in clause 11.39 of SSR Part - I.

15.4 The main contractor shall stand guarantee to the Government for period of TEN YEARS from the date of taking over the completed work for the efficiency of the treatment carried out. The main contractor shall furnish written guarantee for the above in favour of Garrison Engineerimmediately on completion of work.

15.5 For this particular contract guarantee amount calculated as applicable to individual security deposit on the amount of water proofing treatment work at contract rates is **Rs. 5000/-.** This amount shall be retained by the Govt as Security Deposit for the entire guarantee period from the contractor's dues. The amount shall be released after successful expiry of the guarantee period of ten years from the certified date of completion by the GE provided always that the Contractor shall first have been paid the final bill and have rendered a No-Demand certificate (IAFA-451). The facility of furnishing fixed deposit receipt / BGB in lieu of the sum to be retained as security may be accepted. The contractor shall furnish written guarantee for the above in favour of GE immediately after completion of work" .The amount so withheld shall not carry any interest. The contractor may however, furnish a fixed deposit receipt in lieu, from a Schedule Bank pledged in favour of **GE(M)(AF)Jalahalli**.

15.6 The Security Deposit referred to in Condition 22 of General Conditions of contract IAFW-2249 is independent of the Guarantee amount referred herein before. Conditions 46 and 68 of the General Condition of contract (IAFW-2249) shall be deemed to be amended to the extent mentioned above.

15.7 Should the GEat any time, during the construction or prior to the expiry of said guarantee period of 10 years, find that the buildings have been found leaking the contractor, on demand in writing from the GE, will forthwith under take to carryout such repairs/rectification which may be necessary to render the buildings free from leekage/seepage at his own expense till expiry of the guarantee period of ten years. The guarantee shall also be applicable to wood-work and joinery as specified here-in-after.

15.8 In the event of Contractor's failure to comply with the GE's directions within the stipulated period, the work shall be carried out at the risk and cost of the contractor. The liability of the contractor under this condition shall not, however, be extended beyond the period of 10 years from the certified date of completion, unless the notice was served on the contractor previously to rectify such defects.

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PARTICULAR SPECIFICATIONS(CONTD…)

15.9 The contractor shall provide a plaster plate of requisite size in location as decided by the Engineer-in-Charge on the wall of of the building where work carried out. The plate shall be 10mm thick in cement mortar (1:4) to indicate the details such as water proofing treatment done vide CA NO, date of expiry of guarantee period and name of contractor by engraving and painting (black). The cost of plaster plates are included in the ratequoted .

16.0. **SANITARY & TOILET FITTINGS**

16.1 **GENERAL**

16.1.1 All sanitary appliances shall be vitreous china ware (White) first quality for all toilets as approved by **GE** and shall confirm to IS-2556 (Part-I) for general requirement and the specific requirements as mentioned in relevant clause of MES Schedules. These shall be of an approved make from the list given in clause here-in-after .

16.1.2 Flush pipe and socket of flushing rim of WC shall be jointed with white and red lead cement (white and red lead in equal proportion by weight and linseed oil added to form paste).'P' and 'S' trap shall be of vitreous china ware and jointed to WC pan with cement joints as specified in clause 18.48.5 of MES Schedule Part – I. The sizes, given here in after are approximate sizes. The size of sanitary fittings to be provided shall be to the nearest size as per manufacturer's catalogue as approved by GE.

16.2 **MIRROR**

16.2.1 Mirror shall be of size as indicated on Schedule. It shall be with approved selected quality sheet glass duly silver plated uniformly on the back edge 5.5 mm thick and plywood backing 3 ply 6 mm thick conforming to IS-303-1975 of General purpose and shall be of BWR grade with type 'B' face on the both ends. The plywood shall be given a coat of zinc chrome primer.

16.4 **WATER CLOSET INDIAN TYPE (ORISSA PATTERN)**

16.4.1 Provide Indian type water closet squat pan Orissa type of 580mm x 440mm white with monolithically cast foot rests including 'P' or 'S' trap as directed. Flushing cistern shall be of 10 liters capacity, low level of HDPE with lever handle or knob press handle with internal fittings (valve less syphonic fittings), ball valve with polythene ball, polythene LDPE flush pipe 32mm dia, and pair of CI or angle iron brackets. CI / angle iron brackets shall be painted two coats of synthetic enamel paint over a coat of red-oxide zinc chrome primer. Foot rests shall conform to IS 2556 (Part 7) – 1995. The size of foot rest shall be 250 x 125 mm and as specified in Clause No. 18.32.4 of MES Schedule Part – I.

16.4.2 The flushing cistern shall be procured from manufacturers as listed here-in-after.

16.4.3 It shall be vitreous china ware white conforming to IS 2556 (Part 3) – 2004 and as specified in clause 18.32.3 of MES Schedule Part - I.

16.4.4 Fixing of water closet, flushing cistern and foot rest shall be as specified in clause 18.86.1 to 18.86.3 of MES Schedule Part- I.

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PARTICULAR SPECIFICATIONS(CONTD…)

16.5 **WASH DOWN WATER CLOSET**

16.5.1 Water Closet shall conform to IS 2556 (Part 2)-2004. Specification for vitreous sanitary appliances (vitreous china), part II, specific requirements for wash down water closets, and shall be of pattern 1 or 2 as directed, and of height 390 mm and 410 mm respectively. Each closet shall have an integral trap either with P or S outlet; trap inlet depth shall be at least 75mm. Where required the closet shall have an anti-syphonage 50 mm dia vent horn on the outlet side of the trap. The serrated part of the outlet shall not be glazed externally. Each closet shall have not less than two holes for fixing to floor

16.6. **STAINLESS STEEL SINK**

16.6.1 It shall be manufactured from Salem Stainless Steel Sheets grade A1 S1 305. Thickness of Sheet shall be 1 mm. Size of sink shall be as indicated. The surface of the sink shall be plastic coated to make it safe and scratch free installation.

16.7 **SHOWER ROSE**

16.7.1 Shower rose shall be of brass chromium plated swivel type 80mm dia rim suitable for 15mm bore inlet with swivel joints and including chromium plated arm. The make of shower rose shall be as approved by GE.

16.8 **URINALS**

16.8.1 Urinal shall be vitreous China bowl type flat back of size 465 x 355 x 265 mm including funnel type HDPE 40 mm dia PVC flush pipe (waste pipe) shall be fixed on wall with two Nosaluminiumclamp

16.9 **SHORTER LENGTHS**

16.9.1 Except for WC connections, the contractor may use pipe pieces without sockets in shorter lengths (less than one piece length) if approved by the GE and connected these to pipe fitting with double sockets/collars, including additional joints as specified above without extra cost to the Government.

16.10 **SOIL / WASTE / VENT PIPES / FITTINGS / ACCESSORIES**

16.10.1 Soil pipe, waste pipe and fittings shall be cast iron sand cast pipes and fittings all as described in Sch "A".

16.10.2 Soil, waste and vent pipes including bends, branches etc., shall be tested as specified in clause 18.79 and 18.93 of MES Schedule Part-I, on completion of work to the entire satisfaction of the Engineer-in-Charge. Joints found leaking or defective etc., shall be provided by the contractor with provided without any extra cost to the Government.

6.12 **TESTING OF PIPE LINE AFTER LAYING**

16.12.1 Testing shall be carried out by the contractor all as specified in clause No 18.54 and 18.55 of MES Schedule Part-I in the presence of Engineer-in-Charge. If any fittings, specials, joints leak during testing, the same shall be rectified by the contractor without any extra cost to the Government. The amount quoted by the tenderers against the Schedule 'A' is deemed to include for the above provision and no extra claim will be entertained on this account.

17. **INTERNAL WATER SUPPLY**

17.1 **GALVANISED STEEL WATER TUBING & FITTINGS:**

17.1.1 GI pipes for internal water supply shall be medium grade/ light grade as described in Sch A and shall conform to IS- 1239 (Part I 1979).

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PARTICULAR SPECIFICATIONS(CONTD…)

17.2 **BIBTAPS AND STOP VALVES**

17.2.1 Bib taps and stop valves shall be cast copper alloy screwed down and comply with IS-781-1984 and shall be ISI marked. Stop valves shall be internally / externally threaded. The minimum finished mass of bib taps and stop valves shall be as specified in clause 18.14.1 of ES Schedule Part-I.

17.3 **BALL VALVES**

17.3.1 Ball valves shall be of brass high pressure type and shall comply with IS-1703-1977 and shall be ISI marked. Ball floats excluding floats shall be of brass. The float shall be of polythene. The minimum finished mass of ball valves exclusive of floats and wall thickness of float shall be as specified in clause No 18.19 of MES Schedule Part - I.

17.4 **GATE VALVE / GLOBE VALVE**

17.4.1 Gate valve/Globe valve shall be of gun metal with wheel head, screwed both ends for PPR pipes. The weight of gun metal gate valve shall be as specified in Clause No. 18.102.1 of SSR Part – I and conform to the provisions of IS 778 specifications bearing ISI mark. The valves shall be procured from any one of the manufacturers listed here-in-after. Fixing of valves shall be carried out all as specified in Clause No. 18.62 62 & 18.102.2 of MES Schedule Part – I.

17.5 **LAYING AND FIXING OF PIPES**

17.5.1 The pipes for supply of water shall run on the outside of the walls and connections to various fittings shall be brought to the rooms as directed by the Engineer-in-Charge.

17.5.2 All pipes and fittings shall be fixed truly vertical and horizontal. Pipes and fittings shall be fixed on walls, ceilings etc., with approved pattern holder / bat clamps of required shape and size so as to fit tightly on the pipes, when tightened with screws on wall. The clamps shall be embedded in brick work in cement mortar 1:3 and spaced at regular intervals as specified in clause No 18.51.2 and 18.51.3 of MES Schedule Part-I.

17.5.3 Cutting, threading and jointing of pipes / fittings shall be carried out all as specified in clauses No.18.50.2 & 18.50.3 of MES Schedule Part-I.

17.6 **STOP VALVES (CONCEALED)**

17.6.1 Concealed type stop valves shall be all as specified in Schedule ‘A’ and Clause No. 18.105 of MES Schedule Part - I. The valves shall be fixed all as specified in Clause No. 18.111 of MES Schedule Part – I and as directed by Engineer-in-Charge.

18 **INTERNAL ELECTRIFICATION**

18.1 **MATERIAL AND SAMPLE BOARD**

18.1.1 All materials unless otherwise specified shall possess ISI mark or conform to relevant IS specification or to BSS if ISS is not available.

18.1.2 Approval of GE referred to in the clauses 19.2.1 and 19.2.2 on Page 19-4 of MES Schedule Part I shall be in writing. Approved samples shall belabelled as such and signed both by the contractor and Engineer-in-Charge. They shall remain in the custody of Engineer-in-Charge till completion of the work.

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PARTICULAR SPECIFICATIONS(CONTD…)

18.1.3 The contractor is deemed to have included in rates, cost of making holes/chases where required through masonry or concrete work for taking in cables/conduits and conductors etc., and making good the same to match with existing work

18.2 **TYPE OF ELECTRIC SUPPLY**

18.2.1 Type of electric supply will be AC 415 Volts, 3 phase and 240 Volts single phase at 50 cycles.

18.3 **SCREWS, NAILS ETC**

18.3.1 All screws and nails used in the electric work shall be brass, unless otherwise specified. Plastic sheet cover for MS terminal boxes shall be fixed with cadimium plated iron screws.

18.4 **CABLES**

18.4.1 All cables (except flexible cables) to be used in the work shall be indigenous with IS Mark and conforming to Indian Standard Specifications including amendments if any.

18.5 **LIGHT FITTINGS**

18.5.1 Light fittings shall be of approved make and shall conform to the description given in Sch "A". The rate quoted shall be deemed to include for fixing the fittings and connecting up complete with necessary connectors, cables etc., all as directed by Engineer-in-Charge. The make shall be any one of the makes specified here-in-after. The make shall be got approved by the GE.

18.5.2 Particular attention is drawn to the neatness in appearance which is to be achieved by judicious location of light fittings, switches, socket outlets and main controls etc. Due regard shall be given to doors, windows, openings etc., in fixing the run of cables, position of fittings, control switches etc. The location of fittings etc., shall be marked in advance on walls etc., as approved by GE.

18.6 **SWITCH SOCKET OUTLET**

18.6.1 Switch socket outlet shall be as specified in Schedule and of approved best indigenous make and provided with piano type control switch and shall be ISI marked.

18.7 **SOCKET OUTLET**

18.7.1 Socket outlet shall be of approved best indigenous make and shall bear ISI mark. The socket outlet shall be as specified in Clause 19.40 of MES Schedule Part – I. The number of outlets and capacity shall be as specified in Schedule 'A'. Unless otherwise specified the socket outlets shall be of surface flush and non shuttered type.

18.8 **EARTH PLUG & SOCKET**

18.8.1 Earth plug & socket shall be provided at locations as directed by Engineer-in-Charge. These shall conform to relevant IS and procured from approved manufacturers.

18.9 **PIANO KEY TYPE SWITCHES**

18.9.1 These shall be of indigenous make and bear ISI mark. The switches may be either one way or two ways as specified in Schedule 'A'. The fittings shall be approved by GE before incorporation in the work.

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PARTICULAR SPECIFICATIONS(CONTD…)

18.10 **PVC CONNECTION**

18.10.1 These shall be of best indigenous make conforming to relevant IS suitable for AC single phase 230 volts 5 amps and shall be as approved by the GE.before incorporation in the work. The terminal of grub screws shall be of cadmium plated and shall be concealed.

18.11 **SWITCH BOXES**

18.11.1 Switch boxes shall be ofpressed flush boxes made of GI Sheet of any module for housing modular switches, regulators, sockets, etc. it shall have one earth terminal. The size shall be sufficient to house all the equipment with proper clearance if not specified in the description of respective item in Schedule 'A'**.** The box shall be coated with two coats of red oxide zinc chrome. It shall be embedded in the walls with cement mortar (1:2) so that the cover is flush with the finished wall surfaces.

18.12 **END TERMINATION**

18.12.1 All cable termination for internal electrification for various switches, light fittings, MCBs, MCCBs, junction boxes, connectors etc., shall be provided with suitable crimped lugs, studs, sleeves as required to avoid any possibility of loose connections and sparking. Connections without proper screwing and without providing suitable crimped lugs, studs, sleeves will be strictly prohibited.

18.13 **EXHAUST FAN**

18.13.1Exhaust fans shall be all as specified in Sch 'A' and procured from approved manufacturers listed in list of makes.The exhaust fans shall be fixed at locations as directed by Engineer-in-Charge. The fans shall be erected and fixed in position as specified in Clause No. 19.115.4.6 of MES Schedule Part – I. The cost of civil works shall be deemed to include in quoted Schedule.

18.15 **CONDUIT, CONDUIT ACCESSORIES AND CONDUIT WIRING**

18.15.1 The conduits and accessories shall be steel / non-metallic rigid PVC conduits as detailed in Sch "A". They shall conform to relevant IS specifications and bearing ISI mark and as detailed under clause 19.29 of MES Schedule Part-I. The diameter shall be as specified in Schedule `A'.

18.16 **POINT WIRING / SUB MAIN WIRING**

18.16.1 Cable and earthing lead for internal wiring, sub main wiring shall be as specified in Schedule 'A'. Cables and cords shall be from fresh stocks and shall be of approved make. The capacity of current per circuit shall be as specified in Clause No. 19.24.2 of MES Schedule Part – I.

18.16.2 Cable for internal wiring work shall be as specified in Schedule 'A'. Unless otherwise specified the cable shall be copper conductors and as specified in clause No. 19.25 of MES Schedule Part – I.

18.17 **PLASTIC LAMINATED SHEET**

18.17.1 Suitable size cover plates and white surrounds of any module shall be used for mounting modular switches, regulators, sockets etc.

18.18 **PVC CONNECTORS**

18.18.1 These shall be the best indigenous make conforming to relevant IS suitable for AC single phase 240 volts 5 amps and shall be approved by the GE before

incorporation in the work. The terminal of grub screws shall be cadmium plated brass and shall be concealed.

18.19 **CEILING ROSE**

18.19.1 Ceiling rose shall conform to IS 371 of 1979. No of terminal plates shall be as specified in Schedule. Ceiling rose shall be surface type and provided as specified in Clause No. 19.32 of SSR Part – I.

18.20 **ELECTRICAL TEST**

18.20.1 On completion of wiring the whole installation will be tested in accordance with IS-732 Part III of 1982 and test certificate shall be prepared and held on records. If the test results are not acceptable, all repairs and replacement and extra work of removal and relaying or refixing shall be carried out by the contractor at his own expense and installation retested, until test results indicate compliance with prescribed requirement. The contractor shall supply all necessary apparatus, lab and instruments or equipments required for testing and quoted rate is deemed to include for the same.

18.21 **LED LIGHT FITTINGS**

18.21.1 Provide LED light fittings all as specified in Schedule 'A' and as directed by Engr-in Charge. Make of the LED fittings shall be as specified in 'Schedule 'A' and has to obtain the prior approval of Engr-in- Charge.

18.21.2 The LED lights/luminaries supplied must meet the provision laid down in IS No.16101, 16102 Part I & II, 16103 Part I, 15885 Part II/ Sec 13, 16104, 16105, 16106, 16108:2012 and LM 70

18.21.3 All LED light products must have replacement warranty of 50,000 hours from the date of completion of the contract.

18.21.4 The product will replace free of cost in the following cases:-

(a) Manufacturing defects.

(b) Failure due to mechanical and electrical impact.

(c) Drop in lumen (or lux at 1m) below 90% of claimed values of lumen (or lux at 1m) of the LED/Luminaries.

18.21.5 The warranty will be provided on a case to case basis and shall be extended if above clause are included in contract agreement/supply order.

18.21.6 The firm must have all India foot print, its own R&D and should be a leading manufacturer of LED lights/luminaries.

18.21.7 The contractor shall submit the following certificates from the manufacturer for LED light fittings (both light and driver)

(a) Surge protection certificate.

(b) Type test certificate LM-79, LM-80 for all luminaries along with detailed technical Catalogue duly signed and sealed by the manufacturer.

18.21.8 Owing to continuous innovation and improvements in LED light fittings by manufactures the contractor shall provide latest version of LED fittings with high lumens output and system efficiency which are available in the market during execution of works.

18.21.9 For any change in product or change in catalogue number etc due to technological up gradation letter has to obtain from the lighting company on their letter head signed by an official of National level only.

18.21.10 All the LED fittings shall be identified by printing or fixing stickers duly mentioned the CA number and date of completion.

18.21.11Sample approval must be obtained for any type of LED Light fittings before incorporating in works.

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PARTICULAR SPECIFICATIONS(CONTD…)

19.0 ACCIDENT

19.1 The contractor shall be responsible for all accidents/ injuries to personnel occurring on account of mishandling or due to wrong operation of machine or due to lack of knowledge of safety precautions or on account of any circumstances beyond his control. In case of any injury/accident, fatal or partial disability, the contractor shall be solely responsible for settling all the claims/compensation. No compensation is payable by the department on his account. The department will have right to recover any sum indicated / claim by labour Commissioner/ Court directives.

19.2 The contractor will also maintain all the fire points at each installation to meet the emergency on occurrence of fire.

20.0 **LIST OF MAKES / MANUFACTURERS**

20.1 The make of various items of materials are as under. The contractor shall ensure that the items of these makes only are incorporated in the work, which conforms to the relevant specification/requirements/ stipulation in the contract. The make of items which are not covered in the list of manufacturers/Sch'A' shall be ISI marked & as approved by GE.

Sl No.	Description of Item	Makes
1	2	3
1	Water Proofing compound	ACCO Proof / Aqua Proof / Impermo / CICO / Fosroc/ Dr fixit/ Asian Paints Ltd
2	Factory made Wooden door and window Shutters / Flush Doors/Frames	M/S Goel Brothers, Raipur / M/S Pioneer Timber, Chandigarh / M/S Goyal Industries, New Delhi / M/S Jain Doors pvt Ltd, Haryana / M/s India Wood & Wood Pdts, Mangalore , / M/s India Wood &mouldingDharwad/ Indian timber product, Hyderabad,/ M/s MP wood product, Indore/ , M/s A1 teak products indore/, M/s Door king industries Kolkatta/ Black Cobra
3	Factory made PVC / UPVC / FRP shutters and frames	M/s RajshriPlasti Wood, Indore / M/s Sintex Industries / M/s Accucell / M/s DuroPlast Extrusion / M/s Poly Windows, Pune/ M/s Madu Industries/ Black Cobra/ Supreme/Astrapia/Fenesta/ M/s SMP IMPEX
4	Factory made panneled door shulter, wire gauze shulter/ glazed shulters	Jain wood industries (Jayna)
5.	Steel windows, Ventilators, Door frames, Shutters	M/S Agew Steel MfgPvt Ltd, Ahmedabad / M/S Sen-Harvic, Mumbai / M/S Godrej & Boyce Steel Mfg, Mumbai / M/S RaymusStructurals and Engineering, New Delhi./ M/S Bihar Bobbin &Engg Work, Katihar M/s Madhu Industries Bangalore, Decan Structural Pvt Ltd Bangalore

PARTICULAR SPECIFICATIONS(CONTD…)

6.	Builders hardware	Crown/classic/ Prayag/Swastik/Jyothi/Adarsh/Everest/ ESSES/M/s AluminiumUdyog
7	Aluminium section of shutters / frames for door / window / ventilator	Hindalco / Indal (Indian Al Coy) / Jindal / Associated Profile &Aluminium Ltd / Ajit India/ Sterlite/ Architcture Incorporation Chennai/ Deco Grill
8	Hydraulic Door Closer	Everite / Universal / Prabhat Door King / Perfect Hydraulic / Dyana
9	Water proofing membrane / APP membrane	STP Limited / M/s Pidilite Industries Ltd / M/s IWL India Ltd/ Asian Paints Ltd/Fosroc
10	Galvalume& Roof Sheets	M/s Kirby Building Systems India Ltd, Andhra Pradesh / M/s Lloyd Insulation (India) Ltd Bangalore / M/s JSW steel / M/s Colour Roof India Ltd, / M/s Tata Blue Scope Steel Ltd, Gurgaon / M/s Multi Colour steel (India) Pvt Ltd
11	Perforated particle board / tiles for insulation and acoustic	Anchor Ceiling Tiles / Arm Strong / Gypboard / Bison Panel / Lagyp / Aerolite /SN Industries/ M/s STP/ Eternite/ Aerolite Ceiling System
12	Plywood	Kitply / Century Plywood / Mysore Chip Board Mysore / Green Ply / Anchor/ Swastik,/ Archid ply/ Indian ply wood /Black Cobra
13	Particle Board Gypsum	Mangalam Timber Product / Gypsum Board / Jolly Bd, Mumbai / Indian Gypsum product / Armstrong World Industries/ Indian ply wood/ Anchor Bombay, Aerolite celing System
14	Steel Rolling Shutters / Grills & Collapsible Gates	Shree Lakshmi EnggWks, Bangalore / M/S Prakash& Co, New Delhi / M/S Senthil Rolling Shutters &Engg Co, Chennai / M/S Swastik Rolling Shutters, Mumbai / M/S Jayaraj Industries, Chennai
15	Laminated Sheets	Formica /. Sun Gloss / Sunmica / BacklyteHylum / Eco Board/ Kitlam/ Green lam /Novapan/ Nova teak super/ Black Cobra
16	Pre-laminated Particle board	Novapan / Eco Board Industries, Pune / Kitply / Green Ply / Anchorlam/ Century ply wood/ Black Cobra
17	Non Asbestos fiber reinforced cement board	Visaka industries Ltd, (V –Board)/ Black Cobra
18	Block boards and veneered particle board (MDF Boards)	Bajaj Boards / Nuw Wood / A-1 Boards /Bhutan Board/ Charminar/ Swastik/ Kit ply

PARTICULAR SPECIFICATIONS(CONTD…)

19	Glazed ceramic wall / flooring tiles:	Johnson Tiles / Kajaria / Somany / Nitco / Orient,/ Spartek/ Regency/ Asian/ Naveen (Ist quality only)
20	Non-skid Ceramic tiles	Johnson Tiles / Kajaria / Somany / Nitco / Orient, Naveen (Ist quality only)/ Spartek /Regency / Asian/
21	Vitrified tiles	Johnson Marbonite / Kajaria / Somany / Orient / Euro Tiles (Ist quality only)/ Naveen tiles/ SwastikCeracon Ltd(Swastik tiles)/ Orient
22	Mosaic / Cement Flooring Tiles	M/S NITCO, Mumbai /. M/S Mehatab Tiles, Indore / National Tiles /. Bharat Tiles and Engg Coy, Bangalore /. Modern Tiles and Marbles, Bangalore/ Ultra/ Duracvete
23	Chequered tiles/ Cement Concrete Interlocking Paver Blocks Tiles	Mehtab Tiles , Indore / M/s Ultra Tiles / NITCO / Topaz Tiles / Navya Tiles, Jodhpur/ Sagar tiles, Saharanpur/ CEME/ M/s Swami tiles/ Supreme tiles (SUPREME)/ lucky cement blocks works (LC)/ Bharat tiles and Engg coy Bangalore
24	Distemper Oil-Emulsion (OBD)	Nerolac / Shalimar Paints / Jenson & Nicholson / Asian Paints / Maxx Breeze (M/s Nippon Paint pvt ltd)
25	Plastic Emulsion Paint	Asian Paints / Berger Paints / Nerolac / Shalimar Paints /
26	Cement Based Paint	Super Snowcem / Duracem / Aquacem /Shalimar / Berger
27	Anti Fungal Exterior emulsion paint	Berger paint/ Dulux/Asian paints/ Nerolac Paints / Maxx Durafresh (M/s Nippon Paint pvt ltd)
28	Cement based wall Putty	Birla Cement / JK white / Golden Mohar/ Nippon Silky wall putty (M/s Nippon Paint pvt ltd)
29	Sheet Glass Plain	Hindustan Pilkington Glass works / Saint Gobin / Modi Float / Modiguard
30	Sheet glass frosted	Hindustan Pilkington Glass works / Saint Gobin / Modi Float / Modiguard
31	Rough cast wired glass	Hindustan Pilkington Glass works / Saint Gobain / Modi Float / Modiguard

PARTICULAR SPECIFICATIONS(CONTD…)

32	Oil Putty	Gold Mohar / Shalimar Hardware / M/s Atul Dyes and Chemicals / UK Paint Industries / M/s Burger
33	Mirror	Modi / Atul / Kohinoor / Swastik / Saint Gobain
34	Synthetic Enamel Paint	Asian Paints / Nerolac Paints / Berger Paints / Shalimar Paints (Ist quality only)/ Bodelac (M/s Nippon Paint pvt ltd)
35	Lime	Suryacem /Birla white/Devicem
36	Mangaiore Tiles	Charminar/Raja/ RECHO/ Prajapat/ Kerala Tile Wks, Trisur
37	Mosaic/Cement Flooring Tiles	M/S NITCO, Mumbai / M/S Mehatab Tiles, Indore / National Tiles and Engg Coy, Bangalore / Modern Tiles and Marbles, Bangalore
38	Acid Resistant Tiles	M/S Johnson, Mumbai / Somany /Kajaria / M/s Burn Standard Co, Jabalpur/ M/s Purshuram Pottery Wks, Marvi
39	Heat absorbing glass & reflective solar control film	Hindustan Pikington Glass works/ Saint Gobain / Modi Float / Modiguard
40	Cl Pipe and Fittings	Electro-steel / Kejriwal / NECO / TISCO / Kesoram
41	Dl pipes and fittings	Jindal Ltd, Gujrat / Electrosteel Castings Ltd, WB / Tata Metalinks, Kolkata / Lanco, Andhra Pradesh
42	CI - Soil, waste, rainwater (SWR) & Drainage pipes	NECO, Nagpur / Kesoram / Kapilansh, Nagpur / Electro Steel / Anand Founder & Engineers
43	RCC pipes, drain pipes	Dhere Concrete product, Pune / Everest / Himalaya / Indian Hume Pipes / Vardhaman Concrete Product, Pune
44	PP-R Pipes and fittings	Reliance Industries / Prince / Sudhakar / Savoir-faire Manufacturing Co. Pvt Ltd/ Supreme
45	Air Release Valves	Leader / BIR / Kirloskar / Venus / Sant
46	Foot Valves	Venus / Leader / Kirloskar / Sant / AUDCO /JAYNAM

PARTICULAR SPECIFICATIONS(CONTD…)

47	Reflex Valves	Kirloskar / Leader / Sant / Varun / Venus
48	Sluice valves	Leader / Kirloskar / Upadhya / L&T / Venus
49	Butterfly Valves/ Disc Valves	AUDCO / Castlers / Normax / L&T
50	Water Meter	Capstan / Dashmesh / Kaycee / Capital / Anand
51	PVC water tank	Sintex (ISI) / Polycon (ISI), Jaipur / Rotex(ISI) / Infra (ISI) / AshishPlast (ISI)/Kaveri/ Supreme
52	MS/GI Pipes and fittings	Tata / Jindal / Zenith / Swastik / Prakash
53	HDPE Pipes and fittings	Finolex / Prince / Kisan / Supreme / SFMC
54	PTMT Fittings	Prayag polymers Pvt Ltd/ Supreme/ Shakti Brand manufactures by M/s Shakti enterprises New Delhi/ JAYNAM
55	Rotational molded polyethylene water storage tank	M/s Kaveri/ M/s Sintex Industries Ltd/ Infra/ Rolex/ Poly well/ Supreme/Kaveri/ Prayag
56	CPVC pipes and fittings (Chlorinated polyvinyl chloride)	Ajay Flowguard, Delhi / Dutron / Duplon (Reliance)/ Finolex/ Supreme
57	PVC - Soil, waste, rainwater (SWR) & drainage pipes	Supreme / Prince / Kisan / Finolex / Infra
58	Copper/ Brass - Bib cock, Stop cock, Pillar cock	Jaguar / Soma / Leader / Zoloto / Seico /GEM/ Prayag/ JAYNAM
59	Copper/ Brass /PVC fittings Stop Cock and Bib Cock/ Pillar cock	Jaguar / Soma / Leader / Zoloto / Seico /GEM/ Prayag/ JAYNAM

PARTICULAR SPECIFICATIONS(CONTD…)

60	Gun metal globe or gate valves	Leader / Bir / Zoloto / Kartar / Kirloskar
61	Shower Rose	Jaguar / Marc / Soma / Parko/ ESS-ESS/ / JAYNAM
62	Water closet – Vitreous China/ Squatting Pan orissapatten	CERA / M/s Hindustan Sanitary Ware / Parryware /. Prayag / Neyveli Ceramics (Neycer) /Jaquar/Hindware/Johnson
64	Flushing Cistern- PVC low level	M/s Hindustan Sanitary Ware / Parryware / Commander / CERA / Johnson Peddar/ JAYNAM
65	Plastic Seat covers for EWC	Commander / CERA / Parryware / M/s Hindustan Sanitary Ware / Neycer/ JAYNAM
66	Urinals - Vitreous China	CERA / M/s Hindustan Sanitary Ware / Parryware / Prayag / Neyveli Ceramics (Neycer)
67	Wash Basin – Vitreous China	CERA / M/s Hindustan Sanitary Ware / Parryware / Neyveli Ceramics (Neycer) /Prayag
68	Sink Steel / Stainless Steel Sink with Drainage board	Diamond, / Nirali / Prayag / Blue Star / Jayna/Parryware
69	Stainless steel Plate rack	Blue star sanitary industries Pvt Ltd (Silver Shine)/Dimond/ Nirali/ Jaguar /Prayag/ Parryware// JAYNAM
70	Non Asbestos Fiber reinforced (poly propylene), 6mm cement corrugated sheets	Everest Industries Ltd (EVEREST)
71	Health faucet	ESS-ESS/ Jaguar / JAYNAM
72	Wiring Cables	Havells / Plaza / Ravi Cab / Standard / Finolex / BENTEC / Polycab / V- guard, Vishal/ SBEE
73	Switches /Sockets/Ceiling rose/ Bell push (Piono/ Flush type or modular) call	ANCHOR,(ROMA) LEGRAND, LEADER, Crabtree/Havells/ Legrand./ Indoasain / Haveels,

PARTICULAR SPECIFICATIONS(CONTD…)

	bell	Belno,
74	MCB (Miniature Circuit Breakers) & MCCB(Moulded Case Circuit Breakers) / Sheet metal enclosure / RCCBs / DB	Larsen & Toubro / ABB /. Siemens /. Schneider / Havells / Legrand / Indo Asian / Standard / GE Controls / Control & Switchgear / Bentac Electrical & Electronics Pvt Ltd/ M/s Bentec India Ltd (BENLO)/ M/s Orient Electric Ltd
75	Light fittings LED	Phillips / Crompton / Havells / Wipro / C & S Electric/Bajaj/ GE/ Seimens / Bajaj / HPL / Polycab / Shakti, Jaguar, Surya/ M/s Bentec India Ltd (BENLO)/ Halonix/ Luker/ M/s Orient Electric Ltd
76	XLPE Cables	Havells, Finolex/ Polycab /Plaza/L&T/Gloster/ Paragon/ Kalinga/ Universal/ Nicco/ SBEE
77	Ceiling fan /Exhaust fan	Havells/ CG/Orient/Bajaj/Philips/ Polar/ Anchor/ Halonix/ Luker/ M/s Orient Electric Ltd
78	PVC Conduit & Conduit accessories	BEC/Avon Plast/ Finolex/ Bajaj Plast / Kalinga/ AmbicaPlast
79	Cable Lungs	Jainson&Dowells/ Cemet Bharat
80	Capacitor	Crompton Greaves/ Simens/ ABB/ Epcos/ L & T / NGEF
81	Street Light Fittings	Bajaj/ Phillips/ Wipro/ Crmpton/ GE/ Havells/ Glodmedal/ Polycab / Jaguar/ Surya/ Halonix/ Luker
82	Ballast / Starter/tube rod/ Driver / LED lamp	Philips/ Bajaj/ Havells/ Crompton Greaves/ Halonix/ Luker/ M/s Orient Electric Ltd
83	Distributions Board	L&T/ Legrand/ Havells/ INDO Asian
84	Bearings / Gun metal Bush	SKF/NBC / FAG
85	Laminated Sheet	Hylam/Fornica/ Sunglow
86	Ammeter / Voltmeter/ Power Factor/ Frequency Meters	IMP/ Automatic Electrical/ L& T/ Havells/ MECO

PARTICULAR SPECIFICATIONS(CONTD…)

87	Terminal Box	Sintex / EPP
88	Conduit pipes	Avon plast / Precision / Finolex
89	Fan regulator	Crompton Greavs/ Anchor/Cona/ Usha/ Havells/ Indoasian/Legrand
90	Casing /Capping Accessories	Supreme/Polycab/ Plaza/ Prince/ Modi/ Asian
91	Pole- Steel Tubular	India Tube and CO/ India electric poles Mfg Co Maharashtra/ Bombay Tubes/ The National tubing company, Kanpur/ Kalinga tubes/ Singh profile, Pune.
92	Cable Jointing Kit for 11 KV/22 KV	Raychems / Densons / M-Seal / Birla - 3M / CCI / Mahindra & Mahindra / Siemens
93	Fluorescent tube light fittings / CFL fittings	Wipro / Bajaj / Crompton / Phillips / Surya
94	Flame Proof Light Fittings	M/s Sudhir / M/s Baliga / Flexpro Electricals, Nasik / M/s Shyam Switchgears, Mumbai / Bajaj / Crompton / Phillips
95	Florescent lamp (CFL)	Phillips / Wipro / Bajaj / Crompton / Osram
96	Electronic / Photoelectric Switch for Auto Op of Street Lights	Larsen & Toubro / GE- Lighting / Indo-Asian / Bajaj / Legrand
97	Microprocessor based MCCB LT 415 Volts	Larsen & Toubro / ABB / GE Controls / Siemens / Schneider/ Legrand/ Havells
98	Electric accessories, piano switches, ceiling rose, call bells, buzzers, lamp holders	Anchor / Crabtree / Leader / Legrand / Havells/ Indoasian
99	Exhaust fan	Crompton /. Khaitan / Usha / Bajaj / Almonard/ M/s Orient Electric Ltd

PARTICULAR SPECIFICATIONS(CONTD…)

100	Geyser	Bajaj / Racold / Usha / Havells/Jaqvar/ M/s Orient Electric Ltd
101	Flexible Cord Twisted Copper Conductor	Plaza / Finolex / Anchor / Havells / Paragon/ Polycab/ KEI Wires
102	PVC conduits (Rigid)	Finolex / Supreme / Prince / Tirupati / Dutron/AKG/Precision/Kalinga
103	PVC Conduit (Flexible)	Finolex / Avon / Precision / Garware / Supreme
104	LT panel/Feeder Pillar Box	Hensel/ Kewintech/ Rittal/ L&T

Note: - 1. Wherever the word ‘equivalent make’ has been specified the option of equivalent make shall only be considered in case of products of brand/manufacturer specified here-in-before are not available (non- Availability being certified by the authorized representative of the manufacturer) and after taking approval of the Accepting Officer.

2. Applicable make to be taken for approval from the Accepting Officer from Sl No. 1 to 104 above for the particular work.

21.0 LIST OF DRAWING.

-Nil-

Signature of Contractor

AGE (Contracts)

For Accepting Officer