

MILITARY ENGINEER SERVICES
CHIEF ENGINEER JABALPURZONE

PROVN OF SINGLE MEN BARRACKS INCLUDING COOK HOUSE (IN EPC MODE) FOR
AGNIVEERS AT 1 STC JABALPUR

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* These documents are not attached with tender documents and can be seen in the office of **CE Jabalpur, CWE Jabalpur and GE (P) No 1 Jabalpur** during working hours.

(Signature of Contractor)

Dy Dir (Contracts)
For Accepting Officer

Tele No: 0761-2603027
Fax No : 0761-2601027
Email id : dircontcej2-mes@nic.in

CHIEF ENGINEER JABALPUR ZONE
MILITARY ENGINEER SERVICES
RIDGE ROAD
JABALPUR CANTT – 482001

752986/A/ 03 /E8

12 Sep 2025

M/S.....

**PROVN OF SINGLE MEN BARRACKS INCLUDING COOK HOUSE (IN EPC MODE) FOR
AGNIVEERS AT 1 STC JABALPUR**

Dear Sir (S),

1. Tender documents in respect of above work are uploaded on the site www.defproc.gov.in. The tender is based on single stage two cover/two stage three cover e-tendering system. The contents of Cover I & Cover II are specified in NOTICE OF TENDER.

2. Bids will be received online by ACCEPTING OFFICER upto the date and time mentioned in the NOTICE INVITING TENDER (NIT). No tender/bid will be received in physical form and any tender/bid received in such manner will be treated as non bonafide.

3 Bid will be opened on line on a due date fixed for opening as per critical dates given in the portal. Cover 1 will be opened first. Tenderers may see the result of the opening of Cover 1 on the tender portal. Date of opening of Cover 2 shall be decided after technical evaluation of Cover 1 keeping in view the various eligibility criteria given in the NIT and the same will be intimated to the tenderers while uploading the technical evaluation on the tender portal.

4. Your attention is also drawn to instruction on filling and submission of tender attached herewith. You may forward your points on tender documents through e-mail and/or depute your technical representative for discussion on tender/drawings and to clarify doubts, if any, before the bid submission starts. You are requested not to write piece meal points and forward your points duly consolidated in one go. You may also attend the pre bid meeting on the date given in the tender.

5. Unenlisted contractors are required to submit the scanned copies (in pdf file) of documents required as per eligibility criteria mentioned in instructions for filling the tender documents and Appendix 'A' to NIT alongwith EARNEST MONEY DEPOSIT (EMD) and tender fee on procurement portal mentioned above and submit the physical documents in the office of **CHIEF ENGINEER JABALPUR** Zone within time limit specified in NIT. Inadequacy /deficiency of documents shall make the bid liable for rejection resulting in disqualification for opening of finance bid.

6. Enlisted contractors of MES shall submit the scanned copies (pdf file) of enlistment letter, tender fee and such other documents as mentioned in Appx 'A' to NIT on e-procurement portal and submit physical documents in the office of **CHIEF ENGINEER JABALPUR ZONE** before date & time fixed for this purpose.

7. The contractor must ensure that the tender/bid is uploaded on the tender portal using the authorised DSC in time as the Accepting Officer will take no cognizance of any quotations/offer received in any other electronic or physical form like email/fax/by hand/through post from tenderer/bidder.

8. Keeping in view delays due to system failure or other communication related failures, it is suggested that tender/bid may be uploaded sufficiently in advance of the last due date and time fixed on the portal.

9. General Conditions of Contracts (IAFW-2249) (1989 Print) and errata and amendments thereto, Schedule of Minimum Fair Wages and MES SSR (Part-I and Part-II) are not enclosed with these documents. These are available for perusal in the Office of GE/AGE concerned and this office. Tenderer is also requested to keep the copy of these documents with him as same are available in the market.

10. PERFORMANCE SECURITY DEPOSIT After acceptance of the Tender, the contractor will be required to lodge with the Accepting Officer PERFORMANCE SECURITY DEPOSIT @ 05 % of contract amount. The amount is required to be lodged within 28 (Twenty eight) days of the receipt by the contractor of notification of acceptance of tender/bid, failing which action as stipulated in Condition 19 of GCC (IAFW 2249) shall be taken.

11. ANY TENDERER, WHICH PROPOSES ALTERATIONS TO ANY OF THE CONDITIONS, SPECIFICATIONS LAID DOWN IN THE TENDER DOCUMENTS OR ANY NEW CONDITION, WHATSOEVER, IS LIABLE TO BE REJECTED.

(Signature of Contractor)

Dy Dir (Contracts)
For Accepting Officer

INSTRUCTIONS ON FILLING AND SUBMISSION OF TENDER

1. EARNEST MONEY DEPOSIT (EMD) Contractor(s) who are not enlisted with MES/who are enlisted but have not executed the Standing Security Bond shall submit Earnest Money Deposit as detailed in Notice of Tender in one of the following forms, along with their tender/bid:-

- (a) Deposit at Call Receipt from a Scheduled Bank in favour of GE/AGE(I) concerned.
- (b) Receipted Treasury Challan, the amount being credited to the Revenue Deposit of GE/AGE(I).

It is advisable that Earnest Money is deposited in the form of deposit call receipt from an approved Schedule Bank for easy refund. In case the tenderer/bidder wants to lodge 'Earnest Money Deposit' in any other form allowed by MES, a confirmation about its acceptability will be obtained from the Accepting Officer well in advance of the bid submission end date and time. Earnest Money Deposit shall be submitted in the name of concerned GE/AGE(I).

NOTES:- Earnest Money Deposit (EMD) in the form of cheque/Bank Guarantee etc will not be accepted. **Non-Submission of Earnest Money Deposit (EMD) (scanned copy alongwith Technical Bid & hard copy before the date & time fixed for opening of BOQ) will render the bid disqualified for opening of Cover -II (finance bid).**

2. GENERAL INSTRUCTIONS FOR COMPLIANCE

2.1 The bids received only in the electronic form will be considered. All bids shall be submitted on defproc.gov.in portal. Documents should be scanned and forwarded in 'pdf' format and 'xls' form as indicated. Bids shall be uploaded on 'defproc.gov.in' portal on or before the bid closing date mentioned in the tender. No tender/bid in any other electronic or physical form like date email/fax/by hand/through post will be considered.

2.2 The bid shall be DIGITALLY signed using authorised DSC. All pages of tender documents, drawings, corrections/alterations shall be signed/initialed by the lowest bidder after acceptance of tender for making original and CTC of the contract.

2.3 Digital signatory of the bid/tender shall ensure that he is competent to bind the contractor (through partnership deed, general power of attorney or Memorandum and Article of Association of the Company) in all the matters pertaining to the contract with Union of India including arbitration clause. A scanned copy of the documents in confirmation of such authority shall be attached with the tender/bid in 'pdf' form in Cover 1. It shall be ensured that power of attorney shall be executed in accordance with the constitution of the company as laid down in its Memorandum & Article of Association.

2.4 Drawings, if issued in physical form, must be returned duly initialled by the tenderer/bidder in separate envelope indicating his name and address.

2.5 The tender shall be signed, dated and witnessed at all places provided for in the documents after acceptance. All corrections shall be initialled. The Contractor shall initial every page of tender and shall sign all drawings forming part of the tender. Any tender/bid, which proposes alterations to any of the conditions whatsoever, is liable to be rejected.

3. BOQ :-

3.1 The tenderer shall quote his rates on the BOQ EXCEL FILE only as per guide line of e-procure web portal. No alteration to the format will be accepted and such bid will be disqualified.

3.2 In case any tenderer wishes to revise/modify the rates quoted in the BOQ file, he can do so only in the BOQ files before uploading the tender through <https://defproc.gov.in> site only before closing date & time.

3.3 After the uploading of tender, Department may upload the errata/ amendment through corrigendum. The tenderer/bidder should submit their offer considering the errata/amendment carried out through corrigendum issued from time to time.

3.4 While uploading the bid, the tenderers/bidders should specifically check whether any revised BOQ has been uploaded by department through corrigendum prior to Bid submission start date. Tenderers/bidders attention is specifically drawn to the fact that they should submit their offer on revised BOQ only. In case any tenderer/bidder submits offer on pre-revised BOQ in lieu of Revised BOQ, it will be considered as a willful negligence by the tenderer/bidder and quotation shall be considered non-bonafide.

4. REVOKATION/REVISION OF OFFER UPWARD/ OFFERING VOLUNTARY REDUCTION, AFTER CLOSING OF BID SUBMISSION DATE & TIME”

In the event of lowest tenderer/bidder revoking his offer or revising his rates upward/ offering voluntary reduction, after closing of bid submission date & time, his offer will be treated as revoked and the Earnest Money deposited by him shall be forfeited. In case of MES enlisted Contractors, the amount equal to the Earnest Money stipulated in the Notice of tender, shall be notified to the tenderer/bidder for depositing the amount through MRO. Bids of such Contractors/bidders shall not be opened till the aforesaid amount equal to the earnest money is deposited by him in Govt Treasury. In addition, bids of such tenderer/bidder and his related firm shall not be opened in second call or subsequent calls. Reduction offered by the tender/bidder on the freak high rates referred for review shall not be treated as voluntary reduction.

5. C P M (Critical Path Method)

5.1 The project planning for work covered in the scope of tender is based on CPM. CPM shall be prepared on Primavera.

5.2 The tenderer/bidder is expected to be fully conversant with the CPM technique and employ technical staff who can use the technique in sufficient details. Sufficient books and other literature on the subject are widely available in the market which the tenderer/bidder may make use of them.

5.3 The tenderer's/bidder's attention is drawn to special condition of the tender regarding preparation of the detailed network analysis and time schedule for the work and his liability for employing sufficient resources to adhere to this schedule. Any inability on the part of the tenderer/bidder in using the technique will be taken as his technical inefficiency and will affect his class of enlistment and future prospect/invitation to tenders for future works.

5.4 Department may issue amendments/errata in form of CORRIGENDUM to tender/revised BOQ to the tender documents. The tenderer/bidder is requested to read the tender documents in conjunction with all the errata/ amendments/corrigendum, if any, issued by the department.

5.5 These instructions shall form part of the contract documents.

6. Tenders/bidders who uploaded their priced tenders/bids and are desirous of being present at the time of opening of the tenders/bids, may do so at the appointed time.

7. Hard copies of all above documents shall be sent by the contractor to the Tender issuing authority well in advance to be received before the date & time fixed for the same.

8. The contractor shall employ Indian Nationals after verifying their antecedents and loyalty. Attention is also drawn to relevant provisions in Special Condition referred here-in-after and also Conditions 24 & 25 of IAFW-2249 (General Conditions of Contract).

Contractor Signature

Dy Dir(Contracts)
For Chief Engineer

MILITARY ENGINEER SERVICES
NOTICE INVITING TENDER (NIT)

1. A tender is invited for the work as mentioned in Appendix 'A' to this NOTICE INVITING TENDER (NIT).
2. The work is estimated to cost as indicated in aforesaid Appendix 'A'. This estimate, however, is not a guarantee and is merely given as a rough guide and if the work costs more or less, a tenderer/bidder will have no claim on that account.
3. The work is to be completed within the period as indicated in aforesaid Appendix 'A' in accordance with the phasing, if any, indicated in the tender from the date of handing over site, which will be on or about two weeks after the date of acceptance of tender.
4. Contractors whose names are on the MES approved list and within whose financial category the estimated amount would fall and unenlisted contractors may submit tender/bid subject to other criteria mentioned in Appendix A. However in case of term contracts, enlisted contractors of Class SS to E may submit tender. Not more than one tender shall be submitted/uploaded by one contractor/ firm. Under no circumstances will a father and his son(s) or other close relations who have business dealing with one another be allowed to tender/bid for the same contract as separate competitors. Two firms shall be deemed to have business dealing if any of the partners/proprietor/director is common among both of them. A breach of this condition will render the tenders/bids of both the parties liable for rejection.
5. The Office of **CHIEF ENGINEER JABALPUR ZONE, RIDGE ROAD, JABALPUR- 482001** will be the Accepting Officer here-in-after referred to as such for the purpose of this contract.
6. Not more than one tender/bid shall be submitted/uploaded by one bidder firm. Under no circumstances will a father and his son(s) or other close relations who have business dealing with one another be allowed to tender/bid for the same tender as separate competitors. A breach of this condition will render the tenders/bids of both the parties liable for rejection.
7. The Technical Bid and Financial Bid (Cover-1 and Cover-2) shall be uploaded by the contractor on or before the date & time mentioned in NIT. A scanned copy of DD with enlistment details and other documents as specified in Appendix A shall be uploaded as Cover-1 (Technical bid) of the tender on e-tendering portal. DD is refundable in case the contractor is not considered eligible in technical evaluation of Cover 1 resulting in non-opening of Cover1. The applicant contractor shall bear the cost of bank charges for procuring and encashing the DD including revalidation of DDs and shall not have any claim from Government whatsoever on this account.
8. Tender form and conditions of contract and other necessary documents shall be available on website defproc.gov.in for download and shall form part of contract agreement in case the tender/bid is accepted.
9. In case of MES enlisted contractor who has not executed the Standing Security Bond and unenlisted contractor, the Cover-I shall be accompanied by Earnest Money for the amount mentioned in Appendix 'A' in the form of deposit at call receipt in favour of concerned CCE/GE/GE (I)/AGE (I) (see Appendix 'A') by a Scheduled Bank or in received treasury Challan the amount being credited to the revenue deposit of the concerned CCE/GE/GE(I)/AGE(I) (see Appendix 'A'). The CCE/GE/GE (I)/AGE (I) will return the Earnest Money, wherever applicable, to all unsuccessful tenderers/bidders by endorsing an authority on the deposit at call receipt for it's refund, on receipt of intimation from the Accepting Officer to do that.
10. In case of successful contractor i.e the lowest contractor having submitted EMD, he shall have the option of converting the EMD instrument into part of the Performance Security to be deposited by him within 28 days from the receipt of intimation of acceptance of tender from Accepting Officer.
11. Sample of materials and stores to be supplied by the contractor will also be available for inspection by the bidder at the office of concerned GE/GE (I)/AGE (I)/Project Manager during working hours. The bidder is advised to visit the site of work by making prior appointment with GE/GE (I)/AGE (I)/CCE/Project Manager, who is the Executing Agency of the work (see Appendix 'A'). The bidder shall be deemed to have full knowledge of all relevant documents, samples, site etc whether he has inspected them or not.

12. Any bid which proposes any alteration to any of the conditions laid down or proposes any other new condition whatsoever, is liable to be rejected.

13. The uploading of bid by a bidder implies that bidder has read this notice and the conditions of contract and has made himself aware of the scope and specification of work to be done and of the conditions and rates at which stores (as applicable) etc will be issued to him and local conditions and other factors having bearing on the execution of the work.

14. The bidder must be in possession of a copy of the MES Schedule (SSR) (Part-I & Part-II of latest edition) including amendments and errata thereto.

15. Accepting Officer does not bind himself to accept the lowest or any tender/bid or to give any reason for not doing so.

16. The Accepting Officer reserves the right to accept a tender submitted by a Public Undertaking/Small & Medium Enterprises (SMEs), giving a price preference/purchase preference over other tender(s)/bids which may be lower, as are admissible under the Government Policy. No claim for any compensation or otherwise shall be admissible for such tenderer/bidder whose tender/bid is rejected.

17. The Notice Inviting Tender (NIT) including Appendix 'A' and Annexures thereto, if any, shall form part of the contract agreement.

APPENDIX‘A’TO NOTICE INVITING TENDER (NIT)

1.	Name of Work	PROVN OF SINGLE MEN BARRACKS INCLUDING COOK HOUSE (IN EPC MODE) FOR AGNIVEERS AT 1 STC JABALPUR Tender ID : 2025_MES_725970_1									
2.	Estimated Cost	Rs. 2772.093 Lakh (At Par Market)									
3.	Period of Completion	548 days									
4.	Cost of tender documents	Rs 3000 in the form of DD/Bankers cheque from any schedule Bank in favour of GE (P) No 1 Jabalpur and payable at Jabalpur . (Note: In case of retendering. The contractor who had quoted in the previous call is not required to submit the cost of tender.)									
5.	Website/portal address	www.defproc.gov.in									
6.	Type of contract	The tender shall be partly based on drawing and specifications (IAFW-2159) and GCC(IAFW-2249) with Schedule ‘A’ to be pre- priced by MES and partly based on Engineering, Procurement & Construction (EPC) mode to be priced by contractor. The contractor is required to quote the lump-sum amounts for parts of schedule ‘A’ and quote their rates against items of other parts of Schedule ‘A’ in BOQ.									
7.	Time line details :										
	(a) Bid submission start date	Refer critical dates on the website Refer critical									
	(b) Bid submission end date	dates on the website									
	(c) Date of bid opening	Refer critical dates on the website									
8	Eligibility Criteria:										
	(A) For MESenlisted contractors	Contractor shall be enlisted with MES in Class ‘ SS ’ and Category ‘ a(i) ’ and above subject to satisfactory remarks wrt performance in respect of works in hand as reflected in Work Load Return (WLR) or any other report circulated by competent engineer authority.									
	(B) For contractors not enlisted with MES	(i) Contractor not enlisted with MES should meet the enlistment criteria of class ‘ SS ’ and Category ‘ a(i) ’ MES contractors i.e. with regard to having satisfactorily completion of requisite value works with Central/ state Government/ Central / state PSUs / AWHO / AFNHB / CGEWHO / DGMAP. Annual turnover, Bank Solvency, working capital, and other requirements given in Para 1.4 & 1.5 of Section 1 of MES Manual of Contracts 2020. (ii) Not carrying adverse remarks in Work Load Report (WLR) or any other similar report circulated by any competent authority, if already working in MES. (iii) Not suspended / debarred / black listed (either permanently or temporarily) from participating in any bid or for business dealings by any Central / State Government Department or any Central / state Government PSU or any Autonomous Body under Central / State Government or any Local Body as on the bid submission end date. (iv) Details of works completed and under progress in MES be submitted in the following format:- <table border="1"><tr><td>Srl No.</td><td>CA No & Name of Work</td><td>Value of CA</td><td>Date of Commence ment</td><td>Date of Completion</td><td>Extended Date of Completion</td></tr></table> (v) Un-enlisted Contractor who have secured two works in MES should get themselves registered in the appropriate designated class with any registering Authority, else the firm will not be eligible for participation in the tender unless until the firm is enlisted with the MES.				Srl No.	CA No & Name of Work	Value of CA	Date of Commence ment	Date of Completion	Extended Date of Completion
Srl No.	CA No & Name of Work	Value of CA	Date of Commence ment	Date of Completion	Extended Date of Completion						

9.	Tender issuing and Accepting Officer	CHIEF ENGINEER JABALPUR ZONE, JABALPUR Email : dircontcej2-mes@nic.in
10.	Executing Agency	GE (P) No 1 Jabalpur
11.	Earnest Money	Rs 15,00,000.00 in favour of GE (P) No 1 Jabalpur.

NOTES:

1. After opening of Cover 1, if the number of MES enlisted contractors of eligible class as well as un-enlisted contractors, if any, fulfilling the other eligibility criteria given in NIT are less than 7(Seven), applications in respect of contractors one class or two classes (in case of remote and difficult areas to be decided as per list circulated by CE command/ADG) below the eligible class shall also be considered subject to fulfilment of other eligibility criteria given in the NIT. Therefore, MES contractors one class below (two classes below in case of remote and difficult areas) may also bid for this tender. However contractors of one/two classes below the eligible class shall not be considered in case their present residual work in hand is more than **FIVE** their present tendering limit. Such bidders shall upload in their Cover-1 bid details of works in hand showing names of work, names of Accepting Officers, Contract amounts, dates of commencement and completion (stipulated) and progress as on bid submission date. These details shall be verified by the Tender Issuing Authority from concerned formations in case bids of such contractors are considered for evaluation.
2. In case after opening of Cover 1, the number of MES enlisted contractors of eligible class as well as un-enlisted contractors, if any, fulfilling the other eligibility criteria given in NIT, are 7 (Seven) or more, applications of only those one class below the eligible class bidders shall be considered, who have previously completed similar works satisfactorily and are meeting the criteria of upgradation in respect of past experience of completed works (individual work experience and/or average annual turnover as applicable) and financial soundness (solvency/financial soundness and working capital) as per details given in Manual on Contracts. Therefore such contractors shall upload the requisite information/documents in the Cover-1.
3. Unenlisted contractor shall be considered provided he meets the criteria. Foreign firms shall not be eligible for this tender. However Indian Firms having foreign national / Indian nationals staying abroad / Indian national having taken foreign citizenship, as director(s) shall be considered subject to security clearance from the concerned authorities.
4. Contractors enlisted with MES will upload following documents in Cover 1 for checking eligibility:-
(a) Application for tender on Firm's letterhead.
(b) Enlistment letter issued by the Registering Authority duly renewed for the cycle period in vogue.
(c) Scanned copy of DD /Bankers Cheque toward cost of tender and EMD instrument in case SSD bond is not signed at the time of registration.
(d) Any other document required as described in this Appendix.
5. Contractors not enlisted with MES will be required to upload following documents in Cover 1 for checking eligibility.
(a) Application for tender on Firm's letterhead.
(b) Scanned copy of DD/ Bankers cheque toward cost of tender and Earnest Money Deposit (EMD) instrument.
(c) Copy of Police Verification Report/Police Clearance Certificate/ Character Certificate from the Police Authority of the area where the registered office of the firm is located/notarized copy of valid passport of Proprietor/each Partner/each Director.
(d) All documents required for enlistment in MES for the class mentioned in Para 8(b) above as per Para 1.5 of Section 1 of MES Manual on Contracts 2020.
(e) Details of works being executed in MES, if any.
6. Tenders not accompanied by scanned copies of requisite DD/Bankers Cheque towards cost of tender and earnest money (as applicable) in Cover 1 shall not be considered for validation of 'T' bid and their Financial Bids will not be opened.

7. Contractors should ensure that their original physical DDs and Earnest Money Deposit (EMD) instruments (as applicable) reach the office of Accepting Officer within **FIVE** days of bid submission end date failing which following action shall be taken.

(a) In case of tenders from an enlisted contractor of MES, where scanned copies of requisite DD/ Bankers Cheque towards cost of tender have been uploaded in Cover 1 but physical copies are not received within the stipulated period, their financial bids (Cover 2) will be opened. However non-submission of physical copies of cost of tender shall be considered as willful negligence of the tenderer with ulterior motives and such tenderer shall be banned from bidding for a period of six months commencing from the date of opening of Financial Bid (Cover 2).

(b) In case of tenders from unenlisted contractor, where scanned copies of requisite DD/Bankers Cheque towards cost of tender have been uploaded in Cover 1 but physical copies are not received within the stipulated period, their financial bids (Cover 2) will not be opened. Name of such contractors along with complete address shall be circulated for not opening of their bids for a period of six months commencing from the date of opening of Financial bid (Cover 2).

(c) In case of tenders from enlisted and unenlisted contractors, where scanned copies of instruments for Earnest Money Deposit (as applicable) have been uploaded in Cover 1 but the same are not received in physical form within stipulated period, such tenders shall not qualify for opening of financial bid (Cover 2).

8. Contractor will not be allowed to execute the work by subletting or through power of attorney to a third party/another firm on his behalf. However a contractor can execute the work through power of attorney to sons/daughters/ spouse of Proprietor/Partner/Director and firm's own employees, director, project manager provided they are not having a separate enlisted firm in MES in their name as Proprietor/Partner/Director.

9. After opening of Cover 1 and during its technical evaluation, in case any deficiency is noticed in the documents required to be uploaded by the tenderers as per NIT, a communication in the form of e-mail/SMS/Speed Post etc shall be sent to the contractor to rectify the deficiency within a period of seven days from date of communication failing which their financial bid (Cover 2) shall not be opened and contractor shall not have any claim on the same.

10. Invitation for e-tender does not constitute any guarantee for validation of Technical bid and subsequent opening of financial bid of any applicant/bidder merely by virtue of enclosing DD. Accepting Officer reserves the right to reject the Technical bid and not to open the financial bid of any applicant/bidder. Technical bid validation shall be decided by the Accepting Officer based on eligibility of the firm as per criteria given in this Appendix. Tenderer/bidder will be informed regarding non-validation of his Technical bid assigning reasons therefore through tender evaluation report which shall be uploaded on the website. Such tenderer, if desires, may appeal to the next higher Engineer Authority (NHEA) viz HQ CECC on email **jtdgcontceengrii-mes@nic.in** with copy to the Accepting officer on email **dircontcezj2-mes@nic.in** before the scheduled date of opening of Cover 2. NHEA shall decide the matter within a period of seven working days from the date of receipt of appeal. The decision of the NHEA shall be final and binding. The tenderer/bidder shall not be entitled for any compensation whatsoever for rejection of his bid.

11. In case an unenlisted contractor is already executing works in MES, he shall not be considered eligible for the subject tender if the total value of such works is more than twice the tendering limit of the MES Class of contractor for which it is eligible. For this purpose, details of the works being executed by such a contractor shall be uploaded in the Cover -1 of the bid and shall be checked/verified by the Accepting Officer.

12. In case the BOQ is revised through the corrigendum and the bidder has failed to quote on revised BOQ (ie he has quoted on pre revised BOQ), such bid shall be treated as willful negligence by the bidder and his quotation shall be considered non-bonafide. In such cases the lowest tender shall be determined from amongst the valid/bonafide bids only. Accepting Officer may decide whether to re-tender or consider the lowest bonafide tender for acceptance.

13. Revoking the offer or revising the rates upward or offering voluntary reduction by the lowest tenderer after opening of Cover 2 shall be considered as a willful default. For this default a penalty of an amount equal to Earnest Money shall be levied. In case of an unenlisted tenderer, Earnest Money deposited by him shall be forfeited. In case of MES enlisted tenderer having deposited the Standing Security Bond, an amount equal to the earnest money stipulated in the NIT, shall be notified to the tenderer for depositing through MRO and consideration of such tenderer in tender evaluation for future works shall remain suspended till the aforementioned amount is deposited in the Government Treasury. No other disciplinary/administrative action shall be taken against such tenderers. In such a situation, the next lowest offer shall not be considered for acceptance. Instead, retendering shall be resorted to in a transparent and fair manner and the defaulting tenderer and his related firm if any, shall not be eligible for this tender in second call or subsequent calls.

14. Irrespective of whatever is mentioned in condition 19.3 of IAFW 2249 with regard to suspension of tenders on account of non-submission of performance security, issue of tenders to such tenderers shall remain suspended for period of six months from date of cancellation of contract under condition 19.3 of IAFW 2249 in case of unenlisted contractors. In case of MES enlisted contractor issue of tenders shall remain suspended till deposit of EMD or six months from the date of cancellation whichever is later.

15. Tender to related firms shall not be issued simultaneously. Firms shall be termed as related if Proprietor/one or more Partners/Directors are common. Decision of Accepting Officer on issue/deny the tender to any one of the related firms shall be final and binding.

16. The integrity pact (IP) duly signed by Officer on behalf of Accepting Officer has been uploaded alongwith NIT as per '**Annexure "I" to 'Appendix 'A'**'. Scanned copy of IP (Integrity Pact) duly signed on each page by the bidder(s) shall be uploaded as part of technical bid (Cover-I) and original IP duly signed on each page shall be forwarded by post along with demand draft. **Bid of all the bidder(s) who do not upload signed copy of IP along with technical bid, (cover-I) shall be rejected.**

Signature of Contractor

For Accepting Officer

File No 752986/A/ 03 / E8

Date 12 Sep 2025

Military Engineer Services
Headquarter
Chief Engineer Jabalpur Zone
Military Engineer Services
Ridge road
Jabalpur 482001

INTEGRITY PACT

General

1. Whereas the president of India, represented by HQ Chief Engineer Jabalpur Zone, Jabalpur hereinafter referred to as Principal / Owner and the first part, has floated the Tender (NIT No.....) and Intends to award, under laid down organizational procedure , contract for **PROVN OF SINGLE MEN BARRACKS INCLUDING COOK HOUSE (IN EPC MODE) FOR AGNIVEERS AT 1 STC JABALPUR** Hereinafter referred to as Works / Services and M/s_____ represented by(Which term unless expressly indicated by the contract, shall be deemed to include its successor and its assignees), hereinafter referred to as the Bidder/ Contractor and the second part is willing to carryout the Works/ services.

2. Whereas the Bidder is a Proprietorship Concern / Partnership Firm/Limited Liability Firm /Private Limited Company /Limited Company / Joint Venture constituted in accordance with the relevant law in the matter and the Principal /Owner is HQ Chief Engineer Jabalpur Zone Jabalpur performing its functions on behalf of the President of India.

Objectives

3. Now, therefore, the Principal / Owner and the Bidder agree to enter in to this pre-contract agreement, referred to as **INTEGRITY PACT (IP)**, to avoid all forms of corruption by following a system that is fair, transparent and free from any influence/ prejudiced dealings prior to, during and subsequent to the conclusion of the contract to be entered into with a view to:-

3.1 Enabling the Principal /Owner to get the desired works / services at a competitive price in conformity with the defined specifications of the Services by avoiding high cost and the distortionary impact of corruption on public procurement.

3.2 Enabling Bidders to abstain from bribing or any corrupt practice in order to secure the contract by providing assurance to them that their competitors will also refrain from bribing and other corrupt practices and the Principal/ Owner will commit to prevent corruption, in any form by their officials by following transparent procedures.

Commitments of the principal / Owner

4. The Principal/ Owner commit itself to the following:-

4.1 The Principal/ Owner undertakes that, no official of the Principal/ Owner, connected directly or indirectly with the contract will demand, take a promise for or accept, directly or through intermediaries, any bribe, consideration, gift, reward, favour or any material or immaterial benefit or any other advantage from the Bidder, either for themselves or for any person, organization or third party related to the contract, in exchange for an advantage: in the bidding process, bid evaluation, contracting or implementation process related to the Contract.

4.2 The Principal/ Owner will, during the pre-contract stage, treat all Bidders alike and will provide to all Bidders the same information and will not provide any such information to any particular Bidder which could afford an advantage to that particular Bidder in comparison to other Bidders.

Commitments of Bidders

4.3 All the officials of the Principal / Owner will report to the appropriate Government office any attempted or completed breach(s) of the above commitments as well as any substantial suspicion of such a breach.

5. In case of any such preceding misconduct on the part of such official (s) is reported by the Bidder to the Principal/ Owner willful and verifiable facts and the same is prima facie found to be correct by the Principal /Owner, necessary disciplinary proceedings, or any other action as deemed fit, including criminal proceedings may be initiated by the Principal / Owner and such a person shall be debarred from further dealing related to the tender / contract process. In such a case while an Inquiry is being conducted by the Principal /Owner the tender process / proceedings under the contract would not be stalled.

6. The Bidder commits himself to take all measures necessary to prevent corrupt practices, unfair means and illegal activities during any stage of his bid or during any pre-contract or post-contract stage in order to secure the contract or in furtherance to secure it and in particular commits himself to the following:-

6.1 Bidder will not offer, directly or through intermediaries, any bribe, gift, consideration reward, favour any material or non-material benefit or other advantage, commission, fee, brokerage or inducement to any official of the Principal /Owner, connected directly or indirectly with the bidding process, or to any person, organization or third party related to the contract in exchange for any advantage in the bidding, evaluation, contracting and implementation of the Contract.

6.2 The Bidder further undertakes that he has not given, offered or promised to give, directly or in-directly any bribe, gift, consideration, reward, favour any material or non-material benefits or other advantage, commission fees, brokerage or inducement to any official of the Principal /Owner or otherwise in procuring the Contract or forbearing to do or having done any act in relation to the obtaining or execution of the contract or any other Contract with the Government for showing or forbearing to show favour or disfavor to any person in relation to the Contract or any other Contract with the Government.

6.3 The Bidder will not collude with other parties interested in the contract to impair the transparency, fairness and progress of the bidding process, bid evaluation, contracting and implementation of the contract.

6.4 The Bidder will not accept any advantage in exchange for any corrupt practice, unfair means and illegal activities.

6.5 The Bidder would not enter into conditional contract with any agent (s) or any other intermediaries wherein payment is made or penalty is levied, directly or indirectly, on success or failure of the award of the contract.

6.6 The Bidder commits to refrain from giving any complaint directly or through any other manner without supporting it with full and verifiable facts. Complaint will be processed as per **Guidelines for Handling of complaints** in vogue. In case the complaint is found to be vexatious, frivolous or malicious in nature, it would be construed as a violation of Integrity Pact.

7. Previous Transgression

7.1 The Bidder declares that no previous transgression occurred in the last three years immediately before signing of this Integrity Pact with any other company in respect of any corrupt practices envisaged hereunder or with any public Sector Enterprise in India or any Government Department in India.

7.2 If the Bidder makes incorrect statement on this subject, Bidder can be disqualified from tender process or the contract and if already awarded, same can be terminated for such reason.

8. Company Code of Conduct

8.1 Bidders are advised to have a company code of conduct (clearly rejecting the use of bribes and other unethical behavior) and a compliance program for the implementation of the code of contract throughout the country.

9. Sanction for Violation

9.1 Any breach of the aforesaid provisions by the Bidder or any one employed by him or acting on his behalf (whether with or without the knowledge of the Bidder) or the commission of any offence by the Bidder or any one employed by him or acting on his behalf, as defined in Chapter IX of the Indian Penal Code, 1860 or the Prevention of Corruption Act 1988 or any other act enacted for the prevention of corruption shall entitle the Principal /Owner to take all or any one of the following actions, wherever required:-

- (i) Technical bid of the Bidder will not be opened. Bidder will not be entitled to or given any compensation. However, the proceedings with the other Bidder(s) would continue.
- (ii) Financial bid of the Bidder will not be opened. Bidder will not be entitled to or given any compensation. However, the proceedings with the other Bidder(s) would continue.
- (iii) The Earnest Money Deposit shall stand forfeited either fully or partially, as decided by the Principal /Owner in case contract is not awarded to the Bidder and the Principal /Owner shall not be required to assign any reason therefore. For enlisted contractors an amount

- less than or equal to Earnest Money Deposit as decided by the Principal / Owner shall be deducted from any amount held with the Department /any payment due.
- (iv) To immediately cancel the contract, if already concluded /awarded without any compensation to the Bidder.
 - (v) To encash the Performance Security furnished by the Bidder.
 - (vi) To cancel all or any other Contract (s) with the Bidder.
 - (vii) To temporarily suspend or temporarily debar / permanently debar the bidder as per the extant policy.
 - (viii) If adequate amount is not available in the present tender / contract, the deficient amount can be recovered from any outstanding payment due to the Bidder from the Principal / Owner in Connection with any other contract for any other works / services.
 - (ix) If the Bidder or any employee of the Bidder or any person acting on behalf of the Bidder, either directly or indirectly, is closed related to any of the officers of the Principal /Owner or alternatively if any close relative of an officer of the Principal / Owner has financial interest/ stake in the Bidder's firm, the same shall be disclose by the Bidder at the time of submission of tender. Any failure to disclose the interest involved shall entitle the Principal /Owner to debar the Bidder from the bid process or rescind the contract without payment of any compensation to the Bidder. The term 'close relative' for this purpose would mean spouse whether residing with the Government servant or not, but does not include a spouse separated from the Government servant by a decree or order of a competent Court, son or daughter or step son or step daughter and wholly dependent upon Government servant, but does not include a child or step child who is no longer in any way dependent upon the Government servant or of whose custody the Government servant has been deprived of by or under any law; any other person related, whether by blood or marriage, to the Gove servant or to the Government servant's wife or husband and wholly dependent upon Government servant.
 - (x) The Bidder shall not lend to or borrow any money from or enter into any monetary dealings or transactions, directly or indirectly, with any employee of the Principal / Owner and if he does so, the Principal /Owner shall be entitled forthwith to cancel the contract and all other contract with the Bidder.

9.2 The decision of the Principal / Owner to the effect that a breach of the provisions of this Integrity Pact has been committed by the Bidder shall be final and binding on the Bidder. **However, the Bidder can approach the Independent External Monitor(s) (IEM's) appointed for the purposes of this Pact.**

10. **Independent External Monitors (IEM's)**

10.1 MoD has appointed the following Independent External Monitors for this Pact in consultation with the Central Vigilance Commission:-

SI No	Name of IEM	E-mail id
1	Sh Narayan Murthy Ganapathy, IFoS(Retd) 3/268, Vipul Khand, Gomtinagar, Lucknow-226010	gana_narayan@yahoo.com
2	Sh Lalatendu Mohanti, IPS(Retd) A-1 Tower-5,New Motibagh, New Delhi-110023	l.mohanti@gmail.com

10.2 Details of Nodal officer nominated by E-in-C's Branch are as follows:-

Name : Shri P K S Sengar,, Dir (Contracts)
E-mail id : **pkss_2004@yahoo.co.in**
Postal Address: Room No 158
Dte of Contract Management, Engineer-in-Chief's Branch
Kashmir House, Rajaji Marg, New Delhi-110011,
Tele No – 011-23019154

10.3 In case of any complaint with regard to violation of Integrity Pact, either party can approach IEM's with copy to the Nodal Officer and the other party. If any such complaint from bidder is received by the Principal /Owner, the Principal /Owner shall refer the complaint to the Independent External Monitor for their recommendations /inquiry report.

10.4 If the IEMs need to peruse the relevant records of the Principal /Owner and /or of the Bidder /Contractor in connection with the complaint sent to them, the Principal /Owner and / or the Bidder /Contractor shall make arrangement for such perusal of records by the IEMs as demanded by them including unrestricted and unconditional access to the project documentation and minutes of meeting. If records/ Documents of Sub-Contractor (s) are also required to be perused by the IEMs, the Bidder shall make arrangement for such perusal of records by the IEMs as demanded by them. IEMs are under obligation to treat the information and documents of the principal / Owner and Bidder/ Contractor / Sub-contractors with confidentiality.

10.5 The task of the IEMs is to review independently and objectively, any complaint received with regard to violation Integrity Pact and offer recommendation or carry out inquiry as deemed fit. The IEMs are not subject to any instructions by the representatives of the parties and shall perform their functions neutrally and independently. The report of inquiry, if any, made by the IEMs shall be submitted to either of the following for a final and appropriate decision in the matter keeping in view the provision of this Pact:-

- (a) Engineer-in-Chief in normal cases.
- (b) CVO (MES & BRO) /MOD in cases involving vigilance angle.

11. **Examination of Books of Accounts**

In case of any allegation of violation of any provisions of this Integrity Pact payment of commission, the Principal / Owner or its agencies shall be entitled to examine the Books of Account of the Bidder and the Bidder shall provide necessary information of the relevant financial documents in English and shall extend all possible help for the purpose of such examination.

12. **Law and Place of jurisdiction**

This Pact is subject to Indian Law. The Place of performance and jurisdiction is the seat of the Principal /Owner.

13. **Other Legal Actions**

The actions stipulated in this integrity pact are without prejudice to any other legal action that may follow in accordance with the provisions of the extant law in force relating to any civil or criminal proceedings.

14. **Signing of Integrity Pact on behalf of Bidder**

- (a) Proprietorship Concern – the Integrity Pact must be signed by the proprietor or by an authorized signatory holding power of attorney signed by the proprietor.
- (b) Partnership firm – The integrity Pact must be signed by all partners or one or more partner holding power of attorney signed by all partners.
- (c) Limited Liability firm – The integrity pact must be signed by all partners or by one or more partner holding power of attorney signed by all partners.
- (d) Private Limited /Limited Company – The Integrity Pact must be signed by a representative duly authorized board resolution.
- (e) Joint Venture – The Integrity Pact must be signed by all partners and members to joint Venture or by one or more partner holding power of attorney signed by all partners and members to the joint Venture.

15. **Validity**

15.1 The validity of this Integrity Pact shall be from date of its signing. It expires for the contractor after the final payment under the contract has been made or till the continuation of Defect liability period, whichever is later and for all other bidders, till the Contract has been awarded.

15.2 Should one or several provisions of this Pact turn out to be invalid; the remainder of this Pact remains valid. In this case, this case, the parties will strive to come to an agreement to their original intentions.

INTEGRITY PACT

To

Sub-Tender ID No **2025_MES_725970_1** for the work **PROVN OF SINGLE MEN
BARRACKS INCLUDING COOK HOUSE (IN EPC MODE) FOR AGNIVEERS AT 1 STC
JABALPUR**

Dear Sir,

It is hereby declared that MES is committed to follow the principal of transparency, equity and competitiveness in public procurement.

The subject Notice Inviting Tender (NIT) is an invitation to offer made on the condition that the Bidder will sign the Integrity Pact, which is an integral part of tender/bid documents, failing which the tender /bidder will stand disqualified from the tendering process and the bid of the bidder would be summarily rejected.

This declaration shall form part and parcel of the Integrity Pact and signing of the same shall be deemed as acceptance and signing of the Integrity Pact on behalf of MES.

Yours faithfully

HQ Chief Engineer Jabalpur Zone,
Jabalpur.

INTEGRITY PACT

To
HQ Chief Engineer
Jabalpur Zone,
Jabalpur.

Sub-Tender ID No **2025_MES_725970_1** Submission of Tender for the work of **PROVN OF SINGLE MEN BARRACKS INCLUDING COOK HOUSE (IN EPC MODE) FOR AGNIVEERS AT 1 STC JABALPUR**

Dear Sir,

I/We acknowledge that MES is committed to follow the principles thereof as enumerated in the Integrity Pact enclosed with the tender/bid document.

I/We agree that the Notice Inviting Tender (NIT) is an invitation to offer made on the condition that I/We sign the Integrity Pact, which is an integral part of tender document, failing which I/We will stand disqualified from the tendering process I/We acknowledge that THE MAKING OF THE BID SHALL BE REGARDED AS AN UNCONDITIONAL AND ABSOLUTE ACCEPTANCE of the condition of the NIT.

I/We confirm acceptance and compliance with the Integrity Pact in letter and spirit and further agree that execution of the said Integrity Pact shall be separate and distinct from the main contract, which will come into existence when tender/bid is finally accepted by MES. I/We acknowledge and accept the validity of the Integrity Pact, which shall be in line with Para 15 of the enclosed Integrity Pact.

I/We acknowledge that in the event of my/our failure to sign and accept the Integrity Pact, which submitted the tender/bid, MES shall have unqualified, absolute and unfettered right to disqualify the tender/ bidder and reject the tender/bid in accordance with terms and conditions of the tender/bid.

Yours faithfully

(Duly authorized signatory of the Bidder)

LETTER OF INTENT FROM BIDDER (To be given on Letter Head)

Date:

From :

To,

The Chief Engineer Jabalpur Zone

PROVN OF SINGLE MEN BARRACKS INCLUDING COOK HOUSE (IN EPC MODE) FOR AGNIVEERS AT 1 STC JABALPUR

Sir,

1. Having examined the Tender Documents for the subject work as set out in your Notice Inviting Tender, Instructions to Bidders, Scope of Work, Design Basis Report, Particular Specifications, Line Plan of STP, Typical Drawings, Special Conditions of the Contract, General Conditions of Contract (IAFW -2249), MES Standard Schedule of Rates (Part –I & Part –II), Zonal plan of CE Jabalpur zone, Payment schedule, BOQ, Integrity Pact we undertake to Design and Construction of the subject work for the Lump Sum Price and payment schedule.

2. If our tender is accepted we will provide performance guarantee for the due performance of the contract as stipulated in the General Conditions of Contract hereto.

3. Unless and until a formal Agreement is prepared and executed this tender together with your written acceptance thereof shall form a binding Contract between us.

4. We agree to abide by this bid for the period of **90 days (Ninety days)** from the end date of submission of Bid and it shall remain binding upon us and may be accepted any time before expiration of that period.

5. We understand fully that you are not bound to accept the lowest or any bid received.

Yours faithfully,

Signature with office seal Full Name: Designation:

Note : The signatory of this letter should be duly authorized by the Firm/Company to bind the Firm/Company to such legal commitment.

ENGINEERING, PROCUREMENT AND CONSTRUCTION AGREEMENT
THIS AGREEMENT is entered into on this the day of, 2025.

BETWEEN

The President of India through the Military Engineer Service (MES) represented by Chief Engineer Jabalpur Zone (MES), Jabalpur Cantt (hereinafter referred to as the “Employer/Client” which expression shall, unless repugnant to the context or meaning thereof, include its administrators, successors and assigns) of One Part;

AND

{-----}, means the selected bidder having its registered office at , (hereinafter referred to as the “Contractor” which expression shall, unless repugnant to the context or meaning thereof, include its successors and permitted assigns) of the Other Part.

WHEREAS:

(A) The Government of India had entrusted to the Employer the **“PROVN OF SINGLE MEN BARRACKS INCLUDING COOK HOUSE (IN EPC MODE) FOR AGNIVEERS AT 1 STC JABALPUR”**, on EPC Mode.

(B) The Employer had resolved to Design & Construction of **“PROVN OF SINGLE MEN BARRACKS INCLUDING COOK HOUSE (IN EPC MODE) FOR AGNIVEERS AT 1 STC JABALPUR”** (hereinafter called the “Project”) on Engineering, Procurement, Construction Mode (“EPC”) basis in accordance with the terms and conditions to be set forth in an agreement to be entered into.

(C) The Employer had prescribed the technical and commercial terms and conditions, and invited bids (as covered in NIT) from the bidders.

(D) After evaluation of the bids received, the Employer had accepted the bid of the selected bidder and issued its Letter of Acceptance of Contract bearing No dated (hereinafter called the “AoC/LoA”) to the selected bidder for **PROVN OF SINGLE MEN BARRACKS INCLUDING COOK HOUSE (IN EPC MODE) FOR AGNIVEERS AT 1 STC JABALPUR** at the contract price specified hereinafter, requiring the selected bidder to inter alia:

(i) to disclose the name of contractor’s authorized representative who will enter into this Agreement and the enforceability of the provisions thereof, within 10 (ten) days of the date of issue of LOA; and

(ii) Execute this Agreement within 15 (fifteen) days of the date of issue of LOA/AOC.

(E) The Contractor has fulfilled the requirements specified in Recital as above;

NOW THEREFORE in consideration of the foregoing and the respective covenants and agreements set forth in this Agreement, the sufficiency and adequacy of which is hereby acknowledged, the Employer hereby covenants to pay the Contractor, in consideration of the obligations specified herein, the Contract Price or such other sum as may become payable under the provisions of the Agreement at the times and in the manner specified by the Agreement and intending to be legally bound hereby, the Parties agree as follows:

The following documents attached hereto shall be deemed to form an integral part of this Contract:-

- (a) NIT & Instruction to Bidder (b) Scope of Work (c) Design Basis Report (d) Particular specifications (e) Special Conditions of the Contract (f) Payment schedule (g) Schedule 'A' (BOQ) Notes & BOQ
- (h)MES Standard Schedule of Rates (Part-I Specifications) -2009 with amendment Nos 1 to 3 and MES Standard Schedule of Rates (Part-II Rates) - 2020 together with amendment/errata Nos 1 to 122 as applicable to the above said schedule.
- (i) General Conditions of Contracts (IAFW-2249) (1989 Print) together with Amendment Nos.1 to 49 and Errata 1 to 20.

In witness whereof the parties hereto have caused this Agreement to be signed in their respective handsas of the day and year first before written.

FOR & ON BEHALF OF CONTRACTOR FOR & ON BEHALF OF PRESIDENT OF INDIA

Signature

Name

Address

CE Jabalpur Zone

Witness(1)

(2)

SCHEDULE ‘A’ NOTES

LIST OF WORKS AND RICES

PROVN OF SINGLE MEN BARRACKS INCLUDING COOK HOUSE (IN EPC MODE) FOR AGNIVEERS AT 1 STC JABALPUR

1. The Notes here-in-below shall be applicable to all parts of Schedule ‘A’ and BOQ. Wherever Schedule ‘A’ is mentioned in tender documents, it means the Schedule ‘A’ as well as BOQ as applicable.
2. The Schedules are divided into various parts as detailed below:-

(i)	Sch ‘A’ Part-I	Building/Structures (To be quoted by the tenderer)
(ii)	Sch ‘A’ Part-II	External Electric Supply (Pre Priced on SSR 2020)
(iii)	Sch ‘A’ Part-III	External Water supply (Pre Priced on SSR 2020)
(iv)	Sch ‘A’ Part-IV	Road Path Culvert (Pre Priced on SSR 2020)
(v)	Sch ‘A’ Part-V	Sewage Disposal (Pre Priced on SSR 2020)
(vi)	Sch ‘A’ Part-VI	Security Fencing & Gate (Pre Priced on SSR 2020)
(vii)	Sch ‘A’ Part-VII	Area Drainage (Pre Priced on SSR 2020)
(viii)	Sch ‘A’ Part-VIII	Summer & cooling Appliances (Pre Priced on SSR 2020)
(ix)	Sch ‘A’ Part-IX	Arboliculture (Pre Priced on SSR 2020)
(x)	Sch ‘A’ Part-X	Fire Fighting System (Pre Priced on SSR 2020)
(xi)	Sch ‘A’ Part-XI	Lightning protection system (Pre Priced on SSR 2020)
(xii)	Sch ‘A’ Part-XII	Site Clearance (Pre Priced on SSR 2020)
(xiii)	Sch ‘A’ Part-XIII	(Miscellaneous B&R / E&M items of works (To be quoted by the tenderer))

3. The description of various items of works mentioned in Schedule ‘A’ and BOQ are in brief and includes for all materials and labour complete unless otherwise mentioned. These shall be read in conjunction with Special Conditions, Particular specifications, Drawings including notes there on, specifications for materials and workmanship contained in SSR Part-I and relevant preambles to various trade sections in SSR Part-II. Words “all as specified and/or shown on drawings and/or as directed” shall be deemed to be included in all items of Schedule ‘A’ and BOQ whether specifically mentioned in Schedule ‘A’ and BOQ or not.
4. **VISIT TO SITE:** The bidders shall visit the work site of work by taking prior appointment with GE before quoting. The bidders shall have no claim what-so-ever on this account at a later stage whether he has actually inspected the work site or not. Bidder shall upload a certificate self-certifying about having visited the site of work.
5. **LAYOUT:** Layout of Building/Structures and Works Services indicated in the SITE PLAN are Tentative and no Adjustment in Price shall be done on account of Final Approved Layout.
6. **PERIOD OF COMPLETION:-**

6.1 The entire work under this contract shall be completed in both Phases in **550 (Five Hundred fifty) Days**, from the date of handing over site as indicated in Work Order No.1. The brief details work to be carried out in each phase are as under:

Phas e	Scope covered	Date of commencemen t	period of completion from the date of commencement	Amount of Phase for calculation of Compensation
I	Topographic survey, Site clearance, Soil investigation, Submission of design & drawing, vetting by IITs/NITs and its approval from employer	As per Work order No. 1	60 Days	60 Lakh
II	All works NOT covered in Phase -I	Next day subsequent to completion of Phase-I	490 Days	CA Amount – (Minus) 60 Lakh

Note: -

- (i) Work order will be placed for both phases simultaneously duly mentioning date of commencement and date of completion of each phase. In case of extension of completion period of Phase-I, the commencement date of phase-II shall be modified accordingly. Completion certificate shall be issued for each phase separately.
- (ii) The whole work shall be deemed to be completed only after completion of Phase-II.
- (iii) Single Final bill shall be submitted by the contractor and paid by the department.
- (iv) Defect liability period of work shall commence from the completion date of the Phase-II.

6.2 **HANDING OVER OF SITE:**

Site for execution of work will be available as soon as the work is awarded. In case it is not possible to make the entire site available on the award of work, the contractor will have to rearrange his working programme accordingly. No claim whatsoever, for not giving the entire site on award of work and for giving site gradually, will be tenable. However Work Order No 1 shall specifically indicate phased handing over of site as proposed in consultation with users.

7. Lump sum amount and Unit rate quoted by the tenderer shall inter alia includes for all taxes levied by Central Govt/State Govt/Local bodies viz GST, GST on works contract, workers welfare tax/cess etc. including recovery of income tax, GST on works contract and labour welfare tax which is deductible at source. No claim of whatsoever nature shall be admitted by the Govt on this account.

8. Probable distribution of various Items of Internal/External Services is indicated on site plan/line plan / relevant Drawings, inventory of items and the same are tentative. Bidder will work out his own details/schedule for various services and cost as per bidder's own schedule and the same shall be accounted for in his quoted lump sum. These may be varied as per site requirement, where necessary, at the discretion of the Engineer-in-Charge. The effect of such changes/variations in quantities due to realignment or resitting after approval of contractor's final schedule shall be duly accounted for in working out the deviation as applicable.

9. Cost considered for each item of work covering the scope of work shall be inclusive of all 'Material & Labour' or 'Supply & Fixing' or 'Supply & Laying' including Tools and Plants, Installing, Commissioning and Testing complete as required for entire Completion of Works.

10. All Reinforcement bars shall be TMT Bars (Fe 500D grade) (except Mild Steel Round Bars where specifically shown in approved Drawings/TD drawings) irrespective of whatever shown on approved drawings or specified elsewhere in these tender documents. Wherever Mild Steel Round Bars is intended as reinforcement, the same shall be of size 8mm dia TMT Bar (Fe 500D).

11. In case any royalty is required to be paid by the Contractor for bringing approved earth from outside of the MoD Land, the rate quoted shall be deemed to include for the same and nothing extra shall be paid to the Contractor by the Department.

12. Cost of testing including transportation of Materials and/or Equipments or Items, provision of all facilities for testing in accordance with Specifications and/or IS shall be borne by the Contractor unless otherwise mentioned.

13. **SAFETY MEASURES, PRECAUTION'S, RISKS ETC.**

13.1 The Work shall be carried out with utmost care to ensure that no damage to existing/adjoining work is done failing which the damage, if any done shall be rectified by the contractor to match with the existing/ adjoining work to the entire satisfaction of Engineer-in-Charge under contractor's own arrangement and at his own expenses.

13.2 Suitable tools, plants, equipments, mechanism, etc., as considered necessary shall be adopted during execution of the work. The Contractor shall take all precautions, safety measures, etc., to avoid any damage, mis-happening, accident, etc., to the workmen engaged by him to carryout the work. The lump sum amount quoted by Contractor shall be deemed to have included the element of adopting safety measures, precautions and also the risks, etc. involved in work, except Accepted Risks as covered under the General Conditions of Contract, and nothing EXTRA shall be admissible on this account.

14. **METHOD OF MEASUREMENTS:** The method of measurements to be adopted in the Contract shall be as laid down in MES Standard Schedule Of Rates Part-I & II, **IS-1200 (latest)** and other relevant BIS standard. The General Rules, Special Conditions, preambles and other provisions of these documents shall be deemed to apply to the work under this Contract unless otherwise mentioned in the tender documents.

15. SCOPE OF WORK

15.1 SITE OF PROJECT

15.2 Site for PROVN OF SINGLE MEN BARRACKS INCLUDING COOK HOUSE (IN EPC MODE) FOR AGNIVEERS AT 1 STC JABALPUR is located at Jabalpur. For exact location, the tenderers are advised to visit the office of GE (P) No 01 Jabalpur. Layout Plan/Site Plans enclosed alongwith the tender documents should be referred for access road, electric point, water point, temporary shed, tentative layout of the various buildings and other relevant information.

15.3 Site Context :

15.3.1 New accommodations are to be constructed as catered in Schedule -A part-I.

15.3.2 An inventory of site including the land, buildings, structures, road work, trees, services and any other immoveable property on, attached to or lying at the site shall be prepared jointly by the contractor and representative of Employer and such inventory shall form part of the contract agreement.

15.4 Climate

15.4.1 The climate of Jabalpur over most of the year is a pronounced continental in character .It is very hot in summers and markedly cold in winters. May and June can be really hot with the temperature soaring to over 42°C,while in winter it can be as low as 4°C. Jabalpur has a semi-arid as well as tropical climate.. Around 70% rainfall is received during the month of Jun to Aug and the remaining rainfall is received during December to February. Jabalpur is the one of the maximum rain-hit area in Madhya Pradesh with average rainfall being 54.6 inches per annum.

15.4.2 Bidders are advised to login to Govt website of Metrological Dept for other details.

16.5 Seismology

16.5.1 Seismically Jabalpur district lies in a region where earthquakes of moderate to high risk of earthquakes have been experienced in the past. A committee of experts under the auspices of Indian Standard institution prepared seismic zoning map of India, where Jabalpur district has been placed in **zone III**

16.6 Soil

16.6.1 The soil is generally black cotton soil (Vertisol). However, project is to be taken up only after proper soil investigation as catered under schedule -A part-I of Scope of Work. Preliminary soil investigation has been done by the deptt but final soil testing for design is to be done by the bidder. Tentative report is attached for guidance only.

17. Brief Scope of Work:

17.1 Objective

17.1.1 This contract is an EPC Contract wherein the Employer has provided concept drawings, specifications and other documents to establish and make clear the Employer's goals, objectives, requirements and expectations to do Engineering procurement and **PROVN OF SINGLE MEN BARRACKS INCLUDING COOK HOUSE (IN EPC MODE) FOR AGNIVEERS AT 1 STC JABALPUR** as detailed in the contract documents. The Contractor is required to use the concept documents provided by the Employer and then fully develop detailed, final and thorough plans, design, specifications and all other documents (**referred to in the contract document as 'Design Development' or 'Design Development Report'**) needed to successfully execute the works. In this regard the Employer is providing the following in concept form:

- (a) Line plan of buildings
- (b) Design Basis Report
- (c) Brief scope of services
- (d) Specifications
- (e) Plant details

17.1.2 These documents are intended to provide the contractor with sufficient information so as to clearly understand the Employer's intent, goals and objectives in execution of the works. The contractor is not required to strictly conform to concepts provided by the employer, but, on the contrary, is encouraged to improve on concepts with the goal to provide the final solution which best meets the Employer's goals and objectives. The contractor shall use a certain degree of liberty and flexibility in producing solutions which best meet established goals and objectives. The contractor will be required to adopt the general concepts, as provided, and expand and develop the same to produce complete, thorough, comprehensive and high quality designs, working drawings, and specifications for review and approval by the Employer. While developing the complete and final designs and specifications, the contractor shall review the concept designs and planning for betterments or improvements which may be incorporated to better achieve the Employer's goals and objectives.

These betterments, if any, shall be submitted by the contractor to the employer for review and approval before the final design is completed. A brief summary of the Employer's key goals and objectives in executing works under this EPC Contract are as follows:

- (a) High quality construction
- (b) Pleasant and sustainable architectural appearance/features planned as per terrain and local climatic conditions
- (c) Quality life for residents
- (d) Maximize sustainability concepts.
- (e) Minimize long term facilities maintenance and upkeep costs.
- (f) Employee latest/modern construction technologies and best practices.
- (g) Maximize the natural surroundings and attributes to the extent possible.
- (h) Complete interim project priority milestones and overall schedule objectives on time.
- (j) Complete project within established budget.
- (k) Completion of various stages of the project within laid down time schedule as approved by the Accepting Officer

17.1.3 The specifications contained, herein, shall apply to all works/items of work as are required to be executed under the Contract or otherwise directed.

17.1.4 The Specifications must be read in conjunction with the conditions of contract, concept drawings, specifications" and other documents forming the Contract documents. Notwithstanding the subdivision of the specification under different headings, every part of it shall be deemed supplementary to and complementary of every other part. In the event of a discrepancy, difference or conflicting provisions among different parts of the documents on the same issue, the interpretation shall be based on the order of precedence as laid down below :-

- (a) provisions as contained in Notes to Schedule "A"
- (b) provisions as contained in the Scope of Work
- (c) provisions as contained in the Design Basis Report (DBR)
- (d) provisions as contained in Design Development Report
- (e) provisions as contained in Particular Specifications
- (f) provisions as contained in the Schedule of Finishes
- (g) provisions as contained in the MES Standard Schedule of Rates (SSR) (Part -I)
- (h) provisions as contained in the relevant Indian Standard of BIS
- (j) provisions as contained in the TD (Typical Details) drawings
- (k) provisions as contained in the General Conditions of Contract (GCC)

The heading in these specifications shall not be deemed to be part, thereof, or be taken into consideration in the interpretation or construction, thereof, or of the Contract.

17.2 Documents to be submitted before commencement of work:

17.2.1 The architectural drawings (tentative) of the buildings covered under Schedule 'A' Part-1, have been uploaded along with the tender document. Buildings covered under Schedule 'A' Part-1 shall be of Pre-Engineered Building for which design is to be given by the tenderer. The Tenderer shall require to submit complete structural drawings duly vetted by any IIT/NIT and final architectural drawings within 60 (sixty) calendar days from the date of commencement as per Work Order No. 1.

- (a) The following documents shall be submitted to this office after acceptance:-
 - (i) Soil Investigation Report for guidance
 - (ii) Design parameters adopted.
 - (iii) Detailed load calculation.
 - (iv) Enumeration of load combination & load factors (Hard & Soft copies).
 - (v) Analytical model (Hard & Soft copies).
 - (vi) Design output of software in hard copies.
 - (vii) Detailed Structural drawings duly vetted by any IIT/IISC/NIT in required number in tracing and white sheet, ink signed and certified to be "safe" and design as per standard procedure incorporating relevant codal provisions of loading and detailing.
 - (viii) Architectural and Structural Drawings must be complete and detailed enough for interpretation by Engineer/ Quantity Surveyor.
 - (ix) Detailed bills of quantities with abstract and analysis of items based on market rates as specified hereinafter.
- (b) The design parameters for buildings covered under Schedule 'A' Part-1 and is appended in PS clauses.
- (c) Detailed specifications, are given in particular specification which shall be taken into consideration by the contractor for designing the complete structural components of Schedule 'A' Part-I. In case any deficiency is noticed by the tenderer while carrying out design etc., the same shall also be intimated along with design details. The deficient details submitted shall also be deemed considered by the tenderer for arriving the lumpsum quoted for Schedule 'A' Part-I.

17.2.2 REFERENCE STANDARDS

- (a) The work covered by this specification shall comply with the latest editions and revision of SSR Part-I Specifications and as specified elsewhere in the Contract documents.
- (b) The latest editions and revision of SSR Part-I applicable as on bid submission start date shall be adopted. The contractor shall maintain at site a copy of the latest editions of all Indian Standards being followed in the design development, SSR and Codes applicable to the work to be undertaken on site.

17.3 WORK(S) COVERED UNDER SCH 'A' PART-I

17.3.1 Brief scope of work of buildings covered in schedule -A part-I is given under Particular Specifications. These provisions are for guidance only and the contractor shall be fully responsible for submission of sound, safe aesthetic design in the scope of work of this Contract.

17.3.2 Description of buildings covered in schedule -A part-I, is in brief. These are deemed to be amplified and read in conjunction with Special Conditions, Particular Specifications for materials and workmanship and conditions in relevant trade section of SSR Part-I, Part-II and contract drawings including notes on the drawings.

17.3.3 The scope of work under Sch A Part-I is not exhaustive. However, the contractor is required to execute all the items as per scope of work, Design Basis Reports (DBR) and in compliance with general specifications, particular specifications, drawings etc. to make the SINGLE MEN BARRACKS INCLUDING COOK HOUSE and its services fit for its purpose i.e. handing over for functional use. The details mentioned in DBR and general as well as particular specification / conceptual drawings / site plan/line plan are indicative in nature. The bidder will ensure to complete the work and make it functional as per relevant codes and Standards. Any other item not covered under scope of work but seems necessary for proper operation of building shall be executed by the contractor within the quoted amount and no extra payment shall be admissible.

17.3.4 The scope also includes Two (02) years of Defects Liability Period (DLP) for all Works and Plants as defined in the General Conditions of Contract (GCC) IAFW-2249. The Defect Liability Period of plants, equipment, machineries etc. shall be as per guarantee/warranty clause herein-after. Contractor shall deploy required number of technicians, tools, plants and machineries for maintenance/upkeep of buildings and plants/installations during the period of DLP, as per service liability agreement.

17.3.5 An indicative area chart (Site Plan) of SINGLE MEN BARRACKS INCLUDING COOK HOUSE to be constructed under the Project is given in tender drawings. The built-up area is as per scales of accommodation for defence services as given in Line Plan and the same shall be the basis for designing architectural plan of the buildings.

17.3.6 The site shall be cleared of rubbish, debris and all waste material by the contractor at his own expense and the site shall be delivered in clean and tidy state to the satisfaction of Engineer –in-Charge.

17.4 THIRD PARTY VETTING

17.4.1 From the date of commencement of work. A period of 60 (sixty) calendar days will be given to the contractor within which drawings and details of Sch 'A' part-I, duly vetted and certified by any of the IIT/NIT, shall be submitted to the Accepting Officer for approval. Any discrepancy or observation raised by Accepting Officer shall be got modified by the vetting agency within a week's time. The commencement of physical execution of work shall start after approval of vetted design/drawing by the Accepting Officer only. However, during the period of 60 days mentioned above, the contractor can start mobilization on site his preparatory arrangements for the work like making site offices, bringing tools, plants, machineries etc. No extension of time or request to re-fix the commencement date of the work for any ground(s) whatsoever shall be entertained, in case the approval takes more time for vetting and certification from IIT/NIT. The work order shall be placed by GE after the acceptance of tender catering above activities.

17.4.2 After acceptance of contract and before commencement of physical execution building of work catered in Sch 'A'/BOQ, it is mandatory requirement of this contract that the design calculations and detailed drawings of Sch 'A' which will eventually form part of the contract are vetted by one of the IIT/NITs within a period of 60 days from the date of commencement of work mentioned in work order issued by the GE. In case Vetting Agency suggests modifications/changes/ alterations/ additions, they will have to be complied with by the contractor in his design and drawings by way of dated revisions. Vetted/certified design & drawings along with correspondence exchanged between contractor & Vetting Agency shall be submitted to Accepting Officer along with 7 (seven) sets of drawings and original tracings who will approve the same & circulate them officially to contractor & executives of the Deptt which shall only be used for execution. In case owing to site/technical reasons, any further clarification/modification in design/drawing is necessitated, the contractor shall approach the vetting agency for revised design/drawing at his own cost and the work shall be executed as per revised design/drawing without any extra cost to the Government. The cost effect towards vetting & certification fees payable/paid to Vetting Agency & submission of 7 (seven) sets of design & drawings including original tracings are deemed included in the quoted rate/offer. All the expenditure towards these elements shall be on contractor's account and nothing extra shall be payable on account of any misunderstanding in respect of this clause.

17.4.3 The vetting of designs and drawings and its report shall be duly signed by the authorized signatory on behalf of the institute and not from a professor/individual of the institute in his personal capacity.

17.4.4 A certificate that all details have been thoroughly checked and are in compliance as per laid down standards, regulations in respect of safety soundness and economy, IS Codes, adherence to NBC norms and sound engineering practices shall be obtained from the vetting agency. The certificate duly signed shall be submitted by the consultant.

17.4.5 The vetting agency shall also be liable and answerable for any design deficiencies detected during design life of the structure/ plant and may be called upon to address such issues, if required.

17.4.6 The consultant/Institute shall facilitate interaction of rep of Accepting Officer with the vetting authority during the vetting/proof checking of the design/drawings and ensure all clarifications/confirmations of design parameters from the vetting authority.

17.5 BILL OF QUANTITIES

Based on entire set of working drawings so finalised, the contractor shall work out the Bill of Quantities for Training Sheds with pricing at market rates. The contractor shall work out detailed estimates including services and price it at par market rates and work out Yard Stick for payment in respect Sheds at different stages of progress. The detailed BOQ of Shed and Yardsticks of Training Shed shall be submitted to CWE through GE for the approval. BOQs and Yard sticks approved by CWE shall be the basis for making payments under RARs.

17.6 PROCESS OF APPROVALS OF DESIGNS, DRAWINGS

17.6.1 GE (P) No 01 Jabalpur is responsible for getting the approval for different types works under the Engineering Phase from the authorities as stipulated below. The contractor shall submit all the requisite documents/ details through the GE and liaise with stipulated authorities for approval within period stipulated as per milestones.

17.6.2 Ten (10) Copies of approved drawings along with soft copies (10 CDs) shall be submitted for execution

- (a) Architecture - Director (Arch)/ E6 section, HQ CE Jabalpur Zone
- (b) Soil Investigation Reports & Structural Design of Bldgs - Director (Des)/ E2(Des) section HQ CE Jabalpur Zone
- (c) Any Issue related to contract- Director (Contracts)/ E8 section HQ CE Jabalpur Zone
- (d) Any issue regard to site - CWE Jabalpur / GE (P) No 01 Jabalpur

17.7 DESIGN BY CONTRTACTOR AND COPYRIGHT

17.7.1 All these design drawings will become the property of MES. The drawing cannot be issued to any other person, firm or authority or used by the contractor for any other project. No copies of any drawing or document shall be issued to anyone except MES and authorized representative of MES.

17.7.2 All drawings/specifications/makes, shop drawings and construction methodology etc. are to be got approved from MES prior to execution/procurement. However, it does not imply that contractor absolves themselves from Codal provisions/ statutory requirements.

17.7.3 If any modification in Architectural/Structural/Service design/drawing or any other change is needed due to deficiency in design/drawings/scheme arising out of inadequate considerations of site conditions/ non-compliance of Codal provisions, the contractor shall do/re-do the design/redevelop the scheme and then execute without any extra cost. The decision of the GE shall be final and binding. No claim whatsoever will be entertained in this regard. However in. case of architectural changes in buildings arising out of Client's requirement after preparation/finalization of the drawings leading to change in specifications/finishes/scope of work, the same shall be regularized through deviation order.

17.7.4 The area mentioned in tender document is indicative in nature. The Built-Up area is

·based on concept drawings/permissible as per scale of Accommodation for Defence Services and other components. In case of any increase in area mentioned in tender document due to Employer/User requirement, the cost on this account is deemed to be included in the quoted by contractor and nothing extra shall be paid on any account.

17.7.5 All structural drawings/ Facade drawings shall be got approved from any of the IITs. Statutory fee shall be borne by the contractor.

17.7.6 The contractor is required to submit all its submittals like Drawings, Documents, reports, Schedules, invoice copies, etc. (whether original or revised) in 6 (Six) Hard & 6 (six) soft (CD/DVD) copies. This clause applies to every submittal of contractor under this contract.

17.8 DESIGN LIFE

The class of Structure of the buildings/ structures being provisioned under the subject work is "General Buildings and Structures", as such, the Mean Probable design life of structure in years shall be 50 as stipulated in IS 875: "Code of practice for design loads of building and construction". The contractor shall accordingly select the Materials and construction systems to be consistent with Mean Probable design life of structure.

17.9 SITING OF BUILDINGS:

Siting of buildings shall be as per layout plan generally. However, same may vary wherever necessary as per Employer requirement. The contractor shall not be entitled for any claims on account of any such re-siting of Building(s).

18. SCHEDULE 'A' PART- II to VII

(a) The unit rates inserted by MES under column 4 of Schedule 'A' Part-II to Part-VII have been worked out at par with MES Standard Schedule of Rates 2020 including amendments and errata's thereto as indicated in tender page, or at the rates analogous thereto. The accuracy of unit rates is however not guaranteed. The tenderer's attention is invited to Condition 6A(B) of IAFW-2249.

(b) The contractor is required to quote his unit rates against each item of work given under **BOQ (Schedule 'A') Part-II and Part-VII**. The rates quoted shall include supply of material and labour and fixing etc complete.

19. UNIT RATES FOR SCHEDULE 'A' PART-I (BUILDING/STRUCTURES WORKS)

19.1 The lump sum considered towards BOQ shall be deemed to include for all items of works complete as specified/referred in Annexures, Particular Specifications and all minor details though not specifically shown on approved drawings/TD drawings or specified in Particular Specifications. STD/TD drawings required for the tender have not been attached. These drawings can be referred in the office of Chief Engineer Jabalpur Zone on any working day during working hours.

19.2 Cutting and forming chases in masonry, concrete work etc. including cutting and or leaving holes/recesses, sinking, etc. where required and as directed by the Engineer-in-Charge shall be done as far as possible while the work is in progress. The cost of materials and labour for cutting and/or forming chases, cutting or leaving holes/recesses, sinking and making good in cement mortar 1:3 for filling up to 20mm and in PCC 1:2:4 (12.5mm graded stone aggregate) for filling more than 20mm shall deemed to be included in the cost considered by the contractor in its lump sum.

19.3 In all the above and other similar cases, the details indicated elsewhere in the drawings as approved or TD drawings that 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 lump sum /rates quoted by contractor.

19.4 LUMP SUM amount considered by the Contractor for the building/Works under Schedule -A part-I shall be deemed to include for the following whether or not these are covered in the approved drawing :-

(a) The existing areas/ground where the buildings /structures covered in Schedule -A part-I are to be provided, are assumed not having much undulations. In case large undulations are existing at site and site clearance/development works are required to achieve the modified ground level, the same shall be provided including surface dressing.

(b) Pre-construction anti-termite treatment shall be carried out to the all the buildings. Pre-construction Anti-Termite Treatment shall be carried out as per IS.

(c) Contractor has to give the Guarantee for for Anti-Termite Treatment for TEN YEARS.

(d) Damp Proof Course (DPC) as required and specified.

(e) Seismic Strengthening measures as per relevant IS.

(f) Water proofing roof treatment shall be provided to the buildings. Contractor has to give the Guarantee for Water Proofing Treatment over RCC Roof Slabs for TEN YEARS.

(g) PCC Plinth Protection with PCC Surface Drain as indicated/shown in TD Drawings or approved drawings.

- (j) Builders hardware for doors/windows etc. as essential from functional requirement.
- (k) Crumple joints as per standard engineering practice.
- (l) RCC/HDPE water tank of suitable capacity as per including PVC valve with PVC float of size to suit inlet pipe for each service tank including over flow pipe and wash out pipe CPVC pipe of dia same as inlet pipe).
- (m) Flushing Cistern, WC /EWC shall be as per standard pattern, Urinal, Readymade PVC Connecting Pipes to Wash Hand Basin, etc., Wash Hand Basin with bottle trap including Mirror.
- (n) Nahani trap with stainless steel grating, gully trap with grating, soil, waste and vent pipe, HDPE drain pipe upto and including first manhole and gully trap where bath/WC/toilet are occurring.
- (p) Suitable provision for hanging arrangement for ceiling fan and fixing arrangement for exhaust fan, AC, etc.
- (q) The foundation depth wherever marked on approved drawings shall be taken as depth from natural ground level and in no case any foundation shall be laid on filled earth.
- (r) Suitable provision for required type of RCC shelves / RCC loft / working platform.
- (s) Suitable provision for cup-board for living room
- (t) Provision of required type of "false ceiling" as per functional requirement.
- (u) Provision of required type of "Cable Duct" as per functional requirement.
- (v) Water proofing compound (liquid water proofing compound) of approved make as per manufacturer instructions whichever is more to be mixed in water used for concrete/mortar.
- (w) All built-in furniture as per Scale of Accommodation
- (x) Sunken floor
- (y) Efflorescence treatment.

19.5 SBC (SAFE BEARING CAPACITY) : The SBC as indicated in report enclosed with the tender documents is indicative and purely for guidance only. While quoting the offer, the tenderer shall consider complete Soil Investigation as part of Scope of Work. The contractor shall ascertain the actual SBC of soil at the locations of respective buildings before designing of buildings. However, in case GE observes soil of unusual nature at site during the execution, which may result in lower SBC, he shall get tested the SBC of soil and if actual SBC found at site is at variance with reference to SBC as found out after soil investigation, the case shall be referred to Accepting Officers for approval and the structural design of affected elements shall be redone by the contractor at his own cost.

20.0 ALL SCHEDULES EXCEPT SCH 'A' PART-I

- (a) The quantities of items of work shown in relevant column of BOQ are approximate/provisional and are inserted as a guide only. These shall, however, not be varied beyond the limits laid down in condition 7 of IAFW-2249 (General Conditions of Contract) forming part of this contract.
- (b) Unless otherwise mentioned in the description of items, the unit rates (inserted by the department/as well as by the tenderer) shall be deemed to include for all material and labour complete. The description shall also be deemed to include for fixing, erection, installation, testing etc as required by the Government.
- (c) Layout of buildings indicated on site plan is tentative. No adjustment in price shall be done on account of changes/modifications in the final approved layout within the site plan area.
- (d) Probable distribution of various items of internal/external services are indicated on drawings. These are tentative and likely to be varied where necessary at the discretion of the Engineer-in-Charge. The contractor shall not be entitled for any claim whatsoever on account of such varied alignment.

SCHEDULE 'A' NOTES
LIST OF WORKS AND PRICES (Contd...)

21.0 MINOR CONSTRUCTION DETAILS

(a) Rate quoted for a particular item and/or lump sum quoted by tenderer shall deemed to be included for any minor details/item of work and/or construction which are obviously and fairly intended which may not have been included in these documents but which are essential for the execution and entire completion of the work as per standard Engineering practice. Decision of Accepting Officer as to whether any minor details of work and/or construction is obviously and fairly intended to be included in the contract or not shall be final, conclusive and binding and beyond the scope of arbitration clause.

(b) Some of the minor details/ items which shall be deemed to be essential for execution and entire completion of work are detailed as under for guidance: -

- (i) Reinforcement for any RCC member not indicated in the drawings but is structural requirement.
- (ii) Dwarf wall in situations like verandah, passage etc not indicated in drawings.
- (iii) Lintel over doors, windows and openings not shown in drawings.
- (iv) Builders hardware for doors/windows etc though not indicated on drawings but essential for usage.
- (v) In all the above and similar cases, the details indicated elsewhere in the drawings which are similar or near similar to 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 lump sum quoted. In the event of any dispute, decision of the Accepting Officer shall be final and binding.

(c) The unit rates inserted in Sch 'A' Part-I to VII are deemed to be at par with rates contained in MES Schedule Part-II (2020) or at rates analogous thereto. The tenderer shall work out the total lump sum cost against these different parts of Schedule 'A' based on his own calculations/rates and arrive at total lump sum for each part of Schedule 'A' which shall be inserted in the relevant column of BOQ. The contractor shall have no claim whatsoever on account of error or inaccuracies in the unit rates /lump sum price inserted by MES.

22.0 MAKES OF ITEMS

(a) In case Sch "A" items indicate the makes, then same shall be from any one of the makes specified therein at the option of contractor.

(b) If Sch "A" items do not indicates makes, then makes to be incorporated in the work shall be from those listed Appendix to Particular Specifications. Selection shall be at the option of contractor from amongst the list. In case manufacturer of the item makes both ISI and non ISI marked items, then ISI marked item shall only be used. Please note that even if any makes are given in Particular Specifications, they shall stand superseded and only the makes given in Appendix to particular specification shall be applicable for all purposes.

(c) Materials/items for which no makes have been specified, shall be ISI marked. Contractor will download list of BIS marked manufacturers from BIS site www.bis.org.in and submit name of manufacturer meeting the contract specifications criteria and hand over the report with a request letter to Engineer- in-Charge with his signature for approval of makes. The material shall only be procured by Contractor after approval of makes by GE concerned. In case ISI marked materials/items are not manufactured then same shall confirm to relevant IS amended upto date.

(d) For materials/items not covered in para (a) to (c) above, the same shall be of best quality available in market and approved by GE.

(e) Contractor will intimate in writing to GE the name of make of material along with brand, model No/Cat Part No, etc. which he intends to procure. GE will approve the same within 10 days of receipt of such request after due verification of documents supplied by contractor with his request letter.

23.0 **VALUATION OF DEVIATION**

The percentage addition/deduction of MES Schedule of Rates for the purpose of Pricing deviation vide Condition 62 of IAFW-2249 shall be as follows:

(a)	For works covered under BOQ/ Schedule 'A' Part-I	(-) 10% on SSR-2020 RATES
(b)	For works covered under BOQ/ Schedule 'A' Part-II to Part-VII	Percentage addition/ deduction as derived from the lump sum amount tendered by comparing with the amount inserted by MES (as per condition 6-A of IAFW- 2249) as applicable or stipulated in Condition 62 (B)
(c)	For works covered under BOQ/ Schedule 'A' Part VIII	Condition 62 (F) and (G) as applicable

24.0 In absence of any specification either in tender documents or in the drawing, the specification as given in SSR for relevant items and/or as per BIS Code shall be considered while quoting the tender. Reference to any drawings which is mentioned in the tender documents and or drawings forming part of the tender but not specifically mentioned in the list of drawings shall deemed to be forming part of the tender. The tenderer shall see such drawings/details in the office of the Accepting Officer/concerned CWE/GE before quoting the tender. No claim whatsoever shall be entertained by the Govt on this account.

25.0 M&L or S&F wherever occurring shall be read as “Material and Labour” or “Supply and Fix” respectively. All items of works included in BOQ shall include supply of all materials (new), labour and fixing etc complete all as specified and shown on drawing except where specifically mentioned otherwise in the description of items/works.

26.0 A list of drawings indicates main drawings under particular heading of building. Certain other connected drawings as referred to in the main drawings but not under particular heading of buildings shall also apply to corresponding items of Schedule 'A'. Details not given in the drawings referred to in the main drawings shall be followed from any other drawings in the list of drawings.

27.0 The contractor shall maintain updated data and progress of work/ records/drawings/CPM etc on computer at site as required by work. One graduate Engineer or one diploma Engineer having adequate knowledge of computer shall be deputed by the contractor for this purpose. The CWE/GE may check these updated details at site on computer.

28.0 The department may exercise the right to call the manufacture for verification of the quality of the items as per his discretion.

29.0 The tenderers are advised to refrain from making any stipulations or conditions in their offer.

30.0 **WORKING CONDITIONS:**

(a) The subject work lies in **Un-restricted Area**.

(b) Tenderers are advised to visit site of work to familiarize themselves with nature of site, access to site, approaches, existence of shrubs/vegetation, etc. security checks exercised by the authorities in whose control the area lies, availability of labour and local materials, space for keeping their men, material in proximity of site, climatic conditions of the area, to enable them their resource planning for completion of work within the period of completion specified in the tender documents. The tenderer shall be deemed to have noted the site condition before quoting their offer irrespective of the fact whether they have visited the site or not and nothing extra shall be admissible on this account.

(c) Tenderers are advised to quote their rates keeping all these factors in view. Sites will be handed over on as-is-where-is basis. No claim whatsoever shall be entertained at a later date after acceptance of tender. If the tenderer envisages any difficulty existing at site and desires to propose any change, he should do so in writing at least seven days before due date of receipt of tender so that his proposals could be seen, analysed and cognizance of any changes can be made in tender documents by issue of suitable amendments as applicable. Tenderers quoted rates are deemed to have applicable. Tenderers quoted rates are deemed to have taken into consideration all these factors irrespective of whether they visited the site or not.

31.0 **RECORD DRAWING & PSMBs:**

The Contractor shall submit four sets of digital record drawings of buildings/structures & one set of PSMBs duly recording quantities of items required for the periodical maintenance of buildings/structures duly signed by the contractor & concern AGE to the GE immediately along with completion letter of work. The Lump sum amount quoted for Schedule 'A' Part I is deemed to be included for this provision.

32.0 **BREAK DOWN DETAILS FOR PAYMENT:**

33.0 Pymtent Schedule for Phase-I work:

SN	Description of Work	% OF QUOTED AMOUNT FOR PAYMENT
i	Topographic survey,	0.5%
ii.	Site clearance	0.5%
iii.	Soil investigation	1%
iv.	Submission of design & drawing, vetting by IITs/NITs and its approval from employer	2%

33.1 The tenderer shall submit yard stick for each building / structure mentioned in Schedule 'A' Part-I in duplicate to GE within one month of acceptance of tender, indicating percentage payments to be made for each stage along with supporting details i.e detailed estimate. Yard stick will be technically checked by JE(QS&C)/AGE(Contracts) of GE office and shall further be submitted to the office of CWE for technical check by DCWE(Contracts)/ACWE(Contracts) of CWE office and shall be approved by CWE. The tenderer shall take cognizance of this aspect while quoting the tender. No claim whatsoever arising due to any misinterpretation / misunderstanding on this account shall be admissible. The decision of CWE, in this regard shall be FINAL AND BINDING.

33.2 There may be certain changes in the yard stick percentages as submitted by the contractor while approving the yard stick by CWE due to market rates of various materials and due to policy of the Dept of withholding sufficient amount for later stages of the building. Contractor shall not have any claim on this account and percentage payment made for each stage as per approved yardstick shall be final and binding.

33.3 Payment against lump sum buildings shall be made as per the approved yard stick. Payment against lump sum buildings shall be allowed in III RAR and onwards to Contractor only after yard stick for the buildings is finalized and approved by CWE. Any delay in the payment of III RAR on account of late submission of yard stick by the Contractor to the GE shall be Contractor's responsibility and no claim on this account shall be entertained

34.0 **FIXING OF SPECIAL (STAR) RATES**

(a) In case of any deviation, mode of pricing shall be decided by Accepting Officer in terms of Condition 62 of IAFW-2249.

(b) In the event of a deviation order involving fixation of Special (Star) Rate, Draft Rate shall be prepared by GE (within a maximum period of 30 days) while initiating the proposal for deviation seeking approval of Accepting Officer and notified to contractor. While notifying the Draft Rate, it will be clearly stipulated that the same is merely an estimated rate and firm rate shall be fixed based on actual and receipt of supporting documents from contractor such as vouchers/literature of product/test certificates etc (as applicable) on completion of the work involving Star Rate. Any objection to the method of fixing Star Rate will be dealt as per Condition 7 of IAFW-2249.

- (c) Draft Star Rate shall be made based on market enquiry through telephonic enquiry/ quotations/ email/rate lists/internet based sources, material & labour constants available in various Civil Engineering books and record available in respect of Star Rates approved in the past for similar items of work etc. Contractor may also assist GES office in preparation of draft Star Rate.
- (d) The Draft Star Rate shall be purely a draft rate and shall not be used for claiming final payment during execution of work. However GE shall allow part payment to the tune of 80% during execution to avoid any financial hardship to contractor.
- (e) After completion of the item of work involving Star Rate, contractor shall submit the vouchers/literature of product/test certificates (as applicable, decision of GE being final in case of any disagreement) for finalisation of Star Rate. The Star Rate shall be technically checked by DCWE (C)/Director(C) depending upon the financial effect & approved by competent authority within a period of one month from submission of the relevant documents by contractor as mentioned above.
- (f) The Star Rate as approved by competent authority after technical check by DCWE (C)/Director(C) depending upon the financial effect shall be referred as "the rate decided by GE" under Para 62(G) of IAFW-2249.

34.1 **DIGITAL PHOTOGRAPHS**

The contractor shall provide digital photographs taken at various stages as decided by GE during the progress of work and submit the same alongwith RARs. Two copies (A4 size) and two soft copies (CD) of each digital photograph shall be submitted by contractor to the GE. The unit rate against Sch 'A'/BOQ shall be deemed to be included the cost of above provision and nothing extra shall be payable on this account. In the event of failure by the contractor to submit the same along with RARs, RARs will not be processed.

35. SITE ESTABLISHMENT:

The tenderer shall be required to strictly ensure engagement of Engineers and deployment of T&P, Machinery & Transport as specified in subsequent paras. Inadequate engagement of Engineers/ deployment of T&P, Machinery & Transport shall be considered as serious breach of contract condition attracting ban/ removal/ downgrading/ debarment of the firm/company. The requirement of Engineer/ deployment of T&P, Machinery & Transport required to be ensured by the contractor are as mentioned below. However this is the minimum requirement. The contractor at his own shall work out and deploy additional Engineer, T&P, Machineries & transport, if the execution of work in the given time period demands. No extra payment shall be admissible in case more Engineers, T & P, Machinery etc are deployed at site and all cost shall be deemed to be included in the rate quoted by the contractor.

SCHEDULE 'A' NOTES
LIST OF WORKS AND PRICES (Contd...)

(A) LIST OF T&P, MACHINERY AND TRANSPORT:

Srl	Description of T&P desired in work	Unit	Qty	Remark
a	RMC plant with 15 Cum/ hour capacity (Optional)	Each	01	
b	Fully automatic concrete batching plant (1 cum)	Each	02	
c	Vibrator (Needle/ Plate type)	Each	04	
d	Steel shuttering with spans, props etc	Sqm	1000	
e	Trucks / Tippers	Each	02	
f	Tower/ Builder's hoist	Each	01	
g	Total station	Each	01	
h	Cube testing machine (hydraulically operated)	Each	01	
j	Excavators (JCB, Power shovel, etc)	Each	01	
k	Drilling machine	Each	02	
l	Boring Rig	Each	01	
m	Transit mixer	Each	01	
n	Delivery Pump/Concrete pump (for RMC)	Each	02	
o	Vibratory roller	Each	01	
p	Power roller 8 to 10 tonne	Each	01	
q	DG Sets/ 10 KVA	Each	01	
r	Crane	Each	01	
s	Auto level with staff	Each	01	
t	Site Testing lab with full set of testing apparatus	Each	01	
u	Steel aluminum ladders 1.5 m to 8m	Each	02	
v	Chase cutting machine	Each	01	
w	Torque wrench for nuts/bolts /screws	Each	01	
x	Magnetic dial indicator for alignment	Each	01	
y	Conduit die set	Each	01	
z	Pipe vice	Each	01	
aa	Bench vice	Each	01	
ab	LT meager 500 Volts	Each	02	
ac	Hydraulically operated & hand operated crimping machines	Each	02	
ad	Portable Drilling Machine	Each	01	
ae	Test bench for light fittings	Each	01	
af	Earth tester	Each	02	
ag	Multi Meter	Each	02	

(B) ENGINEER ESTABLISHMENT:

Refer condition-25 of General Conditions of Contract IAFW-2249 for supervision of work at site. Contractor shall employ the following Engineers. This provision shall be applicable irrespective of whether contractor himself is a qualified Engineer or not:-

- (a) Two Graduate Engineers from recognized Institution/Engineering College with 5 years experience.
- (b) Three Diploma holder Engineers from recognized Institutions with 5 years experience.
- (c) One Lab Technician having graduation with 4 years experience.

Signature of Contractor

Dated:

Dy. Dir (Contracts)

For Accepting Officer

SCHEDULE ‘B’

ISSUE OF MATERIALS TO THE CONTRACTOR
(SEE CONDITION 10 OF IAFW-2249)

SL No	Particulars	Rate at which materials will be issued to the contractor		Place of issue by name	Remarks
		Unit	Rate		

NIL

SCHEDULE ‘C’ & SCHEDULE ‘D’
SCHEDULE ‘C’

LIST OF TOOLS AND PLANTS OTHER THAN TRANSPORT
WHICH WILL BE HIRED TO THE CONTRACTOR

(See Condition 15, 34 and 35 of IAFW-2249)

Sl. No	Qty	Particulars of T&P	Details of MES crew supplied	Hire charges per unit working day.	Stand by charges per unit per off day	Place of issue by name.	Remarks.
1	2	3	4	5	6	7	8

SCHEDULE ‘D’

TRANSPORT TO BE HIRED TO THE CONTRACTOR

(See condition 16 and 35 of IAFW-2249)

Sl No.	Qty.	Particulars	Rate per unit per working day	Place of issue by name.	Remarks.
1	2	3	4	5	6

NIL

Signature of Contractor
Date :

Dy Dir/ AD (Contracts)
for Accepting Officer

In lieu of IAFW 2159

TENDER

To,

The President of India

Having examined and perused the following documents: -

1. Specifications signed by AAD(C)/AD (C)/DyDir(C)/SSW.
2. Drawings detailed in the specifications.
3. Schedule 'A', 'B', 'C' and 'D' attached hereto.
4. MES Standard Schedule of rates 2009 (Part-I) specifications together with amendment No. 1 to 3 and Part-II 2020 (rates) (hereinafter referred to as the MES Schedule) together with amendment No 1 to 122 and including Section 30 for "Runway & Pavement" containing item Nos. 30001 to 30053 as applicable.
5. General Conditions of Contracts IAFW-2249 (1989 print) together with Errata **1 to 20** and Amendments No **1 to 49**.
6. WATER: CONDITION 31 OF IAFW 2249- GENERAL CONDITIONS OF CONTRACTS.
WATER WILL NOT BE SUPPLIED BY MES
7. Should this tender be accepted, I/We AGREE.

* (a) That the sum of **Rs. 15,00,000.00 (Rupees fifteen lakh only)** forwarded as Earnest Money shall be refunded by the Govt on receipt of the required amount of Performance security deposit all as per condition 19 of the IAFW-2249.

(b) To execute all the works referred to in the said documents upon the terms and conditions contained or referred to therein and as detailed in the General Summary hereinafter and to carryout such deviations as may be ordered vide condition 7 of IAFW-2249 up to maximum of 10% (Ten percent).

(c) Further agree to refer all the disputes in terms of condition 71 of GCC during execution of the work or after determination/cancellation/termination of the contract arising out of the contract except/excluding those for which decision of the Accepting Officer/CWE/GE is final & binding as stipulated in the subject contract Agreement & in the GCC however including any disagreement by either party with any action/ Inaction/ opinion/ instruction certificate or valuation by the Accepting Officer or his Nominee shall in the first place be referred to the DISPUTE RESOLUTION BOARD (DRB) (applicable in contracts of value more than Rs 10 crores) or CONCILIATION (applicable in contracts of value upto Rs 10 crores) all as mentioned in the special condition of the Tender Documents.

(d) Further agree to refer all disputes, as required by condition 70 to the sole arbitrator from MoD panel of Arbitrator to be appointed by the Engineer-in-Chief or officiating E-in-C or Director General of Works if specifically delegated in writing by Engineer-in-Chief, Army Headquarters, New Delhi whose decision shall be final, conclusive and binding.

* To be deleted where not applicable

TENDER (CONTD...)

Brought forward for the Contract Sum **quoted on BOQ**

Rs _____ **(Rupees** _____

Signature _____ in the capacity of _____

For and on behalf of _____

(IN BLOCK LETTERS)

Dated : _____

Address: _____

Witness _____

Address : _____

ACCEPTANCE

_____ alterations have been made in these documents and as evidence that these alterations were made before the execution of the Contract Agreement; they have been initialled by the Contractor and

_____.

The said officer is hereby authorised to sign and initial on my behalf, the documents forming part of this Contract.

The above tender was accepted by me on behalf of the President of India, for the Contract Sum of Rs _____ (Rupees _____

_____)

on the ____ day of ____ 2025

Dated _____

Signature _____

Appointment: Chief Engineer Jabalpur Zone, Jabalpur
(For and on Behalf of The President of India)
Accepting Officer

Substitute page for:

General Conditions of contracts

IAFW-2249 (1989 print)

Lumpsum Contracts (IAFW-2159)

1. A copy of the General Conditions of Contracts) (IAFW-2249-1989 Print) with Errata 1 to 20 and Amendments No 1 to 49 has been supplied to me/us and is in my/our possession. I/we have read and understood the provisions contained in the aforesaid General Conditions of Contracts before submission of this tender and I/We agree that I/We shall abide by the terms and conditions therefore, as modified, if any, elsewhere in these tender documents.
2. It is hereby further agreed and declared by me/us that the General Conditions of Contracts (IAFW-2249-1989 Print) including condition 71 and 70 thereof pertaining to settlement of disputes first through Conciliator/Dispute Resolution Board and thereafter by arbitration, containing 34 pages (including this page) with Errata 1 to 20 and Amendment No 1 to 49 shall form part of these tender documents.
3. It is also agreed by me/us that in case of any discrepancy in the interpretation of the Contents between ENGLISH and HINDI VERSION, ENGLISH VERSION shall take precedence over HINDI VERSION.

Dy Dir/ AD (Contracts)
for Accepting Officer

Signature of Contractor
Date

Substitute page for
SCHEDULE OF MINIMUM FAIR WAGES

1. It is hereby agreed by me/us* that the "Schedule of Minimum Fair Wages" (SMFW) as published vide Government of India which specifies the minimum rates of wages for various categories of workmen as applicable on the last due date of receipt of this tender shall form part of the tender documents and is in my/our* possession. I / We* have read and understood the provision contained in the aforesaid Schedule of Minimum Fair Wages before submission of tender.
2. My/Our signature hereunder amounts to my/our having read and understood the provisions contained therein and I/we agree that I/we shall abide by the same and that aforesaid documents form part of this tender.
3. It is also agreed by me/us that although latest notification, as available with the Accepting Officer, has been formed part of the contract, in case the Government has further revised the wages, the latest revised wages for labour shall only be applicable.
4. Schedule of Minimum Fair Wages is not enclosed along with tender but the contractor is deemed to have full knowledge regarding the minimum wages payable to labourers as legally effective on the last date of bid submission end date and his tendered rates shall be deemed to have been based on the same.
5. The minimum wage legally effective referred to above is the minimum wages notified in Gazette / governed by any local regulations or by Central Government, whichever is higher.

Notes:

- (a) The documents mentioned above can also be seen in the office of the **Chief Engineer Jabalpur Zone, Jabalpur Cantt-482001** or in any other MES office during working hours.
- (b) In case of difference in interpretation due to wordings of English and Hindi versions, the English version will prevail as per Article 348 of Constitution of India.

(* Delete whichever is not applicable)

Dy Dir/ AD (Contracts)
for Accepting Officer

Signature of Contractor
Date

SPECIAL CONDITION**GENERAL**

1. (a) General specifications mentioned any where in the contract including those in General Conditions of Contracts, viz IAFW-2249, shall mean the specifications given in the MES Standard Schedule of Rates 2009 (Part-I). Particulars specifications given here-in - after are in brief and only to particularize/amend and emphasis the specification given in the MES Standard Schedule of Rates. Specifications general rules, Preambles and special conditions contained in MES Standard Schedule of Rates 2009 Part-I & Part-II 2020 shall, unless specifically described otherwise, be applicable to this contract.

(b) Any work shown on drawing(s) but not described in Particular specifications shall, unless specifically described to be excluded from the contract, be deemed to be included in the lumpsum quoted by contractor for Schedule 'A'. In case of doubt with regard to the manner of detail for executing the work, the decision of the Accepting Officer shall be final, conclusive and binding. This shall not be applicable to the items of work pertaining to services for which separate parts of Schedule 'A' setting out the requirements have been given. Should there be item(s) or parts as shown on drawings but not included in the relevant sections of Sch 'A' these shall, unless otherwise described or stated in the contract, constitute an additional work.

(c) All heading and marginal notes to these special conditions or to any other documents of this contract are solely for the purpose of giving a concise indication and not a summary of the contents thereof, and they shall never be deemed to supersede the contents of the clauses.

(d) The tender is advised to point out in writing discrepancy(s) if any of the tender documents, at least 10 days before the due date of receipt back of tender. In case discrepancy(s), in contract documents is/are noticed by the contractor during execution of the works, it shall be brought out to the notice of the Accepting Officer of contract and others concerned in writing before commencement of the particular work where discrepancy(s) is/are noticed failing which the contractor shall forfeit his right to claim on account of such discrepancy(s).

(e) Also where there are obvious mistakes in any of the contract provisions, the Accepting Officer shall be sole deciding authority with regard to the intention of the contract documents and his decision in this respect shall be final, binding and conclusive.

(f) Where the drawings show finishes to wooden members, such finishes shall be applied to wooden members as well as wood based members. However, surfaces covered with laminates shall not be given any finish such as painting, polishing etc.

(g) Where reinforcement details/thickness of RCC members such as slab, beams, lintels etc are not shown on the drawings, the same shall be supplied by the GE on the basis of provisions in IS-456- 2000 and the same shall be provided and incorporated in the works by the contractor and no extra payment will be admissible on this account.

2. **CONDITIONS OF CONTRACTS AND EXECUTION OF WORKS:** - The various sections /sub-divisions of the tender documents shall be deemed to be supplementary/ complementary to each other.

3. **INSPECTION OF SITE BY THE TENDERER :-**

(i) The tenderer is advised to contact the GE for the purpose of inspection of site(s) and relevant document other than those sent herewith, who will give reasonable facilities for the purpose. The tenderer shall also make themselves familiar with the working conditions accessibility of site, availability of materials and other cogent conditions which may effect the entire completion of work under this contract.

(ii) The tenderer shall be deemed to have inspected the site(s) and made themselves familiar with the working conditions, whether they have actually inspected the site(s) or not.

SPECIAL CONDITION (CONTD...)**4. CONDITIONS OF WORKING**

4.1 CONDITION FOR WORKING IN UNRESTRICTED AREA. All works lie in Unrestricted Area. The restrictions for entry to work site and conditions of working in unrestricted area shall be as under:-

(a) The work lies in an Unrestricted Area. However, the contractor, his agents, servants, workmen and vehicles may pass through the unit lines, in which case, the Engineer-in-Charge at his discretion has the right to issue the passes, control their admission to the site of work or any part thereof. The contractor shall, on demand by the Engineer-in-Charge, shall submit a list of personnel etc concerned and any other information called for by the Engineer-in-Charge and shall satisfy the Engineer-in-Charge as regards the bonafide of such people. Passes shall be returned at any time on demand by the Engineer-in-Charge and in any case on completion of work.

(b) The contractor and his work people shall observe all the rules promulgated from time to time by authority controlling the area where the work is to be carried out eg prohibition of smoking etc. Any person found violating the security rules laid down by the authority shall be immediately expelled from the area without assigning any reasons whatsoever and the contractor shall have no claim on this account. Nothing shall be admissible for any man hours lost on this account.

5. SECURITY OF CLASSIFIED DOCUMENTS :- Contractor's special attention is drawn to condition 2-A & 3 of General Conditions of Contracts (IAFW-2249). The contractor shall not communicate any classified information regarding the works either to Sub-contractors or others without prior approval of the Engineer-In-Charge. The contractor shall also not make copies of the design/drawings and other documents furnished to him in respect of the work and he shall return all documents on completion of the work or earlier or termination of contract. The contractor shall alongwith final bill attach a receipt from the Engineer-in-Charge in respect of his having returned the classified documents as per condition 3 of General Conditions of contracts (IAFW-2249).

6. OFFICIAL SECRET ACT :- The contractor shall be bound by the Indian Official secret Act 1923, particularly section 5 thereof, all as per condition 2A of IAFW-2249

7. EMPLOYMENT OF PERSONNEL :-

(a) Contractor shall employ only Indian Nationals as his representatives, servants and workmen after verifying their antecedents and loyalty. He shall ensure that no person of doubtful antecedents and nationality is, in any way, associated with the work. If for the reasons of technical collaboration or other considerations the employment of foreign national(s) is unavoidable, the contractor shall furnish full particulars to this effect to the Accepting Officer at the time of submission of the tender. As a proof that the contractor has employed only Indian Nationals, he shall render a certificate to GE within one month from the date of acceptance of tender to this effect. In case the GE desires, contractor will have the police verification done of personnel employed by him.

(b) The GE shall have full powers, and without giving any reason to order the contractor immediately to cease to employ in connection with this contract, any agent, servant or employee whose continued employment is, in his opinion, undesirable, The contractor shall not be allowed any compensation on this account.

(c) The contractor's attention is also drawn to condition 25 of IAFW-2249 in this connection.

SPECIAL CONDITION (CONTD...)

8 AVAILABILITY OF LAND FOR STORAGE OF MATERIALS, TEMPORARY WORKSHOP AND OFFICES ETC: -Refer condition 24 of IAFW-2249. The contractor shall be permitted to store his materials including erecting temporary sheds at the area of land marked on site plan and he shall pay a license fee of Rs 1/- per year or part thereof in respect of each and every separate area of land allotted to him.

9. DAMAGE TO EXISTING STRUCTURES:- Any damage to the existing structures, any existing road, etc during the execution of work shall be made good by the contractor at his own expense. Rectification, replacement, making good and touching up etc, shall be carried out to conform to the materials and workmanship originally provided and to the satisfaction of the Engineer-in-Charge. In case of any dispute on this account, the decision of the GE shall be final conclusive and binding.

10. QUARRIES AND ROYALTIES :- Quarries are not available on land which is in the charge of MES authorities, Condition 14 of IAFW-2249 shall be treated as not applicable.

11. APPROACHES: - The contractors shall make arrangements for and provide at his own cost all temporary approaches, if required to the site(s), after obtaining approval in writing of the GE to the layout of such approaches.

12. ACTION WHERE NO SPECIFICATIONS EXIST :-

(a) In case any class of work for which there is no such specifications in the tender documents including SSR, such work shall be carried out in accordance with Indian Standard Specifications and where Indian Standard Specifications do not cover the same, the work shall be carried out as per standard engineering practice subject to the approval of the GE.

(b) No claim what-so-ever will be tenable for any misunderstanding or for not having ascertaining requisite information /knowledge to muster the resources required in satisfactory completion of the entire work to requirements as per contract agreement.

13. METHOD OF MEASUREMENT: - Measurement of all measurable work executed under this contract shall be taken in accordance with the rules of measurements as laid down in SSR 2009 Part-I and SSR 2020 Part-II pertaining to various items of work as applicable, unless otherwise indicated in the respective sections of schedule "A". In case the method of measurements for a particular item of work is not given in the SSR, a reference will be made to the relevant provision contained in the latest edition of IS-1200.

14. CRITICAL PATH METHOD/NET WORK ANALYSIS AND THE TIME SCHEDULE:

(a) The time and progress chart, to be prepared as per condition 11 of IAFW-2249 (General Conditions of contracts), shall consist of detailed net work analysis and a time schedule based on latest project management tools / techniques & software. The critical path net work will be drawn by the contractor and approved by GE soon after acceptance of the tender.

(b) (i) The time scheduling of the activities will be done by the contractor so as to finish the work within the stipulated time. The contractor is advised to use the facilities of computerization available with any Organization which affords such facility in doing the same. On completion of the time-schedule, a firm calendar date schedule will be prepared and submitted by the contractor to GE, who will approve it after scrutiny. No financial liability shall accrue to the Govt in connection with computerization

(ii) The schedule will be submitted in quadruplicate within two weeks from the date of handing over of site. In case the contractor fails to submit the CPM net work diagram, the net work prepared by the GE will be binding on him and he will be bound to employ resources of men and materials in the manner directed by the GE.

SPECIAL CONDITION (CONTD...)

(c) During currency of the work, the contractor is expected to adhere to the time schedule and this adherence will be part of the contractor's performance under the contract. During the execution of the work, the contractor is expected to participate in the reviews and updating of the net work undertaken by GE. These reviews may be undertaken at the discretion of the GE either as a periodic appraisal measure or when the quantum of work ordered on the contractor is substantially changed through deviation order (s)/or amendment. Any revision of the schedule as a result of the review will be submitted by the contractor to the GE within a week, who will approve it after due scrutiny. The contractor will adhere to the revised schedule thereafter.

(d) In case of Contractor not agreeing to the revised Schedule, the same will be referred to the Accepting Officer whose decisions will be the final, conclusive and binding. GE's approval to the revised Schedule resulting in completion date beyond the stipulated date of completion shall not automatically amount to grant of extension of time, Extension of time shall be considered and decided by the appropriate authority in terms of condition 11 of IAFW-2249 and separately regulated.

(e) Contractor is expected to mobilise and employ sufficient resources to achieve the detailed schedule within the broad frame work of the accepted methods of working and safety.

(f) No additional payment will be made to the Contractor for any multiple shift work or other incentive methods contemplated by him in this work schedule even though the time schedule is approved by the Department.

15. **CO-ORDINATION WITH OTHER AGENCIES:** - The contractor shall permit free access and afford normal facilities and usual convenience to other agencies or departmental workmen to carryout connected works or service under separate arrangements. The contractor will not be allowed any extra payment on this account.

16 **SECURITY AGAINST LOSS OR DAMAGE**

(a) Contractor's plants/equipments at site. The contractor shall furnish to the Engineer-in-Charge every morning a distribution return of his plants/equipments on the site of the work, stating the following particulars:-

- (i) Particulars of plants/equipments, its make, manufacturer No, Model No if any, Registration No if any, capacity year of manufacture and year of purchase etc.
- (ii) Total No (Qty) on site of work.
- (iii) Location and indication of No (Qty) at each location of the site of work.
- (iv) Purchase value on the date of purchase .For the purpose of this condition, plant/equipment shall include vehicles i.e. trucks and lorries but neither the workman's tools nor any manually operated tools/equipment. The Engineer-in-Charge shall record the particulars supplied by the contractor in the works dairy and send monthly return to the GE for record in his office.

(b) Loss on account of Enemy Action: - If as a result of enemy action the contractor suffers any loss or damage, the Govt shall reimburse to the contractor such loss or damage to the extent and in the manner provided here-in-after.

(i) The loss suffered by him on account of any damage or destruction of his plant / equipment (as defined in special condition (a) above), material or any part or parts thereof the amount of loss assessed by the Accepting Officer of the contract on this account shall be final, binding and conclusive.

(ii) The compensation paid by him under any law for the time being in force, to any workmen employed by him for any injury caused to workmen or workman's legal successor for loss of the workmen's life.

SPECIAL CONDITION (CONTD...)

(iii) Payment of compensation for loss or damage to any work or part of work carried out. The amount of compensation shall be determined in accordance with condition 48 of General Conditions of Contracts (IAFW-2249).

(iv) No reimbursement shall be made nor shall any compensation be payable under the above provision unless the contractor had taken Air Defence precautions ordered by the GE/or concerned, or in the absence of such order, reasonable precautions taken by the contractor. No reimbursement shall be made nor shall any compensation be payable for any plants/equipment or materials not lying at site of work at the time enemy action.

17. FORCE MAJEURE

Should any force majeure circumstances arise, each of the contracting party shall be executed for the no fulfillment or for the delayed fulfillment of any of its contractual obligations, if the affected party within 15 days of its occurrences informs the other party in writing.

Force majeure shall mean fires, floods, natural calamities or other acts such as war, turmoil, strikes (as no limited to be establishment of the solded), sabotage, explosions, quarantine restrictions beyond the control of either party.

It is understood and agreed between the parties hereto that the rights and obligations of the parties shall be deemed to be in suspension during the continuance of the force majeure event as aforesaid and the said rights and obligations shall automatically revive upon the cessation of intervening force majeure event. The period within which the rights & obligations of the parties shall be in suspension due to the force majeure event shall not be considered as a delay with respect to the period of delivery and /or acceptance of delivery under the contract or otherwise the detriment of either party.

Notwithstanding the provisions of the immediately foregoing clauses it is further understood and agreed between the parties hereto that in the event of any force majeure persisting for an uninterrupted period exceeding 6 (Six) months, either party hereto reserves the right to terminate this contract upon giving prior written notice of 30 (Thirty) days to the other party of the intention to terminate without any liability other than reimbursement on the terms provided in this agreement of the goods received.

18 WATER (Refer to condition 31 of IAFW-2249)

18.1 (a) Refer condition 31 of General Condition of Contract IAFW-2249, clause 1.13 of MES Schedule, Part-I & SI No 06 on Tender page

18.2 Refer to condition 31 of IAFW-2249. **Water will not be supplied by the MES.** The tenderers are advised to visit the site of works to ascertain availability of water from civil sources or from nearby natural sources outside ministry of Defence land. The contractor shall be allowed, if he so desires, to install hand pumps, tube wells at site of work at places as approved by Engineer-in-Charge and nothing shall be charged from the contractor. The contractor shall remove the hand pumps, tube wells as and when asked to do so by Engineer-in-Charge/GE and in any case on completion of the work and before issue of completion certificate, unless GE desires that these hand pumps, tubes wells be left in position and the contractor agrees to do so without claiming cost thereof from department. No compensation whatsoever shall be admissible to the contractor, if he is required to remove the pump (s) tube wells before completion of work. Use of water from such sources shall only be permitted if, found after testing, potable and fit for use in the work. The water from such sources shall be got tested by contractor initially once for all individual source of supply and every time if there is a change of bore well within MOD land and once in every month (monthly) or whenever there is a change of source when water is fetched from the source outside MOD land. The water from such sources shall be got tested regularly by the contractor from laboratory approved by the GE, who shall after satisfying himself permit the contractor to use the water from such sources. Testing charges shall be borne by the contractor.

SPECIAL CONDITIONS (CONTD...)

18.3 The contractor, if he so desires, will be allowed to augment the departmental water supply by boring wells at his own cost at site(s) approved by the GE. On completion of the work the contractor shall remove pipes etc. installed and make good the site as directed by the Engineer-in-Charge without any extra cost to Govt. The contractor shall be given no rebate for augmentation of water supply and charges for water shall be recovered at the rate mentioned hereinbefore.

19. ELECTRIC SUPPLY :-

(a) In case the contractor desires to buy electricity from the MES, he shall be charged for electric energy consumed in the following rates:-

(i) At Rs 13.69 per unit for the light.

(ii) At Rs 13.69 per unit for power.

(b) Electric supply required for the work shall be made available by the MES at the point(s) marked on the layout plan. The main switch and energy meter to register the electric energy supplied shall be provided and installed by the MES. The contractor shall provide all necessary cable, fittings etc from the main switches in order to ensure a proper and suitable supply of electricity for the execution of work. The contractor shall also provide necessary earthing keeping in view the security requirements. The MES does not guarantee for the continuity of supply and no compensation what so ever shall be allowed for supply becoming intermittent or for breakdown in the system.

(c) The actual position of supply point(s) for electric energy will be ascertained by the contractor from the GE before submitting his tender. Irrespective of whether he actually inspects or not, he shall be deemed to have inspected and seen the supply point (s) in consultation with GE before submitting his tender. No claim, what so ever, shall be entertained on this account.

20. VALIDITY OF TENDER: - Tender shall remain open for acceptance for a period of **90 days** from the next date subsequent to last date of bid submission.

SPECIAL CONDITION (CONTD...)

21. SAMPLE OF MATERIALS/ARTICLES.

- (a) Materials/Articles provided by the contractor for in-incorporation in the works shall unless otherwise specified in the Particular specifications, comply with the requirements of the relevant Indian standards (IS) of the year of publication/ edition specified in the MES Schedule Part-I and shall have IS certification marking.
- (b) Sample of all materials before incorporating in the work, ordering in bulk shall be got approved by the contractor from GE in writing .
- (c) In case of material/ articles for which Indian standards are not finalised/ issued and therefore not include in the MES schedule contractor shall produce the samples and get them approved by the GE in writing before incorporation in the works.
- (d) The contractor is advised to inspect the samples of local building materials, e.g bricks, stone aggregate, sand etc and other materials maintained by the CWE/GE before submitting his tender. The contractor will be deemed to have inspected those samples and have full knowledge thereof, whether he inspects them or not. The materials to be provided by the contractor shall conform to or be superior to the sample.
- (e) The selection and use of sources for materials shall be subject to the compliance of these specifications read in conjunction with MES schedule and relevant Indian Standard Specifications.

22. PROPRIETORY MATERIAL/ ARTICLES.

- (a) The proprietary articles such as cement , electrical cables , electrical fittings and sanitary fittings etc when brought to site shall be inspected and approved by the GE.
- (b) The quantity of proprietary articles brought to site shall be recorded in measurement book (IAFW-2261) and signed by the contractor and the Engineer-in-Charge as a check to ensure that required quantity has been brought to site for incorporation in the works.
- (c) The proprietary materials shall be stored as directed. Those already recorded in the measurement book shall be marked suitably for identification.
- (d) The contractor, shall on demand, produce to the GE, original receipt vouchers/ invoices in respect of the supplies, to ensure that the contractor has actually brought the articles of required quality and quantity from the authorized agent/manufacturer/ supplier and also to find out the rates thereof.
- (f) **Purchase voucher** of following materials from manufacturer/dealer shall be produced by the contractor to Engineer-in-Charge. Defaced copies of voucher shall be held on record by the Engineer-in-Charge. Details of vouchers of proprietary material shall be entered in MB.

(i)	HDPE Pipe	(xi)	Cable Jointing Kit
(ii)	Gunmetal gate valve or globe valve	(xii)	Reinforcement
(iii)	Road marking paint	(xiii)	PCC Cable cover
(iv)	GI Pipe	(xiv)	PCC Block
(v)	Synthetic Enamel paint,	(xv)	Traffic convex mirror
(vi)	Bitumen	(xvi)	Tubular delineator
(vii)	Cat eye, Solar Cat Eye	(xvii)	LT Panel
(viii)	Interlocking paver block	(xviii)	Tubular Swaged pole
(ix)	Premium acrylic emulsion paint	(xix)	LED Light
(x)	Kerb stone	(xx)	LT and HT XLPE Cables

SPECIAL CONDITION (CONTD...)**23. RECORD OF CONSUMPTION OF CEMENT.**

(a) For the purpose of keeping record of cement issued and consumed in works one properly bound register serially numbered and all pages initialed against the numbering by the Engineer-in-Charge and in the form approved by Engineer-in-Charge showing daily receipt quantity used in the work, balance in hand, shall be maintained.

(b) The register shall be kept at site in the safe custody of the contractor's representative during the progress of the work and shall be produced for verification of the Inspecting officer on demand.

(c) The entries in the aforesaid register will be signed daily by the contractor or his authorised representative and the JE for supervision and once in a week by Engineer-in-charge.

(d) On completion of the work, the contractor shall deposit the cement register with Engineer-in-Charge for record.

24. WATCH/LIGHTING ; - The contractor shall at his own cost take all possible precautions to ensure safety of life and property by providing necessary fencing, barrier, light, watchmen etc, during the progress of work and as directed by Engineer-in-Charge .

25. MAKING GOOD ; -The contractor shall leave or form holes of concrete (Plain or RCC), brick work , stone masonry and in any other situation as required for the work or as directed by Engineer-in-charge and make good all the holes in the same mortar and mix as specified for that portion of work.

26. CLEANING DOWN:-Refer condition 49 of IAFW-2249. The contractor shall clear work site & area allotted for storage of material & erection of plants so as to leave the whole premises clean and tidy to the entire satisfaction of Engineer-in-Charge before handing over the items/works. No extra payment shall be admissible to the contractor for this operation.

27. CONSTRUCTION LABOUR WELFARE CESS/TAX:- Consequent upon promulgation of ordinance by the President of India, the contractor is liable to pay element for construction labour welfare CESS/Tax. The rates quoted by the contractor shall be deemed to be inclusive of this CESS/TAX.

28. PRICING OF DEVIATIONS:-The principle enumerated in condition 62 of IAFW-2249 shall apply to this contract.

29. MINIMUM WAGES PAYABLE:-

(a) Refer condition 58 of IAFW-2249. Govt. of India Min of Labour (Deptt of labour and Employment) vide notification dated have fixed minimum rates of wages as up to dated from time to time for various categories of employees under the Minimum Wages Act 1948. The contractor shall not pay wages lower than minimum wages including allowances as fixed under said notification as updated till the date of receipt of tender. Where in any area the minimum rates of wages are also fixed by state Government for employees in employment in the construction/maintenance of buildings/roads/runways, the labour wages as fixed vide above said updated notification of Ministry of labour or respective state Government whichever is higher in respect of these areas shall be deemed minimum rates of wages payable under this contract and the contractor shall not pay lower than this minimum rates of wages.

(b) Contractor's attention is also drawn, amongst other things to the "explanations" to the schedule of minimum wages referred to above.

(c) The fair wages referred to in condition 58 of IAFW-2249 will be deemed to be the same as the minimum wages, referred to above as up to dated from time to time.

SPECIAL CONDITION (CONTD...)

(d) Sch. of minimum wages has not been enclosed along with tender documents. However, contractor shall be deemed to have verified the minimum wages payable as on the last due date of receipt of tender.

(e) The contractor shall have no claim whatsoever, if on account of local factor and/or regulations, he is required to pay the wages in excess of minimum wages as described above during the execution of work.

(f) Wages/salary of employed labourers and supervisor/deployed staff shall be paid by the contractor through Aadhar Linked bank account of individual labour and deployed staff. Relevant details of payment made by the contractor through bank shall be produced for verification of principal employer (Garrison Engineer).

30. TAXES

Tendered rates are inclusive of :-

- (i) Goods & Services Tax (GST)
- (ii) Labour welfare cess & (iii) Other levies, royalties & duties.

31. RE-IMBURSEMENT/REFUND ON VARIATION IN TAXES DIRECTLY RELATED TO CONTRACT VALUE

(a) The rates quoted by the contractor shall be deemed to be inclusive of all taxes including GST, Labour welfare cess/Tax, duties, royalties and other levies.

(b) (i) The taxes which are levied by Govt at certain percentage rates of contract Sum/Amount shall be termed as "taxes directly related to contract Value" such as GST on works contracts, Labour Welfare cess/tax and like but excluding Income Tax. The tendered rates shall be deemed to be inclusive of all "taxes directly related to contract value" with existing percentage rates as prevailing on last due date for receipt of tenders. Any increase in percentage rate of "taxes directly related to contract value" with reference to prevailing rates on last due date for receipt of tenders shall be reimbursed to the contractor and any decrease in percentage rate of "taxes directly related to contract value" with reference to prevailing rates on last due date of receipt of tenders shall be refunded by the contractor to the Govt/deducted by the Govt from any payments due to the contractor. Similarly imposition of any new "taxes directly related to contract value" after the last due date for receipt of tenders shall be reimbursed to the contractor and abolition of any taxes directly related to contract value" prevailing on last due date for receipt of tenders shall be refunded by the contractor to the Govt/deducted by the Govt from the payments due to the contractor.

(ii) The contractor shall, within a reasonable time of this becoming aware of variation in percentage rates and/or imposition of any further "taxes directly related to contract value", give written notice thereof to the GE stating that the same is given pursuant to this special condition, together with all information relating there to which he may be in a position to supply. The contractors shall submit the other documentary proof/informations as the GE may require.

(iii) The contractor shall, for the purpose of this condition keep such books of account and other documents as are necessary and shall allow inspection of the same by a duly authorized representative of Govt, and shall further, at the request of the GE furnish, verified in such a manner as the GE may require, any documents so kept and such other informations as the GE may require.

(iv) Re-imbursement for increase in percentage rates/imposition of "taxes directly related to contract value" shall be made only if the contractor necessarily and properly pays additional "taxes directly related to contract value" to the Govt, without getting the same adjusted against any other tax liability or without getting the same refunded from the concerned Govt authority and submits documentary proof for the same as the GE may require.

SPECIAL CONDITION (CONTD...)

32 GST AND LABOUR WELFARE CESS :- It shall be deducted by the disbursing officer at the prevailing rates from gross amount payable to the contractor. Contractors quoted rates shall include taxes to be paid/ deducted at source by the disbursing officer. Rate of recovery of taxes shall be all as per Govt notification /SRO as applicable on last date of receipt of tender. Nothing extra is payable on this account.

32.1 Rate of Tax to be paid/recovered at the source under Goods & Services Tax (GST) shall be the percentage on gross value of contract as prescribed by the Central Board of Excise & Custom authorities.

32.2 Contractor shall get registered with the Central Board of Excise & Custom for allotment of ARIN / ID / GSTIN. Contractor shall file monthly/ quarterly returns for GST as per instructions in the matter from the concerned authorities.

33. WORK ON HOLIDAYS :- The contractor shall not carry out any work on gazetted holidays, weekly holidays and other non-working days except when he is specially authorised in writing to do so by the GE. The GE may at his sole discretion declare any day as holiday or non-working day without assigning any reason for such declaration.

34. TESTING OF MATERIAL

(a) The contractor shall be responsible for various tests to be carried out as listed in Appx 'A' in the site laboratory which will be set up by the contractor for testing of material at his own cost and arrangement and for that, they shall employ a competent technical representative & staff as approved by GE. All such tests shall be carried out in presence of Engineer-in-Charge. The cost of labour & materials for testing shall be borne by contractor.

(b) The rates of testing given in Col 7 of Appx 'A' shall be per lot of samples. No charges for tests carried out in site laboratory shall be recovered from the contractor. However, in case, a test which was specified to be carried out in site lab, and which could not be carried out in the site lab due to some reason, such test will be carried out in Zonal lab/ Central test lab (CTL) & any other approved lab . Recovery for the same shall be effected from the contractor at the rates indicated in Appx 'A'.

(c) The tests which are specified to be carried out in Zonal lab and any other approved lab, charges for the same shall be borne by contractor at the rates indicated in Appx 'A', only if the test results disclose that materials are not in conformity with provisions of the contract. However, if the tests disclose that materials are in conformity with the provisions of the contract no recovery shall be effected from the contractor.

(d) For the test to be carried out in laboratories other than site laboratory, the facility & cost for conveyance of samples shall be provided by the contractor. The charges for testing shall however be borne by the department if test results are in conformity with contract provisions, otherwise the recovery for such test shall be made from the contractor as per the rates indicated in Appx 'A' or the actual charges whichever is higher.

35. ENFORCEMENT OF EMPLOYEES PROVIDENT FUND AND MISCELLANEOUS PROVISIONS (EPF & MP) ACT 1952

(a) Contractor shall get registered with employees provident fund organization. PF organization will allot **Provident Fund Code Number** to the contracting firm. Scanned copy of letter of allotment of Provident Fund Code number, (showing allotted code number) issued by the EPF organization shall be uploaded by the contractor in cover 1 (T bid) along with scanned copy of DD towards tender cost and application letter. Those bidder not registered with PF organization and not upload above scanned copy of letter of allotment of PF code number in cover 1 (T bid), they shall be disqualified during evaluation of T bid and consequently their financial bid (cover2) shall not be opened.

SPECIAL CONDITION (CONTD...)

- (b) All workers/tradesmen deployed by the contractor under subject contract shall be enrolled as members of Provident Fund and shall be given Universal Account Number (UAN).
- (c) While submitting payment under RAR and final bill contractor shall render relevant certificate duly supported with challans to Engineer-in-Charge/Garrison Engineer giving confirmation that all workers employed directly/indirectly by him under subject contract are enrolled for EPF and contribution toward EPF credited till date into their respective accounts (UAN).
- (d) Failure by the contractor of compliance of EPF and MP Act shall be an offence and attract penalty from the competent authorities in the matter.

37. QUALIFIED TRADEMEN : (APPLICABLE FOR WORKS COSTING RUPEES ONE CRORE OR MORE)

In compliance with the condition 26 of IAFW-2249 (General Conditions of Contracts), the contractor shall employ skilled/semi skilled tradesmen who are qualified and possessing certificate in particular trade from Industrial Training Institute/(ITI)/ National Institute of Construction Management and Research (NICMAR)/ similar reputed and recognized Institutes by State/Central Government, to execute the works of their respective trade. The number of such qualified tradesmen shall not be less than 25% of total skilled/semi skilled tradesmen required in each trade. The contractor shall submit the list of such tradesmen along with requisite certificates to Garrison Engineer for verification and approval. Notwithstanding the approval of such tradesmen by GE, if the tradesmen are found to have inadequate skill to execute the work of their trades, leading to unsatisfactory workmanship, the contractor shall remove such tradesmen within a week after written notice to this effect by the GE and shall engage other qualified tradesmen after prior approval of GE. GE's decision whether a particular tradesmen possesses requisite qualification, skill and expertise commensurate with nature of work, shall be final and binding. No compensation whatsoever on this account shall be admissible.

38. BLASTING : Blasting in any form is prohibited.

39. SITE DOCUMENTS

In addition to the site documents which are normally maintained for works, the following additional documents (as applicable for this work) shall be maintained at site and signed by GE / his authorized representative and the Contractor :-

- a. Sieve analysis for coarse / fine aggregate.
- b. Water absorption test for aggregates of different sizes/ grading.
- c. Stage passing register.
- d. Daily works diary register.
- e. Register of materials daily arrived at site.
- f. Material approval register.
- g. Cement consumption register.
- h. Register for clay, silt and impurities in aggregate test.
- i. Impact value of stone aggregates of different sizes.
- j. Crushing value of stone aggregates of different sizes.
- k. Flakiness index of stone aggregates of different sizes.
- l. Rolling hours Register.
- m. Aggregate abrasion value register.
- n. Register for soundness test.
- o. Register for temperature control at boiler out at paver.
- p. Cube testing register.
- q. Beam testing register.

SPECIAL CONDITION (CONTD...)**40. DISPUTE RESOLUTION BOARD (DRB) (APPLICABLE IN CONTRACTS CONCLUDED BY ZONAL CE/CCE OF VALUE ABOVE RS 10 CRORES).**

- i. During execution of the works or after completion or after determination/cancellation/termination of the contract, all disputes between the parties to contract arising out of the contract (except those for which decision of Accepting Officer or any other officer (CWE and/or GE) is expressed to be final and binding), including any disagreement by either party with any action, inaction, opinion, instruction, certificate or valuation by the Accepting Officer or his nominee, the matter in dispute shall, in the first place be referred to the Dispute Resolution Board (DRB). In case of disagreement with the decision of such DRB, any party may invoke arbitration as per contract conditions.
- ii. The constitution of the DRB shall be a three member body as under :-
 - a. **Chairman:** Jt DG (C) of the concerned Command Chief Engineer/ADG. Where Jt DG (C) is not posted in the Command/ADG office, any other Chief Engineer/ Brig level Officer posted in CE Command/ADG shall be nominated by Command CE at his sole discretion.
 - b. **Member 1 :** Col/Director level officers of command/ADG office or any other Zonal CE to be nominated by Command CE/ADG.
 - c. **Member 2 :** Col/Director level officers of command/ADG office or any other Zonal CE to be nominated by Command CE/ADG.
- iii. The name of chairman and members shall be notified by the Accepting Officer within one month of the date of acceptance of contract.
- iv. Once the DRB is constituted the members and chairman shall disclose in writing their neutrality and impartiality about any personal interest in the work.
- v. The dispute shall be referred to the chairman of the DRB by the concerned party after giving notice to the other party for invoking of this clause.
- vi. The DRB shall decide the dispute in accordance with the terms of the contract, principle of natural justice, equity and fair play.
- vii. The DRB may fix oral hearing at a place, date and time as decided by the Chairman.
- viii. The requisite administrative support to the DRB shall be provided by the Accepting Officer.
- ix. All the contract documents pertaining to the case shall be provided by the Accepting Officer for reference by the DRB.
- x. DRB shall give its decision on the disputes within three months of notice from any party invoking the DRB clause. This period can be extended by one month with the consent of the parties.
- xi. All the decisions given by the DRB shall be by majority and such decisions shall be communicated in writing by the Chairman to the parties.
- xii. If the decision of the DRB is not to the satisfaction of either party or if the DRB fails to give decision within the laid down time, either party shall indicate his reservations to the other party within 30 days of such decision and to refer that dispute for arbitration within the provisions of Condition 70 of IAFW-2249 General Conditions of Contract.
- xiii. It shall be mandatory for the party invoking arbitration on any particular dispute to have first exhausted the remedy provided under the DRB clause for that particular dispute.
- xiv. The mandate of the DRB shall terminate on completion of one year from the date of completion/ determination/cancellation/termination of the contract.
- xv. If any member or Chairman of the DRB is unable to function due to any reason whatsoever, or he resigns his appointment, Chief Engineer Command/ADG as the case may be, shall fill the vacancy so caused within 15 days of the occurrence of such vacancy.

- xvi. Any dispute referred to the DRB and having been decided by the DRB and not objected to by either party within 30 days shall attain finality and shall not be referable to arbitration.
- xvii. Accepting Officer shall ensure implementation of the decisions of the DRB which attain finality, ie except those which are objected to by him or by contractor within 30 days as per Para 12 above. The amount so decided shall be processed as per AIP and the authority be mentioned as ‘decision of DRB’.
- xviii. Findings and decision of DRB shall be admissible as evidence, to the extent permissible as per law, in the subsequent arbitration and/or litigation.
- xix. DRB Chairman/members shall not, in any case, be liable to be called as witness or to produce any evidence in any Arbitration or departmental proceedings of any kind.
- xx. During execution of work the disputes may be referred to the DRB as per the requirement of each party after having exhausted the decision making process provided in the contract. In case of completion of work or after determination/cancellation/termination of the contract all the disputes including payment/ nonpayment/delay in final bill shall be simultaneously referred to the DRB within six months of completion/determination/ cancellation/termination of the contract.

41. **ROLLERS** (Reference condition 15 of IAFW-2249)

41.1 The contractor shall deploy Pneumatic type Roller, Tandem vibratory Roller and smooth wheel road roller as per requirement basis and a log book for each road roller shall be maintained by him for recording working hours. Entries in the log book shall be signed by the contractor or his authorized representative and by the Engineer-in-Charge. To ensure proper consolidation, roller must work for at least the number of days assessed on the basis of output given here under. If the roller has not worked for the number of days so assessed, recovery shall be affected from the contractor for the number of days falling short of the days assessed on the basis of output stipulated. The recovery shall be affected as under:-

- (a) Roller deployed/ hired by the contractor then recovery at the rate of Rs 5000/- per working day of 8 hours. The above provision shall not, however absolve the contractor of his responsibility of properly consolidating surfaces as required under the provisions of the contract.

41.2 **OUTPUT PER DAY OF 8 HOURS WORK**

(i)	Consolidation of formation surface/sub grade	1850 Sqm
(ii)	Consolidation of stone soiling 20cm thick (spread thickness) with 8 to 12 tonne power road roller	590 Sqm
(iii)	do- 15 cm thick –do-	800 Sqm
(iv)	Consolidation of water bound macadam (stone metal) 10 cm compacted thickness including spreading and consolidation with blinding material	185 Sqm
(v)	Consolidation of water bound macadam (stone metal) 7.5 cm compacted thickness including spreading and consolidation with blinding material	248 Sqm
(vi)	Consolidation of single coat surface dressing Consolidation of single coat surface ressing with blinding material	774 Sqm
(vii)	-do- two coat surface dressing	558 Sqm
(viii)	Consolidation of 2.5cm thick premixed carpet including seal coat	600 Sqm
(ix)	Consolidation of 2 cm thick premixed carpet including seal coat	744 Sqm
(x)	Consolidation of 4 cm thick premixed carpet including seal coat	372 Sqm

Note: -

- (i) Wherever tandom vibratory roller and pneumatic tyred rollers & vibratory earth compactor is specified, the output of the same shall be as per manufacturer’s instructions for the respective items so as to achieve proper compaction.
- (ii) Any other Sch ‘A’ items viz WMM, BM & SDAC for which output not covered above shall be determined on actual site basis through BOO ordered by the CWE well before Commencement of road work.

SPECIAL CONDITION (CONTD...)

42 EMPLOYMENT OF PERSONNEL

42.1 The contractor shall employ only Indian National as his representative, servants and workmen and verify their antecedents and loyalty before employing them for work. He shall ensure that no person of doubtful antecedents and nationality is in any way associated with the works. If for reasons of technical collaboration or other consideration the employment of foreign national is unavoidable, the contractor shall furnish the particulars to this effect to the Accepting Officer at the time of submission of the tender. As proof that the contractor has employed only Indian Nationals he shall render a certificate to the GE within one month from the date of acceptance of the tender to this effect. In case the GE desires, contractor will have the police verification done of the personnel employed by him. Contractor’s attention is also drawn to condition 25 of IAFW-2249 in this connection.

42.2 The GE shall have full powers and without giving any reason, to require the contractor immediately to cease to employ in connection with this contract, any Agent or servant or employee whose continued employment is, in his opinion, undesirable. The contractor shall not be allowed any compensation on this account.

42.3 Contractor’s Supervision : Refer Condition 25 of IAFW-2249 along with latest amendments.

43 GUARANTEE IN RESPECT OF ANTI TERMITE TREATMENT

43.1 The contractor shall stand a guarantee of 10 (TEN) years to the Government for the work against recurrence of termite infestation (viz. effectiveness of the treatment carried out). For giving guarantee, if any additional treatment over and above that is specified is required, the same shall be carried out by the contractor without any extra cost to the Government. The contractor shall furnish a written guarantee for the effectiveness of the treatment for a period of TEN YEARS in favour of Garrison Engineer.

43.2 The amount of security deposit to be held back from the Contractor’s bill against the guarantee for anti -termite treatment shall be calculated on the amount of anti- termite treatment at contract rates as per the scales given below enhanced by 1.25 times of the amount so calculated. This shall be worked out by GE and intimated to the Contractor. This amount shall be refunded to him after the expiry of the guarantee period. Alternatively, the Contractor may give a separate interest bearing security deposit to GE valid for 10 Years for this amount.

	Cost at contract rates	Amount of Security Deposit
(i).	Upto Rs. 50 lakhs	2% of the amount subject to a minimum of Rs. 5000/-
(ii).	Over Rs. 50 lakhs and upto Rs. 100 lakhs	Rs. 1,00,000/- + 1.5% of the amount exceeding Rs. 50 Lakhs
(iii).	Over Rs. 100 lakhs and upto Rs. 500 lakhs	Rs. 1,75,000/- + 1% of the amount exceeding Rs. 100 Lakhs
(iv).	Over Rs. 500 lakhs and upto Rs. 1500 lakhs	Rs. 5,75,000/- + 0.5% of the amount exceeding Rs. 500 Lakhs
(v).	Over Rs. 1500 lakhs	Rs. 10,75,000/- + 0.5% of the amount exceeding Rs. 1500 Lakhs subject to Rs. 18.75 Lakh

43.3 Should the GE at any time during construction or reconstruction or prior to the expiry of the guarantee period, finds that the buildings have been infested with termites, the contractor shall on demand in writing from the GE specifying the building(s) complained of, not-with-standing that the same may have been inadvertently passed, certified and paid for, undertake to carryout such treatment as may be necessary forthwith to render the building(s) free from termite infestation at his own expense till expiry of the guarantee period. In the event of his failure to do so within the specified period to be specified by the GE in his demand aforesaid, the GE may undertake such treatment at the risk and expense in all respects of the contractor. The liability of the contractor under this condition shall not extend beyond the period of ten years from the date of completion, unless the GE had previously given notice to the contractor to rectify the defects.

SPECIAL CONDITION (CONTD...)

43.4 The contractor shall provide a plate/board of adequate dimension but not less than 90cm x 45 cm x 2 cm thick in cement mortar (1:4) on one side of each building and indicated thereon the Contract No, Name of contractor and Name of the agency executing the anti termite and water proofing treatment and the date of expiry of the guarantee period.

44. CONCILIATION (APPLICABLE IN CONTRACTS CONCLUDED BY ZONAL CE/CCE OF VALUE UPTO RS 10 CRORES).

(a) Refer condition 71 IAFW-2249. Consequent to enactment of the Arbitration and Conciliation Act 1996 and with an objective to encourage settlement of disputes through Conciliation.

(b) On finalization of conciliation proceedings, the settlement agreement shall be signed by the Accepting Officer on behalf of Union of India after ascertaining the availability of funds.

(c) In case the net total amount of payment involved in the settlement agreement exceeds Rs 2.00 Lakhs, the Accepting Officer will consult the next higher authority and obtain clearance before conclusion of conciliation proceedings.

(d) The amount of settlement agreement shall be treated as an agreed amount payable under the contract and such payment shall be processed through a hand receipt.

(e) This provision is applicable to contracts of value less than Rs 10 Crores concluded by Zonal CEs/CCEs.

(f) The following special condition shall be inserted in the tender documents

1. Scope of Conciliation. The scope of conciliation shall be restricted to the following types of disputes with financial limits as indicated there in:-

(a) Disputes relating to levy of compensation for delay in completion-actual amount of compensation.

(b) Disputes relating to technical examination of works.

(c) Disputes relating to interpretation of the provisions of the contract with reference to their application to parties.

(d) Disputes relating to non return of Schedule 'B' stores over-issued to the contractor.

(e) Any other dispute having fair chances of being resolved by conciliation and considered fit to be referred to conciliation by the parties.

For item (b), (c), (d) and (e) as stated above, the financial limit shall be rupees two Lakhs or one percent of the contract amount whichever is less for each item.

2. Commencement of Conciliation Proceedings .

(a) The party initiating conciliation shall send to the other party a written invitation to conciliate, briefly identifying the subject of the dispute.

(b) Conciliation proceedings shall commence when the other party accepts in writing the invitation to conciliate.

(c) If the other party rejects the invitation, there will be no conciliation proceedings. If the party initiating conciliation does not receive a reply within 30 days from the date on which he sends or within such other periods of time as specified in the invitation, he may elect to treat this as a rejection of the invitation to conciliate and if he so elects, he shall inform in writing the other party accordingly.

SPECIAL CONDITION (CONTD...)

- 3. Number of Conciliators.** There shall be a Sole Conciliator.
- 4. Appointment of Conciliator.** All disputes brought out in Para 1 (a) to (e) above shall be referred to the Sole Conciliator viz. Serving officer not below the rank of Superintending Engineer/Superintending Engineer (QS&C) having degree in engineering or equivalent or having passed final/direct final examination of Sub Division II of Institution of Surveyors (India) to be appointed by the Engineer-in-Chief, Army Headquarters, New Delhi or in his absence the officer officiating as Engineer-in-Chief or Director General of Works if specifically delegated by the Engineer-in-Chief in writing.
- 5. Status of Effect of Settlement Agreement.** The settlement agreement signed by the parties as a result of conciliation proceedings shall have the same status and effect as an arbitral award on agreed terms.

(Signature of Contractor)

Dy Dir (C)/ Asst Dir (C)
For Accepting Officer

SPECIAL CONDITIONS [CONTD. /.]

ANNEXURE A TO SPECIAL CONDITION

MATERIALS AND THEIR TESTS (OTHER THAN STEEL / CEMENT)

Srl No	Material	Tests	Method of testing	Frequency of tests			Level of test	Rate per test Rs.	Remarks
1	2	3	4	5			6	7	8
1.	Fly ash Brick	1) Compressiv estrength	IS-3495 (Part-II)	As per IS-5454 as given under:-			A	330/-	Checks for visual and Dimensional characteristics shall also be carried out
		2) Water Absorption 3) Efflorescence	--Do-- ---Do... (Part-I)	Lot Size. 1001 to 10000 10001 to 35000 35001 to 50000	sample Size 5 10 15	permissible Nos of defective bricks 0 0 1	A A	330/- 330/-	as per IS:5454 Legend A-Site Lab B-Zonal Lab/Govt Enggcollege. C-National test house/SEMTWING/Engg. College.
2.	Coarse Aggregate	1) Sieve Analysis	IS:2386(Part-I)	One test for every 100 cum of aggregates or part there of brought to site.			A	660/-	
		2) Flakiness Index	---do--				A	250/-	
		3) Estimation of deleterious materials	---do--	One test for every 100 cum of aggregate or part thereof.			A	600/-	
		4) Organic impurities	---do--	One test per source of supply			C	275/-	
		5) Moisture content	IS:2386(Part-II)	Regularly as Reqd.			A	330/-	
		6) Specific gravity	--do--	One test for each source of supply.			B	330/-	

CONTD. /.

SPECIAL CONDITIONS [CONTD. I.]

ANNEXURE ‘A’ TO SPECIAL CONDITION

MATERIALS AND THEIR TESTS (OTHER THAN STEEL / CEMENT)

Srl No	Material	Tests	Method of testing	Frequency of tests		Level of test	Rate per test Rs.	Remarks
1	2	3	4	5		6	7	8
3.	Fine aggregate	1) Sieve Analysis	(IS:2386Pt-I)	One test for every 100 cum of FA or part thereof when brought to site.		A	660/-	
		2) Test for clay, silt and impurities	--do--	--do--		A	500/-	
		3) Specific gravity	-do- But (Part- II)	One test for each source of supply		B	330/-	
		4) Test for organic impurities	--do--	One test for each source of supply.		C	275/-	
		5) Moisture content	-do-	Regularly as required subject to 2 tests/per day when being used.		A	330/-	
4.	Cement	1) Setting time	IS-4031-63 Reaffirmed 1980	Once for each consignment or as and when Regd.		B	500/-	
		2) Soundness	--do--	--do--		C	550/-	
		3) Compressive strength	--do--	--do--		B	550/-	
		4) Fineness	--do--	--do--		C	275/-	
5.	Structural concrete	1) Slump test or compacting factortime or VEE-BEE test	IS-1199	The Min frequency of sampling of concrete of each grade shall be as under :-		A	300/-	(1) Random sample shall be carried out to cover all mixunits.
		2) Compressive strength	IS-516	Qty of Conc. IN THE work(M ³)	No of samples	A	900/- per sample	(2) Refer IS-456-2000 Clause. 15.2 for frequency of sampling.
				1-5 6 -15 16-30 31-50 51 and above	1 2 3 4 4 + 1 for each additional 50 Cum or part thereof			
6.	Water for constn purpose	1) Test for acidity 2) Test for alkalinity 3) Test for solid content	IS:456 & 3025 -do- -do-	Once at the stage of approval of source of water		B	500/- 500/- 500/-	Refer relevant clause of IS-456:2000
						B C		

(Signature of Contractor)

Deputy Dir/ AD (Contract)
For Accepting Officer

PARTICULAR SPECIFICATIONS

1. GENERAL

- 1.1 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 (here-in- after called MES Schedule), read in conjunction with each other.
- 1.2 Term "General Specifications" referred to herein after as well as referred to in IAFW-2249 (General Conditions of Contracts) shall mean the specifications contained in the MES Schedule Part-I.
- 1.3 General rules, specifications special conditions and preambles in the MES Schedule shall be deemed to be applicable to the work under this contract, unless specifically stated otherwise in these documents in which case the provision in these documents shall take precedence over the aforesaid provisions in the MES Schedule. The terms as specified wherever appear in tender documents and drawings related to relevant particular specifications and in its absence general specifications. All references to MES Schedule in these specifications relate to SSR Part-I of MES Schedule unless otherwise mentioned. References to some paragraphs of MES Schedule have been made in these particular specifications but other paragraphs and provisions as applicable are also to be followed for all sections/parts of Schedule 'A' even though not particularly mentioned here-in-after e.g. reference to Paras pertaining to general workmanship for brickwork, iron and steel work etc. have not been made but provision therein as required for work are applicable.
- 1.4 Where specifications for any item of work are not given in MES Schedule or in these particular specifications, specifications as given in relevant Indian Standard or as per code of practice shall be followed.
- 1.5 Any drawing, which is mentioned in the drawings forming part of the tender but not specifically mentioned in the list of drawings, shall be deemed to be forming part of the tender. The tenderer shall see such drawings/details in the office of Accepting Officer/concerned CWE/GE.
- 1.6 Rates quoted for a particular item and/or Lump sum quoted by the tenderer shall be deemed to include for any minor details/items 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 details/items of work and/or construction is obviously and fairly intended to be included in the contract or not shall be final, conclusive and binding.
- 1.7 the minor details/items which shall be deemed to be essential for execution and entire completion of work are detailed as under for guidance: -
- (i) Reinforcement for any RCC member not indicated in the drawings but required in structure or code requirement.
 - (ii) Dwarf wall in situations like verandah, passage, all walls of court yard, shafts etc. not indicated in drawings.
 - (iii) Lintels over doors, windows and openings have not been shown in drawings.
 - (iv) Builder's hardware for doors/windows etc. though not indicated on drawings but is essential for usage.
 - (v) In all the above and other similar cases, the details indicated elsewhere in the drawings, 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 quoted rate of a particular item and/or lump sum. In the event of any dispute, decision of the Accepting Officer shall be final, conclusive and binding.
- 1.8 Where specifications/provisions given in these particular specifications are at variance with the provision/specifications given in MES Schedule, specifications/ provision given in these particular specifications shall be followed.
- 1.9 WATER PROOFING COMPOUND (WPC): Unless otherwise quantity of WPC mentioned in PS clauses here-in-below, the same shall be mixed as per manufacturer's instructions. However, the quantity will be accounted in the proportion of 200 ml per bag of cement in case of deviation.
- 1.10. Various structural requirement such as strengthening measures for seismic Zones, joints in RCC and brick parapets, extra reinforcement at external angle etc. and precautions to be taken etc. & typical foundation details have been given in relevant TD drawings through notes & plans, sections elevations and details. These requirements as applicable may or may not have been specifically shown on architectural drawings but are required to be provided and the cost thereof shall be deemed to be included in unit lump sum rates of the relevant items of Schedule 'A'
- Section-I

2. CEMENT

The cement shall not be issued under Schedule 'B'. Contractor shall procure the same under his own arrangement for the entire completion of the work. Provision of condition 10 of IAFW-2249 be read in conjunction with this clause. The specifications and other provisions laid down vide section 4 Para 4.3 of MES Schedule, Part-I shall be read in conjunction with the provisions contained in the subsequent paras here-in-after.

PARTICULAR SPECIFICATIONS (Contd/...)

2.1 **(A) TYPE OF CEMENT:** - The Cement shall be Ordinary Portland Cement (OPC) grade 43 (IS-8112- 2013) or Ordinary Portland Cement (OPC) grade 53 (IS-12269-2013) or Portland Pozzolana Cement (PPC) (IS: 1489-1991 Part-I). While using the PPC, following precautions/ conditions shall be met with by the contractors at site :-

- (a) PPC shall meet the strength criteria as laid down in IS-1489(Part-I)-1991.
- (b) Both OPC & PPC shall not be permitted for use in the same building except for plaster and mortar. Also OPC of different grade shall not be permitted to be used in single independent element/member.
- (c) The contractor shall submit following test certificate from the manufacturer of the cement for every batch of cement:-
 - (i) The quality of fly ash is strictly as per IS-1489(Part I)-1991.
 - (ii) Fly ash is inter-ground with clinker and not mixed with clinker.
 - (iii) Dry fly ash is transported in closed containers and stored in silos.Only pneumatic pumping shall be used.
 - (iv) The fly ash received from thermal power plant using high temperature combustion above 1000^o C should be used.
 - (v) The fly ash content in PPC shall be as per IS 1489-1999 (Part-I).

(d) PPC will not be used for water retaining structures.

(B)STRIPPING TIME: Refer provision given in clause 4.11.6.3 OF MES Schedule Part-I and clause 11.3 of IS-456. However for PPC, the stripping time shall be as under :-

(i) **For members/items under sub-paras (a) & (b) of clause 11.3.1 of IS-456:** Period specified for the members/items by using OPC under sub-paras (a) & (b) of clause 11.3.1 of IS-456 + **01** day.

(ii) **For members/items under sub-paras I to I of clause 11.3.1 of IS-456:** Period specified for the members/items by using OPC under sub para I to I of clause 11.3.1 of IS-456 + **07** days.

I The contractor at the time of commencement of work shall intimate to GE in writing regarding one type of cement, out of the types of cement mentioned in para 2.1(A) above, for incorporating in the work. Any change in use for type of cement thereafter shall only be allowed after the written approval of GE.

2.2 **SOURCE OF PROCUREMENT:** - Cement shall be procured by the contractor under his own arrangement and at his own cost directly from any of the main producers of cement mentioned in Appendix 'B'. For repair works, maintenance works and other works, where entire requirement of cement is less than 1200 bags, cement may be procured by the contractor either directly from one of the manufacturers mentioned in the Appendix 'B' or from the authorized distributors/ dealers of the manufacturer's mentioned in Appendix 'B' but the contractor will have to submit test certificate of the batch issued by the main producers. The particulars of manufacturer of cement alongwith the date of manufacture shall be submitted by the contractor separately for every consignment of cement procured. Each consignment of cement procured by the contractor shall be recorded in the measurement book as "Not to be abstracted" and shall be supported with authentic Documents e.g. original purchase vouchers highlighting the makes, test certificates, batch Nos., quantity etc. The documents in support of the purchase of cement shall be recorded and verified by GE and site staff.

2.3 **IDENTIFICATION:** - Marking of each cement bag shall be as per relevant IS code.

PARTICULAR SPECIFICATIONS (Contd/...)

- 2.4 **SCHEDULE OF SUPPLY:-** Schedule of supply of cement shall be finalized by Contractor with the GE and shall be incorporated in CPM chart so that supply of cement is monitored in a way to avoid any delay in completion of the work. The complete requirement of cement will be worked out before making any RAR payment. Procurement of cement by the Contractor shall be completed sufficiently in advance of the date of completion. No extension of time will be considered for non-availability of cement. Every Cement godown shall be provided with two locks on each door. The key of one lock of each door shall remain with the Engineer-in-Charge or his representative and that of other lock with the Contractor or his authorised agent at site of work so that cement is removed from the godown only according to the daily requirement with the knowledge of both the parties. Cement for purpose of accounting shall be on the basis of numbers of bags. Minor variations in cement not more than 2% by weight of cement in a bag will be permissible for purpose of accounting of cement bags. However cement shall be incorporated in the work on actual weight basis where specified without any additional cost.
- 2.5 **TESTING OF CEMENT:** - The manufacturer will carry out the inspections and testing of cement in accordance with relevant BIS provisions. The contractor shall submit the manufacturer's test certificates in Original along with the test sheet giving the result of each physical test as applicable and the chemical composition of the cement or authenticated copy thereof, duly signed by the manufacturer with each consignment. However when the cement is procured through leveled dealers/distributors as per the provisions contained in clause 2.2 here-in-before, the contractor shall submit photocopy of manufacturer's test certificates duly certified by the authorised dealers/distributors in lieu of original copy of the manufacturer's test certificates. The Engineer-in-charge shall record these details in the Cement Acceptance Register as given at Appendix 'E' after due verification. The GE shall also organize independent testing at random samples of every 250 MT of cement (If batch changes within 250 MT then testing of each batch has to be carried out) from the labs as indicated under special condition No. 25: TESTING OF MATERIALS as per IS: 3535-1986 (Method of Sampling Hydraulic Cement), IS: 4031 (Method of Physical test for Hydraulic Cement) and IS: 4032-1985 (Method of chemical analysis of hydraulic Cement). In case cement test result does not fall within the acceptable limits, respective consignment of cement shall be rejected and shall be removed by the contractor within 24 hours from the site. The cost of tests shall be borne by the contractor irrespective of status of the results and no claim shall be/to be entertained on this account and clause of IAFW-2249 and provisions in this regard in Para 1.7.3 of MES Schedule Part-I shall be deemed to be amended accordingly. Sample of cement from each consignment shall be collected by the Engineer-In-Charge and GE in accordance with IS: 3535-1986.
- 2.6 **STORAGE OF CEMENT:** - The cement shall be stored over dry platform at least 20 cm high and in such a manner as to prevent deterioration due to moisture or intrusion of foreign matters. In case of store rooms, the stack should be at least 20 cm away from floors and walls. The stacking of cement shall not be more than 10 bags high. Inspection shall be carried out once a day by rep of GE associated with the work and rep of contractor. It shall be ensured that tested and untested Cement shall be segregated and stored separately with distinct identification. Not more than three months requirement shall be procured and held in stock to avoid its deterioration.
- 2.7 **DOCUMENTATION:** - The Contractor shall submit original Vouchers and original manufacturer's test certificates from the manufacturer for the total quantity of Cement supplied under each consignment to be incorporated in the work. However when the cement is procured through authorised dealers/distributors as per the provisions contained in clause 2.2 here-in-before, the contractor shall be required to submit original purchase vouchers from the dealers alongwith photocopy of the purchase vouchers from the manufacturer's to the authorised dealers/distributors (duly certified by the authorised dealers/distributors) and photocopy of the manufacturer's test certificates duly certified by the authorised dealers/distributors. All consignment received at the work site shall be inspected by the GE and documents verified before acceptance. The Original Vouchers and the Test Certificates shall be defaced by the Engineer-in-Charge and signed by the contractor showing CA No., Year and dated signature and kept on record in the office of GE duly authenticated and with cross-reference to the Control number recorded in the Cement acceptance register. The cement acceptance register will be signed by JE (Civil), Engineer-in-Charge, GE and the Contractor. The Accepting Officer may order a Board of officers for random check of cement and verification of connected documents. The entire quantity of all type of cement shall be suitably recorded in the measurement Book (Not to be abstracted) for record purposes before incorporation in the work and shall be signed by the Engineer-in-Charge and the Contractor.
- 2.8 **RECORD OF CONSUMPTION OF CEMENT**
- 2.8.1 For the purpose of keeping a record of cement used, the contractor shall maintain a properly bound register serially numbered (all pages initialed against the numbering by the Engineer-In-charge) in the form approved by the Engineer-In-Charge showing daily quantity used in the work and balance in hand at the end of each day. The register shall be maintained with daily entries duly authenticated by the contractor or his authorised representative and the Engineer-in-Charge. Separate register shall be maintained for OPC & PPC indicating locations where the cement was used

PARTICULAR SPECIFICATIONS (Contd/...)

- 2.8.2 The register shall be kept at site in the safe custody of the contractor's rep and Engineer-In-Charge during the progress of the work and shall on demand be produced for verification to the inspecting officer.
- 2.8.3 On completion of the work, the contractor shall deposit the cement register with the Engineer-In- Charge for record.

NOTES:

- (e) *In case of any dispute relating to the interpretations arising out of the above-referred provisions, the decision of the Accepting Officer shall be final, conclusive and binding.*
- (f) *The specifications and provisions here in before for cement shall be applicable for all works indicated in the scope of this contract.*
- (g) *Unless otherwise specified, for pricing of the deviations, for the items/works involving use of cement, the rates given in the MES Schedule Part-II subjected to the contractor's percentage for pricing of the D.O.s mentioned in these tender documents shall be applicable irrespective of any type of cement as per the provisions contained in clause 2.1 is used in the work.*

3 EXCAVATION AND EARTH WORK

- 3.1 **SURFACE EXCAVATION:** Before setting out the buildings and commencing the construction, the contractor shall carry out the preparatory works, such as removal of grass, vegetation etc. Thereafter surface excavation shall be carried out, not exceeding 30 cm deep and averaging 15 cm deep over the entire area covered by the items of Schedule 'A' Section-I and **dispose off the spoil to a distance exceeding 500 metre and not exceeding 750 metre**, spread and levelled as directed by the Engineer-in-Charge. The ground level shown on the drawings shall be considered as the ground level after surface excavation. The 'Area' referred to imply the entire area occupied by the building including plinth protection, ramp, platform, steps, shaft, saucer drains and the like. The cost of all the above works and other relevant elements shall be deemed to be included in the contractor's lump sum against Schedule 'A' **Section-I**.
- 3.2 In case the existing ground is undulated (i.e. if the average difference in levels at different places exceeds 30 cm) it shall be excavated to a level as directed by the Engineer-in-charge & regularization action shall be taken as per relevant Schedule' A' note.
- 3.3 **EXCAVATION GENERAL**
- 3.3.1 Excavation and earth work under this contract shall be considered as excavation in **SOFT/LOOSE SOIL** as specified in Para 3.2.1 (b) of MES Schedule Part-I. Contractor is deemed to have visited the site and acquainted himself with respect to working condition. No claim whatsoever shall be admissible to contractor on this account.
- 3.3.2 Unit lump sum rates for relevant items of Schedule 'A', **Section-I** shall be deemed to include for excavation and earthwork for the strata as mentioned in clause 3.3.1 here in above. In case the strata met with actually at site is found different from that mentioned in particular specifications clause 3.3.1 here in above, necessary price adjustment for the same shall be made through deviation order (s) all as per contract provisions. Any change in soil strata notified by contractor shall be supported with relevant documentary proof viz grain size gradation, detailed soil report etc. otherwise contractors any claim on this account shall not be admissible.
- 3.3.3 The measurement of excavation shall be as given in MES Schedule Part-II.
- 3.3.4 In case timbering to excavation is required and specifically ordered by the GE in writing, it shall be paid separately through a deviation order.
- 3.3.5 Bailing/pumping of water where required shall be carried out as described in Para 3.17 of MES Schedule (Part-I). The cost of such work as may be necessary shall be deemed to be included in the contractor's lump sum. No additional payment as stipulated in Special Condition 3.11 of MES Schedule Part-II will be admissible. In the event of deviation no price adjustment shall be made for cost of bailing/pumping etc.
- 3.3.6 After construction and before handing over building/structure, the area around the building/structure to a width of 3 meter beyond the edges of plinth protection, ramps, steps, saucer drains etc. shall be dressed & leveled without extra cost to department. **Spoil obtained from surface dressing & leveling shall be removed outside MD land, to a place notified for dumping debris by the local administration.** The cost of such work shall be deemed to be included in the rates quoted by the contractor under respective items of **Schedule 'A' Section-I**.
- 3.3.6.1 All rubbish obtained from site clearance and all unapproved spoil obtained from surface dressing shall be removed outside MD land as directed by ENGINEER-IN-CHARGE and the cost thereof shall be deemed to be included in the lump sum.

PARTICULAR SPECIFICATIONS (Contd/...)

- 3.3.7 Boulder and stone if obtained from excavation for the entire work shall be sorted out and neatly stacked as directed by Engineer-in-Charge without any extra cost to the Govt. These boulders and stones shall be the property of contractor and recovery for the same shall be made from the contractors payment @ Rs. 550/- Cu.m. Further the boulders/stones so obtained after breaking of same to the required sizes may be used by the contractor for the works, provided the same meets the contract specifications and approved by the GE. The unused boulders, stones shall be removed by the contractor outside MOD land. Cost of all the above provisions shall be deemed to be included in contractor's quoted rates & no claims whatsoever shall be entertained on this account.
- 3.4 **FILLING IN TRENCHES, PLINTH AND UNDER FLOOR ETC. AND REMOVAL OF SPOIL & SURPLUS EARTH**
- 3.4.1 Filling excavated earth in foundation trenches, in plinth and under floors shall be carried out as per Paras 3.19.1 to 3.19.3 of MES Schedule Part-I. Earth obtained from excavation and not approved for filling or surplus to the requirement shall be removed to a distance as specified in Particular Specifications Clause 3.1 here in before, spread and leveled.
- 3.4.2 If any additional earth is required for filling it shall be brought of quality as approved by the GE from outside MD land and cost thereof shall be deemed to be included in the quoted lump sum against relevant items under Schedule 'A', **Section-I** However for pricing deviations with regards to the lead for bringing additional earth, it shall be priced based on 1,500 metre distance for all works included in Schedule 'A' **Section-I**, what so ever may be the actual distance.
- 3.4.3 All filling will be spread in layers not exceeding 25 cm thick. Each layer will be watered and well rammed. Thickness of filling shown on drawing is after consolidation.
- 3.4.4 **EARTH FILLING IN EMBANKMENT & TRAVERSES:** The earth used shall be reasonably cohesive, as approved by the GE and free from excessive quantity of rash & deleterious organic matters. Stone larger than 75mm dia shall be removed from earth used for forming embankments, Compaction of earth shall be done to maintain structural integrity and avoid erosion of embankment and traverses and all as specified in clause 3.22 of SSR, Part –I .
- 3.5 **HARD CORE:**Unless otherwise specified elsewhere or shown on drawings, hard core shall be of stones/boulders(broken to gauge) not exceeding 63 mm. Hard core shall be deposited, spread and leveled in layer not exceeding 15mm thick and watered, well rammed to a true surface and compacted. The consolidation thickness of the hard core specified or as indicated in the drawings, is the thickness after consolidation and where not specifically mentioned or shown in the drawings, it shall be considered 150mm consolidated thickness.
- 3.6 **BLANK**
- 3.7 **ANTITERMITE TREATMENT PRECONSTRUCTION SOIL TREATMENT IN FOUNDATION AND GROUND FLOORS**
- Buildings mentioned at Serial No. 13 of Sch 'A' Section I.
- 3.7.1 **CHEMICAL** Refer IS : 6313 (Part 2) 2013, Code of Particle for Anti-Termite Measures in Buildings. Following chemicals conforming to the relevant IS specification shall be applied uniformly at the prescribed rate in all stages of treatment:-
(a) Chloropyriophos 20 EC conforming to IS : 8944.
(b) Imidacloprid 30.50 SC conforming to IS 16131.
- 3.7.2 **Procurement** :The chemical shall be brought in original sealed containers & should be purchased from approved manufacturers or their authorized agents mentioned in **Appendix 'B'**. The contractor shall submit original purchase vouchers and test certificates of the chemical from manufacturers before incorporating the same in the work.
- 3.7.3 Anti-termite treatment shall be got done through approved specialist agency/applicators who is member of Indian Pest Control Association (IPCA / Pest Control Association of India (PCAI) holding valid license as per clause 13 of insecticides act 1968. Persons employed to do the anti-termite treatment in this work shall be qualified as per rule 10 of the rules framed under the inspection rule 1971. The specialist agency shall be any one from list attached in Appendix in Appx 'B' with prior approval of CWE.
- 3.7.4 Concentration of the chemical as emulsifiable/suspension concentration is indicated on the sealed containers. For obtaining specified concentration, chemical shall be diluted with water in the required quantity before it is used. Graduated containers shall be used for the dilution of the chemical.
- 3.7.5 Pre-constructional anti termite chemical treatment, which includes bottom and sides of foundation trenches/pits, filling in trenches/pits and below floors, junction of wall and floors, external perimeter of building(s), shall be carried out all as specified in Para 3.26 of MES Schedule, Part-I.
- 3.7.6 Barrier shall be complete and continuous under the whole of the building/structure to be protected. All foundations shall be fully surrounded and in close contact with the barrier of treated soil, on loose, sandy or porous soils, where loss of treated solution through piping or excessive percolation is likely to occur, preliminary moistening to fill the capillary spaces in soil shall be done. Vertical surface of the sub structure for each side of foundation means the footing and off sets of each course of brick work shall be measured of vertical surface of the sub-structure for each side of foundation. Similarly, in case of RCC footings of columns, the vertical stem and horizontal portion of off set of RCC sub-structure shall be measured for each side of foundation.

PARTICULAR SPECIFICATIONS (Contd/...)

3.7.7 Soil treatment shall start when the foundation trenches and pits are ready to take mass foundation concrete. Laying of foundation concrete shall start when the chemical emulsion has been absorbed by the soil and surface is quite dry. Treatment shall not be carried out when it is raining or when the soil is wet with rain or sub soil water. This applies also in the case of treatment to the filled earth surface within the plinth area before laying the sub-base for the floor.

3.7.8 Once formed, treated soil barriers shall not be disturbed. If the treated soil barriers are disturbed, immediate steps shall be taken to restore the continuity and completeness of the barrier system, without any extra cost to the Govt., what so ever maybe the cause.

3.8 **GUARANTEE AND DEFECT LIABILITY FOR ATT**

3.8.1 The defect liability period of anti-termite treatment shall be 10 years and the contractor shall be responsible to keep the entire buildings free from termite infestation for a period of 10 years after certified date of completion. The contractor shall obtain a similar guarantee from the specialist firm engaged by him for the purpose.

3.8.2 Security deposit for anti-termite treatment calculated as per the scales laid down by the MES for calculating individual security deposit as applicable on the date of receipt of tender on the amount of anti-termite treatment at contract rates priced as per condition 62 of IAFW-2249 for the buildings for which treatment has been specified in Schedule 'A' notes shall be held from the contractor's running payments and final bill during the guarantee period which shall be refunded to him after expiry of this period. The guarantee period shall be 10 years commencing from the certified date of completion. The security deposit shall be refunded to him after expiry of this period. Alternatively, the contractor may give a separate interest bearing FDR to GE valid for 10 years for this amount.

3.8.3 If at any time during the construction or prior to the expiry of said Guarantee period of 10 years, it is found that the buildings have been infested with termite, the contractor, on demand in writing from the GE, will forthwith undertake to carry out such treatment which may be necessary to render the buildings free from termite infestation at his own expense. The guarantee shall also be applicable to woodwork and joinery as specified here in after.

3.8.4 In the event of contractor's failure to comply with the GE's direction within the stipulated period, the work shall be got 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.

3.9 **PLASTER PLATE** : The contractor shall provide a plaster plate of size 1000 mm × 750 mm of suitable size at a place, as decided by the Engineer-in-Charge and approved by GE on the wall of each of the building. Date of expiry of guarantee shall be commence from the physical date of completion of the buildings as certified by GE. The plate shall be 15 mm thick in cement mortar (1:4) and engraved and painted black on it the following: -

(i) Contract No., name of contractor and date of completion of the work.

(ii) Antitermite treatment carried out during : (Month&Year) (ii) Cemical used :-

(iii) Agency who executed the work :-

(iv) Date of expiry of 10 years guarantee for anti-termite treatment (Pre-construction soil treatment in foundation and ground floors), anti-termite treatment to wood work and joinery.

(v) Date of expiry of Guarantee against leakage seepage of Water proofing treatment on RCC Roof slab & terraces and crumple joints.

3.9.1 The cost of plaster plates shall also be deemed to be included in the lump sum rates of buildings against Schedule 'A' Section-I.

4 **CEMENT CONCRETE**

4.1 **MATERIALS**

4.1.1 **CEMENT**: Refer Particular Specifications clause 2 and other sub clauses here-in-above.

4.1.2 Coarse and fine aggregate for cement concrete (PCC & RCC):- Refer Paras 4.4.1 to 4.4.7 of MES Schedule Part-I.

4.1.2.1 Coarse aggregate for lime concrete shall be broken bricks as per Paras 4.5, 4.5.1, 4.5.2 of MES Schedule Part-I. The fine aggregate shall be natural sand as for cement concrete.

PARTICULAR SPECIFICATIONS (Contd/...)

4.1.2.2 Grading of coarse aggregate (Broken/crushed stone) unless otherwise specified shall be as follows: -

(i)	For all reinforced/plain cement concrete of thickness up to 25mm or under	: 12.5mm graded
(ii)	For all reinforced cement concrete work over 25 mm thick	: 20 mm graded
(iii)	For plain cement concrete over 25 mm and under 75 mm thick.	: 20 mm graded
(iv)	-do- but 75 mm thick & over	: 40 mm graded

4.1.2.3 Grading of broken brick aggregate for lime concrete shall be as per Para 4.5.3 of MES Schedule, Part-I.

4.1.2.4 Grading of fine aggregate (sand) shall be as per Para 4.4.7(2) of MES Schedule Part-I for grading Zone-III. Coarse aggregate up to 20 mm shall be machine-crushed stone and aggregate of size 40 mm and above shall be manually broken or machine crushed at the option of contractor. Fine aggregate (sand) shall be obtained from natural source.

4.1.3 **WATER PROOFING COMPOUND:** Refer clause 4.8 of MES Schedule Part-I.

4.1.4 **WATER:** Refer clause 4.9, 4.9.2 of MES Schedule Part-I.

4.1.5 **WORKMANSHIP:**

4.1.6 **MIX OR GRADE OF CEMENT CONCRETE:** -Refer IS 456-2000 (fourth edition) amended up to date. Irrespective of what is mentioned in the drawings or in the particular specification in any specific location, mix of concrete in various locations shall be as under :-

(i)	Lean concrete in foundation of load bearing brick walls.	1:4:8 (Type-D-2) (Volumetric Mix)
(ii)	Lean concrete under non load bearing brick walls, RCC columns footings, Plinth Beams, Portal frames, dwarf walls, toe walls, steps, ramps and platforms.	1:4:8 (Type-D-2) (Volumetric Mix)
(iii)	PCC benching at junction of slab/parapet walls/ facia, PCC block for fixing hold fasts/ bolts, cills, straps, PCC padding & similar work.	1:3:6 (Type C-1) (Volumetric Mix)
(iv)	Plain cement concrete in situations other than covered by (i) to (iii) above unless otherwise mentioned in specific location in PS(Particular Specifications) or drawings.	1:2:4 (Type B-1) (Volumetric Mix)
(v)	RCC work in water retaining structures, Static water tanks and piles & pile cap.	Ready Mix Concrete (RMC) M-30 grade as per clause no 4.2.5.12 here in after if approved by the Accepting Officer
(vi)	RCC work in floor/roof slabs,floor/roof beams,column footing and plinth beams except precast concrete elements mentioned hereinbefore	Ready Mix Concrete (RMC) M-30 grade as per clause no 4.2.5.12 here in after if approved by the Accepting Officer
(vii)	All RCC work except covered by (v) & (vi) above	M-25 grade (Design Mix Concrete)

NOTE : Precast concrete elements as specified hereinbefore & PCC mix for flooring shall be as mentioned in PS hereinafter.

4.1.7 **WORKABILITY OF CONCRETE:** - Refer clause 7.1 of IS-456: 2000.

4.1.8 **MIXING OF CONCRETE:-** Refer paras 4.11.5 & 4.11.5.1 of MES Schedule Part I. Concrete for all RCC (except RMC subject to provisions given in clause 4.2.5.4 here in after) and PCC design mix shall be mixed in semi-automatic weigh batcher of capacity not less than **4 Cu. m/Hour**. The weigh batcher should have 03 bins, digital display, weighing gauge with weighing accuracy of one percent with print out facility for each batch.

PARTICULAR SPECIFICATIONS (Contd/...)**FORM WORK:**

- 4.2.1 Formwork shall comply with the requirement specified in para 11 of IS-456:2000 & IS 14687 used, deformed and dented steel sheets shall not be permitted for use as form work.
- 4.2.2 All formwork including plates and props shall be of Steel of adequate strength. Props shall be adjustable type, to avoid slant props. However, the form work to be used for surfaces specified in these specifications to be plastered shall be such that after application of the specified thickness, fair finished surface is achieved as specified herein. Wall thickness shall not be made use of as formwork. Wall shall be built after the columns are cast. In the event of deviation, rates in MES Schedule for clean sawn formwork will be applicable. In this connection also refer to para 7.15 of SSR Part I. In case of bad weather stripping time for form work as specified may be increased as directed by Engineer-in-charge without additional payment to contractor. Formwork shall be provided on soffit of plinth beams to achieve beam action and plinth beams shall not be directly laid on PCC where applicable.
- 4.2.3 The Contractor shall excavate for the RCC footing, walls to their exact size after accounting for formwork to sides. If the excavation is more than required size extra excavation shall be made good as mentioned in clause 3.13.4 and 3.15.5 of SSR Part I. However, form work shall be provided to vertical sides of column pedestals as necessary and as directed by Garrison Engineer. Slopped portion & RCC Column footing if any, under brick work shall be filled with PCC M15 Nominal mix using 40mm aggregate to maintain continuity and level of brick work and lump sum quoted by the Contractor shall be deemed to include for the same.
- 4.2.4 **CONCRETE SURFACING** Exposed surfaces of all RCC work such as soffit of roof/floor slab, sides & bottom of beams, lintels, seismic bands shelves & RCC railing /parapets etc unless otherwise specified herein after in particular specifications shall be provided with a coat of 5mm thick plaster in cement and sand mortar (1:3) finished even and smooth. In case this thickness of plaster exceeds 5mm at places due to local unevenness, no extra payment is admissible. term exposed surfaces does not include the surfaces hidden under earth filling etc, and in such cases irregularities, protruding form work marks shall be removed and air holes, if any, shall be stopped with cement and sand mortar (1:3). Cost of above provisions shall be deemed to be included in the Contractors quoted rates.
- 4.2.5 **READY MIX CONCRETE (RMC)**
- 4.2.5.1 RMC as specified here-in-after shall be provided at the locations mentioned in PS clause 4.1.6 here- in-before. The grade of RMC shall be as specified here-in-before and contractor shall submit the design of RMC mix as per IS-4926 of 2003 fulfilling the requirement / criteria as mentioned in **Appendix 'J'** of these tender documents.
- 4.2.5.2 The deviations related to the RMC, shall be priced at the rates given in MES schedule duly adjusted with the percentage specified for pricing of deviations against Schedule 'A' Section-I contractor's quoted lump sum/ derived percentage there from against the relevant sections/ part of schedule'A' as applicable for relevant grade of design mix concrete corresponding to grade of RMC irrespective of the total quantity of cementitious materials determined by way of design mix. **Further it shall be noted that no price adjustment shall be made if the cementitious contents works out to be more (based on IS: 4926 of 2003) than given in Appendix 'J'.**
- 4.2.5.3 The concrete shall be transported in concrete transit agitators conforming to IS-5892.
- 4.2.5.4 The concrete shall be delivered and placed by pumping using BOOMER. The decision as to whether the RMC can be placed by pumping or not shall be decided by GE whose decision shall be final and binding. The tenderer will have no claim any extra on this account.
- 4.2.5.5 The pump and pumping arrangement shall be inspected and approved by GE, while approving the RMC manufacturer.
- 4.2.5.6 No water / admixture shall be allowed after initial mixing of concrete at the plant. The use of PPC/ Fly ash / mineral based admixture in RMC shall not be permitted.
- 4.2.5.7 Slump test shall be carried out at site by the department in the presence of contractor and representative of RMC manufacturer. The concrete shall be placed in position within the designed initial setting time and at the end of initial setting time, the remaining concrete shall be rejected.
- 4.2.5.8 In addition to the tests carried out by RMC manufacturer at the plant site, sampling and testing of concrete shall be carried out at the site before delivery as per IS-456-2000 by the department along with the representative of the contractor and RMC manufacturer. However, the cost of testing shall be borne by the contractor. The concrete, which does not meet the requirement of acceptance criteria as per IS-456-2000 shall be rejected and the contractor shall make good the same at his risk and cost.
- 4.2.5.8 The records indicating following details duly signed by the competent representative of RMC manufacturer / contractor and Engineer-in-Charge shall be maintained :-
 (a) Date of delivery
 (b) Time of mixing
 (c) Time of delivery at site.
 Quantity and Grade of RMC.

PARTICULAR SPECIFICATIONS (Contd/...)

- 4.2.5.9 The contractor shall enter into an agreement with the approved RMC manufacturer to ensure compliance of above aspects. The overall liability to the department, for the RMC supplied shall rest with the contractor only. The department shall not be liable for any breakdown or problems with the RMC manufacturer.
- 4.2.5.10 The department will recommend to the traffic Police to issue entry permits for the entry of vehicles in to the working area. However, absence of such permits will not be treated as reason for delay in completion of work.
- 4.2.5.11 **MIXING, SUPPLY, TRANSPORTATION, PLACING AND CURING:** Refer relevant clauses of IS: 4926 of 2003.
- 4.2.5.12 The contractor shall obtain the RMC directly from any of the manufacturer as mentioned in Appendix 'B' here-in-after. Alternately, in case the tenderer desires, the tenderer shall be permitted by the Accepting Officer to prepare the Ready Mix Concrete at the site of the work provided the tenderer employs qualified man power, installs requisite batching plant, crane, transit mixers and other T & P etc to prepare the Ready Mix Concrete as specified here-in-after to the entire satisfaction of the Accepting Officer. The batching plant shall be moveable semi-automatic weigh batcher of capacity not less than 4 Cum/hour. The batching plant shall have 03 bins, digital display, weighing gauge with accuracy of one percent with print out facility for each batch. The plant and T & P shall be removed by the contractor from the site only after completion of entire RCC works. However, the tenderer shall be permitted to remove the plant/components of the plant for maintenance & repairs, if required, with prior permission of the GE during currency of the work and the same shall be again installed after repairs/maintenance. It is also clarified that to accord of permission to the contractor for installation of the plant etc for preparation of RMC at site is solely prerogative of the Accepting Officer and no claim what so ever shall be entertained at any stage. In case of dispute with regard to the interpretation of the above provisions, the decision of the Accepting Officer shall be final & binding.
- 4.2.5.13 The contractor shall get the design mix carried out from any of the testing agency mentioned for 'C' level tests as mentioned in Special Condition No. 25.2.3 hereinbefore and the same shall be got approved from the GE before using the same in the works and cost thereof shall be deemed to be included in the lump sum quoted by the contractor for the buildings under Schedule 'A' Section-I and in other relevant Schedules.
- 4.2.5.14 The contractor shall be required to plan procurement of cement & other constituents in such a manner that the design mix can be approved within 45 days from the date of commencement of work.
- 4.2.6 **IMPORTANT REQUIREMENTS OF DESIGN MIX CONCRETE**
- 4.2.6.1 Contractor shall provide all facilities such as materials and labour, tools/ equipment's for moulding, casting and conveyance of test cubes of concrete of grade M-15 (Design Mix), M-20 (Design Mix), M- 25 (Design Mix) and M-30 (Design Mix) for testing in site lab as per details given in Appendix 'D'. Testing charges shall be recovered as per details given in Appendix 'D' and as clarified in Special Conditions.
- 4.2.6.2 Design mix shall be based on parameters given in Appendix 'H' which are based on IS-456: 2000. The Design Mix concrete as well as deviations related to the Design Mix concrete shall be priced on the rates given in MES Schedule Part-II, irrespective of the total quantity of cementitious materials determined by way of Design Mix. Further it shall be noted that no price adjustment shall be made if the cementitious contents works out to more than given in Appendix 'H'.
- NOTE:** For pricing the deviations related to the design mix concrete, the percentage specified for pricing of deviations or contractor's quoted percentage against the relevant section/part of Schedule 'A' (as applicable) shall also be applicable all as per the provisions contained in condition 62 of IAFW-2249.
- 4.2.6.3 The contractor shall get the design mix carried out from CTL/ IIT/ NIT/ Govt Engineering college. The design mix as carried out above shall be got approved from the GE before using the same in the works and cost thereof shall be deemed to be included in the lump sum rates quoted by the contractor for the buildings under Schedule 'A' Section-I and in other relevant Schedules.
- 4.2.6.4 The contractor shall be required to plan procurement of cement & other constituents in such a manner that the design mix can be approved within 45 days from the date of commencement of work.
- NOTE:*** At the places of congestion of the reinforcement and where directed by the GE, the contractor shall use suitable plasticizers or 12.5 mm graded stone aggregates at his option, cost of use of plasticizers and/or carrying out the additional design mix due to use of 12.5 mm graded stone aggregates shall be deemed to be included in the quoted rate of the contractor. The plasticizers shall be of make as directed by GE. For pricing of deviations, the rates given for the respective grade of design mix concrete in MES schedule shall be followed.

PARTICULAR SPECIFICATIONS (Contd/...)

- 4.2.6.5 TRANSPORTATION OF CONCRETE: Refer Para 4.11.9 of MES Schedule, Part-I.
- 4.2.6.6 PLACING OF CONCRETE: - Refer Para 4.11.10 to 4.11.10.3 of SSR, Part-I.
- 4.2.6.7 COMPACTION OF CONCRETE: - Refer to Para 4.11.11 & 4.11.11.1 of MES Schedule Part-I.
- 4.2.6.8 Consolidation/compaction of concrete shall be done with approved mechanical vibrators except in locations where rolling and tamping is permitted by Engineer-in-charge.
- 4.2.6.9 CURING OF CONCRETE: Refer Para 4.11.13 of MES Schedule, Part-I.
- 4.2.6.10 PROTECTION, INSPECTION & FINISHING TO EXPOSED SURFACE OF CONCRETE: - Refer
- 4.2.6.11 Para 4.11.14, 4.11.15 & 4.11.16 of MES Schedule Part-I.
- 4.2.6.12 Unless otherwise specified, exposed soffits of RCC floors/RCC slabs, soffits and sides of slab/beam, parapet and staircase, soffits and sides of shelves, RCC fascia, RCC parapet, chajja and cantilevers etc. which are not continuous with adjoining plastered surface will be finished with a thin layer of 5 mm thick plaster in cement mortar (1:3) and finished fair and even without using extra cement after removal of form work.
- 4.2.6.13 Unless otherwise specified, exposed surface of columns, beams, lintels, bands and similar items which are continuous with plastered surfaces of walls shall be plastered in the manner as that for adjoining walls plastering.
- 4.2.6.14 Unless otherwise specified, exposed surface of columns, beams, lintels, bands and similar items which are not covered under clause 4.2.11.1 & 4.2.11.2 above shall be finished with a thin layer of 5 mm thick plaster in cement mortar (1:3) and finished fair and even without using extra cement after removal of form work.
- 4.2.6.15 Exposed surface of concrete shall be roughened with wire brushes and hacked cut closely for making key for plaster before the application as described above.
- 4.2.6.16 If thickness of plaster in cement mortar (1:3) as specified above is required to be increased in excess of 5 mm to achieve fair and even surfaces, it shall be provided by the contractor without any extra cost to Government and the same shall be deemed to have been included in the lump sum amount quoted by the contractor against various sections of Schedule 'A'.
- 4.2.6.17 SAMPLING AND STRENGTH TEST: Refer clause 15 on page 29 of IS:456-2000. Tests on cubes for 'Compressive Strength Test' at 7 days shall also be carried out. In addition, three cubes from each sample shall be cast & kept as reserve for future record / use.
- 4.2.6.18 ACCEPTANCE CRITERIA: - Refer clause 16 on page 29 of IS: 456-2000.
- 4.2.6.19 INSPECTION AND TESTING OF STRUCTURES: - Refer Clause 17 on page 16 & 19 of IS:456-2000.
- 4.2.6.20 If test results shows that concrete is of grade lower than specified grade and department decides to accept the same due to any reasons, the decision of Accepting Officer in this respect shall be final and binding, such concrete shall be classified and price adjustment shall be made as given in succeeding paragraphs.
- 4.2.6.21 The grade of concrete shall be classified as M-10 or M-15 or M-20 or M-25 according to immediate next below grade e.g. if test result shows the grade of concrete as M-18 instead of M-20 it shall be treated as concrete of grade M-15 and if test result shows the grade of concrete as M-22 instead of M-25, it shall be treated as concrete of grade M-20 and if test result shows the grade of concrete as M-28 instead of M-30, it shall be treated as concrete of grade M-25.
- 4.2.6.22 When such below strength concrete is accepted, adjustment in price shall be made by pricing such concrete for classified grade as mentioned above and as given below:-
- 4.2.6.23 "Grade of concrete M-30, on testing if shows results of M-28, the same shall be classified as concrete of grade M-25 and if grade of concrete M-25 on testing if shows results of M-22, the same shall be classified as concrete of grade M-20 and concrete of grade M-20 on testing if shows results of M-18 to be classified as concrete of grade M-15 i.e. PCC (1:2:4) and grade of concrete M-15, if shows result of M-12, then the same shall be classified as concrete of M-10, i.e. PCC (1:3:6) and so on."
- 4.2.6.24 CONCRETE COVER TO REINFORCEMENT: - Concrete cover to reinforcement shall be provided as per IS-456-2000 unless otherwise mentioned on drawings and elsewhere in tender documents. BED BLOCKS
- 4.2.6.25 Provisions contained in clause 5.23.1 of MES Schedule Part-I shall not be applicable unless specially required due to site condition to make up levels etc. for which no price adjustment shall be made. Bed blocks shall be resting over bearing plaster specified here in after

PARTICULAR SPECIFICATIONS (Contd/...)

- 4.2.6.26
- All RCC beams and lintel beams resting on masonry work shall be provided with PCC bed blocks, set in cement mortar (1:6). Bed block shall be twice the width of beams in length, covering the entire thickness of wall and of thickness 150-mm, if, otherwise not indicated and shown on drawings. Lintels, seismic bands running over the masonry work shall not be provided with bed blocks.
- 4.2.6.27
- PRECAST CONCRETE ARTICLES: - Cement concrete lintels with or without integrally cast chajjas up to 1.5 metre clear span, shelves, bed blocks/plates, cover slabs, PCC cills, fencing posts, fins and jali and the like may either be pre-cast or cast in situ at the contractor's option unless otherwise shown on drawings. If pre-cast these shall be set in cement mortar (1:3). In case of deviation involving these items of work, it shall be done on the basis of cast-in-situ work. Pre-casting shall be done at site.
- 4.2.6.28
- RCC CHAJJAS, RCC FINs AND RCC/PCC CILL: RCC chajjas, Cills and fins shall be provided as per details shown on drawing. Over cills, Baroda green marble stone shall be provided, with bullnosing, irrespective of what is shown in drawings.
- 4.2.6.29
- THROATING WEATHERING: Throating of projection of RCC/PCC beyond external faces of the walls and where chajjas are not provided with down ward fascia shall be provided while casting the concrete by planting fillet/bar of 12 mm diameter in the form work and of smooth finish. The surface of throating shall be of smooth finish without any plaster.
- 4.2.6.30
- RCC SHELVES
- 4.2.6.31
- The finished thickness of RCC shelves and platforms where shown of RCC in drawings shall be as shown on drawings. The edge of RCC shelves shall be bull nosed to a radius of 5 mm. In case the thickness of shelves has not been indicated on drawings it shall be as under:-

(a)	Shelves of wardrobes/cupboards/cabinets in living accommodation etc.	- 40 mm
(b)	Shelves in garages/other situations except in situation in para (a) above	- 75 mm

- 4.2.7
- BEARING OF RCC STRUCTURAL MEMBERS**
- 4.2.7.1
- Bearing of all roof/floor slabs and lintels on masonry walls shall comprise of 20 mm thick bearing plaster in cement mortar (1:4) finished even and smooth with one coat of white wash applied and two layers of laminated water proofing building paper Type-I conforming to IS:1168 weighing not less than 100 gm/Sq. m each layer, laid over it. However in case floor/roof slab rests on RCC beams/bands, this provision does not apply.
- 4.2.7.2
- The bearing of lintels shall comprise of a full brick with vertical joints in brick work staggered.
- 4.2.7.3
- No treatment shall be provided under bearing of RCC bands.
- 4.2.7.4
- CONCRETE PADDING: - Where the required height of walls, opening is not obtained with adequate size of bricks the same shall be obtained by providing PCC as mentioned in PS clause 4.2.1(iii).
- 4.2.7.5
- DAMP PROOF COURSE: - Damp proof course shall be 50 mm thick PCC (1:2:4), type B-1 over 85/25 grade bitumen layer @ 1.50 kg/ Sq m over 200 micron thick polythene film , provided on full width of all walls/brick pillars for their full length and width at the ground floor where there is no basement underneath and at the basement floor. Damp proof course shall also be provided under openings/door opening at depressed level including vertical faces of depressed level and including vertical faces of depressed portion of opening as per requirement of clause 5.8.1.3 of IS-2212. Water proofing compound shall be mixed with PCC as per manufacturer's instructions. DPC shall however NOT be provided over dwarf walls/toe walls, RCC columns & RCC plinth beams.
- 4.2.7.6
- Damp proof course shall not be provided for RCC framed construction where the top of plinth beams/ plinth band is at floor level.
- 4.2.7.7
- LIME CONCRETE
- 4.2.7.8
- LIME:- Refer para 4.2,4.2.1 to 4.2.4 of MES Schedule Part-I. Eminently factory made hydraulic lime class 'A' conforming to IS: 712 shall be used for lime concrete.
- 4.2.7.9
- LIME CONCRETE:- Surrounds of Squat pattern WCs shall be of lime concrete with lime mortar 1:2 mix using 40 mm graded coarse aggregate or well burnt brick aggregate broken to 40 mm gauge and as specified in paras 4.10.1,4.10.2 to 4.10.4 of MES Schedule Part I. The contractor may use quick lime or factory made dry hydrated lime powder at his option without any adjustment of price.
- 4.2.7.10
- EFFLORESCENCE TREATMENT TO WALLS:- Efflorescence treatment shall be carried out all as per drawing No TD-172(C) sheet No. 1R3/1. Instead of bitumen coating two coats of 'TIKI BOND SPL' of Tiki Tar Industries @ 1.50 kg/Sq. m per coat on Tiki Primer-S primer @ 0.3kg/Sq.m or two coats of 'wall mastic-352' of Shalimar Co. @ 0.50 kg/Sq.m per coat (second coat shall be applied after drying of first coat) shall be applied on the plastered surface and as per manufacturer's instructions. Water proofing compound shall be mixed in external plaster as per particular specifications.
- 4.2.8
- RCC JALI**:- RCC Jali where shown on drawings shall be provided as details shown on drgs.

PARTICULAR SPECIFICATIONS (Contd/...)

- 4.3 **BLANK**
- 4.4 **CRUMPLE JOINT:**
- 4.4.1 Wherever shown on drawings, crumple joint shall be provided all as shown in TD drawing.
4. **BRICK WORK**
- 4.1 **BURNT CLAY BRICKS:** - Refer paras 5.6.1 to 5.6.8 of MES Schedule Part-I.
- 4.1.1 **CLASS DESIGNATION:** - unless specified otherwise elsewhere in the tender documents and indicated on the drawings, burnt clay bricks shall be of non modular size (Sub class 'B', old size bricks) of class designation 10 all as per IS-1077-1992 (amended upto date).
- 4.1.2 **GENERAL QUALITY:** - Bricks shall be free from cracks, flaws and nodules of free lime, uniform in colour, smooth rectangular faces with sharp corners.
- 4.1.3 **DIMENSIONS AND TOLERANCE:** -Irrespective of whatever mentioned in MES Schedule Part-I, dimensions of bricks shall be 230 mm x 110 mm x 70 mm.The permissible tolerance on the dimensions of the bricks shall be as per IS: 1077-1992.
- 4.1.4 **PHYSICAL REQUIREMENTS:** -
- 4.1.4.1 **COMPRESSIVE STRENGTH:** - Minimum compressive strength of any one brick shall not be less than 100 kg /Sq. cm for bricks of class designation 10 & not less than 150 Kg/sqcm for bricks of class designation 15.
- 4.1.4.2 **WATER ABSORPTION:** - Not more than 20% by weight for bricks upto class designation 12.5 & not more than 15% for higher class bricks.
- 4.1.4.3 **EFFLORESCENCE:** - Slight ("The common burnt clay building bricks shall have efflorescence not more than slight i.e. not more than 10% of the exposed area of the brick is covered with a thin deposit of salts when tested as per IS -3495 (Part-3) latest version.")
- 4.1.5 **TESTING:** - Testing of bricks shall be carried out as per IS-3495-1992.
- 4.2 **PULVERIZED FUEL ASH-LIME BRICKS:**
- 4.2.1 **GENERAL QUALITY:** - Pulverized fuel ash-lime bricks shall be of class designation 10 all as per IS- 12894-2002 (amended upto date). Bricks shall be sound, compact, uniform in shape, free from visible cracks, warpage and organic matter. The bricks shall have smooth rectangular faces with sharp corners and shall be uniform in shape and colour.Pulverized fly ash used in the process making bricks should confirm to IS-15648-2006.
- 4.2.2 **DIMENSIONS AND TOLERANCE:** - Dimensions of bricks shall be non modular (230 mm x 110 mm x 70 mm) as specified in clause 5.1.2of IS-12894-2002. The tolerance on dimension will be taken as per clause 5.2 of IS-12894:2002.
- 4.2.3 **PHYSICAL REQUIREMENTS:** -
- 4.2.3.1 **COMPRESSIVE STRENGTH:** - With 28 days average wet compressive strength not less than 100 kg/Sq. cm when tested as per procedure laid down in IS-3495 (Part-I).
- 4.2.3.2 **WATER ABSORPTION:** - Not more than 15% by mass when tested as per procedure laid down in IS-3495 (Part-II) after immersion in cold water for 24 hours.
- 4.2.3.3 **EFFLORESCENCE:** - All as specified in PS clause 5.1.4.3 here-in-before.
- 4.2.4 **PROCUREMENT:** Bricks shall be procured from any of manufacturers enlisted as a member of ALL INDIA ASSOCIATION OF FLY ASH PRODUCTS MANUFACTURERS (AFAPM) and as approved by the GE.
- 4.2.5 **TESTING:-** Testing of bricks shall be carried out as per IS-3495 of 1992.Frequency of tests as given for burnt clay bricks in Appendix 'D' to the tender documents shall be applicable for testing of Pulverized fuel ash-lime bricks.

PARTICULAR SPECIFICATIONS (Contd/...)

4.3 **CEMENT:** Refer clause 2 of particular specifications and other sub clauses here in before.

4.4 **SAND:** - Sand for mortar shall be as specified in clause 5.4 of MES Schedule.

4.5 **FIRE BRICKS AND FIRE CLAY MORTAR:** - Refer Para 5.9, 5.9.1 and 5.10 of MES Schedule, Part-I.

4.6 **BRICK WORK WORKMANSHIP**

4.6.1 **MASONARY WORK WITH PULVERIZED FUEL ASH-LIME BRICKS:** Irrespective of whatever has been indicated in the drawings, brickwork upto window cill level of ground floor of all buildings mentioned in Schedule ‘A’ Section-I as applicable shall be built with Pulverized fuel ash-lime bricks in cement mortar as under:

(i)	Brick work in half brick thick walls, bricks laid on edge walls, independent brick pillars, Foundation for half brick thick or bricks laid on edge walls or independent brick pillars, reinforced brickwork, Static water tanks.	: Cement mortar(1:4)
(ii)	Brick Jali work	: Cement mortar(1:3)
(iii)	Brick work in all other situations including foundation	: Cement mortar(1:6)

NOTE:- In case of deviation, brickwork with Pulverized fuel ash-lime bricks shall be priced at the rates given in MES Schedule of Rates for fly ash old size bricks having class designation 75 adjusted with contractor’s quoted/derived percentage as applicable.

4.6.2 **MASONARY WORK WITH BURNT CLAY BRICKS** :- Brickwork in various situation other than mentioned in PS clause 5.6.1 here-in-before and unless otherwise specified here-in-after specifically shall be built with burnt clay bricks in cement mortar as under:

(i)	Brick work in half brick thick walls, bricks laid on edge walls, independent brick pillars, Foundation for half brick thick or bricks laid on edge walls or independent brick pillars, reinforced brickwork, Static water tanks.	: Cement mortar(1:4)
(ii)	Brick Jali work	:Cement mortar(1:3)
(iii)	Brick work in all other situations including foundation	:Cement mortar(1:6)

NOTE:- In case of deviation, brickwork with Burnt Clay Bricks Class designation Class 15 shall be priced at the rates given in MES Schedule of Rates for sub class ‘B’ old size bricks having class designation 75kg/Sqcm with addition of Rs. 449.09, adjusted with contractor’s quoted/derived percentage as applicable.

- 4.6.3 Half brick thick wall of height more than 180 cm shall be reinforced with Flat iron 25 $\times$ 3 mm horizontally at every fourth course starting from floor level & anchored in walls/ columns at junction. The anchorage length provided shall not be less than 100 mm.
- 4.6.4 Width of RCC lintels, beams, cills, columns and the like coming in conjunction with Masonary walls/pillars shall be kept to the actual width of Masonary work of that place unless offsets have been specifically shown in which case the width as shown on drawings shall be maintained.
- 4.6.5 Centerline dimensions of rooms, verandahs etc. shown in drawings shall be maintained. Internal and overall dimensions if at variance from whatever shown in drawings shall be deemed to have been amended accordingly. The dimensions for various heights shall be maintained as shown on drawings.
- 4.6.6 Mortar bed joints shall be such that four course of masonry work and three joints taken consecutively shall measure 3 cm to 4 cm in addition to the combined height of masonry themselves. The provision regarding above made in Para 5.27 of MES Schedule Part-I shall be deemed to be modified accordingly and no price adjustment shall be done on this account.
- 4.6.7 In framed construction masonry, panel walls not supported on plinth/grid beams shall have foundation as shown on drawings. Half masonry walls(115mm thick) up to 2100 mm high shall be erected directly supported on sub base of floors. Half masonry walls (115mm thick) above 2100 mm high and dwarf & toe walls shall be provided with foundations as shown on drawings/ as directed by GE

PARTICULAR SPECIFICATIONS (Contd/...)

- 5.7.2 **JUNCTION BETWEEN BRICK WALL AND RCC WALLS/COLUMNS:**-Flat iron 40mm $\varnothing$ 3mm dowel bar as per Drawing No.TD-263/2021 sheet 1/2 & 2/2 shall be provided at every fourth course of brick work starting from the floor level at the junction between brick wall and RCC wall/columns all as shown on drawings. The lean cement mortar shall be of ratio (1:3) where the drawing indicates RCC walls. The arrangements shall be applicable for RCC columns as well.
- 5.8 **BRICK PADDING:** - The brick padding shall be done with cement mortar 1:4 in the location shown on drawings.
- 5.9 **OPENING FOR EXHAUST FAN:** - Opening for exhaust fan shall be provided as per details shown on electrical drawings.
- 5.10 **EXPANSION/ CRUMPLE JOINTS:** Wherever shown on drawings, expansion/ crumple joint shall be provided all as shown in drawing No. TD-240(C).
- 5.10.1 **JOINT FILLER:** Unless otherwise indicated on the drawings, joint filler shall be BPG-700 or equivalent as approved by the GE. Filler shall be applied after applying one coat of primer-P @ 10 gm/ Sq. m or equivalent as approved by the GE.
- 5.10.2 **JOINT SEALER:** Unless otherwise indicated on the drawings, joint sealer shall be Crack-Seal- RTV(A) or equivalent as approved by the GE.
- 5.10.3 **METAL CRADLE:** Unless otherwise indicated on the drawings, galvanizing (Zinc coating) of metal cradle shall be 120 gm/Sq. m.
- 5.10.4 **STAINLESS STEEL SHEET COVER:** Irrespective of whatsoever is shown on drawings, stainless steel sheet shall be provided to cover the expansion/ crumple joint. Stainless steel sheet shall be 250 mm wide and not less than 1mm thick.
- 5.1 **STONE MASONRY MATERIAL:**
- 5.1.1 **CEMENT:** Refer clause 2 of particular specifications and other sub clauses here in before.
- 5.1.2 **SAND:** - Sand for mortar shall be as specified in clause 5.4 of MES Schedule.
- 5.1.3 **STONE:** - Refer to Paras 6.2 to 6.6.12 of MES Schedule, Part-I.
- 5.2 **WORKMANSHIP:**
- 5.2.1 **GENERAL:** Refer to Paras 6.8 of MES Schedule, Part-I.
- 5.2.2 **STONE MASONRY CONSTRUCTION:** Refer to Para 6.10 of MES Schedule, Part-I.
6. **WOOD WORK (CARPENTER WORK)**
- 6.1 **GENERAL:**
- 6.1.1 **TIMBER AND DEFECTS IN TIMBER:** - Refer to Paras 7.3, 7.4 & 7.5 of MES Schedule, Part-I.
- 6.1.2 **SEASONING AND MOISTURE CONTENTS:** - Refer to Paras 7.6, & 7.7 of MES Schedule, Part-I.
- 6.1.3 **SPECIES OF TIMBER:**- Wherever species of timber are not mentioned in drawings or in Particular Specifications, it shall be considered to be second Class hard wood (Except Mango).
NOTE: Contractor may use first class hard wood (Shisham) in lieu of second class hard wood for woodwork and joinery at his option without any extra cost to the Govt. For pricing of the deviations, the "Shisham wood" shall be considered as second class hard wood.
- 6.1.4 Tolerance in the dimensions shown on drawings for the wrought faces of carpenter's work, joinery etc. shall be permissible as specified in MES Schedule. No tolerance on factory made shutter thickness would be admissible.
- 6.1.5 Unless otherwise specified here in after all woodwork shall be wrought except surfaces of timber in contact with or buried in brick work/concrete/plaster.
- 6.1.6 Counter sunk holes for bolts and the like on wrought faces shall be plugged with tightly fitting plugs and planned/finished to match with surrounding surfaces.
- Use of nails in joinery and other timber built in items, is prohibited. Wood screws of appropriate sizes shall be used.

PARTICULAR SPECIFICATIONS (Contd/...)

7. JOINERY

7.1 WOODEN OR WOOD BASED SHUTTERS

- 7.1.1 **GENERALLY:** Refer to Para 8.20 of MES Schedule Part-I. Shutters shall be hammer marked as specified in IS and of approved make as specified. Shutter shall be procured from factory without any primer or painting coat or polishing. Independent tests on species/class of wood and moisture content shall be carried out as per IS when specifically ordered by the GE.
- 7.1.2 **FLUSH DOOR SHUTTER:** Refer to Para 8.25 & 8.26 of MES Schedule Part-I. All flush shutters for doors shall be factory made, solid core type with block board core and plywood face panels, commercial type on both sides, conforming to IS:2202 (Part-I) -1999. For the purpose of pricing of deviations, if any, the rates given in MES Schedule for flush door shutters subjected to the percentage as per condition 62 of IAFW-2249 shall be applicable. The thickness of shutter, if not indicated in drgs, the same shall be 35mm thick. These shall be of make manufacturer mentioned in Appx 'C' and shall be fixed by approved manufacturer.
- 8.1.4 **WIRE GAUZED/GLAZED DOOR SHUTTER:** Refer to Para 8.21(8.21.1 to 8.21.7) of MES Schedule Part-I. All wooden glazed/wire gauzed shutters for doors shall be 35 mm thick factory made conforming to IS:1003 (Part-I) manufactured from well selected kiln seasoned chemically treated for anti-termite second class hard wood (except Mango). These shall be of make/manufacturer mentioned in **Appendix 'C'**.

NOTES:

1. *For the purpose of pricing of deviation order, the Shisham wood shall be taken as 2nd class hard wood.*
2. *Rates given in MES Schedule for factory made shutters are deemed to include the cost of anti- termite chemical treatment of the timber.*
3. *Anti-termite preservative treatment to wood work before painting, all natural timber surfaces except ply/particle board and factory made paneled/glazed/gauzed shutter which shall be internally treated in factory, shall be treated with two coats of any of the approved chemical such as modified hot and cold treatment with copper chrome arsenic or with acid cupric chromate composition with minimum quantity of chemical impregnated per cubic metre of timber not less than 4 kg as per IS:401 or ASCU etc. as directed by GE for protection against termite. The quantity and application of chemicals shall be as per manufacturer's instructions. Cost of anti-termite treatment to wood work is included in the cost of building work under Schedule 'A'. The rate given in MES Schedule for items of woodwork and joinery shall be deemed to have included the above treatment. Woodwork shall be painted or polished as specified after second coat of anti-termite has completely dried.*

- 7.2 **PVC FLUSH DOOR SHUTTER WITH FRAME:** - Wherever shown in drawing or not 30mm thick PVC flush door shutter made by sticking 2 PVC sheets of 5mm thickness using PVC solvent with frame shall be provided in all toilets. PVC door shutters shall be fabricated by the authorized fabricators nominated by manufacturers mentioned in **Appendix 'C'** and shall be got fixed by approved manufacturer.

8. BUILDERS HARDWARE

- 9.1.1 **ITEMS AND QUANTITIES:** - Hardware fittings shall be provided according to scales indicated on the schedule of iron mongry/fittings on the relevant drawings and in conformity with the note mentioned on a particular drawing.
- 9.1.2 **SIZES:** - In case the size of particular fitting is not given in the drawing, it shall be of size as directed by the GE.
- 9.1.3 All articles of builder's hardware shall bear ISI marking. In case any item/fittings with ISI mark is not manufactured, then it shall conform to the relevant IS specifications and the specifications given in MES Schedule for the relevant item.
- 9.1.3 All articles of builder's hardware shall bear ISI marking. In case any item/fittings with ISI mark is not manufactured, then it shall conform to the relevant IS specifications and the specifications given in MES Schedule for the relevant item.
- 9.1.4 Screws used for fixing items of builder's hardware shall be as specified in clause 9.2.6 of MES Schedule Part-I.
- 9.1.5 **ARTICLES:** - All hardware fittings/iron mongary shall be made of aluminium unless specifically mentioned otherwise here-in-after

PARTICULAR SPECIFICATIONS (Contd/...)

- 9.2.1 **HINGES**
- 9.2.1.1 **BUTT HINGES** :- Butt hinges shall be of cold rolled mild steel of medium weight, all as specified in Para 9.7.2 of MES Schedule, Part-I.
- 9.2.1.2 **BUTT HINGES FOR PVC SHUTTERS**:- Butt hinges for PVC shutter shall be as per manufacturer’s instructions.
- 9.2.1.3 **CONTINUOUS (PIANO) HINGES**:- Shutters of wardrobes/cupboards and built-in kitchen cabinet/hot cases/meter and switch boxes/ toilet cupboards etc shall be fixed with continuous piano hinges of mild steel bright polished chromium plated all as specified in clause 9.7.6 of MES Schedule.
- 9.2.2 **HANDLES AND KNOBS**
- 9.2.2.1 **HANDLES**:- Aluminium handle shall be of anodized fabricated handles all as specified in clause 9.11 of MES Schedule. Where rim/mortice locks or knobs are shown on drawings, handles shall not be provided.
- 9.2.2.2 **KNOB**:- Shutters and drawers of small sized built in cabinets/meter and switch boxes and built in furniture dressing tables etc as shown on drawings shall be provided with aluminium anodized knobs of 40 mm dia.
- 9.2.3 **LOCKS AND BOLTS**
- 9.2.3.1 **MORTICE LOCKS (FOR CUP BOARDS, DRAWERS, CABINETS ETC.):** - Refer clause 9.9.4 of MES Schedule. Where indicated on drawings the mortice locks for Cup boards and drawers shall be of brass and of make mentioned in Appendix ‘B’. In case size of lock and no. of livers not shown on drawing it shall be 50 mm size and of 4 liver.
- 9.2.3.2 **TOWER BOLTS**:- Tower bolts shall be of Aluminium anodized (extruded section) conforming to specifications given in clauses 9.3.1 and 9.3.3 of MES Schedule.
- 9.2.3.3 **HASP AND STAPLES**:- Hasp and staples, shall be safety type, made of aluminium alloy, anodized all as per clause 9.10 of MES Schedule.
- 9.2.3.4 **SLIDING DOOR BOLTS**:- Sliding door bolt shall be aluminium anodized of size 300 mm long for double shutter and 250mm long for single shutter.
- 9.2.3.5 **LOCKING BOLTS**:- Locking bolts shall be of aluminium anodized.
- 9.2.3.6 **BALL CATCH SPRINGS**:- Shutters of all built in furniture such as dressing tables/toilet cupboards, hot cases and meat cases etc shall be provided with ball catches made of brass and polished bright all as specified in clause 9.14 of MES Schedule Part-I.
- 9.2.4 **DOOR SPRINGS**
- 9.2.4.1 **DOOR SPRING HELICAL TYPE**:- All wire gauzed shutters, shall be provided with door spring made of mild steel all as specified. Where rat tail spring hinges have been shown in drawings, the same shall be amended to read as Door Springs Helical.
- 9.2.4.2 **DOUBLE ACTION SPRING HINGES**:- All swing door shutters shall be provided with double action spring hinges of mild steel all as specified in clause 9.7.7 of MES Schedule and shall be of minimum size 125 mm.
- 9.3 **MISCELLANEOUS HARDWARE FITTINGS/FIXURES**
- 9.3.1 **TOWEL RAILS**:- Towel rails shall be brass chromium plated with brackets and sockets ends and shall be fixed to plugs in wall using chromium plated screws. Unless otherwise mentioned on drawings, the length of towel rails shall be 600 mm.
- 9.3.2 **FINGER PLATES**:- Finger plates shall be transparent plastic sheet 1mm thick 200 mm long and 80 mm wide and fixed with brass screws and cup washers. Whether shown on drawings or not all-swing door shutters shall have finger plate on either side.
- 9.3.3 **WIRE CLOTH: - Irrespective of whatever is shown on the drawings, Wire cloth or mesh for windows,** vents and door shutters shall be stainless steel having 0.36 mm nominal dia of wire and average width of aperture 1.40 mm, suitable for mosquito proofing and regularly woven with a number of equally spaced parallel wires in both warp and weft directions to produce uniformly square meshes or openings. Woven wire cloth shall be fixed in panels of door, window, frame/shutter all as per manufacturers instructions of joinery.
- 9.3.4 **TIE HANGER**:- Standard tie hanger ‘D’ shaped 300 mm long of aluminium anodized flat of size 20 mm x 3 mm shall be provided where shown on drawings.
- 9.4 **DOOR CLOSER (HYDRAULICALLY REGULATED)**:- Hydraulic door spring where shown on drawing shall be as per IS:3564-1975 as designation 2 of aluminium alloy body. Closer shall be universal type suitable for both anti-clockwise & clock wise doors.

PARTICULAR SPECIFICATIONS (Contd/...)

- 9.5
- DRAPERY ROD (DR)** :- Irrespective of shown in drawings or not , drapery rods shall be 20 mm dia stainless steel grade-304 provided in all location of doors and windows except inside toilet/store and kitchen. The finial and brackets shall be made of stainless steel of suitable size as approved by GE.
- 9.6
- PEG SET**: Where provision of peg set shown in drawings, it shall be stainless steel of shape approved by the GE. Unless otherwise indicated on drawings, Peg set of Six shall be provided to all bathrooms, WCs and EWCs for hanging clothes etc.
- 9.7
- ARRANGEMENT FOR DRYING CLOTHS/CLOTH LINE**: Where provision of arrangement for drawing cloths/cloth line shown on main drawings, the same shall be provided all as per details indicated on TD drawings.

9. STEEL, IRON & ALUMINIUM WORK

- 9.1
- Entire steel required for use in the work shall be arranged by the contractor and shall comply with the requirements of following specifications (Test certificate shall be produced as ‘specified’ in succeeding Paras): -

(i)	Structural Steel	:	Standard quality Fe 410-W (Gde E-250) quality A conforming to IS:2062-2006 (However for pricing of deviations, rates given in SSR for Fe-410-W (Gde E-250) quality A shall be followed)
(ii)	MS round Bars for reinforcement	:	IS:432 (Part-I) & (Part-2) - (1982) Grade-I for bars
(iii)	Hold Fast, s, grills, guard bars, fencing posts, railing, gates etc. which do not constitute structural members	:	Fe-290 (Gde E-165) Steel conforming to IS: 2062-2006) unless otherwise specified or shown on the drawings.
(iv)	Reinforcement high strength deformed bars of size 8 mm& above.	:	TMT bars Fe-500 D Conforming to IS:1786-2008
(v)	Galvanised Steel Sheets	:	Conforming to IS:277-2003
(vi)	Fabric reinforcement	:	Conforming to IS: 1566-1982.

NOTE: Where-ever in the drawings, for the reinforcement HYSD-415 grade bars/deformed bars/ twisted bars/high strength deformed bars/TMT bars Fe-415 grade/mild steel round bars 8mm dia and above are shown, in lieu of above type of bars, high strength deformed steel bars produced by TMT process Fe-500 D conforming to IS-1786-2006 (equal to diameter shown on drawings) shall be provided.

- 9.2
- GALVANISED STEEL WIRE**: Galvanised steel wire for mattress shall be as specified in Para 10.3.1 of MES Schedule Part-I.
- 9.3
- FABRIC REINFORCEMENT**: - Hard drawn steel wire fabric where shown as reinforcement shall conform to IS: 1566-1982. Wire fabric for general use such as fencing, window grills etc. shall conform to IS: 4948 all as per MES Schedule Part-I clause 10.33. The weight of expanded metal shall be 4-kg/square metre.
- 9.4
- STRUCTURAL STEEL WORK**: Structural steel work in various sections shall be as per the details shown in the drawings and specified.
- 9.5
- PROCUREMENT, TESTING, DOCUMENTATION, STORAGE & SUPPLY ETC. STEEL AND IRON WORK**
- 9.5.1
- GENERAL**
- 9.5.1.1
- Steel shall not be issued under Schedule ‘B’. Contractor shall purchase the same from any of sources mentioned here in after for entire completion of work.
- 9.5.1.2
- Reinforcement steel shall be high strength deformed steel bars produced by Thermo Mechanical Treatment Process (TMT steel bars of grade Fe-500 D) meeting all other requirements of IS: 1786.- 2006.

- 9.5.1.3
- The ordinary quality or standard quality of steel shall be used at places as defined in Para 10.4.1, 10.4.2 & 10.4.3 of MES Schedule Part-I, unless otherwise shown on the drawings.
- 9.5.2
- PROCUREMENT**
- 9.5.2.1
- Structural steel section shall be procured from main producer/primary producer as mentioned in Appendix ‘B’. In case of non availability with main producer/primary producers, the structural steel can be procured from approved secondary producers with a reduction of 5% (five percent) of the accepted rate of structural steel. In case of desired section of structural steel is not rolled/manufactured by main/primary producers, there shall be no price adjustment in use of structural steel procured from approved secondary producers.
- 9.5.2.2
- The structural steel shall be purchased by the contractor from the storage depot of the main producers/primary producers/ secondary producers as per provisions contained here-in-before and not from their authorized agents/dealers.
- 9.5.2.3
- Steel sections for railings, gates, fencing, guard bars, grills, steel chowkhats and holdfasts etc. which do not constitute structural members can be procured from main producers/secondary producers/BIS marked manufacturers or their authorized dealers without any price adjustment.
- 9.5.2.4
- High strength deformed (TMT) steel bars for the work shall be procured directly from the primary producers as mentioned in **Appendix ‘B’**.
- 9.5.2.5
- GALVANISED IRON SHEETS & FABRIC REINFORCEMENT FOR CONCRETE**: These shall be procured directly from main producers/BIS marked manufacturers without any price adjustment.
- 9.5.2.6
- Galvanized sheets & fabric reinforcement for concrete can be procured from authorized dealers of main producers in case the total requirement of steel is less than 5 tonne.
- 9.5.2.7
- All finished steel shall be well and clearly rolled to the dimensions, sections, and weight specified. The finished material shall be reasonably free from cracks, surface flaws, laminations rough, jagged and imperfect edges and other harmful defects and shall be finished in a workman like manner.
- 9.5.2.8
- Tolerance in size and weight of reinforcement bars shall not be more than specified in clauses 10.17.4 & 10.17.5 of MES Schedule Part-I.
- 9.5.3
- TESTING OF MATERIALS**
- 9.5.3.1
- The contractor shall submit the manufacturers test certificate in original along with the test sheet giving the result of each mechanical test as applicable and the chemical composition of the steel or authenticated copy there of duly signed by the manufacturer with each consignment. The Engineer-in- Charge shall record these details in the Steel Acceptance Register, as given in **Appendix ‘F’** after due verification. The GE shall also organize independent testing of random samples of steel drawn from each and every lot from the Labs as indicated under SPECIAL CONDITION NO. 25: TESTING OF MATERIALS, with following frequency-

Srl No	Nominal Size Steel for Concrete Reinforcement	
1.	Bars size less than 10 mm	1 sample (3 specimens) for each test for every 25 tonne of steel or part thereof.
2.	Bars size10 mm to 16 mm	1 sample (3 specimens) for each test for every 35 tonne of steel or part thereof.
3.	Bars size over16 mm	1 sample (3 specimens) for each test for every 45 tonne of steel or part thereof.
4.	Tensile Test	1 test for every 25 tonne of steel or part thereof.
5.	Bend Test	1 test for every 25 tonne of steel or part thereof.

NOTES:

- (i). For various tests acceptance criteria, tolerance etc refer to Appendix ‘F’ and relevant BIS Codes.
- (ii). Testing by the GE as per above frequency is mandatory before payment is released to the contractor or steel is incorporated in the work and testing charges for the same shall be borne by the contractor irrespective of the outcome of test results. However, tests will not be insisted upon for the steel required for guard bars, holdfasts, grills, and such other allied items. Any items of steel, not meeting the requirements, shall be rejected and the particular consignment removed from the site by the contractor at his own cost. The contractor shall have no claim on this account. The contractor at his cost shall provide all facilities required for the testing and cost of materials consumed in the test and transportation charges etc. shall be borne by the contractor.
- (iii). The GE may also increase frequency and number of samples/tests for his satisfaction. The cost of these additional tests shall be governed as per condition 10(A) of IAFW-2249. However cost of samples, transportation and other overheads shall be borne by the contractor irrespective of the test results.

(iv). The TMT steel shall be tested by GE, before incorporation in the work, by simple field tests also and records shall be maintained. Simple field test involves sand papering the X-Section of the TMT bar and dipping the same in chemical solution to give a clearly defined annular ring of tempered steel. The contractor at his cost shall arrange facilities for such tests.

- 10.5.4 DOCUMENTATION: - Steel Acceptance Register and Measurement Book for steel (for record purposes and not to be abstracted) shall be maintained by the Engineer-in-Charge. The contractor shall submit original machine numbered receipted paid vouchers from the manufacturer for the total quantity of steel supplied under each consignment to be incorporated in the work. GE shall inspect all consignments received at the work site along with the relevant documents before acceptance. The original vouchers and the Test Certificates shall be defaced by the Engineer-in-Charge and keep on record in the office of the GE duly authenticated and with cross-reference to the Control No. recorded in the steel Acceptance Register. JE (Civil), Engineer-in-charge, GE and contractor, will sign the steel acceptance register. The entire quantity of all steel items shall also be suitably recorded in the measurement book for record purpose as 'not be abstracted', before incorporation in the work and shall be signed by the Engineer-in-Charge. The accepting officer may order a board of officers for random check of steel and verification of connected documents.
- 10.5.5 STEEL IN COILS ETC. Any bar of any diameter for reinforcement may be procured in round bundles or rolls and the cost of straightening the same shall be borne by the contractor. When bars are procured in bundles the lengths of each bundle shall be worked out on the basis of unit weight predetermined by the GE by getting suitable length (not less than 3 metre) out of each consignment(s) received getting it straightened length measured and weighed in presence of contractor's accredited representative. The length and the weight(s) shall be recorded from which unit weight of bars worked out on the basis of unit weight determined as above shall form the basis for the purposes of calculating quantity of steel used/to be used in the work and taking payment of material lying at site. However if the unit weight works out more than the unit weight given in MES Schedule then unit weight given in MES Schedule shall be followed for computing weight of steel for the purpose of making payment of steel lying at site.
- 10.5.6 STORAGE
- 10.5.6.1 Steel of different sizes shall be stacked separately. For each classification of steel, separate areas shall be marked. Steel shall be marked with distinct painting.
- 10.5.6.2 All steel shall be stored in such a manner so that it is always at least 15 cm above the ground level. Steel shall be stored in a manner so as to prevent distortion and corrosion. Any section that has deteriorated and corroded or if considered defective by Engineer-in-Charge shall not be used in the work and shall be removed from site by contractor without any extra cost. It will be the responsibility of the contractor to make sure that all possible arrangements are made for the safe custody of the steel. In case of any loss of steel only contractor will be responsible and the loss will/shall be made good without any delay or claim whatsoever.
- 10.5.7 SCHEDULING OF SUPPLY
- 10.5.7.1 Schedule of supply of steel shall be finalized by contractor with GE and shall be incorporated in CPM chart so that supply of steel is monitored in a way to avoid any delay in completion of the work.
- 10.5.7.2 The complete requirement of steel of various sizes will be worked out before making any RAR payment and procurement of steel by the contractor will be completed sufficiently in advance of the date of completion. No extension of time will be considered for non-availability of any section of steel.
- 10.5.8 STEEL REINFORCEMENT:WORKMANSHIP
- 10.5.8.1 Reinforcement shall be provided as shown on drawings and in the absence, provisions of IS: 456 and IS: 1786-1985 shall be followed.
- 10.5.8.2 Reinforcement shall be fabricated, placed in position all as shown on drawings and specified in clause 10.17 to 10.21 of MES Schedule Part-I without application of heat.
- 10.5.8.3 WELDING OF REINFORCEMENT: - Refer Para 10.22 of MES Schedule, Part-I. Welding of reinforcement is not permitted. However where due to congestion of reinforcement the welding is required, then necessary permission shall be obtained by the contractor from the GE.
- 10.6 WELDING GENERAL: Welding wherever shown on drawings shall be done by metal arc process unless specifically indicated otherwise on drawings. The welding shall be carried out as per SSR Part- I clause 10.15 (10.15.1 to 10.15.19).
- 10.7 WINDOWS, VENTILATORS & GLAZING
- 10.7.1 WINDOWS, VENTILATORS: Windows and ventilators shall be provided all as per details shown in drawings. Make of windows /ventilators shall be as mentioned in Appendix 'C'
- 10.7.2 FIXED GLAZING: Fixed glazing shall be all as shown on drawings.
- 10.8 GUARD BARS/GRILLS TO WINDOWS AND VENTILATORS:- Guard bars/Grills shall be factory fabricated & provided to all the windows and vents including fan light portion of door frames all as per the details shown on relevant TD and as directed by GE.
- 10.9 PRESSED STEEL FRAMES FOR SHUTTERS:
- 10.9.1 Wherever pressed steel frames for door shutter is mentioned/shown to be provided it shall be as per clause 10.27 of MES Schedule Part-I. Pressed steel frames shall be pressed out of commercial mild steel sheet of thickness 1.25mm thickness and shall comply with requirements of IS:4351-1976: Specifications of steel door frames. The size of pressed steel frames for single and double rebate shall be as shown in Drawings. The frames shall be filled with PCC(1:3:6) type C-0 as per details shown on Drawings. Hinges shall be of mild steel, ISI marked.

PARTICULAR SPECIFICATIONS (Contd/...)

- 10.9.2 WELDING TO FRAMES: The welding to frames of the doors shall be done by flash butt welding.
- 10.9.3 TIE BAR: 02 Nos MS tie of 12mm dia round or deformed bar shall be provided at the bottom of rebate of each frame by welding. The tie bar shall be embedded and left in the floor.
- 10.9.4 MS conduit 20mm dia of 16 gauge closed at one end shall be welded to inner face of frame for receiving shoot of bolt. MS sockets for housing shoots to tower bolt shall also be provided as directed by Engineer-in-Charge.
- 10.9.5 LUGS: Flat iron 40x6mm hold fast/lugs shall be embedded in PCC (1:3:6) type C-1 bed blocks of size 230mmx230mmx75mm in one brick thick or thicker walls and 230mmx115mmx75mm in half brick thick or equivalent walls.
- 10.9.6 Structural steel section shall be of Standard Quality conforming to IS:2062 or Ordinary Quality conforming to IS: 1977 or IS:1732 as specified. The ordinary quality or standard quality of steel shall be used at places as defined in Para 10.4.1, 10.4.3 of MES Schedule Part-I.
- 10.9.A STEEL DOORS(DRG NO TD 142(C): Where indicated in drawings, steel doors with frame and shutter shall be provided as per details. Size of PCC blocks for fixing hold fasts shall be length of hold fast+5cmxwidth of wallx15cm.
- 10.10 FAN HOOKS WITH BOXES: -Wherever fan hooks/fan points have been shown, cast iron/MS boxes with fan hooks as per details shown on drawing No. TD-121(C) shall be provided for RCC roofs and fan hook shall be provided for pent roofs as directed by the GE. Internal/exposed surface of fan hooks and fan boxes shall be given two coats of white paint over a coat of red oxide primer and external (embedded) surfaces in contact with concrete surfaces shall be given a coat of bituminous paint.
- 10.11 ROLLING SHUTTERS (RS)
- 10.11.1 Steel rolling shutters shall conform to the requirement listed in the latest IS specifications 6248 and shall also comply with the following requirements:-
- 10.11.2 (a) Rolling shutters, Self coiling type, Push pull type, manual type without ball bearings shall be provided up to 12 Sqm clear area. Rolling shutter shall be fixed all as shown in drawing. Thickness of lath section shall not be less than 1.00 mm. Lock plate shall not be less than 3.15mm thickness. Locking arrangement shall be both from inside and outside. Steel rolling shutters shall be procured from any one of the approved brands as directed by GE.
(b) Rolling shutters shall be gear operated type (mechanical type) fitted with ball bearings and operated by bevel gear box and crank handle up to a maximum of about 25 Square meter clear area and up to a measure of about 35 Square meter clear area, if operated by chain mounted directly on worm shaft.
- 10.11.3 It shall be fixed from outside/inside as per direction of Engineer-inCharge.
- 10.11.4 Thickness of lath sheet shall not be less than 1.00 mm up to 3.5 metre width and 1.20 mm thick for shutters 3.5 metre and above.
- 10.11.5 It shall have top cover of not less than 1.20mm thick mild steel sheets and lock plate of not less than 3.15mm thickness. Locking arrangement shall be both from inside and outside.
- 10.11.6 Painting shall be of two coats of aluminium paint over a coat of primer.'
- 10.11.7 Also refer provisions given in para 10.23 of MES Schedule Part-I.
- 10.11.8 Rolling shutters shall be got approved from the GE and shall be procured from one of the manufacturers mentioned in Appendix 'C'.
- 10.12 ROOF TRUSS: Where indicated in drawings, roof truss shall be provided all as per details shown & specified.
- 10.13 ALUMINIUM DOORS, WINDOW, VENTILATORS, FIXED GLAZING & PARTITION
- 10.13.1 Aluminium section shall conform to designation 63400 given in IS: 737-1986 all as per details shown on drawings and shall be of make mentioned in Appendix 'B'. If the manufacturers mentioned above do not manufacture sections of size mentioned in drawings, the nearest suitable section to that mentioned in drawing shall be followed without any price adjustment. Sizes & type of Aluminium section shall conform to IS: 1948. Unless otherwise indicated on drawings, the aluminium sections shall be 3 mm thick.
- 10.13.2 Aluminium sections shall be powder coated irrespective of whatever is indicated on drawing.The average thickness of powder coating shall be minimum 15 microns.
- 10.13.3 Aluminium sections shall be provided with PVC protecting sheet to avoid damages, scratches during fixing.
- 10.13.4 Fixing of frames shall be as per manufacturer instructions.
- 10.13.5 EPDM GASKET: E.P.D.M. gasket of suitable profile to accommodate required thick glass shall be provided at all glazing area(s) to make the glazing air tight. The periphery packing of the glazing shall be provided with PVC fillet of Foren Plastics. The glazing frame work shall be provided with approved in built ventilation and drainage system by over lapping the transom members on the mullion member. The entire joint shall be properly sealed with weather silicon seal and to make the joint water tight.
- 10.13.6 Refer clause 10.37 of SSR Part-I for the rest of the provisions of Aluminium doors/windows/Vents etc.
- 10.13.7 FABRICATION: The fabrication of aluminium joinery and partition shall be got done from the fabricators nominated by the manufacturers of sections subject to approval of GE.
- 11 RCC ROOFING
- 11.1 GENERAL
- 11.1.1 SLOPE OF RCC ROOF:- Irrespective of whatever is shown on drawings, RCC roof slabs / terraces shall be laid to slope 1:40 except for all garages, repair bays, scooter shed for which roof slab shall be laid to slope 1:20. Slope in roof of sentry post shall be as per drawings.
- 11.1.2 The RCC roof with parapet shown on the drawings shall be considered as accessible roof and RCC roof shown without parapet shall be considered as non-accessible roof for the purpose of roof treatment.
- 11.1.3 After RCC roof slab is laid, cured and fully set, ponding test shall be done over RCC slab by filling water, which shall be kept there for 48 hours. In case slightest indication of seepage/leakage is noticed, pressure grouting with epoxy compound of make Dr. Fixit or equivalent as approved by the GE after roughening the affected portion shall be applied. Water proofing treatment on roof slabs, where indicated, shall be carried out only when there is no seepage/leakage noticed and after prior approval of GE.

- 11.1.4 RCC roof slab shall be prepared as described in paras 11.44.3 of MES Schedule Part-I before carrying out any treatment.
- 11.2 WATER PROOFING TREATMENT
- 11.2.1 WATER PROOFING TREATMENT TO ACCESSIBLE ROOF
- 11.2.1.2 Water proofing treatment shall comprising of the following applications: -
 - (a) 10mm thick cement plaster (1:3) using coarse sand mixed with integral liquid water proofing compound shall be provided while the concrete of roof slab is green and finishing surface even and smooth with steel trowel.
 - (b) The surface shall be painted with one coat of cold applied bituminous primer @ 0.40 litre per sq. m, all as described in paras 11.44.5 of MES Schedule Part-I.
 - (c) A layer of Atactic polypropylene polymer (APP) modified prefabricated membrane applied over primed surfaces all as described in paras 11.44.5 of MES Schedule Part-I.
 - (d) 22 mm thick PCC tiles shall be laid over 15 mm thick cement mortar (1:3) bedding, joints grouted and pointed flush in cement mortar (1:3) mixed with integral liquid water proofing compound.
 - (e) Benching (gola) of concave shape 80 mm radius at junctions of roof/ terrace with parapets / side walls with PCC (1:2:4) Type B-0 where applicable shall be provided.
 - (f) Treatment mentioned in para 11.2.2 (a), (b) & (c) shall also be provided/continued over side walls/parapets upto a height of 300 mm above roof slab.
- 11.2.2 WATER PROOFING TREATMENT TO NON ACCESSIBLE ROOF
- 11.2.2.1 Water proofing treatment shall be comprising of the following applications: -
 - (a) 10mm thick cement plaster (1:3) using coarse sand mixed with acrylic based water proofing compound shall be provided while the concrete of roof slab is green and finishing surface even and smooth with steel trowel.
 - (b) The surface shall be painted with one coat of cold applied bituminous primer @ 0.40 litre per sq. m, all as described in paras 11.44.5 of MES Schedule Part-I.
 - (c) A layer of Atactic polypropylene polymer (APP) modified prefabricated membrane shall be applied over primed surfaces all as described in paras 11.44.5 of MES Schedule Part-I.
 - (d) Treatment mentioned in para 11.2.2A.1 (a), (b) & (c) shall also be provided over side walls/parapets upto a height of 300 mm above roof slab.
 - (e) APP modified polymeric membrane shall be covered with bituminous based aluminum paint @ 0.2 Kg per sqm in two coats.
- 11.2.3 WATER PROOFING TREATMENT TO GARAGES
- Water proofing treatment shall comprising of the following applications: -
 - 20 mm thick cement plaster (1:3) using coarse sand mixed with acrylic based water proofing compound while the concrete of roof slab is green, finish surface even and smooth with steel trowel.
- 11.3 FINISH TO RCC ROOF SURFACE OF CHAJJA
- 11.3.1 15mm thick cement plaster (1:3) using coarse sand mixed with integral liquid water proofing compound shall be applied while concrete of roof slab is green, finished surface even and smooth.
- 11.4 FALSE CEILING
- 11.4.1 Size of grid shall be 605x605mm. Frame work shall be of GI for seamless ceiling comprising of GI perimeter channel 0.55mm thick with two unequal flanges of 20 and 30mm and web of 27mm fixed to surrounding wall using nylon sleeves and screws at 450mm centre to centre/ intermediate channel 0.9mm thick having equal flanges of 15mm each and web of 45mm suspended from soffit at approx 900mm centre to centre with GI cleat and steel expansion fasteners with and including ceiling section (not exc 1.2m length) of 0.55mm thickness having kurlled web of 50mm and flange of 26mm each with lips of 10.5mm fixed to the intermediate channel at 457mm centre to centre
- 11.4.2 Hangers shall be of 6mm dia GI wire (upto 1200mm length) adjusting level fixed to roof slabs by means of ceiling cleats made out of GI flat 40 x 3mm size 60mm long and expansion hold fasteners 12.5mm dia, 40mm long
- 11.4.3 Wherever Fultone tiles is mentioned to be provided the same shall be as Fultone of Gyproc or equivalent in other specified makes in Appendix ‘B’ hereinafter and shall be fixed to GI framework with screws of suitable size including fixing boards to any specific pattern and also matching or mismatching of grains to obtain a particular design or figure as directed by GE
- 11.4.4 No sunken portion will be provided. PVC false ceiling will be provided to underneath room to cover the hanging CI pipes

MATERIALS

- 11.1.1 **BITUMEN PRIMER:** Bitumen primer shall be all as described in paras 11.44.2.1 of MES Schedule Part-I.
- 11.1.2 **ATACTIC POLYPROPYLENE POLYMER (APP) MODIFIED PRE-FABRICATED MEMBERANE:** Atactic polypropylene polymer (APP) modified prefabricated membrane shall be 3 mm thick, weight not less then 3kg/Sqm with non woven polyester matt all as described in paras 11.44.2.2 of MES Schedule Part-I. APP membrane shall be purchased directly from the manufacturer or their authorised distributors and the contractor shall submit the proof as purchase vouchers to the Engineer-in-Charge. APP membrane shall be done in presence of approved applicator.Certificate by applicator that the work has been done in his presence shall be kept on record.
- 11.1.3 **ACRYLIC BASED WATER PROOFING COMPOUND:** Acrylic based water proofing compound shall be ISI marked (IS:2645) and any one of the manufacturers as mentioned in Appendix ‘B’.
- NOTE: In case of deviation the quantity of water proofing compound will be accounted in the proportion of 1% by weight of cement.
- 11.1.4 **PCC TILES:** Refer paras 13.16 of MES Schedule Part-I. PCC tiles shall be precast factory made 22 mm thick of size 250 mm x 250 mm, fabricated using grey cement & no pigments and any one of the manufacturers as mentioned in Appendix ‘B’.

PARTICULAR SPECIFICATIONS (Contd/...)

- 11.1.5

TERRACOTA ROOFING TILES :-
- 11.5.5.1

Wherever shown on drawings, terracotta roofing tiles of size 125mm x165mmx8mmthick with interlocking arrangement having flat shape on one side and vaulted shape on the other side (source and other specifications as approved by the GE) shall be provided over RCC sloping surfaces over a 20 mm thick (minimum thickness) bedding layer of cement mortar (1:3) mixed with liquid water proofing compound.
- 11.2

GUARANTEE & DEFECT LIABILITY PERIOD OF WATER PROOFING TREATMENT
- 11.2.1

The defect liability period of water proofing treatment to RCC slabs including sunken floors shall be 10 years and the contractor shall be responsible to keep the entire buildings free from leakage/seepage for a period of 10 years after certified date of completion. The contractor may obtain a similar guarantee from the specialist firm (if any) engaged by him for the purpose.
- 11.2.2

The amount of security deposit to be held back from the contractor’s bill against the guarantee for water proofing treatment to top of roof slab of RCC slabs for the specified period at contract rates and shall be on same basis as per the scale laid down for calculating ‘Security deposit’ for Antitermite treatment laid down in Particular Specification here-in-before. This shall be worked out by GE and be intimated to the contractor. This amount shall be refunded to him after the expiry of the guarantee period.”
- 11.2.3

Alternatively the contractor may give a separate interest bearing ‘Security deposit in favour of GE valid for 10 years for this amount.
- 11.2.4

If the GE, at any time during the construction or prior to the expiry of said Guarantee period of 10 years, find that the buildings have been found leaked/seeped, the contractor, on demand in writing from the GE, will forthwith undertake to carry out such treatment which may be necessary to render the buildings free from leakage/seepage at his own expense.
- 11.2.5

In the event of contractor’s failure to comply with the GE’s direction within the stipulated period, the work shall be got 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.
- 11.2.6

The contractor shall provide a plaster plate of size 1000mm x600mm indicate the Contract No., name of contractor, the date of completion of the work and the date of expiry of the guarantee period by engraving and printing black, on the same plaster plate as specified in clause 3.9 here in before.
- 12

RAIN WATER PIPE, FITTINGS, SPOUT, SPLASH STONE AND PCC SUMP
- 12.1

Rain water pipes and fittings, at location indicated in the drawings shall be of type ‘A’ UPVC all as described in para 18.27A of MES Schedule Part-I. Unless otherwise mentioned on drawings the size of pipe shall be 150 mm. Pipes and fittings shall be secured to wall just below all joints with PVC clamps. Pipes and fittings shall be jointed all as described in para 18.52 of MES Schedule Part-I. 20 mm thick splash stone of size 600 x 600mm shall also be provided with neat cement slurry over 20mm thick screed bed in cement mortar 1:4 below the each Rain Water Pipe where water will come out from RWP.
- 12.2

Unless otherwise shown on drawings, the grating shall be of CI, round type, weighing not less than 0.50 kg each, provided and fixed at the inlet of the rain water pipes.
- 12.3

SPOUT: - Spouts shall be of galvanized steel water tubes light grade and the length/dia, taper cutting outside as shown on drawings. Where length/diameter of water tubes is not indicated, it shall be taken as passing through out wall and projecting **15 cm** (minimum) from outer face of the wall and of 75 mm bore.
- 12.4

PCC SUMP: On roofs, PCC sump of size mentioned in drawing shall be provided at the inlet point of each rain water pipe and spout. In case size of sump not shown it shall be considered as 450mm x450 mm x 50mm.
- 13

PRE ENGINEERED GALVALUME SHEETS ROOFING & TRUSS
- 13.1

GENERAL: Various component of the steel structure such as steel trusses in roof where shown on drawings shall be fabricated, assembled and erected carefully by the contractor. The centerline dimensions shall be strictly achieved.
- 13.2

TRUSS: MS angle iron/channel/pipes etc. and other steel members in rafters, purlins and false rafter shall be all as shown on drawings. If thickness of gusset plate not indicated on drawings, it shall be 10 mm thick. Base plate/sole plate and anchor plates etc shall be provided as indicated. Holding down bolts shall be made to shape and size as shown. Purlins & wind tie shall be provided as per drawings and where numbers of purlins are not indicated on drawings, the same shall be as under:-

(a)

For length of sheet not exceeding 1.52m – 2Nos.

(b)

For length of sheet exceeding 1.52m but not exceeding 2.40m – 2 Nos. purlin at the ends and one additional purlin in the center of sheet.

PARTICULAR SPECIFICATIONS (Contd/...)

(c) For length of sheet exceeding 2.40m – 2 Nos. purlins at the ends and minimum 02 Nos. purlins at equal spacing in between ends. One additional purlin shall be provided under the eave of roof sheeting supported over false rafters and projections.

13.3 BLANK

13.4 **PRE ENGINEERED GALVALUME SHEET**

13.4.1 Irrespective of whatever thickness shown on drawings, the Galvalume sheet shall be of minimum 0.50 mm thick total coated thickness, 550 Mpa minimum yield strength and shall conform to physical specifications of ASTM A-792 or AS-1397 or equivalent. The steel sheet shall be coated with hot dip metallic Aluminium zinc Alloy (55% Aluminium, 43.5% Zinc, 1.5% Silicon) coating AZ 150 (minimum 150 gm/sqm total on both sides). The painting system shall comprise 20 micron colour coating of super modified polyester with Silicon on exposed surface over a priming coat of 5 micron and on reverse side alkyd back coat of 5 micron over 5 micron primer. The paint shall be of shade as approved by GE. The galvalume sheet shall have maximum pitch of 250mm c/c and minimum 28mm crest depth in length. The profile shall conform to IS: 513, 277 and 14246. Fixing shall be carried out as per manufacturer’s instructions. Make of Galvalume sheet shall be as given in Appendix ‘B’.

13.4.2 The manufacturer’s test certificate for the chemical and mechanical properties of steel must be submitted by contractor for approval to GE prior to the installation /fixing and/or claiming payment as material laying at site. Contractor shall also submit purchase vouchers from manufacturer or their authorized dealer, manufacturer’s test certificate in original before claiming payment for galvalume sheets. The manufacturer of sheet should submit related documents for expected product service performance of pre painted metal sheet as per relevant AS/ASTM.

13.4.3 Manufacturer’s recommended installation methodology shall be adopted for installation of roofing including profiled sheet, capping, trims, flashing, gutter and all types of accessories considered for roofing. Fasteners shall be used for fixing roofing system as per manufacturer’s recommendation.

13.4.4 Base material for coloured galvalume substrate steel sheet shall conform to the specifications of relevant ASTM or equivalent.

13.4.5 Roofing sheet shall be crest fixed to purlins with hot dip galvanized self-drilling fasteners with integral EPDM washers (one fastener on each crest). Fasteners shall also be provided on side laps @ 500 mm c/c (max) for roofing as well as wall cladding. Penetrations and laps in sheet shall be sealed by using proper sealant. Profiled HDPE filler shall be provided where ever required to close voids between cappings and troughs of the sheet to provide a weather tight exterior. Purlins shall be bolted to top flanges of rafters and purlin laps shall be as per relevant IS/ASTM/AS codes as applicable.

13.4.6 All laps of roof panels shall be sealed with a continuous ribbon of tape sealer.

13.4.7 Minimum laps for galvalume steel sheets in roofing and wall cladding shall be:-

- (a) End Laps - 150mm
- (b) Side Laps - One Corrugation.

13.4.8 Flashing and trims shall be provided at the gable, rack, corners, caves, curves, transition, expansion joints, ridge, joints with translucent sheets, framed openings and wherever necessary to provide for weather tightness and finished appearance. These shall conform to the physical specifications of relevant ASTM/IS specifications and have desired minimum yield strength as specified.

13.4.9 Wall flashing and trims (gable, corner, framed opening, joints with supporting structure of hangar door, accessories, etc) are manufactured from same color, finish and thickness as of wall panels and as per manufacturer’s recommendation.

13.4.10 Roof flashing and trims (parapet flashing, transition trims, expansion joints trims and ridge caps) are manufactured from same color, finish and thickness as of roofing and as per manufacturer’s recommendation.

13.4.11 Formed peak panel matching the slope and profile of adjoining panels shall be provided alongwith the building ridge and shall be of same color, finish and thickness as of roofing and as per manufacturer’s recommendations.

13.4.12 **OTHER ACCESSORIES**

13.4.12 **SEALANT.** Special grade of silicon sealant non-hardening, neutral cure type of approved make and grade shall be applied at all side laps and end laps (with flowable mastic) as per manufacturer’s recommendations and approval by Engineer-in-Charge. Sealer for side lap, end laps and self –flashing windows shall be two way self adhesive tapes 6mm wide 5mm thick asbestos fiber filled, pressure sensitive. The sealer shall be non-asphaltic, non-shrinking, non-drying and non-toxic and shall have superior adhesion to metals, plastics and painted surfaces at temperatures from 50 degree to 104 degree centigrade.

13.4.13 **FASTENERS.** Standard fasteners shall be No. 14, Type ‘A’, self –tapping sheet metal screws with metal and neoprene washers. All screws shall have hexagonal heads, colour coated to match roof and wall sheeting and made of zinc plated /coated steel conforming to relevant IS/ASTM codes. The panel clip shall be fastened to structural members with Scrubolt fastener as per manufacturer’s recommendation. The size of the fastener shall be calculated as per the design load and approved by concern authority.

PARTICULAR SPECIFICATIONS (Contd/...)

- 13.4.14 **RIDGE:** Ridge shall be of section shown on drawings and shall be made of pre engineered galvalume sheet and shall be fixed to purlins with 8 mm dia GI hook bolts and nuts and bitumen and washers which fix the sheet to the purlin as shown on drawings.
- 14 **CEILING & LININGS**
- 14.1 **GENERAL:**
- 14.1.1 **BLANK**
- 14.1.2 **PARTICLE BOARD:** - Unless otherwise shown on drawings or specified elsewhere, particle board shall be exterior grade 18/19 mm thick veneered one side decorative and other side commercial type finish conforming to IS-1697:1980 of make mentioned in **Appendix ‘B’**.
- 14.1.3 **PRELAMINATED PARTICLE BOARD:** - Unless otherwise mentioned on drawings or specified elsewhere pre-laminated particle board shall be exterior grade 18/19 mm thick phenol formaldehyde bonded, flat pressed, 3 layered, melamine faced, BWP type pre-laminated particle board of make mentioned in Appendix ‘B’. Pre-laminated particle board having choice lamination on one side and balancing white lamination on other side. Shade of pre-laminated particle board shall be approved by the GE.
- 14.1.4 **PLYWOOD:** Unless otherwise mentioned/shown elsewhere the Plywood shall be commercial facing veneer on both sides and BWR type BB; 6 mm thick of make mentioned in **Appendix ‘B’**.
- 14.1.5 **LAMINATED SHEET:** - Where provision of laminated sheet shown in the drawings/ specified it shall be Plastic laminated not less than 1.5 mm thick natural teak finish of make mentioned in **Appendix ‘B’**.
- 14.1.6 **WOODEN BEADING:** In case size of beading not mentioned/shown elsewhere it shall be 6 mm thick teak wood as per IS:1687.
- 14.1.7 **PVC PLY:** Where provision of PVC Ply shown in the drawings/ specified it shall be of thickness indicated in drawings and of make mentioned in **Appendix ‘B’**. In case thickness of PVC ply not shown/specified it shall be considered as 6 mm.
- 15 **FLOORING**
- 15.1 **GENERAL:-** Refer Para 13.25 of MES Schedule Part-I.
- 15.1.1 Floor, Skirting and dado of various types shall be provided as shown in ‘Schedule of Finishes’ drawings.
- 15.1.2 Floor shall be laid to levels or to falls as shown on drawings and as directed by Engineer-in-Charge. Finishing layer of the floors shall be carried out through all opening and over dwarf walls.
- 15.1.3 Where two different types of floor finish are provided on either side of an opening, the superior floor finish shall be extended over the opening.
- 15.1.4 Cement concrete in the sub base or sub floor and top stretch coat shall be laid separately and not monolithically.
- 15.1.5 Tiles in all locations of floors and dado shall be laid in non-staggered manner.
- 15.1.6 **SUB BASE:** Sub base or sub floor shall be laid at a stretch without forming panels over well rammed earth filling in ground floor and no adjustment shall be made for form work on this account.
- 15.1.7 Cement concrete in the sub base or sub floor and top stretch coat shall be laid separately and not monolithically.
- 15.1.8 Whether shown on drawings or not, height of skirting shall be 100mm.
- 15.1.9 All exposed edges of stone slabs in location like tread of steps, platform, cills, shelves, counters etc shall be provided with full round nosing irrespective of whether shown on drawings or not. Contractor’s lump sum cost shall be deemed to include above aspect.
- 15.2 **LEVELS AND FALLS:** Refer Paras 13.25.6 of MES Schedule part-I. In case of floor on suspended slabs, slope in the floor as required shall be given in the sub base. Thickness of sub base in locations indicated here in after is average thickness.
- 15.2.1 Flooring where indicated on drawings on RCC surface it shall be laid after laying a coat of cement slurry at the rate of 3 kg per square metre area.
- 15.2.2 Unless otherwise specified, exposed PCC topping to floor shall be finished even and smooth using extra cement while the concrete is green. Quantity of cement shall be 1.38 kg per square metre of the area for finishing smooth.

PARTICULAR SPECIFICATIONS (Contd/...)

- 15.2.3 **SIZE OF PANELS:** - Refer Paras 13.32.1 and 13.38.1 of MES schedule part-I. Unless otherwise specified, PCC floor topping shall be laid in panels of size and as shown on drawings and in accordance with provisions contained in above mentioned paras of MES Schedule Part-I and as specified in these tender documents. Panels shall be formed by using 4mm thick pinhead glass dividing strips of width equal to the thickness of PCC topping/terrazzo topping with its PCC base.
- 15.2.3.1 Glass dividing strips shall not be provided in tiles floor, plinth protection, stone slabs flooring and where other type of joints are to be provided as per the drawings and/or as specified in these tender documents.
- 15.2.3.2 Where **pattern of flooring** is indicated/ specified on the drawings/ schedule of finishes, the same shall be provided as per the pattern indicated/specified.
- 15.2.3.3 The colour of floor toppings, claddings, skirting/dado shall be got approved from the GE.
- 15.2.3.4 If specifications of any floor in any location of a building is not shown in drawings, this shall be considered as 40 mm thick PCC (1:2:4) type B-1 with exposed concrete surface finished even & smooth using extra cement laid over 75mm thick PCC (1:4:8) type D-2 laid over well rammed earth filling for ground floor and 40 mm thick PCC (1:2:4) type B-1 exposed surfaces finished even and smooth using extra cement laid over cement slurry @ 3 kg per Square metre over RCC slab in case of first/subsequent floors.
- 15.3 **MATERIALS**
- 15.3.1 **CEMENT:** Cement shall be as specified in concrete work
- 15.3.2 **AGGREGATE:** Coarse and fine aggregates, as specified for concrete work.
- 15.3.2.1 **BRICK AGGREGATE:** - Refer clause 13.6 and 13.7 of MES Schedule part-I.
- 15.3.2.2 Stone aggregate and sand shall be as specified for concrete work, here in before.
- 15.3.3 **WHITE CEMENT** : White cement shall conform to IS 8042-1989
- 15.3.4 **PIGMENTS:** Pigments shall conform to the requirement of Appendix 'A' of IS 2114-1984.
- 15.3.5 **KOTA STONE:** Quality of Kota Stone shall be as per Clause 13.47.1 of MES Standard Schedule, Part-I. Dressing of stone shall be done as per Clause 13.47.2.
- 15.3.5.1 **IN FLOORS:** Kota stone shall be of size 55 cm x 55 cm with tolerance $\pm 5\%$ and 18mm to 22mm thick, mirror polished, first quality & machine cut with neat and square edges. It shall be uniform in colour and free from stains, cracks, decay and weathering. Kota stone shall be laid in straight pattern along with the length.
- 15.3.5.2 **IN SKIRTING DADO & RISERS:** The thickness of Kota stone shall be 15-18 mm. In case of steps (treads & risers), Kota stone shall be in a single piece to full length & width of riser & tread.
- 15.3.6 **MARBLE STONE:** Refer Clause 6.2.3 and 6.20.3 of MES Schedule, Part-I. Marble stone shall be Abu white "Makrana" 15 to 20 mm thick, machine cut and polished.
- 15.3.7 **BARODA GREEN STONE:** Refer Clause 6.2.3 of MES Schedule, Part-I. Baroda green marble stone shall be dark green and 15 to 20 mm thick, machine cut of size not less than 600 mm x 600 mm and polished. In case of steps (treads & risers), and window cills, stone shall be in a single piece to full length & width of riser, tread and cills.
- 15.3.8 **GRANITE STONE:** Refer Clause 6.2.3 of MES Schedule Part-I. Granite stone shall be jet black if not indicated otherwise in the drawings, machine cut, polished. Unless otherwise mentioned on drawings, thickness of granite on any location shall be 18-20 mm
- 15.3.9 **SAND STONE:** Refer Para 13.12 of MES Schedule, Part-I.
- 15.3.10 **RED SAND STONE:** Refer Clause 6.2.3 & 13.12 of MES Schedule Part-I. Unless otherwise shown on drawings, red sand stone shall be 15 to 18 mm thick, machine cut, fine dressed. Unless otherwise mentioned on drawing, the size of red sand stone shall be 550 mm x 550 mm.
- 15.3.11 **STONE SETTS:** Refer para 13.13 of MES Schedule Part-I. Stone setts shall be of best quality Granite/Trap/Basalt or Quartzite stone having minimum compressing strength not less than 400 kg/Sq. cm with sides dressed. The sources/quarries shall be got approved from GE and also the entire quantity of stone setts after procurement shall be used in the work only after getting prior approval of GE. Use of sedimentary stones shall not be permitted. The stone setts shall be approximately rectangular in shape. Stone setts for flooring/Apron shall be of size 200 to 250 mm long, 150 to 200 mm wide and 150 mm deep with a tolerance of ± 12 mm. Edge stone shall be of size 250 to 300 mm long, 150 to 200 mm wide and depth not less than 450.

- 15.3.12 **METALLIC FLOOR HARDENER/ABRASIVE:** Refer para 13.10 of MES Schedule Part-I and shall be of make as approved by the GE.
- 15.3.13 **NON SKID CERAMIC COLOURED TILES :** Nonskid ceramic tiles for floors and skirting shall conform to IS :13712-2006 and IS:13755-1993, group B II a, 1st quality, coloured & jointfree. Shade of tiles shall be approved by GE. Tiles shall be all as specified in clause 13.14.2 of MES Schedule Part-I. The make shall be as mentioned in **Appendix 'B'**. Irrespective of whatever is shown on Schedule of finish drawings, non- skid ceramic tiles in floor shall be of size 395mm x395mm (rectified i.e straight edge locally known as jointless) in all toilets and 600mm x600mm (rectified) in all other locations as shown on drawings. Thickness of tiles shall be 9 mm minimum.
- 15.3.14 **COLOURED GLAZED CERAMIC WALL TILES:** Glazed Tiles for walls/ dado shall be group B III, I quality, coloured & joint free and shall be all as specified in clause 13.14.1 of MES Schedule, Part-I. The make shall be as mentioned in **Appendix 'B'**. Unless otherwise mentioned in drawings, the size of glazed ceramic tiles shall be 300 mm x 450 mm (rectified) and 7mm thick.
- NOTE:** *Glazed ceramic tiles dado shall be provided under full length mirror(s) /450 x 600 mm looking mirror also.*
- 15.3.15 **INTERLOCKING PAVER BLOCKS :** Refer para 13.18 of MES Schedule part-I.
- 15.3.15.1 **DIMENSIONS:** Precast interlocking paver blocks shall be rubber moulded **60mm thick of grade M-35/80 mm thick of grade M-40 (as shown on drawings)** of rectangular/ Triangular/ Hexagon/ Zigzag/ I-shaped etc as directed by GE. Width and height of chamfered edges measured in horizontal and vertical projection will be at least 4mm and will not exceed 6mm. Blocks shall be uniform in shape and shall have no structural faults such as gravel accumulations, hollows or cracks. Pre cast block shall be fairly straight, flat and rectangular and will have no burrs or projections.
- 15.3.15.2 **MANUFACTURING:** Interlocking tiles shall be created in an automatic plant working on vibration and simultaneous hydraulic compression from top.
- 15.3.15.3 **TOLERANCES:** Length and width of interlocking tiles shall be within a tolerance of ± 2 mm of the nominal dimensions. Thickness of tiles shall be within tolerance of ± 3 mm of the nominal thickness.
- 15.3.15.4 **MIX OF CONCRETE:** Interlocking tiles shall be manufactured out of **M-35 (Design Mix)/ M-40 (Design Mix) concrete** Conforming to IS 15658: 2006.
- 15.3.15.5 **TESTING:** Before incorporation in work, interlocking tiles shall be tested for their compressive strength. Frequency of testing shall be as per test criteria fixed for bricks.
- 15.3.15.6 **LAYING:** The interlocking tiles shall be laid dry, bedded & laid over & including 50 mm thick sand (compacted thickness) over 100 mm thick PCC 1:3:6 subbase Type C-2 over rammed earth as specified here-in-before. The gap between paver blocks shall be filled with sand. Sides of paver blocks shall be grouted with PCC 1:2:4, type B0 to make straight line. The design, shape, size and colour of PCC coloured interlocking tiles shall be got approved from GE in writing before procurement/ incorporation in the work.
- 15.3.15.7 Irrespective of shown on drawing or not on schedule of finishes, skirting in the portion of parking where interlocking tiles are provided shall be 100 mm high, 15mm thick in cement mortar 1:1 finished even and smooth without using extra cement over plastered surfaces.
- 15.3.15.8 The make shall be as mentioned in **Appendix 'B'**.
- 15.3.16 **VITRIFIED TILES :** Vitrified tiles shall be of group B Ia, homogeneous, polished, not less than 10mm thick, all as specified in clause 13.15.1 of MES Schedule Part-I. The colour, shade, texture and design shall be approved by G.E. The make of tiles shall be as mentioned in Appendix 'B'. Unless otherwise mentioned in drawings, the size of vitrified tiles shall be 600mm x 600mm with provision of spacer / joint 4-5mm thick filled with cement based joint filler compound (Epoxy) as approved by GE .
- 15.3.17 **ACID RESISTANT TILES:** Where acid proof/resistant tiles are indicated on drawings, acid Resistant tiles conforming to IS: 4457-1982 shall be provided. The tiles shall be of vitreous ware and free from deleterious substances and shall be unglazed. The finished tile when fractured shall appear fine grained in texture, dense and homogenous. The tiles shall be sound, true to shape, flat and free from flaws and other defects. Tiles shall be 15mm thick of size min 300mm x 300mm as directed by the GE laid over 10 mm thick chemical resistant mortar.. The tolerance on thickness and warpage shall not exceed 2.00 mm. The compressive strength shall be 700kg/Sq.cm. The loss in weight when tested for ACID RESISTANCE shall not exceed 1.50%
- 15.3.18 **PLAIN /CHEQUERED CEMENT CONCRETE TILES:** Refer Clauses 13.16 & 13.17 of MES Schedule, Part-I. These shall be factory made, conforming to IS 1237-1980 and IS-13801-1993 respectively. Chequered tiles shall be with the centre to centre distance of chequers not less than 25mm and not more than 50mm. Unless otherwise mentioned in "Schedule of Finishes" or elsewhere in tender documents; the tiles shall be made in grey cement with pigment. Tiles shall be 22mm thick of size 300mm x 300mm. The make shall be as mentioned in **Appendix 'B'**.

PARTICULAR SPECIFICATIONS (Contd/...)

- 15.4 **BLANK**
- 15.5 **WORKMANSHIP:**
- 15.6 **SUB BASE IN GROUND FLOORS:** Irrespective of whatever is specified in drawings, 75mm thick PCC (1:4:8) type D-2 sub base shall be provided over 100mm thick n exc 63 mm gauge broken stone hard core over well rammed earth in ground floors except garage(s), repair bays, apron(s), ramp(s) and parking(s) where it shall be 150 mm thick PCC 1:4:8 type D-2 over 100mm thick n exc 63 mm gauge broken stone hard core over well rammed earth.
- 15.7 **STONE (KOTA/ MARBLE/ BARODA GREEN/GRANITE):**
- 15.7.1 **FLOORING:** Kota stone shall be laid as defined in Clause 13.47.3 of MES Schedule, Part-I. Bedding mortar (Screed) shall be 15 mm thick (Average thickness) in cement mortar (1:4) and cement slurry shall be @ 3 kg/Sqm. Screed shall be laid over 25mm thick PCC (1:2:4) type B-0 .Kota stone shall be of thickness 18 – 22 mm thick and 15 cm wide white Marble slab border shall be provided with Kota stone flooring where indicated in “Schedule of Finishes”/drawings. Sub base in ground floor shall also be provided as per clause 33.6 *here in before*.
- 15.7.1.1 **SKIRTING, DADO, TREADS & RISERS OF STEPS OF STAIR CASE:** Stone shall be laid over a layer of 10 mm thick screed in cement mortar (1:3) and cement slurry. In case not shown on drawing, the height of skirting shall be 100 mm. The nosing of tread shall be provided as full round with two parallel grooves of 3mm×3mm.
- 15.7.1.2 **CURING, POLISHING & FINISHING:** Refer clause 13.47.4 of MES Schedule Part-I. However the finishing/polishing of the floor shall be to achieve mirror finish.
NOTES TO ACHIEVE MIRROR FINISH:
- (a) *The granite/ mirror finish shall be achieved through seven cuttings method by using grit blocks of 0,1,2,2 ½, 3, 4, 5 & 6 nos. water shall be used as lubricant during cutting operations. The first four operations as carried out shall be known as cutting and grinding, whereas the next three operations shall be carried out for polishing of floors.*
- (b) *The surface shall be washed thoroughly after first cutting and shall be covered with cement grout of watching colour to fill pinholes after first cutting.*
- (c) *The surface shall be cured for three days before allowing second cutting.*
- (d) *The repair shall be applied after second and further cutting shall be carried out in case pin holes are still noticed.*
- 15.7.2 **GRANITE STONE/BARODA GREEN/MARBLE/KOTA STONE ON PCC/RCC CILLS, SHELVES, PLATFORMS & COUNTERS:** Wherever shown on drawings stone shall be laid over 10mm thick cement mortar (1:3) with cement slurry shall be @ 3 kg/Sq. m including cutting, grinding and polishing with mirror finish all as specified in MES Schedule Part-I. Full round nosing shall be provided to all open edges whether or not shown on drawing.
- 15.8 **PCC FLOOR (GENERAL) & ROOMS (EXCEPT GARRAGES, REPAIR BAYS PARKINGS, RAMPS & APRONS)**
- 15.8.1 Refer Clauses 13.25 and 13.32 of MES Schedule, Part-I. Topping/ finishing layer of PCC flooring where indicated in “Schedule of Finishes” and unless otherwise specified & indicated in drawings/ “Schedule of Finishes” shall consist of 40 mm thick PCC (1:2:4) type B-1. Sub base in ground floor shall also be provided as per clause 13.6 here in before.
- 15.8.1.1 Where PCC floors topping at the floors other than ground floor plan indicated in drawings/schedule of finishes it shall consist 40mm thick PCC (1:2:4) type B-1 over cement slurry @ 3Kg/Sq. metre.
- 15.9 **PCC FLOORING FOR CYCLE / SCOOTER SHED INCLUDING RAMP:-**
- 15.9.1 Irrespective of whatever is shown in drgs / sch of finishes, PCC flooring in cycle/ scooter shed including ramp shall be 50mm thick PCC M-20 (Design Mix) using 20mm graded stone aggregate over 150mm thick PCC 1:4:8 type D-2 sub base over over 100mm thick broken stone hardcore gauge n exc 63 mm over well rammed earth.
- 15.10 & 15.11 **BLANK**

- 15.11 **HEAVY DUTY FLOORING:** -Wherever heavy duty flooring is indicated in "Schedule of Finishes" it shall be 30 mm thick layer consist of the materials as specified in clause 13.36 of MES Schedule Part-I, over 100 mm thick PCC M-20 (Design Mix) sub floor.
NOTE: *In ground floors 150 mm thick PCC 1:4:8 type D-2 (using 40 mm graded stone aggregate) over well rammed earth shall also be provided as sub base under sub floor.*
- 15.12 **EXPANSION/ DUMMY/ CONSTRUCTION JOINTS IN PCC FLOORING:** Joints in locations mentioned in clauses 13.10, 13.11 & 13.12 here-in-before shall be provided as per design considerations and all as shown on drawings No. STD-1239 sheet 1/1. Paras 20.B.6.11.2, 20.B.7.10 of SSR Part-I refer. Unless otherwise mentioned on drawings, the sealing compound shall be of Gde-A conforming to IS-1834-1963.
- 15.13 **CERAMIC TILES , VITRIFIED TILES**
- 15.13.1 **GENERAL:**
- (a) The surface on which the tiles are to be laid shall be free from dirt, dust and not be smooth.
 - (b) Tiles shall be soaked in water before laying as recommended by the manufacturers.
 - (c) The size and shade variation is inherent characteristics of ceramic tiles. To achieve pleasant & natural effect of shade tiles of various boxes shall be mixed before laying.
 - (d) Provide adequate gap between the tiles to allow floor base moisture to escape.
 - (e) Joints shall be left open for 1 to 3 days depending upon the humidity before grouting. The sealing of joints should not be carried out before 24 hrs, after fixing of tiles.
- 15.13.2 **FLOORS:** Tiles shall be laid over 25mm thick PCC (1:2:4) type B-0 Sub floor. Tiles shall be laid & fixed with 3 to 6mm thick tile adhesive with notched trowel as per manufacturer's instructions over sub floor & joints shall be sealed with polymer based grout of matching shade. The tiles shall be laid as specified in clause 13.40.2 & 13.40.3 of MES Schedule Part-I. Sub base in ground floor shall be provided as per clause 33.6 *here in before*. In first and subsequent floors tiles shall be provided over sub floor over RCC slab.
- 15.13.3 **SKIRTING AND DADO:** Tiles where shown on drawings shall be laid as specified in relevant clause of MES Schedule, Part-I. Tiles shall be of colour as approved by GE. Tiles shall be laid & fixed with 3 to 6mm thick tile adhesive with notched trowel as per manufacturer's instructions and joints shall be sealed with polymer based grout of matching shade. The tiles shall be laid as specified in clause 13.40.2 & 13.40.3 of MES Schedule Part-I. Sub base in ground floor shall be provided as per clause 33.6 *here in before*.
- 15.14 **PLAIN /CHEQUERED CEMENT CONCRETE TILES**
- 15.14.1 **FLOORS:** Tiles shall be laid over bedding layer of cement mortar (1:6), 20mm average thickness and pointed in cement mortar 1:4. The tiles shall be laid as specified in clause 13.39 of MES Schedule Part-I, with cement slurry @ 3 Kg/Sqm over sub base in ground floor and RCC slab in first & subsequent floors.
- 15.14.2 **SKIRTING AND DADO:** Backing of tiles shall be in 10 mm thick in cement mortar (1:3) with cement slurry @ 3 kg/ Sq. m. Pointing to joints shall be with white cement mixed with pigment of matching shade.
- 15.15 **STONE SETT IN FLOORING/ PAVING/ SAUCER DRAINS:** Where indicated/specified/shown in drawings/Schedule of finishes, Stone set for flooring/Paving/saucer drains shall be laid over 20 mm thick bedding layer in cement mortar 1:3 with joints grouted in cement mortar 1:2 over 150mm PCC M-20 (Design Mix) over 100 mm thick PCC M-15 (Design Mix) over well rammed earth/earth filling. Joints shall be grouted in cement mortar 1:2 mixed with an admixture of metallic floor hardener @ 5% by weight of cement and joints shall be struck flush. Also refer para 13.29 of MES Schedule Part-I.
- 15.16 **PLINTH PROTECTION:** - Irrespective of whatever shown on drawing or not plinth protection shall be provided to all buildings and shall be 50 mm thick PCC 1:3:6 type C-1 over 75 mm thick (Consolidated thickness) hard core of broken stone aggregate of not exceeding 63 mm gauge over rammed earth. Plinth protection shall be laid in 1:20 slope. The concrete shall be laid at stretch not exceeding 3.00 metre in length. Joints/gaps between adjoining slabs at corners and at junction of walls shall not exceed 10 mm in width and shall be sealed with bituminous sealing compound grade 'A'. Top surface of concrete shall be finished even and smooth. Joints shall be provided at not more than 4.00 metre interval at corners and at junctions of walls. Where width of plinth protection is not shown in drawings it shall be 750mm.
- 16 **PLASTERING AND POINTING**
- 16.1 **GENERAL**
- Note :- No plastering shall be done in precast concrete building members.**
- 16.1.1 Plaster (even if external wall face is pointed) and/or skirting/dado shall be returned in jambs, soffits of lintels and windows cills etc. Where plaster on concrete surfaces is shown to match the adjacent wall surfaces, the mix of plaster shall be as for the plastering on brick surfaces.
- 16.1.2 All internal plastered surfaces shall be trowelled to a smooth and even surface without using extra cement and external plastered surfaces shall be finished even and fair.
- 16.1.3 The thickness of plaster mentioned here in after is finished thickness exclusive of dubbing coat. Plastering & dubbing coat shall, however be done in one operation with plaster. The contractor's quoted lump sum/rates shall be deemed to include for plastering as well as dubbing.

- 16.1.4 All corners, angles, junctions and edges shall be truly vertical or horizontal as the case may be and shall be carefully finished. Corners around jambs of opening and junction of walls shall be rounded to minimum radius of 5 mm. 10 mm wide groove at junction of all walls and RCC slabs to the entire thickness of wall plaster shall be provided. Also trowel grooves shall be provided at junction of walls and RCC columns or any other dissimilar material i.e. wooden/steel chowkhats etc.
- 16.1.5 Contractor’s attention is invited to local practices and the local availability of materials like bricks etc., and caters for any extra dubbing required for touching up properly and for smooth and even surfaces. This shall be deemed to have been included in the lump sum or the item rate quoted for plasterwork, as applicable.
- 16.1.6 **GROOVE AT JUNCTION OF RCC WORK AND BRICK WORK:**
- 16.1.6.1 **INTERNAL SURFACES:** 10 mm wide groove at junction of all walls and RCC slabs to the entire thickness of wall plaster shall be provided. Also trowel grooves shall be provided at junction of walls and RCC columns or any other dissimilar material i.e. wooden/steel chowkhats etc.
- 16.1.6.2 **EXTERNAL SURFACES:** No groove shall be provided on external surfaces of building. However, chicken wire mesh 150 mm wide (75 mm on both sides of junction) of size 0.71 mm dia wire with size of mesh 25 mm shall be provided with tinned tacks/Black shoe nails at junction of masonry and RCC Slab/ Columns/ Lintels/ Beams etc on untreated surfaces of building and then plastered as specified.
- 16.2 **MATERIALS**
- 16.2.1 **CEMENT:** - Cement shall be as specified in clause 2 of Particular Specification.
- 16.2.2 **SAND:** - Refer Para 14.5 of MES Schedule Part-I
- 16.3 **WORKMANSHIP:**
- 16.3.1 **INTERNAL PLASTERING:** - All the internal surfaces (except where otherwise specified) of masonry work including inside surfaces of CBs, ward robes , ceiling and loft etc, under Schedule ‘A’ Section–I shall be plastered with 10 mm thick cement plaster in cement mortar (1:6).
- 16.3.1.1 **CEILING PLASTERING:** - All the ceiling surfaces under Schedule ‘A’ Section–I shall be plastered with 5 mm thick cement plaster in cement mortar (1:3) all as specified and directed.
- 16.3.2 **EXTERNAL PLASTERING :** All external masonry surfaces under Schedule ‘A’ Section–I except where otherwise specified shall be plastered with 15 mm thick in cement mortar (1:4) mixed with water proofing compound as per manufacturer instructions. Plaster shall be carried out 150mm below GL.
- 16.3.3 **POINTING:-** Pointing on masonry walls where shown on drawings shall be keyed pointing of cement mortar (1:3) unless any other type of pointing is specified or indicated on drawings.
- 16.3.4 **ROUGH CAST PLASTER:** Wherever rough cast plaster is indicted on drawings, or specified in PS, this shall be all as per relevant clause of MES Schedule. The rendering coat shall be 10mm thick in cement & sand mortar(1:3).
- 17 **FINISHES:-** Irrespective of whatsoever is mentioned hereinafter, work of finishing shall be got executed through paint manufacturer/authorized applicator of manufacturer only. Contractor shall enter into necessary MOU between contractor, said manufacturer of paint and their authorized applicator. Authorized Applicator of paint manufactures shall have valid authorization letter from the manufacturers (Minimum Regional HQs) issued not earlier than 30 days from start date of the said finishing work . The authorization letter needs to also be valid for the complete period of execution. Preparation of plastered or un-plastered surface by scrapping of walls, ceiling, chajja, fins, fascia, parapets etc shall be done by using mechanical sander with internal dust extraction system for clean environment to be certified by the manufacturer . After preparation of surface, approval shall be obtained from Engineer-in-Charge before applying primer and further treatment /coat. Building wise stage passing register shall be maintained. Finishes i.e. cement based paint, oil bound distemper, acrylic water based interior grade primer , interior acrylic emulsion, acrylic water based exterior grade primer, water based primer, water based premium acrylic smooth exterior emulsion etc to surface of walls, ceiling , chajja, fins , fascia, parapets etc shall be applied using airless spray technology and should be capable of operating single spray gun with a suitable hose length. The spray machine should be of reputed manufacturer with pro-guard technology and capability of tracking pressure as well as paint & primer usage. These equipment shall be certified by approved manufacturer. The accessories for applying the finishes shall be able spray in hard to reach areas and penetration of finish on the surface so as to achieve uniform application and quality surface finish.
- 17.1. **COLOUR WASHING**
- 17.1.1 **MATERIALS**
- 17.1.1.1 **LIME:** Refer Para 15.2 of MES Schedule Part-I. Lime used for white washing shall be freshly burnt fat lime (Class C) or magnesium lime (Class D or F), white in colour, conforming to IS-712-1984 specification for building limes.
- 17.1.1.2 **YELLOW AND RED OCHRE:** Refer Para 15.3 of MES Schedule Part-I.

- 17.1.1.3 **BLUE VITRIOL**: Refer Para 15.4 of MES Schedule Part-I.
- 17.1.2 **WORKMANSHIP**
 - 17.1.2.1 **GENERALLY**: Refer Para 15.10 of MES Schedule Part-I
 - 17.1.2.2 **PROTECTIVE MEASURES**: Refer Para 15.10.3 of MES Schedule Part-I
 - 17.1.2.3 **SCAFFOLDING**: Refer Para 15.11 of MES Schedule Part-I
 - 17.1.2.4 **PREPARATION OF SURFACES**: Refer clause 15.12 of MES Schedule Part-I.
 - 17.1.2.7 **APPLICATION OF WHITE WASH**: Refer clause 15.12.5 of MES Schedule Part-I. Unless otherwise indicated, minimum three coats shall be applied so that the surface presents a smooth and uniform finish through which the plaster does not show. The finished dry surface shall not show any signs of cracking and peeling and the whitewash shall not come off readily on the hand, when rubbed. For white wash on ceiling adequate quantity of zinc oxide shall be added to lime wash for achieving pure white shade.
- 17.1.8 **APPLICATION OF COLOUR WASH**: Refer clause 15.12.6 of MES Schedule Part-I. Two coats of colour wash shall be applied over a coat of white wash wherever colour wash is indicated on drawings.
- 17.2 **WASHABLE DISTEMPER**: - Where oil bound distemper/Washable distemper indicated in Schedule of finishes drawings, washable distemper in two coats over a coat of primer shall be provided over one coat of ready mixed water resistant white cement based wall putty to smooth finish including making the surface smooth by sand papering etc. on plastered surfaces.
- 17.2.1 **MATERIALS**: Refer clause 15.6 of MES Schedule Part-I. Make of washable distemper shall be as given in **Appendix 'B'**.
- 17.2.2 **WORKMANSHIP**: Refer clause 15.14 of MES Schedule Part-I. Washable distemper shall be provided after applying of wall putty to smooth finish as per manufacturer's instructions including making the surface smooth by sand papering etc. to the entire satisfaction of Engineer in Charge.
- 17.3 **WHITE CEMENT BASED WALL PUTTY**: Refer clause 15.19.1 of MES Scheule Part-I white cement based putty shall be obtained ready mixed from the approved make as given in **Appendix 'B'**.
- 17.3.1 **PREPARATION OF WHITE CEMENT BASED PUTTY**: Refer Para 15.19.2 of MES Schedule Part-I
- 17.3.2 **PREPARATION OF SURFACES**: Refer Para 15.19.3 of MES Schedule Part-I
- 17.4 **PLASTIC EMULSION PAINT**: Where ever plastic emulsion paint is indicated in Schedule of finishes drawings, it shall be provided in two coats over a coat of primer shall be provided over one coat of ready mixed water resistant white cement based wall putty not less than 01mm thick on plastered surfaces.
- 17.4.1 **MATERIALS**
 - 17.4.1.1 **PLASTIC EMULSION PAINT**: Refer clause 17.16.1 of MES Schedule Part-I. Make of plastic emulsion paint and make mentioned in Appendix 'B'.
- 17.4.2 **WORKMANSHIP**: Refer clause 15.9.2 to 15.9.6.4 and 17.16.2 to 17.16.7.4 of MES Schedule Part-I.
- 17.5 **FIRE/FLAME PROOF PAINT**: Where indicated on drawings, fire/flamm proof paint shall be provided in two coats over a coat of primer all as per manufacturer's instructions. Fire proof paint shall be first quality of make mentioned in Appendix 'B'. Preparation of surfaces shall be carried out all as specified in MES Schedule Part-I.
- 17.6 **CEMENT BASE PAINT**: Where indicated on drawings Cement base paint in two coats shall be provided in the manner as specified.
 - 17.6.1 **MATERIALS**: Refer clause 15.7 of MES Schedule Part-I. Make of cement base paint shall be as given in Appendix 'B'.
 - 17.6.2 **WORKMANSHIP**: Refer clause 15.15 of MES Schedule Part-I.
- 17.7 **ACRYLIC WEATHER PROOF PAINT**: Wherever weather proof paint is shown in Sch of finishes, the same shall be provided in two coats over a coat of primer including preparation of surface and shall be carried out as specified hereinafter.
 - 17.7.1 **MATERIALS**
 - 17.7.1.1 Refer clause 17.17.1 of MES Schedule Part-I. Paint shall be weather proof Acrylic emulsion, exterior grade (100% acrylic) premium quality. Make of paint shall be as mentioned in Appendix '**B**'.

PARTICULAR SPECIFICATIONS (Contd/...)

17.7.1.2 Shade of the paint shall be as approved by GE. Primer shall be as per manufacturer’s instructions. Primer shall be of same make as of paint.

17.7.1.3 The paint and primer shall be brought in manufacturer’s sealed containers only by the contractor duly marked with batch number from the manufacturer.

The contractor shall produce manufacturers test certificate alongwith purchase voucher in original for the paint and primer brought to site before claiming payment for the same. Purchase voucher of paint and primer shall contain the complete description of material, batch No. net weight, test certification No, quantity in each package, No. of packages etc. The quantity of material brought out at site indicating No. of packages, quantity in each package, batch NO., purchase vouchers number test certificate number, date of manufacturing, date of expiry etc shall be entered in MB as “Not to be Abstracted” and shall be signed by the JE, Engineer-in-Charge, GE and contractor.

17.7.1.4 Each lot of paint and primer shall be checked by Engineer-in-Charge and approved by him after verifying from invoice, package, batch No., test certificate, date of expiry etc. Materials shall be incorporated in the work only after **Written approval from GE.**

17.7.2 **WORKMANSHIP:** Refer clause 17.17.2 to 17.17.4 of MES Schedule part-I

17.7.2.1 All brushes, tools, pots, kettles etc., used in carrying out the work shall be free from foreign matter and shall be thoroughly cleaned with hot water and solutions at the end of a day’s work or before use for a different type of material. No finish shall be executed until a sample of the finish to the required colour and shade has been approved by the GE. Where more than one coat is indicated, each coat shall be approved by the GE before the subsequent coat is applied.

17.7.2.2 The colour shall be even shade over the whole surface, if it is patchy or otherwise bad, the work shall be redone by the contractor at his own expense.

17.7.2.3 **PREPARATION OF SURFACES**

17.7.2.3.1 The surface shall be thoroughly cleaned off loose particles, dust, dirt, efflorescence, chalking, grease, mortar drops and other foreign matter. The surface shall be sand papered with grade I abrasive paper and dusted off to achieve an even and smooth surface free from all dust particles. The contractor will use electric blowers for this purpose. If surface so obtained is uneven, it shall be brought to a perfectly even surface by applying putty and allowing it to dry completely and then it shall be rubbed with the abrasive paper and dusted off and finally area cleaned by use of electric blower.

17.7.2.4 **APPLICATION OF PAINT**

17.7.2.4.1 The weather coat emulsion paint shall be applied by brush or roller. No strainer or colorants shall be used. The paint shall be stirred well before use. The primer coat shall not be left without application of top coats for a long period time.

17.7.2.4.2 Two coats of paint thinned as per manufacturer’s instructions shall be applied. The drying period between two coats shall be minimum 4 hours or as per manufacturer’s instructions. The shade shall be approved by GE. The finish of paint shall be smooth matt finish.

17.7.3 **GUARANTEE**

17.7.3.1 The work of applying primer and paint shall be got carried out under the supervision and guidance of accredited representative of the manufacturer. A certificate from their representative shall be obtained by the contractor to the effect that work of painting and primer has been carried out under their strict supervision and as per manufacturer’s instructions. The same shall be submitted by the contractor to GE. **The contractor shall also obtain a written guarantee for effectiveness of paint against fading out, peeling off, crack dust/algae accumulation etc. for 5 (five) years from the certified date of completion of entire work from the manufacturer and submit the same to GE before completion of work.**

17.7.4 **CLEANING**

17.7.4.1 Before commencement of painting work all doors/windows/ ventilators, Balcony railings etc shall be covered property for protecting from the drips of paint/primer while painting, to the entire satisfaction of Engineer-in-Charge. Covering shall be done with tarpaulin or ply wood. After completion, the surrounding area, glass panes, flooring shall be cleaned and all the paint marks on it shall be removed.

17.7.4.2 Contractor’s quoted rates shall be deemed included of the above said provision and nothing extra shall be admissible on this account.

18 **GLAZING**

18.1 **GENERAL:** Glazing shall be as per the drawings and as per manufacturer’s instructions of doors, windows, CSW’s, vents, north light etc.

18.2 **MATERIALS:**

- 18.2.1 **SHEET GLASS:** Refer Para 16.2 of MES Schedule part-I. The sheet glass shall be of ‘B’ quality/ordinary quality for glazing purpose unless otherwise indicated on drawings and shall be of make given in **Appendix ‘B’**. Unless otherwise mentioned on drawings, the nominal thickness of sheet glass shall be 3 mm for panes upto 0.5 Sq. m in size and 4 mm for panes exceeding 0.5 Sq. m in size.
- 18.2.2 **OBSCURED/PIN HEADED GLASS:** - Refer Para 16.3 of MES Schedule Part-I shall be of make given in **Appendix ‘B’**.The window/vents, CSWs panes of toilets/WC’s and baths shall be figured glass, 3 mm thick unless otherwise indicated on drawings
- 18.2.3 **WIRED GLASS:** Refer Para 16.3 of MES Schedule part-I. Unless otherwise mentioned on drawings, the nominal thickness of wired glass shall be 6.4 mm.
- 18.2.4 **GLASS FOR ALUMINIUM JOINERY:** Glass shall be of selected quality (A Quality) and shall be of make given in **Appendix ‘B’**. Unless otherwise mentioned on drawings, the nominal thickness of sheet glass shall be 5 mm. Where tinted glass mentioned in the drawings, the same shall be of shade approved by the GE.
- 18.3 **SILICON :** All glass panes in steel windows/Vents shall be fixed with silicon all around of approved make as per manufacturers instructions.
- 18.3 **WORKMANSHIP:**
- 18.3.1 **PREPARATION OF GLAZING:** - Refer clause 16.7.1, 16.7.2 and 16.7.4 of MES Schedule, Part-I.
- 18.3.2 **GLAZING IN STEEL SURROUNDS:** -Refer Clause 16.7.4 & 16.10 of MES Schedule Part-I.
- 18.3.3 **GLAZING OVER DOORS:** - This shall be provided as shown in drawings and as directed by the GE.
- 18.4 **TOUGHENED GLASS** – Toughened glass to be incorporated in the work shall have the following parameters:-

Thermal shock resistance	Upto 250 ⁰ C
Mechanical strength	Four to five times stronger than annealed glass
Tensile strength	65 MPa
Bending strength	120-200N/mm ²
Surface compression	>
95 MPa Design stress for Architectural Purpose	50
MPa	
Fragmentation	Small round crystals
Conducive for processing	Cannot be cut after toughening
19. **PAINING**
- 19.1 **GENERAL:**
- 19.1.1 **PAINTS AND ALLIED MATERIALS:** Refer Para 17.2 of MES Schedule, Part-I. Painting work-generally-refer Para 17.3 of MES Schedule, Part-I.
- 19.1.2 The contractor shall inform the GE within four weeks of the acceptance of the tender, the brand names of the manufacturers of paint proposed to be used in the works and submit sample thereof well in time and obtain prior written approval of the GE before their use in the work.
- 19.1.3 The contractor shall when so required by the GE produce certificate from the manufactures or their representative to establish that the brands of paint purchased by the contractor from them satisfy the requirements of the relevant Indian Standard.
- 19.1.4 The GE will approve tint of paint if the same is not mentioned in Schedule of Finishes/ drawing.
- 19.1.5 Where painting is indicated in ‘Schedule of Finishes’ it shall be done in three coats i.e. three coats, i.e. two coats (under & finishing) of synthetic enamel paint over a coat of primer. Pink primer & red oxide primer shall be used for wooden and wood based surfaces and steel surfaces respectively unless otherwise specified here in after.
- 19.1.6 Paint and primer shall be of same make/manufacturers.
- 19.1.7 Wire cloth, steel for reinforcement and galvanised steelwork shall be untreated.
- 19.1.8 Other wood & wood based and steel surfaces exposed to view but not covered in ‘Schedule of Finishes’ or their finishing is not specifically indicated in other drawings or specified else where shall be given two coats of synthetic enamel paint over a coat of primer of tint as directed by the GE.

PARTICULAR SPECIFICATIONS (Contd/...)

- 19.1.9 Other wood & wood based and steel surfaces which are not exposed to view but not covered in 'Schedule of Finishes' or their finishing is not specifically indicated in other drawings or specified else where shall be given a coat of primer all as directed by the GE.
- 19.2 **MATERIALS**
- 19.2.1 **SYNTHETIC ENAMEL PAINT:**Synthetic enamel paint and primer shall be of first quality manufactured by the standard firms of make as per **Appendix 'B'**.
- 19.2.2 FRENCH POLISH :**French polish shall be ready made of make mentioned in Appendix 'B'. **All the French polished surfaces shall be treated with PU finish/polish.**
- 19.2.3 PU (POLYURETHANE) POLISH:** PU polish shall be solvent based and of make mentioned in **Appendix 'B'** of shade approved by the GE. Unless otherwise indicated on drawings, PU polish shall be of glossy finish.
- 19.2.4 ALUMINIUM PAINT:** - Aluminium paint shall be conforming to IS: 2339
- 19.3 **WORKMANSHIP**
- 19.3.1 **PAINTING-WOOD OR WOOD BASED SURFACES: -**
- 19.3.1.1 **SYNTHETIC ENAMEL PAINT:** The wood or wood based surfaces where indicated on drawings or elsewhere to be painted with synthetic enamel paint it shall consist of two coats of synthetic enamel paint over a coat of pink primer including preparation of surfaces all as specified in clause 17.6 of MES Schedule, Part-I.
- 19.3.1.2 **FRENCH POLISH :** The wood or wood based surfaces where indicated to be French polished it shall be polished with French polish all as specified in clause 17.7.4.2 & 17.7.4.3 of MES Schedule, Part-I.
- 19.3.1.3 **PU (POLYURETHANE) POLISH/FINISH:** The wood or wood based surfaces where indicated on drawings or elsewhere to be treated with PU finish/PU polished,it shall consist of the following:
- (a) Sanding the wood along the grain of wood with sand paper and dust it off all as directed by the Engineer-in-Charge.
 - (b) The pores shall be filled with filler all as all as specified in clause 17.7.4.2 of MES Schedule, Part-I
 - (c) Vacuum or wipe the wood to remove all dust and lint from the surface.
 - (d) Apply a thin coat of polyurethane all as per manufacturer's recommendation and allow it to dry/cure.
 - (e) Repeat the sanding, cleaning and application step at-least three more times.
 - (f) Before final application sand the surface with wet & dry paper.
 - (g) Apply final coat of polyurethane all as per manufacturer's recommendation and allow it to dry.
 - (h) Buff the wood with buff wheel.
- 19.3.2 **PAINTING-STEEL & IRON WORK:**
- 19.3.2.1 **SYNTHETIC ENAMEL PAINT:** - The steel or iron surfaces where indicated on drawings or elsewhere to be painted with synthetic enamel paint it shall consist of two coats of synthetic enamel paint over a coat of red oxide primer including preparation of surfaces all as specified in clause 17.8 of MES Schedule, Part-I.
- 19.3.2.2 **ALUMINIUM PAINT:** - Where aluminium paint is indicated on drawings it shall be done in two coats over a coat of red oxide primer including preparing the surface.
- 19.3.3 **TARRING:** - Refer clause 17.12 of MES Schedule Part-I. The back of pressed steel/wooden chowkats in contact with brick work/plaster etc. and also wooden/steel surfaces embedded in walls shall be given two coats of tar. Lugs/ hold fasts shall be given two coats of tar and sanded.
- 19.3.4 **CEMENT SLURRY:** - Portions of MS bolts, lugs, anchor bolts and anchoring other than anchor bolts etc. embedded in concrete shall be treated with neat cement slurry.
- 20 **MISCELLANEOUS**
- 20.1 **GENERAL:** - Specifications for miscellaneous items are for guidance only. Drawings of respective items must be studied to avoid any likely ambiguity. All fittings and fixtures shown on drawings unless omitted specifically shall be provided as per details given in the drawings and their cost is deemed to be included in the lump sum cost of building in Schedule 'A' Section-I.
- 20.2 **STAINLESS STEEL SINK WITH DRAINAGE BOARD:** - Where as shown on drawings stainless sink single bowl with single drainage board shall be of overall size 915mmx460mm with bowl size 410mmx330mmx160mm, double bowl with single drainage board shall be of over size 1370mm x 460mm with bowl size 410mm x 330mm x 160mm and double bowl with double drainage board shall be of over size 1750mm x 460mm with bowl size 410mm x 330mm x 160mm make as mentioned in Appx 'B'. The thickness of sheet shall be 1.00mm.
- 20.3 **STAINLESS STEEL PLATE RACK:**-Stainless steel plate rack of size 1700x300x600mm of make mention in Appendix "B" shall be provided all as specified and shown in drawings. Thickness of sheet shall be 1.00 mm.

- 20.4 **ELECTRIC METER BOX, SWITCH BOX:** - Opening for electric meter box, main switch box (MB) and sub main board (SB) shall be provided as per details shown on drawings and as directed by Engineer-in-Charge. Exposed steel surfaces shall be painted with two coats of synthetic enamel paint over a coat of primer of tint as directed by the GE in case factory made paint is not provided. The hidden embedded surfaces of boxes shall be given two coats of bituminous paint.
- 20.5 **EXHAUST FAN:** - Opening for exhaust fan shall be provided as per details shown on electrical drawings. Exhaust fan shall be fixed all as per details attached on drawings
- 20.6 **2 & 3 TIER RCC SHELVES** : - RCC shelving shall be provided as per details shown on drawing No STD-1112, sheet No 1/1. Whatever constructional details are shown on this drawing, these shall be adopted as specified here in before. Platform shall be provided as per details shown on Drawing. These shall be finished with glazed tiles of size 300x200mm, 6mm thick on top and sides of shelves.
- 20.8 **RCC JALI** :- RCC jali shall be precast RCC (1 cement, 2 sand, 4 stone aggregate 6 mm nominal size), jali reinforced with 3 mm dia steel wire all as per shown in drawings. The precast jali unit blocks shall be jointed / set in cement and coarse sand mortar 1:3. Exposed surfaces of jali shall have fair and even surface. Thickness where not shown on drawing shall be 50mm. In the event of deviation, RCC jali shall be priced under item of SSR subject to contractor's quoted percentage under respective item of schedule 'A'.
- 20.9 **VITREOUS CHINA SINK:** - Where shown on drawings it shall be of white vitreous china and shall be fixed as shown on drawings. Unless otherwise shown on drawings the size of sink shall be 600 x 450 x 150 mm. Pair of angle iron brackets of section / size as directed by Engineer-in-charge and 40 mm bore GI waste pipe with CP waste of suitable size shall be provided.
- 20.10 **RCC WORKING SHELF, PREPARATORY TABLE, COUNTER AND SERVICE COUNTER WITH GRANITE TOP:** - These shall be provided all as shown on drawing. Mix of reinforced cement concrete shall be M-25 (Design Mix). Constructional details of RCC shelf shall be adopted as shown in as per relevant STD Drg. Specifications for granite stone shall be adopted as specified here in before clauses.
- 20.11 **PLANTERS:** - These shall be provided all as shown on drawings in conjunction with the specifications of relevant trade sections given herein and in MES Schedule Part-I.
- 20.12 **MEAT HOOK AND ROD :-**
- 20.12.1 **ROD:** - Rod shall be made of GI Pipe, 40 mm dia, heavy duty / grade. GI Pipe shall conform to specifications conforming to IS-1239, (Part-I) 1979. GI Pipe shall be ISI marked. GI pipes shall be procured by the contractor either directs from the manufacturer or from the authorized dealers/authorized distributor of the manufacturer as per appendix 'B'.
- 20.12.2 **PCC BED BLOCK:** - PCC block of size 216 mm x 216 mm x 150 mm for 216 mm thick brick wall and size 115 x 150 mm for half brick wall shall be provided for embedding GI pipe rod. GI pipe rod shall be embedded in PCC block as shown on Drawing. Mix of concrete block for embedding GI rod shall be (1:2:4), type B-1, using 20 mm graded crushed stone Aggregate, nominal mix.
- 20.12.3 **STAINLESS STEEL MEAT HOOK:** - Stainless steel meat hook shall be made of 10mm dia stainless steel. Shape and length of meat hook shall be provided as shown on drawing.
- 20.13 **BLANK**
- 20.14 **GROUND SINK:** - 50mm sunken floor shall be provided in ground sink as shown on drawing. Ground sink shall be provided 70mm x 50mm PCC curb as per aforesaid drawing. Mix of PCC curb shall be (1:2:4) type B-1, using 20 mm graded crushed stone aggregate
- 20.15 **NOTICE BOARD/DISPLAY BOARD** :- The display board shall be provided all as shown on the drawing with the following specification:-
- (a) Wooden frame shall be of First class hard wood (teak).
 - (b) Soft Board, 12mm thick fixed to wall as shown on the drawing with green blazer on top.
 - (c) All exposed wooden surfaces shall be finished with two or more coats of French polish.
- 20.16 **WHITE MARK BOARD:** - Wherever shown on Drawing, white mark board with aluminum frame shall be as per trade pattern, size of white mark as approved by GE.
- 20.17 **MS RUNGS** : - Wherever shown on Drawing, constructional details of MS rungs shall be followed as specified hereunder :-

PARTICULAR SPECIFICATIONS (Contd/...)

(i) **MS RUNGS** :- 16mm dia round bar rungs made to shape as shown on drawing. Centre distance between two MS Rungs shall be 300mm as shown on drawing NO CESK-1188(c), Sheet No-1/1. MS rungs shall be embedded in PCC block of 450mm x 150mm 75mm in PCC (1:2:4), type B-1, using 20mm graded crushed stone aggregate. In case number of rungs is not shown on drawings, the MS rungs shall be provided in two columns staggered starting from 1500mm from the plinth protection top to the roof top of the building keeping centre to centre distance as mentioned above.

20.7 **FINISHES** :- Portion of MS rungs embedded in cement concrete coming in contact of brick work shall be tarred and sanded as specified here in before. All surfaces of MS rungs exposed to view shall be given two coats of synthetic enamel paint

20.18 **RAMP (DOUBLE)** :- Double ramp shall be provided all as shown on drawings in brickwork with cement mortar 1:4 all as per refer PS clause 5 here in before. Foundation concrete shall be in PCC (1:4:8) type D-2. PCC for floors shall be Type B-1 (1:2:4) of thickness mentioned on drawings. Also refer specifications of relevant trade sections given herein and in MES Schedule Part-I.

20.19 **STEEL GATE**: The steel gate and RCC pillars shall be fabricated/ constructed to the dimensions as shown on drawings No. STD-1422. RCC shall be M-25 grade (Design mix) & steel shall be of Fe-410-W (Grade E-250) quality 'B'. 20mm thick machine cut, table rubbed and polished jet black granite shall be laid over 20mm thick cement screed in cement mortar 1:4 on all the four sides and top of RCC pillars. All the exposed steel surfaces shall be applied two coats of synthetic enamel paint over a coat of red oxide primer after preparation of surfaces. Shade of paint shall be as decided by GE.

20.20 **CONDUIT WITH BRACKETS FOR HANGING CLOTHES**: In case not mentioned/shown elsewhere conduit shall be stainless steel 20mm dia having wall thickness not less than 1.60 mm with sockets all as approved by GE

20.21 **CUP BOARD(S)**

20.21.1 **GENERAL**:

20.21.1.1 Unless otherwise mentioned on drawings or in specifications here in below, wooden members shall be of second class hard wood (Except Mango).

20.21.1.2 Wherever lock arrangement shown on cup board drawings, 4 liver, 50 mm size brass mortice lock shall be provided.

20.21.1.3 Hold fast of size & shape shown on drawing shall be embedded in PCC block of size length of hold fast + 5 cm x width of wall x 15 cm duly applying a coat of coal tar and sanding. In case of RCC Column/wall frame shall be fixed with dash through bolt of appropriate size.

20.21.1.4 Other than laminated portion of Cup board shall be painted/polished as described in "Schedule of Finishes" drawing. Also refer P.S. clause 17 here in after.

20.21.1.5 Panels of CB shutter shall be all as shown in drawing. Veneered partical board shall be of exterior grade and shall have commercial faces if not indicated otherwise in the drawing.

20.21.1.6 Fitting fixers for cup boards like handles, tower bolt and hasp and staple etc shall be of aluminium anodized.

20.21.2 Unless otherwise shown on plan the cupboard CB-II shall be provided as per TD-210(C) sheet 1/1.

20.22 **BRICK STEPS** :- Risers of brick steps where PCC flooring is to be provided over the treads of brick steps shall have 15-mm thick cement plaster (1:3) finished even and smooth. In case of PCC topping laid over treads of brick steps, it shall be 40-mm thick PCC (1:2:4) type B-1 and of chequered finish. In case not specified elsewhere the walls on the sides of bricks steps wherever shown on drawings shall be plastered with 15 mm thick cement mortar (1:4) and shall be treated with two coats of cement based paint. Where other type of finishing is indicated in the drawings, the same shall be provided to match with the specifications given in here in before for horizontal and vertical surfaces i.e treads and risers.

20.23 **SIGN BOARD**

The sign post shall be fabricated and executed at site as per Drg No TD- 182 (C) sheet 1/1 but stainless steel pipe 50mm bore of wall thickness not less than 1mm shall be provided in lieu of light grade GI pipe and 2mm thick stainless steel sheet shall be provided in lieu of 3mm thick MS sheet. No finish shall be provided to pipe and sheet. Rest of work shall be executed as indicated on drawings and writing letters shall be with reflective tape on both side all as directed by GE.

21. **SANITARY AND TOILET FITINGS**

21.1 **GENERAL**

21.1.1 All sanitary appliances shall be vitreous china (star white or ivory colour or equivalent shade as approved by the GE) in makes / manufactures mentioned in Appendix 'B', first quality and shall conform to IS-2556 for General requirements and the specific requirements as mentioned in relevant clause of MES Schedule. However flushing cistern for squatt pattern water closet shall be PVC as specified.

- 21.1.2 Flush pipe and socket of flushing rim of WC shall be jointed with white and red lead cement (White and red lead in equal portion by weight) and linseed oil added to form paste.
- 21.1.3 'P' or 'S' trap shall be cast iron & jointed to WC pan with cement joints as specified in clause 18.48.5 of MES Schedule.
- 21.1.4 The sizes given here in after are approximate sizes. The size of sanitary fittings to be provided shall be the nearest size as per manufactures catalogue as approved by GE.
- 21.1 **WATER CLOSET**
- 21.1.1 **WATER CLOSET SQUATT PATTERN OR INDIAN TYPE (WC)** Where ever squatt or Indian type water closet(WC) is shown in the drawings it shall consist of the followings: -
- (a) Squat pattern water closet shall be Orrisa Pattern of size 580 x 440 mm with integral foot rests conform to IS:2556 (Part-III). WC shall be provided with long arm cast Iron 'P' trap so that joint is avoided inside sunken portion as well as in walls and outlet straight away come out of wall. The pan shall be set in the lime concrete (1:2) at least 15 cm around and finished just below the rim to receive the specified thickness of floor finish.
 - (b) Provision of 10 litre discharge capacity low level virgin PVC flushing cistern with all accessories and fixing arrangements/accessories as recommended by manufacturers.
 - (c) 32 mm bore PVC flusing pipe/bend.
- 21.1.2 **WATER CLOSET PEDESTAL PATTERN OR EUROPEAN TYPE(EWC)/ANGLO INDIAN WC** Where ever pedestal or European type (EWC) / Anglo Indian WC water closet is indicated in the drawings it shall consist of the followings: -
- (a) Water closet wash down pattern of height 40 cm with vitreous china with 'S' trap in ground floor and providing with long arm CI 'P' trap so that joint is avoided inside sunken portion as well as in walls and outlet straight away come out of wall in intermediate floors all as per IS-2556 (Part-II 1881). The closet shall be fixed in position with brass screws of suitable length.
 - (b) Plastic seat and cover with flat underside solid moulding closed form pattern shall be as per IS: 2548 (Part-I) and shall be of shade approved by GE and fixed with chromium-plated hinging device.
 - (c) 10 litre capacity low level PVC flushing cistern as specified in clause 18.99 of SSR Part-I with all accessories and fixing arrangements/ accessories as recommended by manufacturer.
 - (d) 32 mm bore PVC flush pipe bent to required shape.
 - (e) Brass chromium plated/stainless steel jet spray set shall be provided all as specified in MES Schedule Part- I.
- 21.1.3 **WATER CLOSET WALL HUNG TYPE** Where ever wall hung water closet (WC) is shown in the drawings it shall consist of the followings: -
- (a) Unless otherwise indicated on drawings wall hung pattern water closet shall be of make CERA (Model Clair) or equivalent in makes mentioned in **Appendix 'B'**.
 - (b) Flushing accessories/arrangements as recommended by the manufacturer's of wall hung WC.
- 21.2 **WASH HAND BASIN**
- 21.2.1 **COUNTER TOP WASH HAND BASIN :** Where ever counter top wash hand basin is shown to be provided in the drawings it shall consist of the followings: -
- (a) Counter top wash hand basin shall be vitreous china, oval shape of size 520 x 430 mm size fixed by cutting granite stone slab to shape as required and as directed by GE.
 - (b) Brass chromium plated waste fittings; 32mm bore GI waste pipe concealed in wall with CP stainless steel bottle trap.
 - (c) Stainless steel soap dish shall be provided as approved by the GE.
 - (d) Wherever indicated on the drawing, full length mirror over WHB shall also be provided.
- 21.3.1 **FLAT BACK WASH HAND BASIN:** Where ever flat back wash hand basin is shown to be provided in the drawings it shall consist of the followings: -
- (e) Vitreous china, flat back Wash Hand Basin of size 550 x 400 mm size, fixed in position over & including GI brackets.

PARTICULAR SPECIFICATIONS (Contd/...)

- (f) Brass chromium plated waste fittings; 32mm bore GI waste pipe concealed in wall with CP stainless steel bottle trap.
- (g) Stainless steel soap dish shall be provided as approved by the GE.
- (h) Wherever indicated on the drawing, mirror of size indicated on drawing over WHB shall also be provided.

21.2 **URINAL (UR):** - Where urinal (UR) is shown to be provided in the drawings, it shall consist of the followings: -

- (a) All urinals shall be Half stall type, flat back vitreous china urinal of size 635 mm x 215 mm x 420 mm.
- (b) **URINAL PARTITION:** Where Urinal partition or division plate is shown on drawings, it shall be of vitreous China 700mm x 340mm size.
- (c) Heavy duty brass chromium plated waste fitting with PVC 32 mm bore waste pipe.
- (d) Virgin PVC 32 mm bore waste pipe.
- (e) Cast copper alloy push type flushing fittings & accessories.

39.5 **SOAP DISH:** - Soap dish shall be of mild steel chromium plated and provided as shown on drawings.

21.6 **BOTTLE TRAP:** The bottle traps shall be all as specified in clause 18.22.1 of MES SSR Part- I.

21.7 **FULL LENGTH MIRROR:** - Where full length/size mirror is shown on drawings it shall be not less than 5.5 mm thick and of dimensions of mirror as shown on the drawings and as directed by the GE. In case the dimensions of mirror are not indicated in drg. the length of the mirror the same shall be equal to the length of the counter of WHB and height shall be 75 cm.

21.8 **SOAP NICHE :-** Soap niche shall be provided of size as shown on drawings or at place as directed by the Engineer-in-Charge and all sides of niche shall be finished as per the surrounding dado finish unless otherwise indicated/shown on drawings

21.9 **NICHE WITH WASH HAND BASIN: -** Where glass or vitreous china shelf not indicated with wash hand basin a niche of size 450 x 200 x 100mm shall be provided. All sides of niche shall be lined to match with adjoin specification/surfaces

21.10 **LOOKING MIRROR: -** Looking mirror of polished sheet glass 5.0mm thick of size 600mm x 450mm, mitred on corners & edges, fixed over 6mm commercial plywood BWR grade with PVC frame.

21.11 **LOOKING GLASS: -** Mirror of polished sheet glass 5.0mm thick of size specification for Backing of the mirror shall be of 6mm thick commercial plywood BWR grade with aluminium frame all round. This shall be fixed on wooden frame and fixed to rawl plug with screw as indicated on the drawing. Where more than one looking glass have shown side by side on the drawings, independent glass shelf be shall provide but continuous mirror of approx. length and of width shown on drawing shall be provided.

22. **PLUMBING**

22-.1 **GENERAL:** Plumbing work shall be carried out as specified in clauses 18.13 to 18.23 of MES Schedule Part-I and shall be laid all as shown on drawings. However no sunken slab will be provided, all the plumbing work for other than ground floor will be suspended on the RCC slab with suspending arrangement shown in TD drawing. The pipe will be fixed in RCC slab by placing sleeves exactly of size of pipe and fixed with the chemical den seal or as approved to avoid further any leakage / seepage in slab/ceiling. 100mm bore CI vent pipe with cowl shall be provided and shall be taken 180 cm above roof level for RCC roofs and of appropriate height in case of sloped sheet roofs. All the suspended pipes will pass through the brick or AAC masonry wall. No structural member e.g Beam / column will be allowed to puncher to cross the pipe. The suspended length of pipe below the slab should be such that no roof beam will be damaged while crossing the pipe. The minimum slope of 1: 20 should be maintained. All other joints to pipe and fittings shall be lead joint as per Clause 18.48 of SSR Part-1.

22.2 **SOIL, WASTE, VENT PIPES, FITTINGS AND ACCESSORIES:** These shall be of UPVC (SWR) Type 'B' pipes conforming to IS 13592-1992 .Rubber rings for pipes and fittings shall conform to IS 5382-1985. UPVC (SWR) fittings shall be used as per recommendations of the manufacturer of the pipes. In case there is no IS code for the fittings, these shall generally conform to the requirements of BS 4515 DIN 19531 and DIN 19534. UPVC (SWR) pipes and fittings shall be strong, dimensionally stable and shall be free from defects.

22.3 **BLANK**

22.4 **NAHANI/FLOOR TRAP:** Refer clause 18.25 and 18.26 of MES Schedule Part-I. Nahani / Floor traps shall be provided in situations as shown on drawings. Floor trap/ Nahni trap shall be provided only for ground floor. All other floors except ground floor will have 'P' trap in the under suspended pipe of 100mm bore to maintain water seal with CP steel gratings on the floor.

- 22.5 **SHORTER LENGTHS:** Except for WC connections, the contractor may use pipe, pieces without sockets in shorter lengths (less than one pipe length) if approved by the GE and connect these to pipes/fittings with double sockets/collars, including additional joints as specified above without any extra cost to the Government.
- 22.6 **GULLY TRAPS:** Where gully trap shown on drawings square mouthed salt glazed stone ware of size 150mm x 150mm size with 150 mm dia outlet type 'P' complying with the requirement of IS:651-1980 with bituminous coated cast iron perforated grating of suitable size shall be provided. Gully traps shall be set in PCC 1:3:6, type C-2, block measuring 45 cm square thickness of bed concrete shall be 10cm. Jointing to drain pipe shall be done in cement mortar 1:1. PCC (1:2:4) type B-1 kerb shall be provided. **TRENCHES FOR PIPE LINES UPTO FIRST MANHOLE:** - The excavation in trenches in soil (mentioned in Particular Specifications clause 3 here in before) shall be done as per the width given in SSR Part-I and depth as required at site. The trenches shall be back filled after testing of pipes with excavated earth in layers not exceeding 250 mm and surplus spoil disposed to a distance not exceeding 50 metre.
- 22.6 **WORKMANSHIP**
- 22.6.1 **GENERAL REQUIREMENTS:-** Refer clause 18.22 of MES Schedule Pt-I.
- 22.6.2 **JOINTING & FIXING OF CI PIPES:** - Refer clause 18.67.2 to 18.67.2.1 and 18.67.4 to 18.67.6 of MES Schedule Part-I. All the joints between CI pipes and fittings (except the joints of CI soil, waste pipes/ fittings with CI vent pipes/ fittings and CI vent pipes/fittings with CI cowl which shall be with cement joints) shall be with lead joints.
- 22.6.3 **TESTING:** - All soil waste & Vent pipes and all fittings shall be tested as specified in Clause 18.67.7 of MES Schedule. Record of Testing shall be maintained separately for each building.

23. **RCC UNDER GROUND TANK AND RCC UNDER GROUND SUMPS**

RCC water tank/Underground sump shall be designed,executed and tested as per IS 3370 including internal and external water proofing treatment.

TESTING OF RCC SUMPS

All arrangements for testing shall be made by the contractor as directed by the Engineer-in-charge. Testing shall be carried out immediately after the removal of formwork and before application of internal water proof treatment. The cost of testing shall be deemed to be included in the lump sum cost quoted by the contractor .

Water shall be supplied slowly at the rate of 300mm to 450mm depth per day and the result closely observed both from the angle of structural stability whether any crack is being noticed in the structure at the time and from the point of view of water tightness. At end of the operation that is when fully supply level is reached all value shall be closed tightly. Water level shall be properly marked on the wall and leakage shall be thoroughly checked and it will be ensured that there is no water level. After 24 hours, 48 hours and 72 hours the water level shall be checked and the drop in level shall be recorded for water tightness. The drop in water level in 24 hours shall not exceed 6mm.

The work shall be treated as completed only after satisfactory test is carried out and a certificate of testing duly signed by GE is issue. The period of completion shall be deemed to include the period required for testing

The contractor shall be fully responsible for water tightness of the sumps.

24. **SITE DEVELOPMENT WORKS :** Refer relevant items of Schedule 'A' in conjunction with the specifications of relevant trade sections given here-in-before and in MES Schedule Part-I.

25 **INTERNAL WATER SUPPLY**

25.1 **MATERIALS:**

- 25.1.1 **GENERAL:** Materials for water supply works shall be of make mentioned in **Appendix 'B'**.

- 25.1.2 **MILD STEEL GALVANISED TUBES (PIPES) & FITTINGS:** - Refer Para 18.4 of MES Schedule Part-I. Pipes and fittings shall be ISI marked.

- 25.1.3 **POLYETHYLENE ALUMINIUM POLYETHYLENE (PL-AL-PE) PIPES:** Refer relevant item of Schedule 'A' and note (a) to (d) for item 2549 and 2550 of MES Schedule Part-II.

- 25.1.4 **BIB TAPS AND STOP VALVES:** - Refer clause 18.14 and 18.15 of MES Schedule Part-I. The handles shall be crutch type. Handle and spindles may be cast brass. Washers to be used for this purpose shall conform to clause 18.18 of MES Schedule Part-I.

- 25.2

WORKMANSHIP:
- 25.2.1

GENERAL REQUIREMENTS: - Refer clause 18.40 and 18.41 of MES Schedule Part-I. General layout of water supply work is shown in drawings. The exact position of water supplies line and fittings shall be as directed by Engineer-in-Charge. The contractor shall use proper bends/elbows/tees at turning/corners etc. Bending of pipes is not permitted. The contractor shall provide screwed plug to all open ends of pipe fittings at the end of day work and at time when work is stopped.
- 25.2.2

EXCAVATION AND PREPARATION OF TRENCHES: - Refer specification here in before and clause 18.42 and 18.50 of MES Schedule Part-I.
- 25.2.3

LAYING OF GI PIPE: - Refer Paras 18.50, 18.51 and 18.56 of MES Schedule Part –I. Unions shall be provided at suitable places as directed by Engineer-in-Charge so that long lengths of pipes are not disturbed during cleaning changing/repair etc. Uncovered threaded portion of pipe shall be painted with approved paint.
- 25.2.4

FIXING WATER SUPPLY FITTINGS: - Refer Paras 18.62 & 18.66 of MES Schedule Part-I.
- 25.2.5

TESTING: - Refer Paras 18.50.4 and 18.55 of MES Schedule Part-I.

26.

INTERNAL ELECTRIFICATION

- 26.1

GENERAL: - Refer clause 19.2 of MES Schedule Part-I.
- 26.1.1
- 26.1.1

Before the execution of the work in internal wiring, the contractor is to submit complete layout plan of each building showing the location of main/sub-main switch boards, distribution board/Sub-distribution board's with complete wiring circuit diagram to the entire satisfaction of the GE.
- 26.1.2

After the execution of the work and testing of the Internal Electric Installation, the contractor shall furnish complete certificate as per Appendix 'G' (E/M) attached. 10% of the amount of Internal electrification is to be kept reserved in addition to other permissible retention money from the running RAR's till the submission of completion certificates as per Appx 'G' given to the department. (Annexure I to Appx 'G' (E/M) is also attached).
- 26.2

No price adjustment in prices shall be made on account of change in location of fittings and accessories shown on drawings.
- 26.2.1

SAMPLE APPROVAL: - All suitable/sockets/Data sockets, light fixing to be incorporated in the work shall be of highest standard quality as specified and shall confirm to IS specifications.
- 26.3

The materials shall be as follows: -

Srl. no	MATERIAL	Refer to Paras of MES Sch., Part-I
(a)	Cable, Cords and Earthing leads.	19:24
(b)	Cables for internal wiring for light power &sub-mains	19.25
(c)	Flexible Cords, Twisted with Copper Conductors	19.27
(d)	Teakwood battens, blocks and boards.	19.28
(e)	PVC Conduit and conduit fittings.	19.29
(f)	Wooden Plugs/Gutties and rawl plugs	19.30
(g)	Screws and fastenings link clips	19.19
(h)	Ceiling rose	19.32
(j)	Shades	19.33
(k)	Bulkhead fittings	19.34
(l)	Fluorescent Tube Lamps, Fittings and Accessories	19.35
(m)	Mercury Vapour Lamp	19.36
(n)	Tumbler Switches	19.37
(o)	Socket outlets	19.40
(p)	Lamp holder	19.41
(q)	Street Light Fittings	19.42
(r)	Distribution Fuse Boards	19.44
(s)	MCBs	19.46
(t)	Light Fittings	19.47

- 26.4

MODULAR SWITCHES & SOCKETS: - Modular Switches & sockets shall be ISI marked and of makes mentioned in **Appendix 'B'**.
- 26.5

DISTRIBUTION FUSE BOARD: - Refer Paras 19.44 and 19.46 of MES Schedule Part-I. Miniature circuit breaker as described in Schedule 'A' shall be provided for distribution of circuits with proper current and rupturing capacity rating. Distribution board shall be of same make as make of MCB/Isolators/RCCB's.

PARTICULAR SPECIFICATIONS (Contd/...)

- 26.6 **MCB/ISOLATOR**: - MCB and Isolators shall be manufactured by any one of the manufacturer mentioned in Appendix 'B' here in after. Fixing of MCB and Isolators shall be done as per manufacturer's instructions. The contractor shall procure MCB's and Isolators either direct from the manufacturer or his distributor, as approved by the GE. MCB's/ Isolators /RCCB's shall be of make as of Distribution board.

WORKMANSHIP

- 26.6.1 **GENERAL**: - Refer clause 19.101 to 19.111 of MES Schedule Part-I.
- 26.6.2 **FITTINGS**: - Refer clause 19.113 of MES Schedule Part-I & Schedule 'A'.
- 26.6.3 **ACCESSORIES**: - Switches, lamp holders, ceiling roses, socket outlet- Refer para 19.114 of MES Schedule Part-I.
- 26.6.4 Attachment of fittings and accessories: Refer clause 19.115 of MES Schedule Part-I.
- 26.7 **INTERNAL WIRING**: - Refer clause 19.125 to 19.132 of MES Schedule Part-I. Wires for power and light circuits will be drawn in separate conduits as per Para 19.102.1 of MES Schedule Part-I. Cable for point wiring shall be flame retardant low smoke (FRLS), PVC insulated and unsheathed, 1100 volt grade ISI 694 marked, TEC and FIA approved.
- 26.7.1 Terminal points of light and power plugs (Socket outlets) Switches, regulators, fittings etc shall terminate in recessed mild steel/pressed steel boxes fixed flush to the walls, top covered with 3mm thick plastic laminated Bakelite sheet instead of wooden blocks. The boxes shall be painted internally with two coats of synthetic enamel paint over a coat of red oxide primer. External surfaces in contact with brick work/RCC shall be painted with one coat of anti-corrosive paint.
- 26.8 **EARTHING**: - Refer clause 19.137 to 19.145 of MES Schedule Part-I. The contractor's special attention is drawn to Para 19.140 of SSR, Part-I (Specifications), according to which, in case, the desired earth electrode resistance can not be obtained on completion of test result of earthing and there is no option of site, then the ARTIFICIAL TREATMENT OF SOIL shall be done by the contractor, as specified in SSR Part-I, mentioned here in before, without any additional cost to the Govt.
- 26.9 **CONDUIT AND CONDUIT FITTINGS**: - Refer clause 19.125 of MES Schedule Part-I.
- 26.9.1 All internal wiring shall be carried out with multi-stranded copper conductor PVC sheathed/un-sheathed cable.
- 26.9.2 The installation shall be accepted on satisfactory performance of the tests mentioned in MES Schedule, Part-I.
- 26.10 **TESTING**: - On completion of the internal wiring, testing for each building shall be carried out as per clause 19.146 of SSR Part-I and signed both by contractor and Engineer-in-Charge.
- 26.11 **CIRCUIT DIAGRAM**: - Circuit diagram for each building shall be prepared by Contractor in duplicate and deposited with Engineer-in-Charge.
27. **SEWAGE DISPOSAL**
- 27.1 **GENERAL**: Specifications for various trades e.g. excavation earth work concrete, brickwork, steel and iron work, plastering and pointing etc, required for sewage disposal work shall be as already given here-in-before under respective trades with modifications, amplifications, additions etc, as given here-in-after and/or in respective section of Schedule 'A' for sewage disposal.
- 27.1.1 Excavation in trenches for sewer shall be allowed to the extent of authorised width as specified in para 3.2.3 of MES Schedule Part-II or that actually excavated whichever is less and shall be measured and paid accordingly.
- 27.1.2 Beds of trenches shall be watered and well rammed and any depression thus formed shall be filled with approved earth to the required level and slopes directed by Engineer-in-Charge.
- 27.1.3 Refilling of trenches shall be done as specified in clause 3.20 of MES Schedule part-I Refilling of trenches on the top and around the pipes up to 45 cm from the crown of the pipe or from top of the concrete encasing shall be done with selected approved earth only in layers not exceeding 25 cm in thickness. The balance of the trenches may be filled up with mixture of earth and stone/gravel/boulders in layers not exceeding 25 cm.

- 27.2 Reinforced concrete pipes shall be non-pressure type, class NP2 and shall conform to IS 458-2003. Specification for concrete pipes with or without reinforcement. Bends, junctions and specials shall be of cast iron and of suitable size . The ends of concrete pipes shall be suitable for butt end joints. The butt ends shall be prepared for collar joint with grooves. The pipe joints shall be capable of withstanding the same pressure as the pipe. Concrete pipes shall be straight and free from cracks excepting craze cracks. The ends of pipes shall be square with their longitudinal axis so that when placed in a straight line in the trench, no opening between ends in contact shall exceed 3 mm in pipes upto 600 mm diameter and 6 mm in pipes greater than 600 mm in diameter. The outside and inside surfaces of pipes shall be smooth dense and hard and shall not be coated with cement wash or other preparation. The pipe shall be free from defects resulting from imperfect grading of the aggregate, missing or moulding. Pipe shall be free from local dents or bulges greater than 3 mm in depth and extending over a length in any direction greater than twice the thickness of barrel. These pipes shall be laid on PCC beds as mentioned laid to falls including packing under haunching against the sides of the pipes after they are laid, tested complete all as specified. Thickness and width of PCC beds, packing haunching etc, shall be all as mentioned in MES Schedule Part-II. Also refer Paras 18.28, 18.68 to 18.70.1 of MES Schedule Part-I.
- 27.3 **CONCRETE:** Mix and grade of concrete shall be as specified in respective items of schedule 'A' for sewage disposal. Thickness and width of PCC bedding, packing, surrounding and haunching for SGSW pipe shall be all as mentioned in MES Schedule, Part-II.
- 27.4 **BRICK WORK:** Brick work shall be with sub class 'B' bricks as specified here-in-before using old size bricks.
- 27.6 **PLASTERING AND POINTING:** Refer relevant item of Annexures.
- 27.7 **PAINTING:** All steel and iron work such as hold fasts, steps, shall be treated with two coats of coal tar/black paint conforming to IS-280 of 1961.
- 27.8 **MANHOLE COVERS AND FRAME:**Manhole covers with frame shall be all as per details under relevant section of Annexures.
- 27.9 **TESTING**
- 27.9.1 Sewers shall be tested by water test as specified in Para 18.79 of MES Schedule, Part-I. Manholes shall be tested for water tightness as directed by Engineer-in-Charge. Record of testing shall be maintained as specified in para 18.79.5 of MES Schedule Part-I.
- 27.9.2 Cost of testing as specified above shall be deemed to have been included in the rates/amount quoted by the contractor and nothing extra shall be paid for carrying out tests. If any pipe burst during testing the same shall be replaced & made good by the contractor without any extra cost to Govt.
28. **AREA DRAINAGE WORKS:** Refer relevant items of Annexures in conjunction with the specifications of relevant trade sections given here-in-before and in MES Schedule Part-I.
29. **SECURITY WALL, FENCING & GATE WORKS:** Refer relevant items of Annexures in conjunction with the specifications of relevant trade sections given here-in-before and in MES Schedule Part-I.
30. **EXTERNAL WATER SUPPLY**
- 30.1 **SCOPE OF WORK** :- The work of external water supply comprises laying and fixing of CI/GI/ERW/HFIW/DI/Flexible quick coupling GI pipes, sluice valves, stop cocks, valve pits, water meter and joints etc. all as described in relevant section of Schedule 'A'.
- 30.2 **SAMPLE AND MATERIALS** : All type of pipes, fittings, sluice valves, stop cocks/gun metal globe valves and other fixtures to be incorporated in the work shall be of highest standard and shall conform to relevant IS Specifications. The items, for which IS has not been issued, shall conform to BSS specifications. Samples of materials/items to be incorporated in this work shall be approved by GE before laying/fixing starts at site. **For makes and manufacturers for various items of this section refer Appendix 'B' and Annexures.**
- 30.3 **GENERAL**
- 30.3.1 Materials, workmanship and testing required to be incorporated in these works shall be as given under specification and workmanship in the trade section of MES Standard Schedule Part-I duly modified by these particular specifications and notes on the drawings.
- 30.3.2 Particular Specifications given here-in-after are only to particularize/ amend or emphasis the aforesaid specification in the MES Schedule which are not repeated here.

PARTICULAR SPECIFICATIONS (Contd/...)

- 30.3.3 Layout of water supply pipelines including fittings and locations of valves, valve chambers as shown on drawing are tentative. The exact layout/alignment of water supply pipe lines including their fittings and location of valves, valve chambers shall be as directed and approved by the Engineer-in-Charge in writing before the contractor takes the work in hand and nothing extra shall be paid due to any change in layout/location.
- 30.3.4 On completion of entire work, the contractor shall submit layout plans drawn to a suitable scale on tracing cloth, showing actual routes/alignment of various pipelines, indicating the size of pipes and distance of pipelines from the main buildings and roads to the Engineer-in-Charge. All sizes and dimensions shall be shown in the above plans in metric units (i.e. in CGS system) only. All work shall be carried out by plumber/fitters/skilled labourers. Nothing extra shall be paid due to above for preparation of final layout plan etc.
- 30.3.5 Before commencement of excavation, the contractor shall mark the proposed pipe route on ground along with the alignment as directed by the Engineer-in-Charge. Exact position of valve chamber, pipe supports etc. which are to be considered on each route shall similarly be marked thereon.
- 30.4 **MATERIALS**
- 30.4.1 **CAST IRON PRESSURE PIPES & FITTINGS**:- Refer clause 18.2 of MES Schedule, Part-I.
- 30.4.2 **MILD STEEL GAVANISED TUBES AND FITTINGS**:- Refer clause 18.4 of MES Schedule, Part-I.
- 30.4.3 **STOP VALVE**: - Stop valve shall be ISI marked. Also refer clause 18.14 of MES Schedule Part-I.
- 30.4.4 **DUCTILE IRON PRESSURE PIPES & FITTINGS**:- Refer clause 18.94 of MES Schedule, Part-I. Spun cast ductile iron pressure pipes shall be class mentioned in Schedule 'A'.
- 30.4.5 **COLLARED END PIPING SYSTEM**: - The pipe shall confirm to IS-11722. The galvanized shall confirm to IS-4736.
- 30.4.6 **GUN METAL GATE VALVE**: - Gun Metal globe valve shall be provided confirming to relevant Indian Standard Specifications with Iron Wheel head screwed on both ends for Iron Pipe. Fixing of Gun Metal gate valve or globe valve shall be done as specified in Para 18.57.1 to 18.57.6 and 18.62 of SSR, Part-I (Specifications). The Gun Metal Gate valve or Globe Valve shall be IS marked.
- 30.5 **WORKMANSHIP**: -
- 30.5.1 **GENERAL**: - Refer Clause 18.40 of MES Schedule Part-I.
- 30.5.2 **GENERAL REQUIREMENTS-WATER SUPPLY**
- 30.5.2.1 Refer Clause 18.41 of MES Schedule Part-I
- 30.5.2.2 The contractor shall use proper bends/elbows/tees at turning/corner. Bending of pipes is not permitted except when the pipe has to follow the contour of brick work or where a fitting cannot be inserted. In such cases the bend shall be gradual and formed with the written permission of the Engineer-in-charge.
- 30.5.2.3 Union shall be provided at appropriate places as directed by the Engineer-in-charge without any extra cost to the department so that in repairs etc. long lengths of pipe are not to be taken down.
- 30.5.2.4 Contractor shall provide screwed plugs to all open ends of pipes on completion of works without any extra cost to the department.
- 30.5.2.5 BLANK
- 30.5.2.6 The pipes shall not run diagonally in any location and shall be straight. All the pipes inside the building shall be fixed on walls/floors. Pipes fixed on walls shall be secured with approved pipe hooks at about 0.75 metres intervals.
- 30.5.2.7 As far as possible, pipes shall be fixed in shafts (where applicable) in such a way so that they do not give an ugly appearance inside. Pipes shall be fixed 15 mm away from the walls fixed with clips where they are not required to be embedded /concealed. Proper unions, sockets shall be provided in rising/delivery main to and from service tank before or after the stop valve without extra cost to the department.
- 30.5.3 **EXCAVATION & PREPARATION OF TRENCHES**: Refer clause 18.42 of MES Schedule Part-I. Authorised width of the trenches or width actually excavated which ever is less, shall be only paid.
- 30.5.4 **LAYING OF PIPES**: - Refer Clause 18.46 of MES Schedule Part-I.
- 30.5.5 **JOINTING OF CI PIPES/FITTINGS**: - Refer Clause 18.48.2 and 18.48.3 of MES Schedule Part-I.

PARTICULAR SPECIFICATIONS (Contd/...)

- 30.5.6 **LAYING & JOINTING OF D.I. PIPES:** - Refer Clause 18.95 of MES Schedule Part-I.
- 30.5.7 **LAYING AND JOINTING OF GI PIPES**
- 30.5.7.1 **EXCAVATION IN TRENCHES:** Refer clause 18.50.1 of of MES Schedule Part-I. Authorised width of the trenches or width actually excavated which ever is less, shall be only paid.
- 30.5.7.2 Returning filling of trenches shall be done with the excavated earth (but free from grass, stone etc.) after laying and testing of pipes. The earth filling shall be raised to the height of 75mm above the ground level.
- 30.5.7.3 **FIXING OF GI TUBES/FITTINGS:** - Refer Clause 18.50 of MES Schedule Part-I. GI tubes shall be laid at an average depth of 60 cm or as directed by Engineer-in-Charge. The cost of union and other fittings are deemed to be included in the laying and fixing rate.
- 30.5.8 **JOINTING OF COLLARED END PIPING SYSTEM:** - Two ends of the pipe shall be properly aligned, sealing ring shall be placed over the grooved portion so that ring over the pipe collar puts the sealing lips in direct and automatic sealing tension. The sleeve coupler shall be tightened on the sealing ring. Nuts/bolts used for sleeve coupler shall be chromium plated.
- 30.5.9 **FLANGED JOINTS:-** Flanged joints for pipes as described in relevant Sch 'A' shall be provided as specified in Para 18.11, 18.48.4, 18.48.6 and 18.48.6.1 of SSR Part-I.
- 30.5.10 Fixing of Sluice valve shall be done as specified in Para 18.57, 18.57.1 to 18.57.6 of MES Schedule, Part-I .
- 30.5.11 **TAPPING OF GI/CI MAINS:** - Refer clause 18.59 of MES Schedule Part-I.
- 30.5.12 **CUTTING OF EXISTING CAST IRON PIPE IN RUNNING POSITION/IN POSITION FOR TAKING NEW POSITION**
Cutting of existing cast iron pipe line for taking new position shall be done as specified in Para 18.59, 18.59.1 to 18.59.3 of SSR Part-I (Specifications). Fixing of water main line etc. shall be done as specified in Para 18.63, 18.63.1 to 18.63.2, as directed/approved by the GE.
- 30.6 **VALVE PITS:** The size of valve pits/chambers is as mentioned in relevant section of Schedule 'A' and as shown on drawings. The specifications shall be as given below: -
- (i) Excavation in soil as mentioned in Particular Section 3.3.1, returning filling & disposal of soil up to 50 metre.
- (ii) Foundation concrete PCC (1:4:8) type D-2.
- (iii) Brick work in sub class 'B' old size bricks of quality mentioned Particular Specifications clause 5 here in above with cement mortar (1:6).
- (iv) PCC (1:3:6) type C-1, in coping and other situations (Other than foundation concrete).
- (v) Covers & locking arrangement all as shown on drawings and as specified in relevant item/clause.
- (vi) Rendering 15mm thick in cement mortar (1:4) to exposed brickwork and concrete surface including finishing fair and even without using extra cement.
- 30.7 **TESTING**
- 30.7.1 After the pipes are laid and jointed, pressure test shall be carried out as specified in para 18.48.7, 18.50.4 and 18.30 of MES Schedule Part-I. Testing shall be done in the presence of GE or his representative. Material, labour and equipment required for testing shall be provided by the contractor at his own cost and same shall be deemed to be included in rates quoted by the contractor for respective items of schedule. Where more than one number of pipe are connected in common section, the testing pressure shall be restricted to one of lower grade.
- 30.7.2 If any pipe bursts during testing the same shall be replaced and made good by the contractor without any extra cost.
- 31 **EXTERNAL ELECTRIFICATION**
- 31.1 **GENERAL REQUIREMENT**
- 31.1.1 General rules, special conditions and preambles to various parts given in MES Standard Schedule of Rates 2020 shall be applicable to the work under this contract. Materials and workmanship required to be incorporated in these works and services shall be as given under "Specification and workmanship" in the various trade sections of MES Schedule, Part-I duly modified by the Particular Specifications and notes on the drawings.

PARTICULAR SPECIFICATIONS (Contd/...)

- 31.1.2 Particular specifications given here in after are only to particularize, amend or to emphasis the aforesaid specifications in the MES Schedule Part-I and relevant shall be read in conjunction.
- 31.1.3 These particular specifications shall be read in conjunction with MES Schedule Part-I and relevant clauses therein. In case of any discrepancy, the provisions given in particular specification shall take precedence.
- 31.1.4 The term “General Specifications” referred to/mentioned in IAFW-2249 and in other documents means specifications including other provisions given in MES Schedule Part-I.
- 31.1.5 The location and distribution of various items in the drawing is tentative. The GE as per the site requirements can make alternations and there shall be no price adjustment on this account.
- 31.1.6 On completion of entire work the contractor shall submit in triplicate to the Engineer-in-Charge layout plan showing actual position of poles, routes, cable run, and all other information and details as directed by the GE that will be necessary for record of maintenance and operation.
- 31.1.7 **TESTING:** General- Refer Para 19.2.5 of MES Schedule part-I.
- 31.1.8 **SAFETY(Procedure & Practice):-** Refer Para 19.2.7 of MES Sch Part-I.
- 31.1.9 **FIRE SAFETY:** Refer Para 19.2.8 of MES Schedule Part-I.
- 31.2 **SAMPLE AND MATERIALS**
- 31.2.1 All materials fittings appliances etc. to be incorporated in this work shall be of highest standard and unless otherwise specified here in after shall strictly comply with the relevant IS and BSS for which no IS has been issued. The contractor will supply the samples of the following items/materials to GE for approval.
- (a) All types of insulators
 - (b) All types of under ground cables
 - (c) Danger Notice Boards
 - (d) Stay assembly and stay wire and anti climbing device.
 - (e) All type of conductors
 - (f) Earthing plates/electrodes
 - (g) MCCB
 - (h) HT/LT insulators
 - (j) MCB & ELCB or RCBO
 - (k) Distribution boards
 - (l) Cable Route Indicator
 - (m) Pre-stressed concrete poles/steel poles.
 - (n) Set of lightning Arrestor HT/LT.
 - (o) LT Panel Board, Voltmeter and Ammeter.
 - (p) Transformer
 - (q) Any other item as directed by GE.
- 31.2.2 The material and the equipment to be supplied and installed under this contract shall be of indigenous make. In case tenderer offers any imported materials, he may do so out of his existing stock. No foreign exchange will be given by the department to the tenderer for importing any equipment for this job.
- 31.2.2 **For makes and manufacturers for various items of this section refer Appendix ‘B’ and Schedule ‘A’.**
- 31.3 For steel and iron articles refer Particular Specification clause 10 here in before.
- 31.4 The contractor after obtaining written approval of samples from the GE shall obtain material and equipment from the approved firms or through their authorized agents only. As a proof that a particular material obtained from the firm/their authorized agents the contractor shall produce such evidence to the satisfaction of GE when asked for. With regard to quality the materials shall be brought to the site with maker’s original packing with seal intact.
- 31.5 All electric works shall be carried out in conformity with the requirements of the Indian Electricity Act 1910 and Indian Electricity Rules 1956 framed there under and fire insurance act as applicable and else the relevant regulations of electric supply authorities concerned as amended from time to time.
- 31.6 Unless otherwise exempted under the rules of the Indian Electricity Rules all electrical works shall be carried out under the supervision of person holding a certificate of competency issued by the recognized authority. The workman shall also hold certificate of competency.
- 31.7 Good workmanship is an essential requirement for compliance with their specifications. The work shall be executed in the manner as directed by the Engineer-in-Charge.

- 31.8
- PRODUCTION OF TEST CERTIFICATE:** Manufacturer’s test certificate in respect of cables, transformers, poles, HT/LT cables, gang operated air break switches and other materials, items or equipments as directed by GE are to be submitted to the GE by the contractor.
- 31.9
- SCOPE OF WORK:** The work of external electrification comprises of execution of entire completion of works included in Schedule ‘A’ and all as described in particular specifications and here under: -

(i)

Lightning arrestors

(ii)

Under ground cables and terminal boxes

(iii)

All type of insulators

(iv)

Anti climbing device

(v)

APFC (Automatic Power Factor Correction Panel)

(vi)

Danger Notice Board

(vii)

Earthing for installations

(viii)

Stay assembly

(ix)

LT Pre-stressed concrete poles

(x)

Fluorescent light fittings etc.

(xi)

Dismantling/taking down

(xii)

Single Panel Switch Board (VCB), Ring main unit (HT).

(xiii)

Any other work as specified in Schedule ‘A’
- 31.10
- EXCAVATION AND EARTH WORK:** The contractor shall excavate to the specified depths as indicated on the drawings and as directed by the Engineer-in-Charge. Excavation made to depths more than the required levels shall be made good by the contractor at his own expense with approved earth by ramming, watering, in 250 mm thick layers. No extra payment shall be made for extra depth excavated and filled by the contractor. The cost of any shoring/boarding and de- watering shall be deemed to be included in the cost of excavation and no extra payment shall be made.
- 31.10.1
- FILLING OF PITS AND DISPOSAL:** After laying of the foundation and erection of poles & stay, the pit shall be filled with the spoil obtained from excavation, watered, rammed and consolidated and brought to the level of the surrounding ground level as directed by the Engineer-in-Charge. All surplus spoil obtained from excavation shall be removed to place at a distance as specified, spread and levelled in the manner as directed by the Engineer-in-Charge.
- 31.11
- CEMENT CONCRETE & FORM WORK:** Refer relevant item of Schedule ‘A’ and Particular Specification clause 4 here in before.
- 31.12
- POLES**
- 31.12.1
- TUBULAR STEEL POLES SWAGED** :-Refer clauses 19.3 of MES Schedule, Part-I.
- 31.12.2
- PRESTRESSED CONCRETE POLES** :-Refer clauses 19.5 of MES Schedule, Part-I.
- 31.12.3
- WORKMANSHIP:-** Refer clauses 19.50, 19.51, 19.51.1. 19.51.2, 19.51.4, 19.52 of MES Schedule Part-I. The numbering of the poles shall be carried out as per the direction of the Engineer-in- Charge and unit rate quoted against the relevant item shall be deemed to include for the same. Planting depth of poles unless otherwise shown on drawing shall be equal to 1/6 of the total length of each pole.
- 31.13
- INSULATORS**
- 31.13.1
- PIN, SHACKLE, REEL, DISC TYPE INSULATOR:** - Refer clauses 19.6.1 to 19.6.3, 19.54 and 19.54.1 of MES Schedule Part-I.
- 31.13.2
- INSULATOR FITTING:** - Refer clause 19.6.4 and 19.54 of MES Schedule Part-I.
- 31.14
- STAY ASSEMBLY:** - Stay assembly complete with accessories shall be as shown in electrical plate No.1 of MES Schedule Part-I, unless otherwise specified here in after. Refer clauses 19.8 and 19.55 of MES Schedule Part-I for specifications, Nominal dimensions of the competent parts of stay assemble shall be as under :-

(i)

STAY ROD – In case not mentioned in Schedule ‘A’ stay rod shall be 20-mm dia and 1800 mm long.

(ii)

Size of stay strand - 7/4.00mm.

(iii)

Size of stays -7/3.15mm

(iv)

Stay plate - 300×300×6mm or as mentioned in item of Sch ‘A’.

(v)

Clamps -All as shown of flat iron 50 ×6mm
- 31.14.1
- The angle between stay and pole shall not be greater than 45 degree. Staying arrangement shall be as specified in clause 19.55 to 19.55.4 of MES Schedule Part-I. The cost of stay bow shall deem to be included in the unit rate.

PARTICULAR SPECIFICATIONS (Contd/...)

- 31.15 **'D' CLAMPS, STEEL CROSS ARMS AND BRACING:** - Refer clauses 19.9 and 19.53 of MES Schedule Part-I. 'D' clamps; MS cross arms, bracing and MS brackets shall be of steel section shown on drawings. Where size of any section of steel is not indicated, this shall be as directed the Engineer-in-Charge. These shall be painted with one coat of aluminium paint over a coat of red oxide primer after fixing in position.
- 31.16 **BLANK**
- 31.17 **BUS BAR:** Bus bar shall be of appropriate sizes Electric grade aluminum/copper as specified for phases and neutral having suitable holes for incoming cables/out going cable having provision for cables connections with thimbles of suitable size. The width shall be accordingly changed as per site requirement of the feeder switches. Provision be made to install KWH meter, Voltmeter, Ammeter at Incoming and outgoing.
- 31.18 **DANGER NOTICE BOARD:** Refer clause 19.18 of MES Schedule Part-I and all as specified in the relevant item. The plate for danger notice board shall be mild steel 1.6mm thick in case not specified in the relevant item schedule 'A'.
- 31.19 **GI PIPES AND FITTINGS** :- GI pipes and fittings shall be laid in trenches, fixed to walls/floor/ceiling/poles and jointed all as specified in clause 18.50 and 18.50.3 and 18.51.1 to 18.51.5 of MES Schedule Part-I.
- 31.20 **CABLES**
- 31.20.1 LT cables shall be XLPE insulated screened, bedded, galvanized strip & shall conform to IS-7098, Part-I. HT cable shall be as per relevant item of Schedule 'A' conforming to IS-7098: Part-II. Laying generally shall conforming to clause 19.75 of MES Schedule Part-I. However, cable protection cover shall be as per relevant item of Schedule 'A'. Sand cushioning in trenches shall extend 8cm beyond outer edge of cable on both sides. Cables shall not be laid in ashes and organic refuses or any other materials, which may injure the cable. Cables shall be brought in standard drum length. No straight through joints shall be permitted except where length of the cable is more than the standard drum length or where considered inescapable.
- 31.20.2 The portion of cables running under roads, poles or on walls through nallah shall pass through galvanized pipe all as described in Schedule 'A' and as directed by the Engineer-in-Charge.
- 31.20.3 The seal of cables shall not be removed until preparations for jointing are complete.
- 31.20.4 Trenches for cables shall be as per clause 19.74 and 19.74.1 of MES Schedule Part-I. Trenches will be filled in after the cable has been tested by the Engineer-in-Charge satisfactorily IR test for all under ground cables shall be conducted during and after physical completion. The tests should be recorded and signed by the contractor and Engineer-in-Charge and kept on record.
- 31.21 **EXPULSION FUSES, LINE CONNECTORS, POWER CABLE:-** Refer clause 19.16,19.17 and 19.19 of MES Sch Part I.
- 31.22 **CABLE ROUTE INDICATOR:-** These shall be fixed along the route of cable at 30 meter interval & on every turning & cable joint.
- 31.23 **DISTRIBUTION BOXES** :- Refer clause 19.21 of MES SSR Part I.
- 31.24 **CABLE TERMINATION & JOINT BOXES:** - Refer clause 19.22 of MES SSR Part I.
- 31.25 **LOW VOLTAGE SWITCHING AND DISTRIBUTION PANEL:** - Refer clause 19.23 of MES SSR Part I.
- 31.26 **EARTHING**
- 31.26.1 Refer clause 19.137 to 19.146 of MES Schedule Part-I. Earthing shall be carried out as described in Schedule 'A' and all as directed by Engineer-in-Charge at the site of work.
- 31.26.2 The earthing shall generally conform to IS-3043/1987 as per clause 19.137 to 19.146.3 of MES Schedule Part-I.
- 31.26.3 The contractor shall take approval of Engineer-in-Charge to the earthing before commencement and shall be operative in the presence of his representative. Excavation shall be passed by the Engineer-in-Charge before filling. The charcoal filling shall be done in alternative layers not exceeding 15cm in depth and shall be properly watered and rammed.
- 31.26.4 The maximum continuity resistance for any point in the installation including earth continuity conductors and earth lead to earth plate shall not exceed one ohm.
- 31.27 **STREET LIGHT FITTINGS:** Refer clause 19.42 of MES Schedule Part-I. This shall be of cast housing and shall comply to IS: 2149 of 1970 for street light all as detailed in Schedule 'A' and shown on drawings.

- 31.28 **LT PANELS:-** LT panels shall be all as specified in Schedule 'A'. The contractor shall produce and get the detailed drawings of LT Panel approved from GE before fabrication and placing the order to the manufacturer.
- 31.29 **ANTI CLIMBING DEVICE:-**Refer Para 19.72.1 of SSRPart I specifications. The anti climbing device shall be provided to prevent authorised climbing if HT line supports as per IE Rules-1991. The anti climbing device shall be provided as per details shown on drg No. STD- 125, Sheet 1/1, except barbed wire as specified in SSR-1991, Part I and as directed by the Engineer-in-Charge.
- 31.30 **LIGHTENING ARRESTOR:-** Lightning arrestor shall be provided as specified in Para 19.12, 19.13 and 19.67 of SSR Part I, specifications and as per IE Rules-1992. The earth lead for any lightening arrestor shall not pass through any iron steel pipe but shall be taken as directly as possible from lightening arrestor to a separate earth electrode subject avoidance of bend & wherever practical.
- 31.31 **MCCB:** - MCCBs shall be provided of various capacity as described in Schedule 'A'. MCCB shall be conforming to IS-8828-1996, IEC-60898, ISI marked as applicable /directed by GE.
- 31.32 **VOLTMETER, AMPERE METER:** - These shall be ISI marked and provided of the shape and size as described in Schedule 'A'. Ampere Meter and Volt meter shall conform to specifications of IS- 722. Ampere Meter and Volt meters shall be of make mentioned in **Appendix 'B'**.
- 31.33 **SELECTOR SWITCH:** - Selector switch shall be ISI marked and provided as per Schedule 'A'. Selector switch shall be conforming to specifications of IS-6875. Ampere Meter and Volt meters shall be of make mentioned in **Appendix 'B'**.
- 31.34 **INDICATING LAMPS :-** Indicating lamps shall be ISI marked, LED type and provided of size and shape as described in Schedule 'A'
- 31.35 **BLANK**
- 31.36 **LT PANEL BOARD, SINGLE PANEL SWITCH BOARD**
- 31.36.1 **SCOPE:** These specifications cover the detailed requirements of medium voltage L.T Panel to be fabricated, supply, installations, its testing and commissioning. Any other material required for the successful completion of the work is included in these specifications if other wise not mentioned herein.
- 31.36.2 **ELECTRICAL PARAMETERS:** Suitable for 415 volt rated voltage 3 Phase, 4 wire 50Hz AC supply.
- 31.36.3 **GENERAL INSTRUCTIONS :**
1. The LT Panel shall be double door outdoor type having incoming and outgoing as specified in schedule 'A'. The degree of protection shall be IP-53 as per IS-2147-1962.
 2. LT Panel shall be of double door outdoor type, free standing type totally enclosed and compact.
 3. The LT Panel shall be rain, dust and vermin proof and shall be suitable for climatic conditions of the station.
 4. The LT Panel shall be fabricated out of MS sheet steel of 3.15mm thickness and foundation frame fabricated out of MS angle iron 40x 40x 6mm.
 5. The design shall include all provisions for safety of operating and maintenance personal. The general construction shall conform to IS-5039 of 1983 for factory assembled LT Panel.
 6. All incoming and outgoing cable entries shall be from the bottom as directed by Engr-in charge.
 7. General construction shall employ the principle of compartmentalization for safety consideration MS sheet to be used for the purpose shall not be less than 2 mm.
 8. The LT Panel shall be powder coated with 7 tank process for treatment of degreasing, pickling & two coats primer, before being given the stove epoxy finish. Final color shade shall be 631 as per IS-5.
 9. The LT Panel shall be suitably double earthed as per standard engineering practice.
 10. The dimensions of the LT Panel shall be as on required basis for incorporating the electrical accessories / switchgear as specified in schedule and these particular specifications.
 11. The front and back side of the LT Panel shall be provided with hinged double doors with locking arrangement. The lock shall be built in flush type of superior quality as directed by Engineer in Charge. The hinges shall be of such construction that the door can swung open by not less than 150 degree. The fixing of the doors shall be such that the doors should automatically come to closed position if not kept open with effort. The panel shall be designed in such a way so as to have independent compartments/cabins for housing MCCB's, cable gallery, bus bar chamber, switch and other accessories.

- 31.36.4 **CANOPY:** The top of the LT Panel shall be fitted with a sloping canopy, design of which shall be such that rain water shall not accumulate on the top.
- 31.36.5 **VENTILATION:** Adequate ventilation shall be ensured by providing ventilation for the inlet and exhaust of air.
- 31.36.6 **BUS BAR:** The Bus Bar shall be of aluminium/copper as specified in Schedule 'A' and shall be of suitable size. The bus bar for neutral shall be half the size of the phase bus bar. The bus bars shall be insulated with PVC heat shrinkable coloured sleeve / tape. One No. GI earth bus shall be 25mmx 4mm and shall be fixed at the bottom of the LT Panel for earth connections.
- 31.36.7 **BUS BAR SUPPORT:** The bus bar shall be firmly fixed on the supports constructed from suitable grade of insulating material such as laminated sheet or porcelain lane insulators of suitable size confirming to relevant IS. The supports shall be sufficient rebuts to withstand electro mechanical force produced during the short circuit. The nut bolt shall be either of GI or cadmium plated. Bus bar, MCCB, cable incoming, cable outgoing, time switch chambers will be manufactured of not less from 2mm thick MS Sheet.
- 31.36.8 **CONNECTIONS:** Connections between bus bar and MCCBs will be made either with solid aluminium strip of adequate capacity duly insulated or by adequate capacity solid aluminium conductor cable with aluminium lugs, provided for making the connections. As per site requirement the aluminium links duly insulated with PVC sleeves or paints shall also be provided for connection with bus bar chamber and incoming or out going onwards.
- 31.36.9 **DANGER PLATE:** Danger plate shall also be provided on the front and back doors of the LT Panel. The LT Panel No or other distinguished mark shall also be written on the LT Panel as directed by the Engineer - in-charge.
- 31.36.10 **INSTALLATION:** The LT Panel shall be installed on a suitable plinth with approximate 2 CU. Feet brick work foundation and grouted in the foundation with cement concrete and finished neatly with plaster as per manufactures recommendations. An apron will be provided below the door level of the LT Panel on the four sides and made from sheet steel with thickness of sheet not then 3.15mm.
- 31.36.11 **EARTHING:** The LT Panel shall be earthed with two distinct earth to electrode (to be measured and paid separately). The earth connections from the electrode shall be done with 32x6mm GI strip drawn through 40 mm bore medium grade GI pipe from mechanical protection. The earth electrodes shall be erected at least one metre away from LT Panel, but on the opposite side. The earthing terminals shall be identified by means of the sign marked in legible and indelible manner on or adjacent the terminals.
- 31.36.12 **TESTING:** All necessary tests such as insulation / earth test etc shall be carried out before connecting the LT Panel with the supply system and will be recorded duly signed by contractor / RM electrical supervisor and Engineer -in- Charge.
- 31.36.13 **MARKING:** Feeder pillar will be marked with a distinct No as directed by Engineer-in-Charge. Feeder pillar box shall also be marked with white paints letters regarding capacity of incoming and outgoing switches including the area to which each switch a MCCB is feeding.
- 31.36.14 **HPSV TUBULAR LAMPS:-** HPSV Lamps shall be of specification as specified in Para 19.36 of SSR Part-I and as described in Schedule 'A'.
- 31.37 **TESTING OF INSTALLATION**
- 31.37.1 On completion of the work, following tests will be conducted in the presence and to the entire satisfaction of the Engineer-in-Charge and GE. Contractor shall give prior notice in writing to this effect at least 7 days in advance:
-
- (a) Insulation resistance test sectional and overall.
 - (b) Continuity resistance test sectional and overall.
 - (c) Conduction and earthing
 - (d) Earth tests.
 - (e) Full load tests.
- 31.37.2 Insulation resistance tests shall be conducted between each conductor and the earth. Contractor shall supply necessary apparatus, labor and instruments required for testing and the Engineer-in- Charge shall be at liberty to use these instruments he may wish to use for the purpose of testing. Results of testing shall be recorded in triplicate and signed both by the Engineer-in-Charge and contractor or his authorised representatives.
- 31.38 **TRANSFORMERS:**
- 31.38.1 The transformers shall be all as described in Schedule 'A'. The temperature rise shall not exceed 500 C by resistance of winding method and 400 C measured by thermometer in oil after continuous rum on full load. The contractor will also provide first oil filling of transformer and the oil shall confirm to IS-335. The transformers should be fitted with mounting as follows:-
- (a) Oil conservator with filling hole and cap including drain plug.
 - (b) HT OFF load tap changing gear with tapping switches indicator, handle and locking device.
 - (c) In addition to (b) above cover of the transformer be provided with air released plug to enable the trapped air inside to be released if any.
 - (d) Rating and terminal marking plates.
 - (e) Lifting lugs.

- (f) Two earthing terminals for body earthing and one additional for neutral.
- (g) Drain valve with plug
- (h) Thermometer pocket including thermometer.
- (j) Four flat rollers
- (k) Explosion vent
- (l) Silica gel dehydrating breather with silica gel.
- (m) Top and bottom filter valve for oil and plug
- (n) Any other fittings required and recommended by the manufacturer.
- (o) Oil level gauge indicating maximum and minimum oil level.
- (p) Cooling radiator.
- 31.38.2 TESTING :- The contractor shall produce manufacturer’s test certificate to GE in respect of routine test enumerated in relevant IS. After installation, the transformer will be tested before commissioning as per Clause 19.97.8 of MES Schedule Part-I by a representative nominated by the Accepting Officer. The contractor shall at his own expense provide al facilities for testing including equipment.

32 SMART ELECTRIC METERS

- 32.1 The scope of work consists of provision of smart metering all as specified in BOQ and comprehensive maintenance part II/BOQ and all as described and specified in Particular Specifications. The scope would include implementation of smart metering and billing system. The system would be operated as Postpaid Smart Billing system with a future provision to convert it as Prepaid Smart Billing system. The system supplied would include the necessary features as outlined in the particular specifications to achieve the same.
- 33 MATERIALS
- 33.1 All materials shall be accordance with the latest editions of the relevant IS/BS specifications and shall be the best indigenous make as indicated in Appendix ‘A’ and approved by GE and shall be ISI marked, except those materials which are being manufactured without IS certification and ISI embossing, shall conform to IS provisions.
- 33.2 The contractor shall not procure bulk materials unless the sample of each article has been approved in writing by GE. Makes of various materials/items have been mentioned in Appendix ‘A’ to particular specifications. However, makes specified in Sch ‘A’/BOQ shall only be provided when makes are mentioned in Sch ‘A’/BOQ. Makes specified in Schedule ‘A’/BOQ items shall take precedence over makes given in Appendix ‘A’ to particular specifications. However, in case no make is specified for a particular item in the tender document, the same shall be BIS marked / approved items from BIS approved manufacturers.
- 33.3 As far as practicable all manufactured materials / articles other than those manufactured in Contractor's workshop at site shall bear IS certification mark. In case any articles not bearing the IS certification mark but confirming to relevant specifications is proposed to be incorporated in the work, samples of the same shall be got approved in writing from the GE before incorporation in the work. The contractor shall submit sufficient evidence to the GE to show that such articles confirm to relevant specifications. Unless specified elsewhere in this specification, the performance & testing of the meters should conform to the following Indian/International standards, to be read with up to date and latest amendments / revisions thereof as on 30 days prior to issue of tender:-

S. No.	Standard No	Title
1	C.E.A. Regulation No. 502 / 70 /CEA / DP&D dt 17/03/2006	Central Electricity Authority (Installation & Operation of Meters) Regulation, 2006.
2	CEA-GO-13-15/3/2019-DPR Division	Central Electricity Authority (Installation and Operation of Meters) (Amendment) Regulations, 2019
3	IS 16444 : 2015	a.c. Static Direct Connected Watthour Smart Meter Class 1 and 2 — Specification
4	IS 16444A1	AMENDMENT NO. 1 FEBRUARY 2017 TO IS 16444 : 2015 a.c. STATIC DIRECT CONNECTED WATTHOUR SMART METER CLASS 1 AND 2 — SPECIFICATION
5	IS 16444A2	AMENDMENT NO. 2 AUGUST 2019 TO IS 16444 (PART 1) : 2015 a.c. STATIC DIRECT CONNECTED WATTHOUR SMART METER CLASS 1 AND 2 — SPECIFICATION
6	IS 16444 (Part 2) : 2017	a.c. Static Transformer Operated Watthour and Var-Hour Smart Meters, Class 0.2S, 0.5S and 1.0S
7	IS 16444_2A1	AMENDMENT NO. 1 AUGUST 2019 TO IS 16444 (PART 2) : 2017 a.c. STATIC TRANSFORMER OPERATED WATTHOUR AND VAR-HOUR SMART METERS, CLASS 0.2S, 0.5S AND 1.0S

- 33.4 Manufactured materials / articles shall be brought at site in original seal containers / packing bearing manufacturers marking unless the quantity required is in a fraction of smallest packing.
- 33.5 The Contractor shall carry out such instructions as are given to him in writing by the Engr-in- Charge to ensure that full quantity of such materials goes into work.
- 33.6 Material such as sand and aggregate etc. shall generally confirm to the samples kept in GE office further in addition to their conformity with relevant specification given in the tender documents. The source of materials to be got approved by GE in writing before these materials are brought at site in bulk.

- 34TESTING OF MATERIALS
- 34.1All the materials to be incorporated in the work shall be subject to quality control tests as per the testing procedure and frequency as laid down in relevant IS and or as specified in the tender.
- 35VOUCHERS
- 35.1All original vouchers for the materials incorporated in the work for full quantity shall be submitted by the contractor to the Engineer-in-Charge for a acceptance and defacing the same and shall be in the custody of Deptt till the finalization of final bill.

36SMART METERING SYSTEM

- 36.1Single Phase Smart Meter
- The specification covers AC whole current 1 phase 2 wires Smart Energy Meter with bidirectional communication facility. The meter shall be suitable for Advanced Metering Infrastructure (AMI). The meter shall communicate with GATEWAY using RF Mesh
- The Smart Meter would have the following minimum basic features-
- Measurement of electrical energy parameters
 - Bi directional Communication
 - Integrated Load limiting switch
 - Tamper event detection, recording and reporting
 - Power event alarms such as loss of supply, low/ high voltage
 - Remote firmware upgrade
- 36.1.1GENERAL STANDARDS APPLICABLE FOR METERS
- Unless otherwise specified elsewhere in this specification, the performance and testing of the meters shall conform to the following standards with latest amendments thereof:

S. No.	Standard No.	Title
1	IS 13779 with latest amendments	AC Static Watt-hour Meter class 1& 2
2	IS 16444 with latest amendments	A.C. Static Direct Connected Watt Hour Smart Meter Class 1 and 2- Specification
3	IS 15884 with latest amendments	Alternating Current Direct Connected Static Prepayment Meters for Active Energy (Class 1 and 2)- Specification
4	IS 15959 Part 1 & Part 2 with latest amendments	Data Exchange for Electricity Meter Reading, Tariff and Load Control-Companion Standards

- 36.1.2COMMUNICATION
- Meter shall have ability to communicate with GATEWAY on RF in a secure manner, as per the site conditions
- 36.1.2.1Remote Load control facility would be as per IS 16444.
- 36.1.3Other Specifications

Applicable Standards	The meters shall comply with IS 16444 for all requirements. Those parameters which are not covered in IS 16444 have been specifically mentioned in this specification.
Reference Voltage	As per relevant IS
Current Rating	10-60 A
Starting Current	As per IS 16444
Accuracy	Class 1.0 as per IS 16444
Limits of error	As per IS 16444
Operating Temperature range	As per IS 16444
Humidity	As per IS 16444
Frequency	As per IS 16444
Influence Quantities	As per IS 16444
Power Consumption of meter	As per IS 16444
Current and Voltage Circuit	As per IS 16444
Running at No Load	As per IS 16444
Test output device	As per IS 16444
Meter Display	As per IS 16444
Parameters to be measured	As per IS 16444 / As per IS 15959 Part-2
Maximum Demand resetting	As per IS 15959 Part 2
Time of Use registers	As per IS 15959 part 2
Power Quality Information	As per IS 15959 part 2
LED/LCD Indicators	As per IS 16444
Load Survey/Interval Data	As per IS 15959 part 2

Tamper/ Event Recording	As per IS 15959 part 2
Measuring Elements	As per IS 16444
Alarm	As per IS 16444/ 15959 Part 2
Load Control	As per IS 16444
Connect/Disconnect and status of load switch	As per IS 16444
Programmability	As per IS 16444
Communication	As per IS 16444.
Communication Protocol	As per IS 16444
Remote Firmware upgrade	As per IS 15959 part 2
Real Time Clock(RTC)	As per IS 16444/ IS 15884 The clock day/date setting and synchronization shall only be possible through password/Key code command from one of the following: • From remote server through suitable communication network. □ Hand Held Unit (HHU) or Meter testing work bench and this shall need password enabling for meter;(The methodology for the synchronization would be as per requirement of utility)

Data Retention	As per CEA regulations
Battery Backup	Meter shall be supplied with separate battery backup for RTC.
First Breath (power on) and Last gasp (power off) condition detection and communication to software	As per IS 16444

36.1.4. ANTI TAMPER FEATURES

The meter shall continue recording energy under any tamper condition and would log the event and send alarm at Head End System after detection of the defined theft features as per IS 15959 Part 2.

36.1.5. DATA DISPLAY FACILITY (AUTO/MANUAL)

Data Display on the meters shall be in three modes-

1. Auto Scroll
2. Scroll with Push Button
3. High Resolution (Shall display energy values with resolution of 2 digits before decimal and 3 digits after decimal in push button mode)

The display order shall be:

Auto Scroll

- ☐ Cumulative Active Energy kWh along with legend.
- ☐ Current calendar month MD in kW with legend.
- ☐ Instantaneous voltage
- ☐ Instantaneous current

These parameters should be displayed on the LCD/LED continuously for a period of 15 seconds on Auto scroll. In case of power failure, the meter should display above parameters with push button.
Scroll with Push-button

- (i) Internal diagnostics
- (ii) Cumulative kWh o Date
- (iii) Real Time
- (iv) Voltage in (V) o Current (I)
- (v) Power (kW)
- (vi) Current month MD in Kw

- (vii) Last month cumulative kWh o Last month MD in kW
- (viii) Last month MD occurrence Date 30
- (ix) Last month MD occurrence Time o Meter Serial Number

The meter's display should return to default display mode (continues auto scroll) if push button is not operated for more than 10 seconds. (The order of display may be revised as per requirement of the utility)

36.1.1. TESTS

36.1.1.1. Type Tests & Test Certificates

Smart meter shall be type tested for all the type tests as per IS: 16444 (latest version) in a third party independent lab. The number of sampling for testing of meters and criteria for conformity would be as per IS 16444.

Necessary copies of test certificates shall be submitted to MES.

36.1.1.2. Routine & Acceptance Tests

The Factory Acceptance and Routine tests shall be carried out as per IS 16444. Apart from above test, meter shall also be tested for all functional requirement through communication as part of acceptance test

36.1.2. GENERAL & CONSTRUCTIONAL REQUIREMENTS

Meter Shall be BIS marked as per IS 16444. General & construction requirement shall be as per IS 16444/IS 13779

36.1.3. METER BASE & COVER

Meter base & cover shall be as per IS 16444/ IS 13779. The meter Base & cover shall be break to open design. The material for meter base and cover shall be made of high grade polycarbonate.

36.1.4. TERMINAL BLOCK &

COVER As per IS 16444/IS 13779

36.1.5. DESIGN

Voltage circuit, sealing arrangement, terminal block, terminal cover and nameplate etc. shall be in accordance with IS- 16444 (latest version).

The meter shall be compact and reliable in design, easy to transport and immune to vibration and shock involved in transportation and handling.

36.1.6. CONNECTION DIAGRAM

As per IS 16444

36.1.7. FIXING ARRANGEMENTS

The meter shall be mounted type. The Meter should have three fixing holes, one at top and two at the bottom. The Top hole should be such that the holding screw is not accessible to the consumer after fixing the meters. The lower screws should be provided under sealable terminal cover. The requisite fixing screws shall be supplied with each meter.

36.1.8. SEALING ARRANGEMENT

Arrangements shall be provided for proper sealing of the meter cover so that access to the working parts shall not be possible without breaking the seal. MES would provide its seal on the meters.

36.1.9. PACKING

The meters shall be suitably packed for vertical/horizontal support to withstand handling during transportation. The meter shall be packed appropriately to ensure safe transportation, handling, identification and storage. All packing materials shall be as per environment law in force. The primary packing shall ensure protection against humidity, dust, grease and safeguard the meter's performance until its installation. The secondary packing shall provide protection during transportation.

PARTICULAR SPECIFICATIONS (Contd/...)**36.1.10. TRANSPORTATION**

The meter shall be compact in design. The meter block unit shall be capable of withstanding stresses likely to occur in actual service and rough handling during transportation. The meter shall be convenient to transport and immune to shock and vibration during transportation and handling.

The meter should not be exposed to undue shock and mishandling during transportation. The stacking of box inside transport media should be such as to avoid their free movement. The packing should also be protected from rain and dust by transport media. The Bidder shall be responsible for any damage during transit due to inadequate or improper packing.

36.1.11. TESTING AND MANUFACTURING FACILITIES AT MANUFACTURER'S PLACE

The manufacturer shall have NABL accredited laboratory to ensure accurate testing calibration as per IS 13779 for acceptance test.

36.1.6. INSPECTION

The MES staff may visit the manufacturer location at their own cost to inspect the meter randomly as per sampling plan for acceptance test as per IS 16444. The meters shall be tested for all functional requirements as part of acceptance test as per IS 16444.

32.1. Three Phase Smart Meter

The specification covers AC whole current 3 phase 4 wires Smart Energy Meter with bidirectional communication facility. The meter shall be suitable for Advanced Metering Infrastructure (AMI). The meter shall communicate with GATEWAY using RF Mesh.

Rest of the specifications would be identical to Single Phase Smart Meter

32.2. GATEWAY

The gateway is a unit for communication of data between the Smart Meters and the Web based software. The gateway receives information from the Smart Meter on a scheduled / need basis and stores the data, which can be accessed by the software.

The gateway provides the central link between Smart Meters and software, enabling continuous/periodic meter read and control. gateway shall exchange data from smart meters on RF and with software on 4G/2G/Ethernet.

32.2.1. Hardware & Power Supply of gateway

- Enclosure/box of gateway shall be minimum IP67 or better compliant. A suitable mounting arrangement required for gateway installation shall also be provided.
- A suitable and optimum power supply shall be provided keeping in view that even in case of outage in one or two phases, gateway can be powered. GATEWAY should be capable of withstanding surges & voltage spikes of 6KV as per IEC 61000-4-5 standards.
- GATEWAY shall have battery with backup for 1 hour for normal meter reading, to push tamper event, carry out on demand reading and the network health status / connectivity continuity & check. GATEWAY should have the suitable feature to send power outage and restoration message to the software.
- GATEWAY shall have built in Real Time Clock (RTC) with separate battery backup. The battery shall have a guaranteed life of 10 years. It shall have self-diagnostic feature for RTC, memory, battery, communication module, etc. Alternatively, Software driven RTC may also be used as per agreement between supplier and utility.

32.2.2. Configuration, Functionality & Interface of GATEWAY

GATEWAY shall have following configuration functionalities:

- It shall be able to configure the communication with underlying nodes/meters.
- It shall pull data from the field devices and push the data at configured intervals to the software. It should also support the software in pulling data from the field devices/meters. The data acquisition (Push/Pull) frequency shall be programmable. GATEWAY shall be capable to prioritize control commands.
- GATEWAY shall support on demand read and ping of individual/group of meters. It shall support IPv4 / IPv6 network addressing.

- GATEWAY shall push events like tamper, power off etc. to software immediately on occurrence/receipt from field devices/meters.

The equipment shall be weatherproof, dustproof and constructed for outdoor installation on poles (minimum rating: IP- 55). A suitable mounting provision shall be made for the equipment.
□ Enclosure: Provision for security sealing shall be provided and in case the gasket of the cover is used for protection against moisture, dust and insects, the gasket shall be made of weather and aging resistant material.

32.2.3. GATEWAY Communication

- The communication architecture shall be any, as defined under IS 16444.
- The GATEWAY shall ensure the appropriate backhaul for secure transfer of data to software. In case of GPRS/3G/4G backhaul, it shall support SIM card from any service provider. It shall have Wide Area Network (WAN) connectivity to the software through suitable means.
- GATEWAY shall be able to communicate with meters on RF mesh (license free band).
- GATEWAY shall periodically monitor meter reads/downstream commands and shall retry and reconnect in case of failed events/reads.
- It shall push events like tamper, power off etc. to software immediately on occurrence/receipt from field devices/meters. GATEWAY shall be able to acquire and send data to software for full capacity (as per designed for no. of meters/ field devices) to ensure the performance level. Full capacity of GATEWAY is required to be indicated in the offer.
- After Power Interruption, on restoration of power supply, GATEWAY shall establish communication with underlying devices as well as upstream application automatically.
- GATEWAY shall be able to communicate with the nearest meters depending on topographical features. For further communication among the meters, distance of the other meters with the GATEWAY shall not be a constraint as communication of the nearest meters shall be established with other meters through appropriate mesh formation / other formation.
- Remote Firmware Upgrade: The GATEWAY shall support remote firmware upgrades as well as remote configuration from the control center. Configuration of programmable parameters of smart meters shall be done through software.

32.3. WEB BASED SOFTWARE

Supply and Configuration of the Web based Software with following modules:

32.3.1. Meter Data Management Module

The meter data management module would be responsible for collecting the data from the concentrator and make the data available to the billing system. The meter data management system would capture and provide the following data:

- (a) 30 min instantaneous data from all the meters for seven parameters – Cumulative Energy, Cumulative Apparent Energy (as applicable), Power, Current, Voltage, Power Factor and Frequency
- (b) Monthly and quarterly billing survey data for cumulative energy and max demand

32.3.2. Meter Data Validation

The system would allow setting the validation alerts for the following:

- No data collection from a meter for a day
- High consumption
- Low consumption
- Zero consumption

The department would get daily alert report via emails. The user can also also get alerts via email.

32.3.3. Tamper Data

The daily tamper data report would be available with the following tampers

- Outage
- Over Voltage
- Earth Leakage
- Neutral Missing
- Meter Cover open etc.

32.3.4. Billing Module

The billing module would collect the data from the meter data management module, calculate the energy consumption, calculate billing determinant and make energy data / billing data available to admin and end users.

The billing module would include functionalities for tariff setup, bill format setup, bill adjustment, occupation billing and vacation billing.

The billing module would support both postpaid billing and prepaid billing.

32.3.5. Occupation and Vacation Module

The system would support occupation / vacation and billing reports. BSO would be able to set occupation of new users as well as vacation of existing users. The users would get email alerts for occupation and vacation.

32.3.6. Web site: There would be a dedicated website for the AGE and BSO team to view all the data and information.

The designated users in MES would have the admin access to the application. The MES staff would also have the access of the key information on an android mobiles app (for admin use).

32.3.7. Customer Portal

The system would include a customer portal for the resident /occupant to log in and view their own energy / billing data. There would be android and iOS mobile apps for the user to monitor its own data on regular basis. The user would be able to get access based on the occupation data: The user would be able to the following on the apps:

- View instantaneous data and history (typically upto one year)
- View periodic reading and consumption for daily and monthly and history
- View Account balance
- View validation alerts
- Make online payment via payment gateway
- Set validation alert limits

32.3.8. Energy Accounting Module

The system would include features of energy accounting. The system would be able to account for total energy block wise, facility wise and would also allow calculations of unaccounted energy in case total energy meter is also available.

32.3.9. Communication Module

The system would provide communication of energy data and bills via print, email and sms methods. The system would provide following alerts via email and/or SMS

- Monthly Bill
- Low Balance (applicable for Prepaid Billing operation only)
- Payment Receipt (applicable for Prepaid Billing operation only)

32.3.10. Meter Master Data

The system would support meter master data repository. The system would support meter replacement process. In case of meter replacement, the consumption estimation of for the non-working days would be carried out.

32.3.11. Excel Export

The system would support export of metering and billing data in excel format.

32.4. Operations Summary

- (i) The meters are smart meter with in-built Radio Communication module. The communication operates at license free frequency of 865-867 MHz.
- (ii) The meter has an on/off relay which can be operated remotely via GATEWAY / Software.
- (iii) A communication mesh network is formed between the meters and GATEWAY.
- (iv) The GATEWAY is connected to the remote server via Sim card or Ethernet connection. It works like a WAN connection.
- (v) A GATEWAY collects the data from the meter every 30 minutes, daily and monthly and share the data with the MDM / Billing web based software.
- (vi) The web based software update the monthly consumption and monthly billing. It then calculates the account balance. If the payables are positive, it sends a signal to the meter via GATEWAY to disconnect the output power supply.
- (vii) Once the payment is entered in the web application (manually or via payment gateway) and the payable becomes negative, it sends a signal to the meter via GATEWAY to reconnect the power supply.

33. Maintenance and Defect Liability

The defects liability period of the installation shall be for a period of 24 months from the date of certified completion. Any defects notified during the defect liability period shall be rectified by the contractor at free of cost to the Department. The unit rate shall also include the comprehensive maintenance as specified in BOQ for defect liability period of 24 months. No further claim on this account shall be admissible at a later date. After the completion of the defect liability period, separate work would be initiated for the comprehensive maintenance of the system.

34. REPLACEMENT OF DEFECTIVE METERS:

Once a meter is found defective, it would be replaced by the spare meter kept. The defective meter shall be replaced by the Contractor within 10 days of notification up to the full satisfaction of the Engineer – in – Charge at his own cost. Failure to do so within the time limit prescribe shall lead to imposition of penalty of the cost of meter quoted by the Contractor in BOQ. The meter defect would be as per the supplier standard guarantee policy.

35. LIST OF DRAWINGS: NIL

PARTICULAR SPECIFICATIONS (Contd/...)

36. Acceptance of Materials:- The order of precedence for acceptance of materials to be incorporated in this work shall be as under :-
- (a) Materials with ISI marking.
 - (b) In case of non-manufacture of ISI marked materials conforming to relevant IS (latest edition)
 - (c) For the software acceptance, the contractor would demonstrate the data being received remotely from all the meters installed. The other features of the software as listed in the specifications would be demonstrated.

37. : LIFTS**41.1 SCOPE**

The scope of this section comprises the supply, delivery, erection, testing and commissioning of lifts with machine rooms as per the tender requirements. The scope also includes getting all statutory approvals for lift. Out of two lifts in each tower one lift with eight passengers shall be designed / earmarked as fire lift with provision of fireman switch.

41.2 SPECIFICATIONS

- i. Provision of lifts in the buildings will be kept as per National Building Code-2016 considering no. of floors, height of the building and speed of elevators. Scheme for Lifts in the buildings shall be submitted to Engineer-in-charge for approval before commencement of work. At least one lift in each block be made barrier free as per CPWD specification, for barrier free provision as shown in architecture plan.
- ii. Work of supplying and installation of lifts will be carried out by the agency as per provisions contained in General Specifications for Electrical Works (Part –III Lifts & Escalators)-2003 and local bylaws as amended up to date.
- iii. Scope of work of the successful bidder shall be inclusive of the following and shall be done by the agency at no extra cost.
- iv. Agency shall furnish the following drawings and data to the Engineer-in-charge in triplicate, for approval.
 - a) General arrangement drawing.
 - b) Detail of foundations/Hangers for equipment, load data of various assembled equipments. Data will include breaking load on guides, reactions on buffers, reaction on support, lift well etc.
 - c) Dimensions for every unit and group of units for erection purpose, as required.
 - d) The correction/changes, if any, intimated by the Engineer-in-charge shall be incorporated and three sets of such corrected drawing shall be furnished to the Engineer-in-charge within 15 days from the date of approval of drawings. The work shall be executed in accordance with the approved drawings.

41.3 INSPECTION AND TESTING AT SITE:

- i. The lift installation shall be subject to necessary inspection during every stage of erection, by the Engineer-in-charge or his authorized representative. The bidder shall provide all facilities and assistance for the purpose.
- ii. On completion of the installation, all adjustments as necessary shall be made for the satisfactory performance of the lifts. The completed installation shall be inspected and tested by the Engineer-in-charge in the manner as will be laid down by him, in consultation with the contractor.
- iii. The lift shall work on microprocessor based control system with self-diagnostic features, site programming to suit the changing need of the user. The lift shall be silent in operation & shall have smooth and controlled acceleration and de-acceleration with leveling accuracy of ± 5 mm.
- iv. Potential free contacts for each floor position and up and down movement of the lift shall be provided in the controller.
- v. Following technical particulars shall be provided by the EPC contractor and get the same approved from consultant:

Sr. No.	Description	
	GENERAL	
1	Shaft Size (W x D x H)	As per plan
2	No. of Halts	As per plan
3	Approx. Travel Height (m)	As per plan
4	Speed of Lift (m/s)	As per NBC but min 2m/sec
5	Pit Depth (mm)	
	MECHANICAL	
6	Car Size (W x D x H)	As per plan
7	Operation Of Lifts (Simplex / Collective)	Duplex selective collective for lift banks and simplex otherwise.
8	Traction Media	Rope / Belt
9	Min Width Of Door (mm)	900 mm
10	Weight Capacity Of Lift (kG)	As per plan
11	Passenger Capacity Of Lift (kG)	As per plan
12	Ventilation type	As per NBC-2016
13	Attended / Unattended	Both
	ELECTRICAL	
14	Motor Rating (kW)	As per lift details
15	Type of drive	VVVF
16	Controller	VVVF
17	Voltage / Current	415V
	INTERIOR	
18	Finish	SS hairline
19	Flooring	As per architect
18	Touchpad / Buttons	Required
19	Handrails	Required
20	Hall lanterns	Required
21	Announcements	Required
22	Mirror	Not required
23	Type (MRL/MR)	MRL
	FIRE & SAFETY	
24	Fire Rating of Car	As per NBC-2016
25	Fire Rating of Door	As per NBC-2016
26	Toggle switch	Fireman"s toggle switch required with each lift
27	ARD	Required
28	Fan / Intercom	Required
29	Overspeed Governor	Required
	Architriving & Others	
30	Supporting frames	Yes, if required
31	Others	Yes, if required
	MEP requirements	
		To be specified

FIRE FIGHTING TECHNICAL SPECIFICATIONS

38. GENERAL PROVISIONS

39. DESCRIPTION

The scope of works for all Firefighting system comprises design, engineering, supply, delivery, installation, testing, commissioning, handover, training, maintenance and warranty all as described or reasonably implied in the Contract. EPC Contractor is obliged to provide fully functioning works and systems in conformance with the requirements of the Contract. In the event certain items are not fully described or indicated in the Contract, but deemed essential (in all reasonableness) for the performance of the works and systems then the provision of such items shall form part of the scope of works at no additional cost to the Employer.

PARTICULAR SPECIFICATIONS (Contd/...)

The EPC Contractor shall be responsible to co-ordinate the equipment and services with all other discipline and shall produce properly coordinated shop drawings to demonstrate the installation & comply with the performance requirement with shop drawing, calculations, samples and details.

Shop drawings shall take into account actual measurement and setting out dimensions/levels obtained and determined by the EPC Contractor on site, actual equipment/material used, actual routing of services, coordination with all installation, and site conditions/constraints.

The EPC Contractor shall prepare and submit, as applicable all plans and documents to all relevant Authorities, secure all the necessary statutory approvals. The EPC Contractor to factor cost associated in his tender for all such requirements.

All works shall be carried out in good engineering practices in compliance with the provision and regulations set out in the National Building Code 2016, and other Indian Codes (its latest amendments) and also in compliance with the terms and conditions.

The EPC Contractor shall engage a team of professional engineers for submission to authorities and supervision of all works in accordance with the approved layouts, development & contract terms.

The EPC Contractor shall be responsible for testing, commissioning & handing over of the completed works with defect liability mention in GCC/SCC of the Tender.

Technical data sheet to be provided by EPC Contractor for all pumps, equipment's and fire components/material for Consultants approval before procurement.

Water for hydro test to be filled by EPC Contractor and hydro test will be done at 20

Bar. Final Fire NOC from Local Fire Authority/CFEES will be in scope of EPC Contractor.

Warranty of the system shall be two years, during warranty period, the required manpower availability from fire EPC Contractor side should be there in the complex.

40. Responsibility and Liability

EPC Contractor shall be fully responsible for the complete all works for the Contract, including all temporary firefighting works required during execution of project.

It is the responsibility of the EPC Contractor to ensure that the work does not compromise the design intents. All Fire Fighting services running through any structural elements shall be coordinated to achieve the required headroom and aesthetic considerations. The EPC Contractor shall fully comply with Consultant requirements for wall & column locations, wall & column sizes, beam locations, beam sizes, minimum head rooms and ceiling heights etc.

EPC Contractor shall furnish sufficient details of the design of the works including plans, specifications, calculations, method of construction and any other relevant information as required by Consultant. Work shall commence only after NOC/approval of Fire Authority. All concurrence letters from the relevant authorities shall be forwarded to the employer for record.

Acceptance of the EPC Contractor's tender proposal and subsequent design, including any revisions, by the Consultant shall in no way relieve the EPC Contractor of his overall responsibility for the adequacy of design to meet functional requirement and complying the authority's requirement. All costs for any remedial work, be it temporary or permanent, that are ordered by the Employer as a consequence of the failure for the works, to satisfy the above-said requirements at any time in the EPC Contractor's work, shall be borne by the EPC Contractor.

41. Technical Specification

EPC Contractor shall be responsible for the preparation of the complete set of Technical Specifications for the execution of works. The EPC Contractor shall refer to the NBC Part-IV and ISI Specifications and UBBL, which shall be the minimum requirement and he shall comply with NOC issued by LOCAL FIRE AUTHORITY/CFEES.

EPC Contractor shall ensure that the quality and workmanship of the works under the Contract shall not fall below the tender specifications. EPC Contractor shall be allowed to propose standards higher than; but not below CLIENT CONSULTANT requirements.

42. Submission of Documents during Tender

EPC Contractor shall submit one (1) set each of the following documents at the close of tender to the Consultant for evaluation and three (3) sets of the complete documents to the Consultant for the formal documentation within three weeks after LOA.

PARTICULAR SPECIFICATIONS (Contd/...)

- (a) A summarized description of the proposed firefighting system and method of construction to be adopted for his contract.
- (b) Key plans with scale of 1:100 for all floors and roof showing the firefighting system of the proposed development and dimensions for all key firefighting elements.
- (c) Typical calculations and details (1:20 or 1: 50 scale) of firefighting system
- (d) Plans showing summary of all proposed firefighting components including:
 - (i) Method statement describing the proposed fabrication, assembly procedures and sequence of erection, typical connection details including means for ensuring accurate fitting out and avoidance of excessive distortion stress.
 - (ii) Details of EPC Contractor's QA/QC Programme.
 - (iii) List of vendor under approved category
 - (iv) Procedure for obtaining approval of new vendor

43.**Submission Drawings**

EPC Contractor shall submit to the Consultant (2 sets) of all drawings and calculations, submitted to the Authorities, including as-built drawing for obtaining No Objection Certificate.

The "As-Built" drawings shall consist of:

- (a) One set of intermediate tracing:
- (b) Two sets of bounded prints.
- (c) Copies of the computer drawing files on CD in PDF & "REVIT format and one set of electronic copy of calculations.

44.**Scope of Works**

The Fire Fighting installation shall generally include, but not limited to following:

- Fire Pumps
- Wet Riser system
- Sprinkler system
- Water curtain system
- Drencher system
- Fire/Smoke curtain
- Pipe, valves and accessories
- Fire Brigade Connections
- Motor Control Panels
- Pressure switch, Pressure Gauge and Instrumentation Accessories
- Hangers and Supports
- Anticorrosive Painting
- Associated electrical works
- Necessary interfacing works with the Building Management System and to local Fire Station
- Associated interfacing works with other trades including electrical, plumbing and sanitary, gas supply and fire alarm/detection, lifts, escalators, etc.
- Liaison with the local fire authority and obtain all necessary approvals after completion.
- Integration and Interface with BMS systems.
- Electrical panel Gas flooding.
- Inert gas firefighting system of Electrical panel / D.G. Sets / Server Room Etc.
- Other works as per N.O.C by LOCAL FIRE AUTHORITY/CFEES.

All the necessary accessories will be provided to meet functional requirements of the firefighting system:

45.**Quality Assurance**

Comply with the current applicable codes, ordinances, and regulations of the authority or authorities having jurisdiction, the rules, regulations and requirements of the utility companies/authorities serving the project and the Employer insurance underwriter.

Drawings, specifications, codes and standards are minimum requirements. Where requirements differ, the more stringent apply.

CLIENT CONSULTANT reserves the right to inspect and reject any part of the works not complying. The EPC Contractor shall replace such rejected works without additional cost implication and delay to the Contract.

Approval or acceptance by CLIENT CONSULTANT shall not relieve the EPC Contractor of his responsibilities under the Contract for the quality of materials and the standard of workmanship in the works.

PARTICULAR SPECIFICATIONS (Contd/...)

No work shall be covered up or put out of view without the agreement of the Consultant. The EPC Contractor shall provide/allow the Consultant full opportunity for the examination and measurement of any work which is about to be covered or put out of view. Upon request by the Consultant, the EPC Contractor shall expose their works and allow/provide access to the Consultant to inspect any part of the works during the course of installation/erection.

EPC Contractor shall submit evidence including written certificates and full testing reports from approved/recognized testing organization certifying that his proposed equipment or material has been tested and it conforms to the specified standard.

All materials and equipment shall be used as per approved list of manufacturer. Any item not specified in approved list should comply to IS code for which technical details/ catalogue should be submitted for approval before procurement.

Sprinklers shall be UL-listed and FM approved inevitably.

Other equipment's and accessories shall be ISI approved plans.

46.

Relevant Indian Standards

The following minimum Indian standards must be followed by the EPC Contractor while installing the system in the building. All material and work to be in accordance with applicable portions of the latest revisions and editions of the following standards unless otherwise indicated.

I.S 1239 (Part I)-1990 C class Mild Steel Tubes, tubular & other wrought steel fittings (Amendments-3)

I.S 3589-1991 Seamless or electrically welded steel

pipes IS : 8.329 Ductile Iron Pipes

I.S 5290-1993 Landing Valves (Amendment No.1)

I.S. 5132-1962 Hose reel tubing for fire fighting

I.S. 884-1985 First Aid Hose Reel for Fire Fighting

I.S. 636-1988 Non-percolating flexible firefighting delivery hose

I.S. 903-1993 Fire hose delivery couplings, branch pipe, nozzle & Nozzle spanner

I.S. 908-1975 Fire hydrant, stand post type

I.S. 904 -1983 2 way & 3/4 way suction collecting heads for firefighting purposes

IS: 15105 Design and installation of fixed automatic sprinkler fire extinguishing system IS:

2190 Code of practice for selection, installation and maintenance of Portable first aid fire extinguisher

I.S. 2878, Portable Fire Extinguishers

940,2171
13849 & IS 10204

IS: 15683:2006 Performance and construction
Portable Fire
Extinguisher

I.S.780 Sluice Valves

I.S.5312 Non Return Valve

I.S.778 Brass Gate Valve

I.S.13095 Butterfly Valves

I.S.2379-1990 Colour Code for identification of pipe lines

I.S. 12992 (Part-I)- 1993 Safety relief valves, spring loaded Part-I Design (Part-II)-1990 Spring loaded safety relief valves Part-2 Testing

I.S.1554	Armoured Power Cable
I.S.694 (Part I & II)	PVC insulated cables (for voltage up to 1100 volts with copper/aluminium conductors)

47. General Requirements

All materials shall be new of the quality conforming to specifications. All works executed shall be as per good engineering practice to the satisfaction of the Consultant.

Pipes and fittings shall be fixed truly vertical, horizontal or in slopes as required in a neat workman like manner.

Short or long bends shall be used on all main pipe lines as far as possible. Use of elbows shall be restricted for short connections.

Pipes shall be fixed in a manner as to provide easy accessibility for repair and maintenance and shall not cause obstruction in shafts, passages etc.

Pipes shall be securely fixed to walls and ceilings by suitable clamps at intervals specified.

Clamps, hangers and supports on RCC walls, columns & slabs shall be fixed only by means of approved make of expandable metal fasteners inserted by use of power drills.

All pipe clamps, supports, nuts, bolts, washers shall be galvanized MS steel throughout the building. Painted MS clamps & MS nuts, bolts & washers shall not be accepted.

Valves and other appurtenances shall be so located as to provide easy accessibility for operations, maintenance and repairs.

Valves shall be clearly identified by its function and for normal position.

Hydrants, hose cabinets, flow switches, inspector's test/drain assemblies and all operable components shall be clearly identified.

48. Products and Equipment's

49. External Hydrant

External yard hydrants shall be conforming to Type 'A' of I.S. 5290-1977.

The outlet shall be angled towards ground with instantaneous spring lock type SS female coupling of 63 mm dia. for connecting to hose pipe.

Hydrant outlets shall be situated 1 m. above ground level.

Hydrants shall be easily accessible, storage of any kind on or around the hydrant being prohibited.

Hydrants located in situations where they are likely to be damaged by vehicular traffic shall be suitably protected on all sides against possible damage.

Hydrants shall be located.

Hydrant heads shall be as per NBC 2016 positioned at distances not less than 2 m from the face of the building

Two numbers of 63 mm dia. 15 m long rubberized fabric lined (RRL) hose pipe with SS male and female instantaneous type couplings machine wound with SS wire (hose to I.S. 636 Type 2 and couplings to I.S. 903 with MS certification), SS branch pipe with nozzle to I.S. 903 shall be provided near external hydrant in a suitable enclosed cabinet.

50. Internal Hydrant (Landing Valve)

Landing valve shall be of the type approved by the relevant fire authority applicable as per Indian standard or equivalent. The landing valve shall comply with the requirements of IS 5290 or approved equivalent. Landing valve shall be fitted to a Tee connection on the wet riser at the landing.

Outlet shall be fitted with a removable SS plug secured by a chain with hand wheel.

Landing valves at lower floors shall incorporate SS Orifice plates to limit the maximum pressure as required by NBC-2016/Fire Authority.

At each landing and other locations as shown on the drawings one single headed SS landing valves (connected to the Fire Riser) with 63 mm dia outlet and 80 mm inlet (I.S.5290). Each landing valve shall be with one shut off butterfly valve.

The valve shall have flanged inlet and instantaneous type outlets and shall be fixed at a height of 1000 mm from the finished floor.

EPC Contractor shall provide for each internal fire hydrant station two numbers of 63 mm dia. 15 m long reinforced rubberized fabric hose pipes with SS male and female instantaneous type coupling machine wound with SS wire (hose to I.S. 636 Type 2 and couplings to I.S. 903 with I.S. Certification), fire hose reel with 20 mm hose 40 meter long, SS branch pipe with nozzle I.S. 903 and SS Fire man's axe as per NBC 2016. one 5 kg ABC and one 4.5 kg Co2 fire extinguisher.

51. First Aid Hose Reel Equipment

First aid hose reel shall comprise reel, hose guide fixing bracket, hose tubing globe valve, stop cock and shut off nozzle. This shall conform to IS: 884 -1969. The hose tubing shall conform to IS: 1532 - 1969.

Hose tubing shall be 20mm dia and 40 m long. The nozzle and globe valve shall be of 20mm size.

The reel shall be of rigid construction using heavy duty CRCA steel. It shall rotate freely on leak proof bearings and be fitted with pivoted nylon rollers to allow easy run-out of the hose.

Hose reel shall be connected directly to the wet riser and installed in the Fire Hose Cabinet.

The approved shutoff nozzle shall be 5mm bore. It shall be adjustable for jet or spray pattern with complete shut-off.

Fire Hose Cabinets for all internal as well as external fire hydrants shall be provided. Hose cabinets shall be fabricated from 2mm CRCA Sheet of fully welded construction hinged double front door partially glazed with L&K locking arrangement, stove enameled finish in Fire red colour with 100 mm high letters "FIRE HOSE" painted on it prominently.

Branch line from Wet riser to Hose Reel shall incorporate SS Orifice plate to limit the maximum pressure as required by NBC/Fire Authority.

52. Hose Pipe, Branch Pipes and Nozzles

56.1 Hose Pipe

Hose pipes shall be rubber lined woven jacketed and 63mm in diameter. They shall conform to type 2 (Reinforced rubber lined) of IS: 636 - 1979. The hose shall be sufficiently flexible and capable of being rolled.

Each run of hose pipe shall be complete with necessary SS coupling at the ends to match with the landing valve or with another run of hose pipe or with branch pipe. The coupling shall be of instantaneous spring lock type.

56.2 Standard Branch Pipes

Branch pipe shall be of SS 63mm dia and be complete with male instantaneous spring lock type coupling for connection to the hose pipe. The branch pipe shall be externally threaded to receive the nozzle.

Branch pipes shall be conform to IS: 903 -1985

56.3 Nozzle

The nozzle shall be SS 16mm in (Internal) diameter. The screw threads at the inlet connection shall match with the threading on the branch pipe. The inlet end shall have a hexagonal head to facilitate screwing of the nozzle on to the branch pipe, with nozzle spanner.

Nozzles shall be conform to IS: 903 -1985

56.4	Fire Hose Cabinet	Fire Hose Cabinet will accommodate the landing valve, hose pipe, hose reel fire man axe, portable extinguisher etc. This shall have lockable, centre opening, glazed doors as per Indian standards or equivalent. Fire Hose Cabinet may be provided of steel frame structure. The hose cabinet shall be painted red and stove enameled.
56.5	Fire Brigade Connections	Stainless Steel collecting head with three or four 63 mm instantaneous type inlets with built in check valves and 150 mm diameter outlet connected to the fire tank, wet riser or sprinkler riser shall be provided for each building. Collecting head shall be installed on a stand post and provided with horizontal C.I. reflux valve. Etched Stainless Steel label plates with 100 mm high letters shall be provided at each fire brigade connection. The plates should be firmly fixed to the Fire Brigade connection and support system. Fire Brigade inlet connections must be provided in accessible locations generally in front side of the premises and must be free of traffic and parking and other obstructions.
56.6	MS Pipes & Fittings	
57	Pipes	All fire pipes within and outside the building in underground / exposed locations shall be as follows: MS pipes 150 mm dia. and below confirming to IS: 1239 part-1, minimum 5.4 mm thick heavy grade, C class. MS pipes 200 mm dia. and above confirming to IS: 3589, minimum 6.35mm thick, grade 330. All pipes above ground and in exposed locations shall be painted with two coat of zinc chromate primer and two or more coats of synthetic enamel paint of approved shade. M.S. pipes when buried underground shall be painted with two coats of approved primer and wrapped with one/two layer of 4 mm thick PYPKOTE sheet or equivalent as per manufacturer's specifications All underground pipes are to be laid not less than 1m below ground level.
57.1	Fittings	- All GI and MS fittings shall be as per IS 1239 part-2 – For Infrastructure. Pipe fittings viz, tees, bends, couplings, flanges, reducers etc. and all such connecting device that are needed to complete the piping work in its totality. Socket welded for up to 50 mm dia pipe. - For Internal Pipes: - Above 50 mm pipes fittings shall be joined with grooved fitting and couplings (UL Listed & FM Approved). Grooving on pipe shall be done using Grooving machine of same manufacturer as Grooved fittings. Forged steel fittings of approved type with "V" groove for welded joints will be used in exceptional cases only with approval of CLIENT CONSULTANT. 37.5 bevel end should be provided for grooving. When two pipes will be joint, it will be 75 degree and gap between both pipes should be checked properly with tapper gauge as directed by CLIENT CONSULTANT. Welded joints shall be permitted as an exception with approval of CLIENT CONSULTANT. Welder should be 6G certified. Fabricated fittings shall not be permitted under normal circumstances. All fittings shall be able to withstand a pressure of 150% of the maximum working pressure.
57.2	Jointing	
58	Joints Screwed and V Groove	

PARTICULAR SPECIFICATIONS (Contd/...)

Joint for GI and Grooved Fittings steel pipes and fittings shall be metal to metal joints using Teflon tapes on threads for pipes up to 50mm diameter. Only forged socket screwed fittings to be used. All fittings shall have manufacturer's trade mark stamped on it.

Fabricated fittings shall not be used under any circumstances.

For pipes and fittings jointed with forged screwed fittings, care shall be taken to remove burr from the end of the pipe after cutting by a round file.

Pipes above 50 mm shall be joined with grooved fittings.

58.1 Grooved End Fittings

Fittings shall be cast of ductile iron with grooved ends for direct connection into grooved piping systems (UL Listed & FM Approved):

58.2 Welded Joints (Exceptions only)

Use Fittings of approved type with "V" groove end for welded joints in 50mm diameter and above, in case grooved fitting can't be used.

Joints between MS pipes and fittings shall be made with the pipes and fittings having groove and fittings. Welded joints are not permissible normally.

58.2 Flanges

Flanges shall be provided on both ends of any fabricated fittings e.g. bends tees etc. of 50 mm dia or larger diameter wherever necessary. Generally, usage of flanged fittings shall be avoided unless necessarily required.

Flanges shall be provided for jointing all types of valves, appurtenances, pumps, connections with other type of pipes to water tanks and other places necessary and required as good for engineering practice.

Flanges shall be as per ASME/ANSI B16.5 with appropriate number of G.I. nuts and bolts, 3 mm insertion neoprene gasket complete.

Unions are to be provided on pipes lines 50 mm and below, near valves and assemblies and as required as per site conditions. All Unions when used shall be with socket welded ends. Usage of unions shall be avoided wherever the pressure exceeds 7 kg/cm² and break up flanges are recommended at these locations.

All couplings and fittings shall be provided by a single source supplier.

58.3 Valves

Valves shall be of same manufacturer for all systems, including valves furnished with equipment.

For flanged valves, companion flanges are to be provided of same PSI rating/class of valve being used.

All valves are to be provided with rating not less than 16kg/cm² working pressure for fire systems or as indicated otherwise.

Valves to be provided as required for complete isolation of equipment, branches from the main lines, arranged so as to give complete and regulation control of piping systems throughout the building. Valves to be provided with neat appearance and grouping, so that all parts are easily accessible for maintenance.

All the valves up to 50mm dia. shall be of gunmetal/bronze body with screwed ends and shall be provided with unions on both the sides for removal and repair, unless instructed otherwise.

All the valves above 50mm dia shall be of CI body with flanged ends and shall be provided with flanges on both the sides for removal and repair, unless instructed otherwise.

Wherever possible, install valves accessible from floor level. Provide operating handles for all valves and cocks. Provide adequate clearance for easy operation.

Face to Face dimensions of the valves shall be as per ASME/ANSI B 16.10.

- 58.4

Ball Valves

Ball valves shall be in accordance to IS: 9890, gun metal with screwed female ends to IS: 554, flanged ends to ASME B 16.5.

Provide full bore, quarter turn, lever operated ball valves with S/S ball and SS (AISI 410) spindle with Teflon seating and gland packing. All ball valves shall have locking handles to allow servicing and removal of equipment.

Provide lever handle with plastic sleeve on all ball valves unless otherwise noted. Provide extension stem for all ball valves to be installed on insulated piping.
- 58.5

Gate Valves

All gate valves up to 50 mm shall be of hand wheel operated with bronze body, with screwed in bonnet, non-rising spindle and solid wedge, with threaded ends as specified and as required by the piping system in which they are installed.

All gate valves larger than 50 mm shall be of cast iron body with bronze mountings and shall be provided with flanged ends as required by the piping system in which they are to be installed.
- 58.6

Globe Valves

All globe valves 50 mm and smaller shall be of bronze body with screwed in bonnet, rising spindle and with threaded ends and as required by the piping system in which they are installed.

All globe valves larger than 50 mm shall be of cast iron body with bronze mountings and shall be provided with flanged ends as required by the piping system in which they are to be installed.
- 58.7

Check Valve

All check valves 50mm and smaller shall be of bronze body and disc, threaded ends or as required by the piping system in which they are installed.

All check valves 65mm and larger shall be of cast iron body with stainless steel trim and shall be of flanged end as required by the piping system in which they are installed.

All check valves shall be swing check type.
- 58.8

Butterfly Valve

Butterfly valves 80mm dia. and above shall be Cast Iron butterfly valve to be used for isolation. The valves shall be bubble tight, resilient seated suitable for flow in either direction and seal in both directions with accompanying flanges and steel handle.

Butterfly valves shall be of best quality conforming to IS: 13095 of PN20 class

with position indicator. Provide wafer type C.I. double flanged butterfly

valves of required sizes and of rating.

Butterfly valves shall be high performance valves manufactured of ductile iron body SS-316 stainless disc and stainless steel stem with EN-8/ SS-410 shaft.

Joints for double flanged butterfly valves shall be made with suitable tail/socket pieces on the pipeline and flanges joints made with appropriate number of bolts, nuts and washers with 3 mm thick insertion rubber gasket.

Provide the following butterfly valve accessories:

Valves 150 mm and smaller shall have nine

position levers. Position indicator on all butterfly

valves.

For valves without full access provide enclosed extension stems to allow operation.
- 58.9

Sluice Valve

Sluice Valves (80 mm dia. and above) shall be C.I. double flanged sluice valves with rising stem. Each sluice valve shall be provided with wheel in exposed positions and cap top for underground valves. EPC Contractor shall provide suitable operating keys for sluice valves with cap tops.

PARTICULAR SPECIFICATIONS (Contd/...)

Sluice valves shall be of approved makes conforming to IS: 780/PN16 class.

Sluice valves shall be high performance valves manufactured of ductile iron body, SS-316 stainless disc and stainless steel stem with EN-8/ SS-410 shaft

Joints for double flanged sluice valves shall be made with suitable tail/socket pieces on the pipeline and flanges joints made with appropriate number of bolts, nuts and washers with 3 mm thick insertion rubber gasket.

58.10 Safety Relief and Pressure Reducing Valves

All safety and relief valves to be properly rated and installed in accordance with relevant standards.

Use bellow type pressure reducing devices or orifice plates judiciously to limit the pressure in the high pressure areas as per the requirements and keep the pressure within the permissible and operable limits in compliance to fire authority in the entire system.

58.11 Air Valve

25 mm dia. screwed inlet C.I. single acting air valve shall be necessarily provided on all high points in the system.

58.12 Installation Testing Valve

Alarm valve shall be provided in the sprinkler system, to indicate the flow of water in the sprinkler system. Installation Testing Valves assembly shall be installed on the sprinkler system.

EPC Contractor shall submit detailed shop drawings showing the exact location, details of installation of the valve and alarm complete in all respects.
Installation valve shall comprise of a cast/ductile iron sluice valve with gunmetal trim, pressure gauge, pressure relief valve, double seated clapper check valves as alarm valve with pressure gauge, test valve and orifice assembly and drain pipe with pressure gauge, bye pass on check valve to regulate differential pressure and false alarm, turbine water gong including all accessories necessary and required and as supplied by original equipment manufacturer and required for full and satisfactory performance of the system.

58.13 Orifice Plates

Orifice Plates fabricated made of 6mm/8mm thick stainless steel of required size shall be provided to reduce pressure at strategic locations as per requirements and as per relevant I.S. code. The EPC Contractor shall submit detailed hydraulic calculations for the orifice plates for approval before installation as per location & pressure condition.

58.14 Drain Pipe

80 mm dia black steel pipe confirming to IS: 1239 (heavy class) with gunmetal full way valve for draining any water in the system in low pockets shall be provided.

Flange and blind flange shall be provided after the valve to ensure accidental opening of drain valve.

58.15 Testing of Valves

Test valve bonnets for tightness. Test and operate the valves from closed-to-open-to-closed position while valve is under test pressure.

Test automatic valves including solenoid, pressure relief valves, safety valves and temperature and pressure relief valves for proper operation at settings indicated.
Ensure that valves are field checked for packing and lubricated.

Test all valves, air relief valves, safety relief valves, safety valves and temperature and pressure relief valves three times.

58.16 Strainers

Strainers shall be bucket type with CI/MS body of class 150. The flanged ends shall be confirming to Indian Standard and it shall have perforated S/S (AISI-304) sheet with large screen area.
Vendor to submit the strainer flow graph for approval.

It shall be of compact shape and size as per approval and should be easy to install and repair.

58.17 Hangers and Supports

All hangers, supports, anchors, inserts and guides shall be in accordance with the British Standard BS 3974, MSS SP-58, MSS SP-59, RAL-GZ 656 or equivalent and to the relevant NFPA Standards

Dielectric Protection. Furnish acceptable protection or copper plated hangers between ferrous and nonferrous metal pipe and hangers on all water piping.

All supports used for firefighting system shall be UL listed and FM approved. Horizontal Piping Hangers

Provide one of the following types of hangers for horizontal piping manufactured by one of the approved makes.

Provide clevis type supports. Provide sprinkler type supports.

Provide trapeze hangers where several pipes can be installed parallel and at the same level, and fabricate from structural steel shapes.

Use roller chairs or pipe-roll stands where provision for expansion is required.

Spacing shall not be farther than the closest interval required for any size pipe supported thereby, or as necessary to prevent damage or failure to the structure.

Where there is doubt of the structural capacity for concentrated loads necessary structural calculations shall be carried out and the load distributed sufficiently.

Floor Supports:

EPC Contractor to fabricate galvanized steel frame to suit the site conditions to the Engineer's approval.

Wall Supports.

Provide one of the following means of supporting horizontal piping from wall:

Provide wall mounted cantilever type steel supports fabricated from galvanized structural steel of at least 240 MPa yield strength.

Galvanized steel frame designed to suit the site conditions to the Engineer's approval.

The dimensions of steel members to be used for brackets shall be suitable for the supported load and to Engineer's approval.

Vertical Piping Supports:

Vertical pipe supports shall be steel riser pipe-clamps.

Manufacturer's rated maximum loading for each size pipe shall be used (with minimum 50% safety factor) for spacing of supports.

Bolt clamp securely to pipe, reset clamp-end extension on building structure. Beam Clamps:

Non-"C-Style" beam clamps shall be malleable iron for up to 9.5 mm hanger rods, forged-steel for hanger rod size 9.5 mm and above.

"C-Style" beam clamps shall be adjustable hanger rod type, malleable iron with set screw, jam nut, retaining clip, FM and UL approved.

Where beam configuration does not allow horizontal movement of C-clamp when set screw and jam nut are positioned, retaining clips may be omitted.

Inserts and Expansion bolts:

Furnish and set inserts in concrete forms.

For pipes 200 mm and over or equivalent group of pipes on trapeze, use two or more inserts to prevent exceeding maximum loading.

As an alternative to the above mentioned inserts the EPC Contractor may use expansion bolts. If the EPC Contractor uses expansion bolts, the maximum spacing between supports may need to be reduced so as not to exceed the maximum loading and the expansion bolt locations shall be determined in coordination with the structural elements.

Manufacturer:

All supports and clamps shall be from one of the approved manufacturers.

Unless otherwise indicated, all supports, clamps or frames shall be protected against corrosion by galvanizing as per ASTM B 633 or coated as per ISO 12944.

Supports/clamps or frames used outside the building shall be hot dipped galvanized as per ASTM A 123, ASTM A 153 or coated as per ISO 12944.

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Provide hangers to support the required loads.
Hang pipe from substantial building structure. Piping shall not be hung from other piping. All rigid hangers shall provide a means of vertical adjustment after erection.
Do not suspend pipe from metal roof deck.
“C” clamps shall be installed as per manufacturer's recommendations. HORIZONTAL PIPING SUPPORT SCHEDULE
Support horizontal piping on threaded, galvanized, hot rolled steel rod hangers.

Where proprietary hangers are being used, the threaded rod size shall be as required for the hanger.
The maximum spacing shall be based on the load carrying capacity of the hanger, after allowing a safety factory of 50% on the insulated full pipe weights.

Steel Pipe - Maximum Spacing Between Single Pipe Supports:

Nominal Pipe Size, mm												
Maximum Span Metres												
Minimum Rod Diameter, Millimeters												

Support steel piping 300 mm and larger at 6 m intervals or less to ensure even distribution of loading on structural members.
The spacing specified herein is included to limit deflection in the pipe to an acceptable minimum. Shorten intervals as necessary so as not to exceed the support manufacturer's maximum recommended safe load values in accordance with BS 3974.

Trapeze Hanger. Spacing shall not be farther than the closest interval required for any size pipe supported thereby, or as necessary to prevent damage or failure to the structure. Provide additional framing as required to transfer loads to adequate structure.

Supporting rods over 450 mm long shall be braced at every fourth hanger with diagonal bracing attached to the structure.

The EPC Contractor shall select support distances such that the precast structure is not subjected to excessive point loads. The EPC Contractor will be required to submit calculations to demonstrate that the proposed loads can be safely supported from the structure.
VERTICAL PIPING SUPPORT

Support vertical piping with steel riser clamps. Make adequate provision for expansion, contraction, and lateral stability by using sliding devices or spring-type installations. Also, account for vertical expansion and lateral movement of the building structures.
Support steel pipe at a minimum of every floor as required to relieve joint stresses.
The space between the vertical pipe supports shall be same as specified for horizontal pipe supports.
Where required, furnish and install heavy anchorage to the pipe against movement from expansion and contraction and secure the approval of the Consultant for the method of installing the anchorage before the work.
Horizontal piping shall be supported at intervals not greater than 3 m spacing and at all changes of direction.

Pipes shall be hung by means of expandable anchor fastener of approved make and design. The hangers and clamps shall be fastened by means of galvanized nuts and bolts. The size/diameter of the anchor fastener and the clamp shall be suitable to carry five times of the weight of water filled pipe plus 250 pounds’ pressure.

58.18 Pressure Gauge

Pressure gauge shall be 110 mm dia gunmetal Bourden type with stainless steel isolation cock, tapping and connecting pipe and nipple. The gauge shall be installed at appropriate level and height for easy readability. Pressure gauges shall read 0-20 Kg/sqcm.

58.19 Pipe Sleeves

EPC Contractor has to furnish, install and be responsible for the location of proper sleeves for all pipes passing through floor, walls, partitions or other building construction. Where sleeves occur in concrete construction, they shall be set before concrete is poured.

Sleeves and anchors are to be set in a suitable manner so that they will not become displaced. Sleeves for piping passing through walls and floors in concealed spaces shall be cut flush with walls or floor. All sleeves shall be heavy duty M.S pipe, and of such a size as to permit piping and piping insulation to pass through sleeve.

Sleeves passing through foundation or exterior walls, or where seepage may occur, shall be thoroughly waterproofed by removing all loose material and caulking with oakum and lead wool tightly around pipe or exterior as well as interior surface. Finish off interior surface with cement. Finish off exterior surface with two layers of felt, mopped on with hot asphalt, making for an absolutely waterproof installation. All waterproofing must be performed before any backfilling is done.

On all pipes passing through fire rated walls and ceilings, in finished areas, and where pipes are exposed to view, furnish and install plates on each side of the wall. Plate shall be large enough to cover sleeve opening and pass insulation. Clamp plate firmly to pipe by means of setscrews.

Sleeves passing through walls and floors between rooms shall be filled from both ends of sleeve with fireproof insulation material of a fire rating equal to that of the wall or floor.

58.20 Hydrant/Valve Chambers [IN GROUND]

EPC Contractor shall provide suitable brick masonry chambers in cement mortar 1:5 (1 cement: 5 coarse sand) on cement concrete foundations 150 mm thick 1:5:10 mix (1 cement: 5 fine sand: 10 graded stone aggregate 40 mm nominal size) 12 mm thick cement plaster inside and outside finished with a floating coat of neat cement inside with cast iron surface box as approved or as specified in Schedule of Quantities and in drawings including excavation, backfilling complete.

Valve chambers shall be of following size: -

- I. 120 x 120 cms x 100 cms
- II. 90 x 90 cms x 100 cms

58.21 Flow Switches

[Sprinkler System]

Provide REED type

flow switches for

Water flow alarm switches shall be UL listed and FM approved with pneumatic retard mechanism. Alarm switches shall be installed and coordinated with fire alarm system.

Flow switch shall be provided on sectional mains and branch lines of sprinkler systems where necessary and required and directed by the Consultant.

Flow switch should be suitable to actuate within 90 seconds of opening of a single sprinkler and shall be suitable for connection to a central Annunciation Panel. Wiring up to MODEM / SMOKE DETECTOR will be included.

Testing Assembly

Prefabricated, assembly consisting of a grooved end body, flow switch, inspectors test valve and pressure gauge.

58.22 Sprinklers [Quartz Bulb Type]

All sprinkler heads shall be UL listed and FM approved. Sprinklers shall be rated for ordinary temperatures (68 deg. C) except as required near kitchen heaters or locations where elevated temperatures may normally be expected or as otherwise indicated in the drawings or required by the local fire regulations. The temperature rating of a sprinkler should not be less than 30 deg. centigrade greater than the highest anticipated temperature of the location of the installation.

Sprinklers shall not be painted. They shall not be altered in any respect nor have any type of ornamentation or coating.

All the sprinkler shall be of conventional pendant type sprinklers. Upright sprinkler shall be mandatorily provided inside the false ceiling wherever the depth between the structural slab and false ceiling is more than 800mm. Side wall sprinklers shall also be used as per suitability.

Open Nozzles for Water Curtain

To be installed as per manufacturers. These shall be operated automatically.

58.23 Sprinkler Cabinets

Provide spare sprinkler emergency cabinet and spare stock of sprinklers heads conforming to NFPA 13. EPC Contractor shall provide no less than 24 spare heads of each type and/or temperature rating.

Sprinkler cabinet shall be constructed of 2mm CRCA sheet with prime coat and manufacturer's baked enamel finish in color selected by the Consultant. Cabinet(s) shall be located in Fire Pump Room(s). Final location shall be as directed by Consultant in charge.

58.24 Annunciation Panel [Coordinated with Fire Alarm]

Provide one solid-state electronic annunciation panel, fully wired with visual display unit to indicate Flow conditions in any flow-indicating valve.

The panel should give a visual and audible alarm for any of the above conditions.

58.25 Fire Extinguishers

6kg multi-purpose ABC dry chemical type as per IS: 15683:2006 of approved make/type in red glossy polyester coated cylinder with pressure gauge and nozzle shall be used throughout.

4.5kg Carbon Dioxide as per IS: 15683:2006 of approved make/type in red glossy polyester coated cylinder with discharge horn and wall bracket shall be used in specified areas.

5kg inert Fire Extinguishers: Provide fire extinguishers in accordance with local fire authority, where indicated on the drawings, and in each mechanical, electrical equipment and elevator machine room.

58.26 Hydrant, Sprinkler, Jockey & Water Curtain Pump

Fire pumps, Sprinkler pumps & Jockey pumps, associated controllers, and transfer switches shall be provided by a single source supplier.

Pump shall be capable of delivering 150% of rated capacity at not less than 65% of rated head. Pump shall be fire authority approved and the unit shall be design proven in fire protection services.

Pump sets shall be single stage/multistage horizontal centrifugal single outlet with cast iron body and bronze dynamically balanced impellers. Connecting shaft shall be stainless steel with bronze sleeves and grease lubricated bearings.

Pumps shall be connected to the drive by means of spacer type love joy couplings, which shall be individually balanced dynamically with bearings. The pump coupling joining the prime movers with the pump shall be provided with a sheet metal coupling guard.

All pumps shall be provided with approved type mechanical seals.

The pump and motor shall be floor mounted on a cast iron floor pedestal frame.

58.27 Electric Motor

Electrically driven pumps shall be provided with totally enclosed fan cooled induction motors. For fire pumps the motors should be rated not to draw starting current more than 3 times normal running currents.

Motors for fire protection pumps shall be at least equivalent to the horse power required to drive the pump at 150 % of its rated discharge and be designed for continuous full load duty and shall be design proven in similar services.

Motors shall be wound for class H insulation and winding shall be vacuum impregnated with heat and moisture resistant varnish glass fibre insulated.

Motors shall be suitable for 415+ 10% phase, 50 cycles, AC supply and shall be designed for 38 deg C temperature. Motors shall conform to the relevant I.S. Standards.

Motors shall be capable of handling the required starting torque of the pumps.

The pump shall be direct driven and the speed of the motor shall be compatible with the speed of the pump.

Technical data sheet to be provided for all pumps, equipment's and all fire components for CLIENT CONSULTANT/Consultants approval before procurement.

58.28 Air Vessel

Air vessel shall be minimum 450 mm dia x 2000 mm high fabricated from 10 mm M.S plate with dished ends and tested to minimum 20 kg/sq cm pressure with suitable supporting leg. Air vessel shall be provided with a 100 mm dia flanged connection from pump header, one 25 mm dia drain with one gunmetal valve and pressure relief valve.

58.29 Operating Conditions

The fire pumps shall operate on drop of pressure in the mains. The pump operating sequence shall be arranged in a manner to start the pump automatically but should be stopped manually by starter push buttons only.

Jockey pump shall start and stop through pressure switch

automatically. Jockey pump shall stop when main pump starts.

Main pumps shall start automatically on fall of pressure but stopping

automatically/manual. Diesel pump – Start Automatic – Stop Manually.

Automatic transfer switch (es) shall be factory mounted and inter wired with the fire pump controller. The controller and transfer switch shall be capable of interrupting a short circuit current at least equal to the available short circuit current in the controller supply circuit.

Ratings shall suit the electricity demand and meet the requirement of

local Fire Authority. Contacts shall be silver plated, arcing type with arc

barriers and arc chutes.

Accessories will be as under:

- a. Test switch in cover.
- b. Green pilot light to indicate "Normal" position.
- c. Amber pilot light to indicate "Emergency" position.
- d. Push-to-test emergency indicating pilot light with long life lamps and fuses.
- e. Adjustable time delay on retransfer to normal:
- f. 0-25 minutes plus 5 minutes unloaded running time for the generator. The time delay shall be by passed automatically upon failure of the emergency source.

g. Number of closed auxiliary contacts shall be 1 on normal, 1 on emergency.

Isolating means shall be a manually operable, moulded case switch, horsepower rated and suitable for the interrupting of the motor locked rotor current

Provide an isolating switch ahead of the emergency input terminals of the automatic transfer switch.

Provide auxiliary contacts for remote audible and visual signals indicating that the switch is in the open position.

Withstand rating shall not be less than the transfer switch rating.

If required by the project conditions the entire assembly shall be delivered in parts and assembled in place under the supervision of the authorized manufacturer's representative.

Pump casing to spill over to the floor drain.

Fire pump flow measuring system/devices approved by local fire authority.

59 Manufacturer's Identification

Manufacturer's nameplate, catalogue numbers, rating identification, name or trademark shall be permanently affixed with screws or rivets (adhesives or cements are not acceptable) to all equipment and material furnished under this specification.

Identify model number, size, capacity, electrical characteristics, serial number, etc. Leave nameplates clean, legible and with unobstructed view.

59.1 Apparatus Identification

Equipment nameplates shall be 50 mm high, 1.5 mm thick, three-layer black laminated plastic plates with 20 mm high white lettering engraved through the black layer. Edges shall be beveled.

Equipment identification nameplate shall be securely attached to each piece of equipment. Secure nameplate to each starter, switch, relay, transformer, etc. that controls the equipment.

Nameplates to bear notations corresponding to notations on operating instructions and as built Drawings.

59.2 Pipe Identification

Identify with symbol identification and colour-code all piping. Provide directional arrows on circulating systems separate from and adjacent to each identification as per Indian Standard.

Plastic Markers: Snap-on laminated plastic protected by clear acrylic coating. Each marker must show accepted colour-coded background, proper colour of legend in relation to background colour, accepted legend letter size, accepted marker length.

50 mm letter size for pipe 75 mm or larger; 25 mm letter size for pipe 65 mm or smaller.

Name of contents and directional arrows shall be placed at points of entrance and exit from mechanical room, adjacent to each valve, on each riser, at each tee fitting, at points of entrance and exit from building, at least once in each room, and intervals no longer than 6 m on long pipe runs.

Colour Coding: The following colour coding shall be used:

Service	Color of background	Color Of Letter	Designation
Sprinkler	Red (Post Office)	White	Sprinkler
Hydrant	Red (Post Office)	White	Hydrant

59.3

Valve Identification

Provide valve tags for all valves. Attach to hand wheel or stem of each control and line shutoff valve installed with heavy brass "S" hook, colour-coded plastic laminate or brass identification tag. Engrave laminate tags shall be at least 25 mm in diameter with numerals at least 3 mm thick.
Identify all fire service valves with above specified tags with "fire main - do not close" with white letters on red background.

59.4

Valve and Equipment Charts

Provide typewritten schedules giving numbers, service and locations, and notations of normal position and future position of all tagged valves. List piping systems with symbol and color coding on pipe identification chart. List valve model numbers and symbol for service corresponding to piping symbol on valve identification chart. Provide small "key plan" identifying valves as related to column lines. Enclose each schedule, list and key plan in separate transparent plastic binder.

Frame one copy of schedule under glass; in equipment room.
Provide typewritten list of equipment, indicating location, service, area served, with equipment reference number corresponding to as-built drawings suitably framed, with glass front, mounted in each equipment room.

Provide engraved plastic laminate identification plate showing function of switches and manually operable controls, including switches furnished under another Division. Provide point numbers on all control system components corresponding to programmed and second drawing point numbers.

59.5

Equipment Identification

Properly identify each piece of equipment and controls pertaining thereto by nameplates mounted on equipment and controls using round head brass machine screws or pop rivets.

Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

Place warning signs on machines driven by electric motors which are controlled by automatic starters.

59.6

Valve Identification

Valve Identification tags shall have the following abbreviations plus valve number.

Service	Abbreviation
Sprinkler	S
Hydrant	H
Drencher	D
Water Curtain	W

Identification shall be black lettering on white background or in a manner approved by the Consultant.

59.6.1

Sealing of Penetrations

A.

Air Tight Seals

All penetrations through the building fabric subject to suction or pressurization shall be sealed airtight.

B.

Holes in Roof

Roof penetrations for passage of pipes using a flexible polypropylene conical sleeve.

C.

Fire Rated Penetrations

Where services penetrate any fire rated barrier, the EPC Contractor shall seal the penetration with the use of an appropriate material to ensure the integrity of the fire barrier.

The EPC Contractor shall seal the cable enclosures through fire rated barriers to ensure the integrity and rating of the fire barrier.

D. Acoustic Penetrations

Where services penetrate acoustic barriers, sealant shall be supplied and installed to maintain the acoustic separation at least equal to the barrier penetration.

59.6.2 Mounting Heights

Verify exact locations and mounting heights with the Consultant in charge before installation.

59.6.3 Waterproofing

Avoid, if possible, the penetration of any waterproof membranes such as roofs, machine room floors, basement walls, and the like. If such penetration is necessary, make penetration prior to the waterproofing and furnish all sleeves or pitch-pockets required.

59.6.4 Supports

Provide supports, hangers, auxiliary structural members and supplemental hardware required for support of the work.

Provide supporting frames or racks extending from floor slab to ceiling slab for work indicated as being supported from walls where the walls are incapable of supporting the weight. In particular, provide such frames or racks in electric closets and equipment room.

Provide supporting frames or racks for equipment which is installed in a free standing position.

Supporting frames or racks shall be of standard angle, standard channel or specialty support system steel members, rigidly bolted or welded together and adequately braced to form a substantial structure. Racks shall be of ample size to assure a workmanlike arrangement of all equipment mounted on them.

59.6.5 Fastenings

Fasten equipment to building with expandable metal fasteners.

Where weight applied to the attachment points is 45 kg or less, conform to the following as a minimum:

- 1. Concrete and solid masonry Bolts and expansion shields
- 2. Solid metal Machine screws in tapped holes or with welded studs

Where weight applied to the building attachment points exceeds 45 kg, but is 135 kg or less, conform to the following as a minimum:

- 1. At concrete slabs provide 60 cm x 60 cm x 13 cm steel fishplates on top with through bolts. Fishplate assemblies shall be chased in and grouted flush with the top slabs screed line, where no fill is to be applied.
- 2. At steel decking or sub-floor for all fastenings, provide through bolts and threaded rods. The tops of bolts and rods shall be set at least one inch below the top fill screed line and grouted in. Suitable washers shall be used under bolt heads or nuts. In cases where the decking or sub-floor manufacturer produces specialty hangers to work with his decking or sub-floor such hangers shall be provided.

Where weight applied to building attachment points exceeds 135 kg, coordinate with and obtain the approval of Consultant and conform to the following as a minimum:

- 1. Provide suitable auxiliary channel or angle iron bridging between building structural steel elements to establish fastening points. Bridging members shall suitably welded or clamped to building steel. Provide threaded rods or bolts to attach to bridging members.

For items which are shown as being ceiling mounted at locations where fastening to the building construction element above is not possible, provide suitable auxiliary channel or angle iron bridging tying to the building structural elements.

- 59.7

Building Management System and Interfaces

EPC Contractor shall co-ordinate the mechanical system and equipment to interface with the Building Management System in accordance with the data point schedules.
- 59.8

Spare Parts and Tools

Tenderer is obliged to provide in his tender, a written guarantee that the spare parts for the works will be available for a period of five (5) years beyond the issue date of Taking over Certificate for the works. Failure to provide the guarantee may, at the sole discretion of the Employer, result in the Tender being rejected.

EPC Contractor to submit with his Tender his recommended lists of spares parts for three years operation and maintenance covering all systems and sub-systems of the specification. This list should be priced so that the Employer can, at his discretion, order these spare parts in part or in whole at any time up to the issue of the Performance Certificate without any increase in price.

The EPC Contractor shall also include in the Contract to procure and hand-over the required quantity of spare parts.
- 59.2

Samples

Samples showing fabrication techniques, quality and workmanship of component parts, compatibility of accessories shall be submitted for approval, upon request by the Consultant.
- 59.3

Warranties

EPC Contractor shall warrant that the capacity, rating or duty of all product used in the installation shall be less than 2 years operating under the specified conditions. Any product/system not meeting this requirement shall be rejected and replaced by EPC Contractor at his cost.
- 59.4

Protection of Materials, Personnel and Property

All material and goods shall be delivered to the site in new condition, properly packed and protected against damage due to handling, adverse weather or other circumstances, and be kept in packing case or under protective covering until required for use.

Any items suffering damage in transit or on site shall be rejected and replaced without extra cost and time to the Contract.

EPC Contractor shall be entirely responsible for all apparatus; equipment and materials furnished by him in connection with his works, and special care shall be taken to protect all parts thereof in such a manner as may be necessary or as directed.

Protection shall include covers, crating, sheds, stores or other means to protect the apparatus, equipment and materials from the weather, water damage, corrosion and to prevent dirt, grit, plaster or other foreign substances from entering the working parts of machinery or equipment. Special care shall be taken to keep all opening of pipes, ducts, etc. closed while in storage or during the course of delivery and erection/installation.
- 59.5

Safety Equipment and Notices

EPC Contractor shall supply and install the following safety equipment and notices for each switchboard/control panel in the respective switch rooms and plant rooms: -

Solid rubber insulated mats complying with Indian Standard in front of and extending the full length of the control panel/switchboards.

Copies of all statutory safety notices, regulations and instructions for resuscitation and treatment after electrical shock.

Danger signs on the switchboards/control panels to the requirements of the Power Supply Authority.

A copy of the main single line diagram, varnished and mounted on suitable hard backing and framed (in glass panel), showing clearly the full details of the electrical and mechanical systems as supplied and installed.

Notices as required by all local Authorities.

59.6 Quality Assurance/Quality Control (QA/QC)

EPC Contractor, prior to the commencement of the Works, shall submit for the deptt approval comprehensive QA/QC programme for the installation which shall include, but not be limited to the following: -

1. Method statement of all site erection/installation works;
2. Method of protection for material/equipment during delivery, and stored on and off the site; and
3. Testing and commissioning programmes, procedures, etc.
4. Holiday test for underground piping, Radiography for welding joints min. 10 % of all joints, DP test for all flange joints, hydro test for entire system at 20 bar. Welder should be 6G certified. In the case of Welder's 6G Certification Radiography for welding joints will be reduced from 10% to 4%.

The QA/QC programme and procedures shall generally be in conformance with the guidelines of ISO 9000.

All equipment, material and items incorporated in the Works under this Contract are to be new.

All work under this Contract shall be performed in a skillful and workmanlike manner and in accordance with best workshop practice.

All components shall be easily accessible for maintenance/replacement.

All instrumentation and equipment required for inspection, testing and commissioning shall be calibrated and maintained by the EPC Contractor. The EPC Contractor shall submit all valid calibration records from manufacturer and/or recognized laboratories and testing authorities before the use of such instrumentation and equipment.

59.7 Progressive Record/As-Built Drawings

During the course of the Contract, the EPC Contractor shall keep progressive record drawings of all installation works.

As-built drawings shall be developed and produced during the course of the installation and, when requested by the Consultant, for substantiating of monthly progress claims.

As-built drawings shall be submitted prior to the issue of Taking over Certificate by the Consultant.

As-fitted schematic system diagrams, properly framed, shall also be provided and mounted on the wall inside each plant room.

Submission of approved "as-built" or "as manufactured" drawings shall be in the following manner: -

1. One (1) set of special quality plastic film transparency for all drawings;
2. Two (2) sets of computer soft copy in DVD or any other equivalent device;
3. Three (3) bound sets of paper prints for all drawings; and

Additional set of as-built drawings in addition to the above as specified in the Contract Preliminaries and reasonably requested by the Consultant shall also be provided.

59.8 As-Built Drawings Submissions

As-built drawings shall be provided as required by the Consultant.

The EPC Contractor shall ensure that the submissions are made properly and in a timely fashion and will not delay the inspections and testing by the authorities. All as-built drawings shall be produced based on the latest architectural plans.

59.9 Testing
59.10 General

The entire works shall be fully tested in stages as the work proceeds and on completion of work as applicable.

To provide during normal working hours, all necessary labour, instruments, equipment,

materials, fuel, power and maker's representatives, to carry out such tests as may be necessary to satisfy the Consultant that the installation meets the requirement and intent of the specification as well as such tests required by local Fire Authority as per guide lines.

All piping in the system shall be tested to a hydrostatic pressure of 2 times the working pressure and 1.5 times the working pressure plus 3.5 kg/cm² whichever is more. The pressure shall be maintained for a period not less than 24 hours.

Rectify all leakages, make adjustments and retest as required and directed.

All tests shall be made in the presence of the Consultant or his representative or inspecting authority.

Tests described hereinafter and including all tests prescribed by the Fire Authority having jurisdiction shall be carried out. Any tests proved unsatisfactory shall be repeated to the satisfaction of the inspecting parties.

To provide skilled technicians/EPC Contractor's engineer to commission the plant and associated controls to the satisfaction of the Consultant. The engineers will be required to demonstrate the correct procedures in starting and stopping the plant, running the various items of equipment under automatic and manual control and the correct maintenance of the plant.

Water flow rates of all equipment shall be adjusted to design conditions. Complete results of adjustments shall be recorded and submitted.

Holiday test for underground piping, Radiography for welding joints min. 10 % of all joints, DP test for all flange joints, hydro test for entire system at 20 bar. Welder should be 6G certified. In the case of Welder's 6G Certification Radiography for welding joints will be reduced from 10% to 4%.

59.11 Method of Testing

Method of testing shall be as follows:

Pressurize the fire hydrant system by running the main fire pump and after attaining the required pressure shutoff the pump.

Open by-pass valve and allow the pressure to drop in the system. Check that the jockey pump cuts-in and cuts out at the pre-set pressures. If necessary, adjust the pressure switch for the jockey pump. Close by- pass valve.

Open hydrant valve and allow the water to flow into the fire water tank in order to avoid wastage of water. The main fire pump should cut-in at the pre-set pressure and should not cut out automatically on reaching the normal line pressure. The main fire pump should stop only by manual push button. However, the jockey pump should cut-out as soon as the main pump starts.

Switch off the main fire pump and test check the diesel engine driven pump in the same manner as the electrically driven pump.

When the fire pumps have been checked for satisfactory working on automatic controls, open fire hydrant valves simultaneously and allow the hose pipes to discharge water into the fire tank to avoid wastage. The electrically driven pump should run continuously for two hours so that its performance can be checked.

Check each landing valve, male and female couplings and branch pipes for compatibility with each other. Any fitting which is found to be incompatible and does not fit into the other properly shall be replaced by the EPC Contractor. Landing valves shall also be checked by opening and closing under pressure.

59.18 Tanks and Level Switches

The tanks shall be thoroughly cleaned with water and drained before city mains supply will feed in.

Also before city mains supply will feed in, the level switch shall be simulated for the various cut- in and cut-out settings.

59.19 Pressure Switches

The testing equipment shall be suitable for nominal working pressure of 20 bar (PN 20) conforming to the IS, e.g. the pipe work shall conform to relevant IS Code for

class C heavy class black mild steel tube. The pressure settings corresponding for pump cut-in (lamp and buzzer energised) and pump cut-out (lamp and buzzer de-energised) and reset differentials shall be tested by applying the hand jacking pump or by opening the test valve.

59.20 Flow Switches:

The calibration test equipment shall provide a flow of 60 dm³/min over the vane of the flow switch in the direction shown, to be confirmed by the direct reading flow meter.

The flow switch contacts shall make with energisation of the lamp and the buzzer, upon a flow not greater than 60 dm³/min flowing over the vane in the correct direction.

59.21 Hydrostatic Tests:

All parts of the water circuit shall be filled with water before hydrostatic pressure testing, and pump running tests for verification of pressure and flow rate are conducted.

The hand jacking pump shall be applied to increase the system pressure to 2 times the working pressure and 1.5 times the working pressure plus 3.5 kg/cm² whichever is more but in any case not less than 7 bar. The pressure shall be maintained for a period not less than 24 hours.

Where any sections of pipe work or equipments unable to withstand the maximum pipe work test pressure, it shall be isolated during the pipe work test then that section of pipe work or equipment shall be re-tested at the appropriate test pressure.

The working pressure for various systems shall be as per NBC/BIS guidelines.

60 Electrical Tests:

Electrical tests shall comply with the current edition of IEE regulations and requirements enforced by local authorities.

Electrical insulation tests earth electrode resistance test and cost amenity test shall apply to bus bars, isolators and other equipment and wiring where applicable.

A 500V DC instrument shall be used to check the insulation resistance. The reading shall not be less than 1 mega-ohm in all instances.

Function simulation tests shall be performed to ensure that the systems have been installed to the control requirements as described in the specification therein.

60.1 Pump Operating Test:

Ensure to the satisfaction of the Consultant that the installation or portion thereof which has been set to work complies with all requirements including the following:

60.2 That the plant and apparatus shall be of robust construction and of capacity for the duty specified,

60.3 That all valves, switches, controls and the like are properly regulated and capable of proper operation and in the case of valves are capable of being shut-off.

60.3.1.1 That all apparatus shall be silent.

60.3.1.2 That all instruments are correctly calibrated and read accurately,

60.4 Statutory Authorities Tests and Inspections

As and when notified in writing or instructed by the Consultant, submit as-built shop drawing and attend all tests and inspections carried out by the Local Fire Authorities, and shall forthwith execute free of charge any rectification work ordered by the Consultant as a result of such tests and inspections which determine non-compliance with Statutory Regulation.

Submit of all necessary forms and shop drawings/as-built drawings to the Statutory Authorities which shall conform in layout to the latest architectural plans submitted kept by these Authorities.

The submission shall comply with the requirements set forth in the current Codes of Practice and circular letters of the Statutory Authorities.

60.5 Preliminary Commission Checks

Ensure that all equipment is thoroughly cleaned, lubricated and checked for serviceability before setting to work. Particular attention is drawn to the removal of building debris from the pipe work systems.

Special attention is drawn to the need for thoroughly flushing out all pipe work systems to ensure that all foreign matter is removed.

All automatic controls and safety devices shall be inspected and checked for service ability before the working fluid or electricity is applied to the system.

- 60.6

Commission Checks

EPC Contractor shall set to work, regulate and calibrate all system in the entire installation. Special attention shall be paid to the following items:

That all valves, switches, controls, etc. are regulated and capable of proper operation and in the case of isolation valves that they are capable of tight shut off.

That all apparatus is silent in accordance with the requirements of this Specification. That all instruments are correctly calibrated and read accurately.

That all services are tested in accordance with the details in the relevant clauses of this Specification.

Operate pumps, pressure reducing sets, etc. to ensure that all control systems are functioning correctly and are properly set, sequenced or interlocked.
- 60.7

Final Acceptance Tests

EPC Contractor shall carry out final acceptance tests in accordance with a programme to be agreed with the Consultant.

Acceptance tests are required by the Local Fire Service. The tests shall be carried out by the EPC Contractor prior to the issue of Completion Certificate by client.
- 61

Commissioning
General

EPC Contractor shall be responsible for obtaining N.O.C. from Local Fire Service/CFEES.

All testing and commissioning to enable proper operation of the Works shall be completed to the satisfaction of the Consultant.

All final adjustments and final balancing of the equipment/system operation shall be completed before the Date of Taking Over Certificate.
The complete testing and commissioning are deemed to be concluded successfully only when the installation operated properly within the specified limits of its rating continuously without failure of any kind.
EPC Contractor shall arrange for all submissions to Authorities and pay the cost of statutory inspections and certificates.
- 61.1

Attendance to Occupation Permit Application

EPC Contractor shall provide all necessary attendance to inspections by the Consultant and authorities for the purpose of Occupation Permit application.
- 61.1.1

Operation and Maintenance Instructions Manual

Each set of Operation and Maintenance Instruction manual shall be in A4 size paper and be bound in rigid covers covered and engraved with lettering giving the Employer's name, project name, Consultant name. EPC Contractor shall submit three (3) sets and a soft copy of this manual for record before Taking Over certificate is issued.
- 61.2

Taking Over Procedure

EPC Contractor shall submit the arrangement of the commissioning to the satisfaction of the deptt.

The installation shall be complete following issue of the N.O.C. by Local Fire Service. It is solely the EPC Contractor's responsibility to ensure that all plant/equipment shall have their respective warranty by the respective equipment/plant supplier directly in favour of client.
A joint inspection shall be held among the Consultant and EPC Contractor to establish an outstanding works and defects list. All outstanding works/defects, shall be completed within one month from the date when the Taking Over Certificate issued.

If, at the end of the one month's period from the date of issuing the Taking Over Certificate, any defects/outstanding works mentioned in the list still exist, the Consultant is empowered to appoint a body to rectify all defects/outstanding works at the risk and cost of EPC Contractor.
- 61.2.1

Defect Notification Period

Notwithstanding the liability of the EPC Contractor in terms the Defects Notification Period for Fire Suppression System shall be 24 months. The period commencing on the date of issue of the Taking Over

Certificate. During the Defect Notification Period, EPC Contractor shall provide a 24-hour 'call-out' service to repair any equipment that has broken down.
EPC Contractor shall attend to such calls within a maximum time limit of 4 hours.

During the Defect Notification Period, EPC Contractor shall at his own cost remedy and make good with all faults or defects in the Works.

If the EPC Contractor fails to remedy such faults or defects within 48-72 hours, the Consultant may proceed to do so at the expense of the EPC Contractor and without prejudice to such other rights as the Employer may have under the Contract.

61.2.2 Building Management System and Interfaces

All necessary interfacing works with IBMS amongst all installation shall be included.

61.2.3 Cleaning and Adjusting

Brush and clean all work prior to concealing, painting and acceptance. Perform in stages if directed.
Painted or exposed work soiled or damaged: Clean and repair to match adjoining work before final acceptance.

Remove debris from inside and outside of materials

and equipment. Flush out piping after installation.

Adjust valves and automatic control devices

I. TRAINING REQUIREMENTS

The EPC Contractor shall provide operational training to each shift of the owner's personnel. Each training session shall include control panel operation, manual and (optional) abort functions, trouble procedures, supervisory procedures, auxiliary functions and emergency procedures.

II. OPERATION AND MAINTENANCE

The EPC Contractor shall provide three (3) complete operation and maintenance instruction manuals to the owner. All aspects of system operation and maintenance shall be detailed, including piping isometrics, wiring diagrams of all circuits, a written description of the system design, sequence of operation and drawing(s) illustrating control logic and equipment used in the system. Checklists and procedures for emergency situations, troubleshooting techniques, maintenance operations and procedures shall be included in the manual.

III. AS-BUILT DRAWINGS

The EPC Contractor shall provide three (3) copies of system "AS-Built" drawings. The drawings shall show actual installation details including all equipment locations (i.e., agent container(s), etc.), as well as piping routing details. Show all room or facilities modifications, including door and/or damper installations completed. One (1) copy of reproducible engineering drawings shall be provided reflecting all actual installation details.

IV. ACCEPTANCE TEST

- A. The EPC Contractor shall submit a "Test Plan" describing procedures to be used to test the control system(s). The Test Plan shall include a step-by-step description of all tests to be performed and shall indicate the type and location of test apparatus to be employed. The tests shall demonstrate that the operational and installation requirements of this specification have been met. All tests shall be conducted in the presence of the owner and shall not be conducted until the Test Plan has been approved.

V. SYSTEM INSPECTIONS

- A. During the two-years warranty period, the installing EPC Contractor shall provide two (2) inspections of each system installed under this contract. The first inspection shall be at the six-month interval, and the second inspection at the 12-month interval. Inspections shall be conducted in accordance with the manufacturer's guidelines and the recommendations of NFPA 2001.
- B. Documents certifying satisfactory system(s) inspection shall be submitted to the owner upon completion of each inspection.

VI. WARRANTY

All system components furnished and installed under this contract shall be warranted against defects in design, materials and workmanship for the full warranty period which is standard with the manufacturer, but in no case less than Two (2) years from the date of system acceptance.

PERFORMANCE SPECIFICATIONS
FIRE FIGHTING PERFORMANCE SPECIFICATIONS

Note: All Stainless Steel 304 Grade

S. NO	PARAMETERS	REQUIREMENTS	
[1]	External Hydrant	(i)	Outlet to be angled towards ground with instantaneous spring lock type female coupling of 63 mm dia. for connecting to hose pipe
		(ii)	Hydrant outlets situated 1 m. above ground level
		(iii)	Hydrant heads positioned at distances not less than 2 m from the face of the building
		(iv)	Two numbers 63 mm dia. 15 m long rubberized fabric lined (RRL) hose pipe with male and female instantaneous type couplings machine wound with Stainless Steel wire (hose to I.S. 636 Type 2 and couplings to I.S. 903 with MS certification) provided near external hydrant
[2]	Internal ydrant (Landing Valve)	H (i)	At each landing, single/double headed Stainless Steel landing valves (connected to the Fire Riser) with 63 mm dia outlet and 80 mm inlet (I.S.5290), with individual shut off valves and cast iron wheel shall be provided
		(ii)	Valve to have flanged inlet and instantaneous type outlets and to be fixed at a height of 1000 mm from the finished floor
		(iii)	Each internal fire hydrant station to have two numbers of 63 mm dia. 15 m long reinforced rubberized fabric hose pipes with stainless steel male and female instantaneous type coupling machine wound with stainless steel wire (hose to I.S. 636 Type 2 and couplings to I.S. 903 with I.S. Certification) fire hose reel with 20 mm hose 40 meter long, stainless steel branch pipe with nozzle I.S. 903 and Fire man's axe
[3]	First Aid Hose Reel	(i)	Hose tubing to be 20mm dia and 40 m long and nozzle and globe valve to be of 20mm size
		(ii)	Nozzle to be chrome-plated brass of 5mm bore
		(iii)	Hose cabinets to be fabricated from 2mm CRCA sheet
[4]	Hose Pipe, Branch Pipes and Nozzles	(i)	Hose pipes to be rubber lined woven jacketed and 63mm in diameter
		(ii)	Branch pipe to be of Stainless Steel 63mm dia and complete with male instantaneous spring lock type coupling for connection to the hose pipe
		(iii)	Nozzle Stainless Steel, 20mm in (Internal) diameter
		(iv)	Stainless Steel collecting head with three or four 63 mm instantaneous type inlets with built in check valves and 150 mm diameter outlet connected to the fire tank, wet riser or sprinkler
[5]	MS Pipes & Fittings	(i)	ERW pipes 150 mm dia. and below confirming to IS: 1239 part-1, heavy grade, C class
		(ii)	ERW pipes 200 mm dia. and above confirming to IS: 3589 minimum 6.35 mm thick, grade 330
[6]	G.I. Pipes & Fittings	(i)	G.I pipes up to 50mm diameter to be galvanized steel tubes grade, conforming to I.S. 1239 heavy grade C class

S. NO	PARAMETERS	REQUIREMENTS	
[7]	Jointing	(i)	Socket weld for pipes up to 50mm diameter
		(ii)	Grooved connection (Coupling & fittings) with wrought iron filling for pipe above 50 mm.
[8]	Pipe Protection	(i)	M.S. pipes when buried underground to be painted with two coats of approved primer and wrapped with one/two layer of 4 mm thick PYPKOTE sheet as per IS: 10221.
[9]	Flanges	(i)	Unions to be avoided wherever the pressure exceeds 7 kg/cm2
[10]	Valves	(i)	Valves are to be provided with rating not less than 20 kg/cm2 working pressure for fire systems or as indicated otherwise
		(ii)	Valves up to 50mm dia. to be of gunmetal/bronze body with screwed ends and to be provided with unions on both the sides
		(iii)	Valves above 50mm dia to be of CI body with flanged ends and to be provided with flanges on both the sides for removal and repair
[11]	Ball Valves	(i)	Ball valves to be in accordance to IS: 9890, gun metal with screwed female ends to IS: 554, flanged ends to ASME B 16.5
[12]	Gate Valves	(i)	Gate valves of size 40mm or less to be as per IS: 780 and of size 50mm or more to be as per API 600
		(ii)	All gate valves up to 50 mm to be of hand wheel operated with bronze body, with screwed in bonnet, non-rising spindle and solid wedge, with threaded ends as specified and as required by the piping system in which they are installed
		(iii)	All gate valves larger than 50 mm to be of cast iron body with bronze mountings and to be provided with flanged ends as required by the piping system in which they are to be installed
[13]	Globe Valves	(i)	All globe valves 50 mm and smaller to be of bronze body with screwed in bonnet, rising spindle and with threaded ends and as required by the piping system in which they are installed
		(ii)	All globe valves larger than 50 mm to be of cast iron body with bronze mountings and to be provided with flanged ends as required by the piping system in which they are to be installed
[14]	Check Valve	(i)	All check valves 50mm and smaller to be of bronze body and disc, threaded ends or as required by the piping system in which they are installed
		(ii)	All check valves 65mm and larger to be of cast iron body with epoxy coated ductile iron/ stainless steel trim and to be of flanged end as required by the piping system in which they are installed
[15]	Butterfly Valve	(i)	Butterfly valves conforming to IS: 13095 of PN20 class
		(ii)	Butterfly valves 80mm dia. and above to be Cast Iron butterfly valve to be used for isolation

S. NO	PARAMETERS	REQUIREMENTS	
		(iii)	Joints for double flanged butterfly valves to be made with suitable tail/socket pieces on the pipeline and flanges joints made with appropriate number of bolts, nuts and washers with 3 mm thick insertion rubber gasket
[16]	Sluice Valve	(i)	Sluice Valves (80 mm dia. and above) shall be C.I. double flanged sluice valves with rising stem
		(ii)	Sluice valves shall be of approved makes conforming to IS: 780 / BS 5163 of PN16 class
		(iii)	Joints for double flanged sluice valves to be made with suitable tail/socket pieces on the pipeline and flanges joints made with appropriate number of bolts, nuts and washers with 3 mm thick insertion rubber gasket
[17]	Air Valve	(i)	25 mm dia. screwed inlet C.I. single acting air valve to be necessarily provided on all high points in the system
[18]	Orifice Plates	(i)	Orifice Plates fabricated made of 6mm thick stainless steel of required size
[19]	Drain Pipe	(i)	80 mm dia black steel pipe confirming to IS:1239 (heavy class) with 50 mm gunmetal full way valve for draining any water in the system in low pockets
[20]	Strainers	(i)	Strainers to be Bucket type as specified
[21]	Hangers and Supports	(i)	Vertical pipes to have riser clamps not to exceed 4.5 m spacing
		(ii)	Horizontal piping to be supported at intervals not greater than 3m spacing and at all changes of direction
		(iii)	The size/ diameter of the anchor fastener and the clamp to be suitable to carry five times of the weight of water filled pipe plus 250 pounds pressure
[22]	Pressure Gauge	(i)	Pressure gauge to be 110 mm dia gunmetal Bourden type with gunmetal isolation cock, tapping and connecting pipe and nipple
		(ii)	Pressure gauges to read 0-20 Kg/sqcm
[23]	Hydrant/Valve Chambers	(i)	Valve chambers to be of following size: - I. 120 x 120 cms x 100 cms II. 90 x 90 cms x 100 cms
[24]	Flow Switch	(i)	Flow switch to be suitable to actuate within 90 seconds of opening of a single sprinkler and to be suitable for connection to a central Annunciation Panel
[25]	Sprinklers	(i)	As specified
		(ii)	Temperature rating of a sprinkler as specified and should not be less than 68 deg. Centigrade
[26]	Sprinkler Cabinets	(i)	Sprinkler cabinet to be constructed of 22-gauge steel with prime coat
[27]	Fire Extinguishers	(i)	6 kg multi-purpose ABC dry chemical type as per IS: 15683:2006
		(ii)	4.5kg Carbon Dioxide as per IS: 15683:2006

S. NO	PARAMETERS	REQUIREMENTS	
		(iii)	5kg Inert Gas
		(iv)	Dry Chemical powder type of 6kg as per IS: 15683:2006
[28]	Testing	(i)	All piping in system to be tested to a hydrostatic pressure of 2 times the working pressure and 1.5 times the working pressure plus 3.5 kg/cm2 for a period not less than 24 hours
		(ii)	In factory test, motors of 40 kW output and above, routine individual test certificates in accordance with BS 5000
		(ill)	For testing pipe work, when installed and subjected to the test loadings the pipe to be supported in excess of 8 mm
		(iv)	While testing pressure switches, testing equipment to be suitable for nominal working pressure of 20 bar (PN 20) conforming to the IS, e.g. the pipe work to conform to BS 1387:1967 Table 3 or relevant IS Code for class C heavy class black mild steel tube
		(v)	While testing flow switches, calibration test equipment to provide a flow of 60 dm3/min over the vane of the flow switch in the direction shown, to be confirmed by the direct reading flow meter
		(vi)	In hydrostatic test, hand jacking pump to be applied to increase the system pressure to 2 times the working pressure and 1.5 times the working pressure plus 3.5 kg/cm2 whichever is more but in any case not less than 7 bar for a period not less than 24 hours
		(vii)	In electrical test, 500V DC instrument to be used to check the insulation resistance. The reading shall not be less than 1 mega-ohm in all instances

63. ARBOLICUTURE

1.	GENERAL		
	1.1	Scope: Contractor to furnish all materials, labour and related terms necessary to complete the work indicated on drawing and specified here in.	
2.	MATERIALS:		
	2.1	Plant materials: Plant materials shall be well formed and shaped true to type, and free from disease, insects and defects such as knots, windburn, injuries, abrasion or disfigurement. All plant materials shall be healthy, sound, and vigorous, free from plant disease, insect pests or their eggs, and shall have healthy, well-developed root systems. All plants shall be hardy under climatic conditions similar to those in the locality of the project. Plants supplied shall conform to the names listed on both the plan and the plant list. No plant material will be accepted if branches are damaged or broken. All material must be protected from the sun and weather until planted.	

		Any nursery stock shall have been inspected and approved by the Landscape Architect. All plants shall conform to the requirements specified in the plant list, except that plants larger than specified may be used if approved, but use of such plants shall not increase the contract price. If the use of the larger plant is approved, the spread of roots or ball of earth shall be increased in proportion to the size of the plant. Deliver plants with legible identification labels.	
	2.2	Topsoil: (Good earth) PH range 6.5 to 7.5 Topsoil or good earth shall be a friable loam, typical of cultivated topsoil of the locality containing at least 2% of decayed organic matter (humus). It shall be taken from a well-drained arable site. It shall be free of subsoil, stones, earth clods, sticks, roots or other objectionable extraneous matter or debris. It shall contain no toxic material. No topsoil shall be delivered in a muddy condition.	
	2.3	Fertilizer: Dry farm yard manure shall be used measurement shall be in stacks, with 8% reduction for payment. It shall be free from extraneous matter, harmful bacteria insects or chemicals.	
	2.4	Root System: The root system shall be conducive to successful transplantation. Where necessary, the root-ball shall be preserved by support with hessian or other suitable material. On soils where retention of a good ball is not possible, the roots should be suitably protected in some other way which should not cause any damage to roots.	
	2.5	Condition: Trees and shrubs shall be substantially free from pests and diseases, and shall be materially undamaged. Torn or lacerated roots shall be pruned before dispatch. No roots shall be subjected to adverse conditions, such as prolonged exposure to drying winds or subjection to water-logging, between lifting and delivery.	
	2.6	Supply and substitution: Upon submission of evidence that certain materials including plant materials are not available at time of contract, the contractor shall be permitted to substitute other material and plants, with an equitable adjustment of price. All substitutions shall be of the Nearest equivalent species and variety to the original specified and shall be subject to the approval of the Landscape Architect.	
	2.7	Packaging: Packaging shall be adequate for the protection of the plants and such as to avoid heating or drying out.	
	2.8	Marking: Each specimen of tree and shrub, or each bundle, shall be legibly labelled with the following particulars: (A) Its name (B) The name of the supplier, unless otherwise agreed. (C) The date of dispatch from the nursery.	
3.	TREES, ORNAMENTAL PLANTS & PALMS PLANTING:		
	3.1	Trees should be supplied with adequate protection as approved. After delivery, it planting is not to be carried out immediately, balled plants should be placed cheek to cheek and the ball covered with sand to prevent drying out. Bare-rooted plants can be heeled in By placing the roots in a prepared trench and covering them with earth which should be watered into avoid air pockets round the roots.	
	3.2	Digging of Pits. Tree pits shall be dug a minimum of three weeks prior to backfilling. The pits shall be 1.2 m in diameter and 1.2 m deep. It shall be replaced with soil mixture as specified further herein. While digging the pits, the top soil up to a depth of 30 cm may be kept aside, if found good (depending upon site conditions) and mixed with the rest of the soil. If the soil is bad below, it shall be replaced with the soil mixture as specified further herein. The bottom of the pit shall be forked to break up the sub- soil.	

	3.3	Backfilling If the excavated soil is normal, it shall be mixed with manure. River sand shall be added to the soil if it is heavy. However, if the soil is bad, the pit shall be refilled with imported good garden soil mixed with manure 2:1 by volume (2 parts of stacked volume of earth after reduction 20% : 1 part of stacked volume of manure after reduction by 8%). The soil backfilled has to be watered through and gently pressed down a day previous to planting to make sure that it may not further settle down after planting. The rest 100mm shall be filled with manure. The soil shall be pressed down firmly by treading it down, leaving a shallow depression all around for watering.	
	3.4	Planting: No tree pits shall be dug until final tree positions have been pegged out for approval. Care shall be taken that the plant sapling when planted is not buried deeper than in the nursery, or in the pot. Planting should not be carried out in water logged soil. Plant trees at the original soil depth; the soil marks on the stem is an indication of this and it should be maintained on the finished level, allowing for setting of the soil after planting. All plastic and other imperishable containers should be removed before planting. Any broken or damaged roots should be cut back to sound growth.	
		The bottom of the planting pit should be covered with 50mm to 75mm of soil. Bare roots should be spread evenly in the planting pit; and small mound in the centre of the pits on which the roots are placed will aid an even spread. Soil should be placed around the roots, gently shaking the tree to allow the soil particles to sift into the root system to ensure close contact with all roots and to prevent air pockets. Backfill soil should be firmed as filling proceeds, layer by layer, care being taken to avoid to avoid damaging the roots, as follows: Chlorpyrifos emulsifiable concentrate 20% with 1% concentration shall be applied on walls of pit, and initially pit shall be filled to 200 depth with earth mixed Chlorpyrifos emulsifiable concentrate 20% with 1% concentration. The balance earth shall be filled in a mixture of 1:2 (part manure to 2 part earth). Chlorpyrifos emulsifiable concentrate 20% with 1% concentration shall be applied every 15 days.	
	3.5	Staking: Newly planted trees must be held firmly although not rigidly by staking to prevent a pocket forming around the stem and newly formed fibrous roots being broken by mechanical pulling as the tree rocks.	
		Methods: The main methods of staking shall be: (A) A single vertical stake, 900mm longer than the clear stem of the tree, driven 600mm to 900mm into the soil.	
		(B) Two stakes as above driven firmly on either side of the tree with a cross- bar to which the stem is attached. Suitable for bare-rooted or balled material.	
		(C) A single stake driven in at an angle at 450 and leaning towards the prevailing wind, the stem just below the lowest branch being attached to the stake. Suitable for small bare-rooted or balled material.	

		(D) For plant material 3m to 4.50 m high with a single stem a three-wire adjustable guy system may be used in exposed situations.	
		The end of stake should be pointed and the lower 1m to 1.20m should be coated with a non-injurious wood preservative allowing at least 150mm above ground level.	
		Tying: Each tree should be firmly secured to the stake so as to prevent excessive movement. Abrasion must be avoided by using a buffer, rubber or hessian, between the tree and stake. The tree should be secured at a point just below its lowest branch, and also just above ground level; normally two ties should be used for tree. These be adjusted or replaced to allow for growth.	
	3.6	Watering: The contractor should allow for the adequate watering in of all newly planted trees and shrubs immediately after planting and he shall during the following growing seasons, keep the plant material well watered.	
	3.7	Fertilizing: Fertilizing shall be carried out by application in rotation of the following fertilizers, every 15 days from the beginning of the monsoon till the end of winter: - sludge of organic well-rotted dry farmyard manure or vermicompost or approved organic manure as per directions of landscape architect:	
4.	SHRUBS, GROUND COVERS, CREEPERS PLANTING IN PLANTERS AND BEDS		
	All areas to be planted with shrubs shall be excavated, trenched to a depth of 600 mm, refilling it with finely mixed good black garden soil and excavated earth (after breaking the clods and mixing with sludge in the ratio 8:1 (8 parts of stacked volume of earth after reduction by 20%: 1 part of stacked volume of sludge after reduction by 8%). Backfill soil should be firmed as filling proceeds, layer by layer, care being taken to avoid to avoid damaging the roots, as follows: Chlorpyrifos emulsifiable concentrate 20% with 1% concentration shall be applied on walls of pit. The balance earth shall be filled in a mixture of 1:2 (part manure to 2 part earth). Chlorpyrifos emulsifiable concentrate 20% with 1% concentration shall be applied every 15 days.		
	Tall shrubs may need staking, which shall be provided if approved by the Landscape Architect depending upon the conditions of individual plant specimen. For planting shrubs and ground cover shrubs in planters, good earth shall be mixed with sludge in the proportion as above and filled in planters. Positions of shrubs to be planted should be marked out in accordance with the planting plan. When shrubs are set out, precautions should be taken to prevent roots drying. Planting holes 45 cm dia and 45 cm deep should be excavated for longer shrubs. Polythene and other non- perishable containers should be removed and any badly damaged roots carefully pruned. The shrubs should then be set in holes so that the soil level, after settlement, will be at the original soil mark on the stem of the shrub. The hole should be backfilled to half pots depth and firmed by treading. The remainder of the soil can than be returned and again firmed by treading.		

	5	POST DEVELOPMENT MANAGEMENT: Maintenance Works Criteria Table:					
Work description		Activities/parts	Recourses		Remarks		
Landscape Management							
Lawn Management	Mowing		Mower				
	Weeding		Manually/ specific weedicides		With the client approval		
	Nutritive application		FYM/ fertilizer		Broadcasting, praying and intercultural s		
	Irrigation		QCV, Sprinklers				
	Washing		QCV/ Water tanker				
	Cleaning		Brooming etc				
	Insect/Pest management		Plumbing machine / broadcasting manually/ Auto spray pump				
Tree management	Training/ Pruning/ Shaping		Telescopic chain pruner/ saw				
	Fertilization		Manually				
	Basin preparation		Manually				
	Irrigation		QCV, Sprinklers				
	Washing		QCV, water tanker				
	Uprooting of dead trees/ palms		Mechanized/ manually, as per the condition				
Shrubs and Ground Covers	Cutting/ Training/ pruning		Mechanized/ manual hedge trimmer				
	Watering		QCV, Sprinklers				
	Washing		QCV, Water tankers				
		Weeding	Manually				
		Bed cleaning	Manually				
	6	The landscape contractor shall maintain all planted areas within the landscape contract boundaries for one year after the area is handed over in whole or in phases. Maintenance shall include replacement of dead plants, watering, and weeding, cultivating, control of Insects, fungus and other diseases by mean off spraying with an approved insecticide or fungicide, pruning, and other horticulture operations necessary for the proper growth of the plants and for keeping the landscape contract area neat in appearance.					

	7.	Mortality Replacement: Replace the plants mortalities in case of natural plant death and due to negligence but not be held responsible to replace any plant/ tree/ grass/ mortality against damage done by RWCs or natural calamities such as earthquake, Fire, Flood, and storm.	
	8.	Respond Time: Immediately for routine work and 24 hour for extra works.	
	9.	Safety, Health and Environment: Public health and safety have to be considered on priority at site. Use of PPE (Personal Proactive Equipment) such as gumboots, safety jackets, goggles, safety helmets, gloves, safety mask etc is highly recommended. Workers will be properly attired while working at site. The contractor to arrange sufficient stocks of medicines, antidotes, first aid tools and equipment as may be required to treat cases arising from skin contamination, eye contamination, swallowing etc. at all times at site.	
	10.	Pruning and repairs: Upon completion of planting work under the contract all trees should be pruned and all injuries repaired where necessary. The amount of pruning shall be limited to the minimum necessary to remove dead or injured twigs and branches and to compensate for the loss of roots	
	11.	Tree guards: Where tree guards are necessary, care should be taken to ensure that they do not impede natural movement or restrict growth.	
	12.	Nursery Stock: Planting should be carried out as soon as possible after reaching site. Where planting must be delayed out of necessity, care should be taken to protect the plants from pilfering or damage from people or animals. Plants with bare roots should be heeled-in as soon as received or otherwise protected from drying out, and others set closely together and protected from the wind. If planting is to be delayed for more than a week, packaged plants should be unpacked, the bundles opened up and each ground of plants heeled in separately and clearly labeled. If for any reason the surface of the roots becomes dry the roots should be thoroughly soaked before planting.	
	13	Completion On completion the ground shall be formed over and left tidy before commencement of maintenance.	

Appendix ‘A’

1. APPROVED CEMENT MANUFACTURERS FOR MES WKS ON PAN INDIA LEVEL
(Updated by E-in-C’s branch letter No. A/90154/ 02/E2 Des-3 dated 09 Jan 2025)

Sr No	Company Name & Brand	Address	Type of Cement
1	The Associated Cement Companies Ltd. Brand: “ACC”	414-421, Splendor Forum (4 th Floor), 3, District Centre, Jasola, New Delhi-110044 Ph- 011 46583600	ALL
2	M/s Ultra Tech Cement Brand: “ULTRATECH”	B Wing, 2 nd Floor, Mahakali Caves Road, Andheri (East) Mumbai – 400093 Ph : 022-66917800	ALL
3	The India Cement	Dhun Building, 827, Anna salai, Chennai-600002	ALL
4	M/s Dalmia Cement (Bharat) Ltd Brand: “DALMIA INFRA PRO”	Dalmiapuram Distt- Truchirappalli Tamil Nadu – 621651	ALL
5	Century Cement Brand: “CENTURY”	Industry House, 159 Church gate Reclamation. Mumbai-400020 Ph-022 22023936	ALL
6	Saurashtra Cement Brand: “SAURASHTRA”	Gala No A-1, Ground Floor, Udhyog, Sadan No 3 MIDC, Central Road, Andheri (East), Mumbai – 400093 Ph-022 32955557/67 Mob.9320290081	ALL
7	The Ramco Cements Ltd. (Formerly Madras Cement) Brand: “RAMCO”	Aurus Corporate Centre, 98-A, Dr RadhakishnanSalai , Mylapore, Chennai-600004 Ph: 044-28478666	ALL
8	Mangalam Cement Ltd Brand: “MANGALAM”	PO Adityanagar, Morak, Dist-Kota, Rajasthan-326520 Ph-9351468076	ALL
9	Birla Corporation Ltd. Brand: “BIRLA”	Birla Building (3 rd &4 th floor), 9/1, R.N. Mukherjee Road Kolkata-700001 Ph-033 30573700	ALL
10	Orient Cement Brand: “BIRLA-A1”	5-9-22/57/D, 2 nd and 3 rd Floor, GP Birla Centre, Adarsh Nagar, Hyderabad-500063 Pin-044 23688600	ALL
11	Nuvoco Vistas Corporation Ltd (Formerly Lafarge Cement) Brand: “NUVOCO”	Equinox Business Park Tower-3, East Wing, 4 th Floor, LBS Marg ,Kurla (west), Kurla Mumbai, Maharashtra-400070	ALL
12	Shree Cement Brand: “SHREE”	Bangur Nagar, Beawar, Disst- Ajmer, Rajasthan-305901 Ph-01462 228101-06	ALL

APPROVED CEMENT MANUFACTURERS FOR MES WKS ON PAN INDIA LEVEL (Contd..)

Sr No	Company Name & Brand	Address	Type of Cement
13	J K Cement Brand: “J K”	Kamla Tower, Kanpur-208001	ALL
14	JK Lakshmi Cement Ltd Brand: “J K LAKSHMI”	Jaykaypuram, Dist-Sirohi, Rajasthan Ph-02971 244409/10	ALL
15	Jaypee Rewa Cement Brand: “JAYPEE”	Jaypee Nagar, P.O- Jaypee Nagar, Rewa-486450 M.P	ALL
16	Ambuja Cement Ltd Brand: “AMBUJA”	Kodinar, PO- Ambujanagar, Taluka- Kodinar, Disst- Junagadh, Gujarat-362715 Ph-02795 237000	ALL
17	M/s Sagar Cements Ltd Brand “SAGAR”	M/s Sagar Cements Ltd Plot No 111, Road No 10, Jubilee Hills, Hyderabad-500 033 Tel: +91-40-23351571, 2335672 Fax: +91-40-2335673 Website: www.sagarcements.in	(a) OPC 43 (b) OPC 53 (c) PPC (d) PSC
18	M/s Chettinad Cement Corporation Ltd. Brand: “CHETTINAD CEMENT”	4 th Floor, Rani Seethai Hall Building, 603, Anna Salai Hall, Chennai-600006 Tel-No 044-42951800 Fax-No.044-28291558 E mail:- info@chettinadcement. com Website-www.chettinadcement.com	(a) OPC 43 Gr (b) PPC
19	M/s My Home Industries Ltd. Brand : “MAHA CEMENT”	9 th Floor, Block-3, My Home Hub, Madhapur, Hyderabad-500081 Ph- 040-66929696 Fax- 040-66929797/98	(a) OPC 43 Gr (b) PPC (c) PSC
20	M/S Wonder Cement Ltd. Brand: “WONDER Cement”	17,Old Fatehpura, SevaMandir Road, Udaipur-313004, Rajasthan (India) Tele: +91-294-33991133 Fax:+ 91-294-3006333 Email ID:- Corp.office @ wonder cement .com	(a) OPC 43 (b) OPC 53 (c) PPC

2. APPROVED TMT STEEL MANUFACTURERS FOR MES WKS**(Updated by E-in-C's branch letter No. 83044/Steel/ 03/E2 Des-3 dated 09 Jan 2025)**

SI No.	Company Name & Brand	Address	Type of Steel
1	Rashtriya Ispat Nigam Limited (RINL) Brand: "RINL"	Visakhapatnam Steel Plant Visakhapatnam – 530 031 India Tel : (91 891) 518226, 518376 Fax : (91 891) 518316 Email : cmdvsp@itpvis.ap.nic.in	For all types & dia of TMT bars
2	Tata Iron & Steel Company (TISCO or Tata Steel) Brand: "TATA"	Bombay House, 2-4 Homi Modi Street Mumbai – 400 001, India Tel : (91 22) 204 9131 Fax : (91 22) 204 9522, 287 0840 Email : corpcomm@sr.tatasteel.com (Br office for North: Jeevan Tara Bldg. Patel Chowk. New Delhi)	For all types & dia of TMT bars
3	Steel Authority of India Limited (SAIL) Brand: "SAIL"	Central Marketing Organisation, Northern Region, 17 th Floor, scope Minar, Laxmi Nagar Distt. Centre Delhi – 110092	For all types & dia of TMT bars
4.	M/s Gallantt Metal Ltd Brand: "GALLANTT TMX"	Ward 10BC, Polt No. 123 Ground Floor, Gandhi Dham, Kutch, Gujarat - 370201 Tel : 91-2836-228164 Fax : 91-2836-235787 E-mail : gml@gallantt .com Website : www.gallantt .com	TMT Bras of Gde Fe 500 Fe 500D CRS (Size 8-32mm)
5.	M/s Rashmi Metalics Limited, W.B. Brand: RASHMI TMT	Premlata Building 39, Shakespears Sarani 6th Floor, Kolkata-700017 Tele: 033-22894255/56 Fax: 033-22894254 Email- mkt.domesticdip@rashmigroup.com Website: www.rashmigroup.com	TMT Bras of Gde Fe 500 (Size 8-32mm) Fe 500D & Fe 550D (Size 8-25mm)
6.	M/s Bajrang Power & Ispat Ltd., Raipur Brand: GOEL TMT	M/s Bajrang Power & Ispat Ltd., Raipur Vill-Borjhara Urla Industrial Area Raipur-493221(CG) Tele: 0771-4288019/29/39 Fax: 0771-2323601/602, 4288123 Email- infobir@giekgriyo.co.in	TMT Bras of Gde Fe 500 & Fe 500D (Size 8-32mm)
7.	M/s Real Ispat & power Ltd Brand: "G K TMT"	Vrindavan, Near IDBI Bank Civil Lines, Raipur -492001, CG Tel : 91-771-4224000 Fax : 91-771-4224010 E-mail : real@realispat.com Website : www.realispat.com	TMT Bras of Gde Fe 500 Fe 500D (Size 8-36mm)

APPROVED TMT STEEL MANUFACTURERS FOR MES WKS (contd...)

8.	M/s Steel Exchange India Ltd. Brand: "SIMHADRI TMT"	D. No: 1-65/K/60, Plot No. 60 Abhis Hiranya, 1 st Floor Kavuri Hills, Hyderabad Telangana-500081 Tel-040-23403725, Fax-040-23413267 E-mail : info@seil.co.in	TMT Bars of Gde Fe 500 Fe 500D HSCRM
9.	M/s Super Smelters Ltd Kolkata. Brand: "SUPER SHAKTI"	Premlata, 39, Shakespeare Sarani, 3 rd Floor, Kolkata -700017 Tel/ Fax : 033-2289-2734/ 36 E-mail : info@supershakti.in Website :www.supershakti.com	TMT Bras of Gde Fe 500D Fe 550 (Size 8-32mm)
10.	M/s Shyam Steel Industries Ltd Brand: "SHYAM"	Shyam Towers EN-32, Sector- V, Salt Lake, Kolkatta - 700091 Tel-033-40074007, Fax 033-40074010 E-mail : marketing@shyamsteel.com	TMT Bars of Gde Fe 500 Fe 500D CRS
11.	M/s Jai Balaji Industries Ltd Brand: "Balaji Shakti"	5 Bentek street, Kolkata-700001 Delhi Office 510, Block-b, Navraung House 21 Kasturba Gandhi Marg. New Delhi-110001 011-43620219, 43620220 Mob: 7838272772/9958936103 E- mail: info@jaibalajigroup.com	TMT Bars of Gde Fe 500 Fe 500D
12.	M/s MSP Steel & Power Limited, Chattisgarh Brand: MSP TMT 500D	M/s MSP Steel & Power Limited, Chattisgarh 16/S, Block-A, New Alipore Kolkata 700053 Tele: 033 40057777/2398 2239 Mob: 7381028976 Email: contactus@mspsteel.com Website: www.mspteel.com	TMT Bars of Gde Fe 500D (Size 8-32mm)
14.	M/s SPS Steel Rolling Mills Ltd, (WB) Make : ' ELEGANT TMT '	M/s SPS Steel Rolling Mills Ltd, (WB) Regd Office " Diamond Heritage" 16, Stand Road, Room No H523 A, 5 th Floor, Kolkata-700 017 Corp office: " Diamond Prestige, 41 A, A.J.C. Bose Road, 8 th Floor, Room No 801, Kolkata -700 017 Mob no: 9831055568 / 9830281273 Email : info@spsgroup.co.in	TMT Bars of Gde Fe 550D
15.	M/s Sugna metals limited, Hyderabad Brand : ' SUGNA TMT '	M/s Sugna Metals Limited Plot No 76, Vemireddy Enclave, Road No 12, Banjara Hills Hyderabad -500 034(Telangana) Tele-04027664502/27663527 Email : info@sugnatmt.com	TMT Bars of Gde Fe 550D (Size 8-32mm)
16.	M/s Shyam Metalics and Energy Ltd Brand: 'SEL TIGER'	M/s Shyam Metalics and Energy Ltd Viswakarma Building, North west Block 1 st , 2 nd & 3 rd floor 86C, Topsia Road Kolkata- 700 046(WB) Tel-+9133-40113000 Fax-+9133-22852212 Website : www.shyammetalics.com	TMT Bars of Gde Fe 550D (Size 8-32mm)

APPROVED TMT STEEL MANUFACTURERS FOR MES WKS (contd...)

17.	M/s Jindal Steel and Power Ltd. Brand: “JINDAL PANTHAR”	M/s Jindal Steel and Power Ltd, Haryana OP Jindal Road Hissar, Haryana, Haryana, Pin-125005 Tel-+91-1662-222471/84 Fax-+91-1662-222476 www.jindalsteelpower.com	TMT Bars of Gde Fe 500, Fe 500D, Fe 550, Fe 550D & CRS with (Size 8-40mm)
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3. APPROVED STRUCTURAL STEEL MANUFACTURERS FOR MES WKS
(Updated by E-in-C’s branch letter No. 83044/Steel/ 03/E2 Des-3 dated 09 Jan 2025)

SI No.	Company Name & Brand	Address	Type of Steel
1	Rashtriyaspat Nigam Limited (RINL) Brand: “ RINL ”	Visakhapatnam Steel Plant Visakhapatnam – 530 031 India Tel : (91 891) 518226, 518376 Fax : (91 891) 518316 Email : cmdvsp@itpvis.ap.nic.in	Structural Steel (Angle, Beam, Column, Channel, Plate etc)
2	Tata Iron & Steel Company (TISCO or Tata Steel) Brand: “TATA”	Bombay House, 2-4 Homi Modi Street Mumbai – 400 001, India Tel : (91 22) 204 9131 Fax : (91 22) 204 9522, 287 0840 Email : corpcomm@sr.tatasteel.com (Br office for North: Jeevan Tara Bldg. Patel Chowk. New Delhi)	Structural Steel (Angle, Beam, Column, Channel, Plate etc)
3	Steel Authority of India Limited (SAIL) Brand: “SAIL”	Central Marketing Organisation, Northern Region, 17 th Floor, scope Minar, Laxmi Nagar Distt.Centre Delhi – 110092	Structural Steel (Angle, Beam, Column, Channel, Plate etc)
4	M/s Jindal Steels and Power Ltd. Brand: “JINDAL”	Jindal Centre, Plot No. 2, Sector- 32, Gurgaon – 122001 Haryana Tele : 0124 6612000 Fax : 0124 6612125 Website : www.jindalsteelpower.com	Structural Steel (Angle, Beam, Column, Channel, Plate etc)

CONSOLIDATED LIST OF PRODUCTS APPROVED: E-IN-C'S BRANCH AS ON 09 Jan 2025
(PLEASE REFER THE APPROVAL LETTER FOR FURTHER DETAILS
OF PRODUCTS APPROVED)

CIVIL CONSTRUCTION PRODUCTS

1. ALL RUNWAY RELATED PRODUCTS

(a) POLYMER MODIFIED BITUMEN (PMB)

Sl. No	Name of firm	Product Description	Approval letter No and date	Valid upto
i.	M/s Hindustan Colas Ltd	"Hincol" Brand 'Polymer Modified Bitumen (PMB) (Elastomeric SBS Modified) Confirming to IRC SP: 53/2002 or latest, and IS - 15462:2004 and prepared with base bitumen sourced only from any of PSU refineries of India. Source of base mtrl: Govt refineries/ Govt approved PSUs	43285/CMPT/653/Des-2 dt 17 Feb 2023	18 Sep 2025
ii.	M/s Ooms Polymer Modified Bitumen Pvt Ltd	"Ooms Polymer" Brand 'Polymer Modified Bitumen (Elastomeric SBS Modified) Confirming to IRC SP : 53/2002/2010 and IS - 15462:2004/2019 Source of base mtrl : Govt refineries / Govt approved PSUs.	43285/CMPT/660/Des-2 dt 10 Jul 2023	06 Feb 2026
iii.	M/s Kotak Asphalt LLP	Polymer Modified Bitumen (PMB)	43285/CMPT/672/Des-2 dt 27 May 2024	26 May 2026
iv.	M/s Tiki Tar and Shell India Pvt Ltd	"SHELL CARIPHALTE" Brand 'Polymer Modified Bitumen (PMB) Confirming to IRC SP : 53/2010 and IS - 15462:2019 Source of base bitumen : Govt refineries/ Govt approved PSUs	43285/CMPT/675/Des-2 dt 18 Sep 2024	17 Sep 2027

(b) BITUMEN EMULSION

Sl. No	Name of firm	Product Description	Approval letter No and date	Valid upto
i.	M/s Hindustan Colas Ltd	Hincol Bitumen Emulsion confirming to IS-8887:2004 and ASTM D 2397	43285/CMPT/653/Des-2 dt 17 Feb 2023	18 Sep 2025
ii.	M/s Verma Industries	Bitumen Emulsions RS-1 for tack coat applications SS-1 for prime coat application over WMM/WBM	43285/CMPT/659/Des-2 dt 26 Jun 2023	25 Jun 2025
iii.	M/s Kotak Asphalt LLP	Bitumen Emulsions (RS1 & SS1)	43285/CMPT/672/Des-2 dt 27 May 2024	26 May 2026
iv.	M/s Tiki Tar and Shell India Pvt Ltd	"SHELL SPRAMUL" Brand 'Bitumen Emulsions RS-1, SS-1 and CSS-1.	43285/CMPT/675/Des-2 dt 18 Sep 2024	17 Sep 2027



(c) **GLASS GRID / FIBRE GLASS**

Sl. No	Name of firm	Product Description	Approval letter No and date	Valid upto	Remarks
i.	M/s Giridhar Techfab Pvt Ltd	GTF Glass Geogrid,	43285/CMPT/625/Des-2 dt 03 Jan 2022	16 Jan 2025	* Approval of the firm is temp suspended till three firms have been approved.

(d) **POLYMERIC BITUMEN EMULSION (PME)**

Sl. No	Name of firm	Product Description	Approval letter No and date	Valid upto
i	M/s L N Petro Chem Private Limited	Polymer Modified Emulsions Brand Name : EMULCOTE	43285/CMPT/666/Des-2 dt 10 Jan 2024	09 Jan 2027

(e) **OTHER RUNWAY RELATED PRODUCTS**

Sl. No	Name of firm	Product Description	Approval letter No and date	Valid upto
i	M/s ITS Coatings Pvt Ltd	Waterborne Acrylic Airport Marking Paint IS:164 grade brand Name "iTraff"	43285/CMPT/664/Des-2 dt 01 Nov 2023	31 Oct 2025
ii	M/s The Supreme Industries Ltd	DURA BOARD HD 100 DURA ROD	43285/CMPT/679/Des-2 dt 28 Nov 2024	27 Nov 2029

2. **CONSTRUCTION CHEMICALS AND WATERPROOFING PRODUCTS:-**

(a) **M/s Berger Paints India Ltd**

(i) Approved vide letter No 43285/CMPT/670/Des-2 dated 08 Apr 2024 and approval is valid upto 07 Apr 2025 :-

(a) Berger Homeshield Waterproof Putty.	(f) Berger Homeshield Tank Shield PW.
(b) Berger Homeshield Dampstop.	(g) Berger Homeshield Proshield.
(c) Berger Homeshield Cementmix Plus.	(h) Berger Weathercoat Kool & Seal.
(d) Berger Homeshield Advance Latex Plus/Latex Plus.	(j) Berger Weathercoat Roofguard.
(e) Berger Homeshield Latex Shield 2K.	(k) Berger Homeshield Tile Adhesive Plus.
	(l) Berger Homeshield Crackfill Paste.

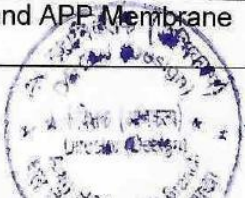
(b) **M/s Tiki Tar Danosa (India) Pvt Ltd:**

(i) Approved vide letter No 43285/CMPT/657/ Des-2 dated 22 May 2023 and approval is valid upto 16 Feb 2026 :-

<u>App Membrane</u>
(a) HYDROSTOP Waterproofing Membrane.

(c) **M/s Torchtar Membranes & Bitumen Product Pvt Ltd**, approved vide letter No 43285/CMPT/656/Des-2 dated 27 Apr 2023 and approval is valid upto as per products :-

(i) Torchtar Brand APP Membrane	-	approval valid up to 20 Jan 2026
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(d) **M/s Pidilite Industries Ltd**, approved vide letter No 43285/CMPT/663/Des-2 dated 26 Sep 2023 and approval is valid upto 25 Sep 2025:-

<u>Epoxy/ Polyurethane Industrial Flooring</u>	
(a) Dr Cipy Cipoxy Range	(g) Dr Cipy Deckfloor Range
(b) Dr Cipy Floorkote Range	(h) Dr Cipy Duraseal Range
(c) Dr Cipy Cipothane Range	(j) Dr Cipy Floortop Range
(d) Dr Cipy Floorcrete Range	(k) Dr Cipy Stathgaurd Range
(e) Dr Cipy Walcote Range	(l) Dr Cipy Cerazzo Range
(f) Dr Cipy Duracrete Range	(m) Dr Cipy Aquoxy Range
	(n) Dr Cipy Cipocem Range

(e) **M/s Bostik India Pvt Ltd**, approved vide letter No 43285/CMPT/655/Des-2 dated 28 Mar 2023 and 43285/CMPT/658/Des-2 dated 14 Jun 2023 approval is valid upto 27 Jan 2026 :-

<u>Construction Chemicals/ Materials</u>	<u>Reinforcement/Concrete Protective Coating/Systems</u>
(a) Bostik LW	(a) Epoxy Coat UW (Block E550 Epoxycote UW)
(b) Bostik Two in One	(b) Procoat PU
<u>Tile Adhesive</u>	(c) Bostik CTE
(a) Fix All	(d) Magic Repellent SB (Block X530 Hydro Repel)
(b) Super Fix All	(e) Magic Repellent WB
(c) Tile Grout	<u>Epoxy/ Polyurethane Flooring</u>
(d) Epoxy Tile Grout	(a) Bostik Ultralevel ESL 1000
<u>Repair & Rehabilitation / Bonding Agents / Grouts</u>	(b) Bostik Ultralevel ESL 2000
(a) Bostik EP Bond	(c) Bostik Ultralevel EUL 2000
(b) Boscocem 475	(d) Bostik ESM
(c) Bostik Plug Leak (Block C920 Power Plug)	<u>Waterproofing Chemicals / Materials</u>
(d) Bostik Patch Fix MC	(a) Boscocem Slurry (Block C530 Boscocem Slurry)
	(b) Bostik K11 Slurry
(e) Bostik Patch Fix Concrete	(c) Boscocrete
(f) Bostik LVEP	(d) Moisture Seal
(g) Bostik Grout Admix	(e) Bostik CWP (Block C350 Bostik CWP)
(h) Bostik ERM	(f) Hydroment 476 (Block A350 Powermix)
(j) Bostik Anchor Grout	(g) Boscolastic (Block C750 Boscolastic)
(k) Bostik Flow fill Grout GP	<u>Membrane & Liquid Membrane / Coatings</u>
<u>Joint Sealants</u>	(a) Boscoseal PU (Block P530 Boscoseal PU-D)
(a) Bostik Seal N Flex 2K	(b) Elasocoat (Block A550 Boscoseal RC2)
(b) Bostik Seal N Flex 1 Plus P 590	
(c) Bostik Seal N Flex Premium P 795	
<u>Floor Hardner</u>	
(a) Bostik Floor Hardner	

(f) **M/s Sika India Pvt Ltd**, approved vide letter No 43285/CMPT/668/Des-2 dated 29 Jan 2024 and approval is valid upto 28 Jan 2027 :-

<u>Joint Sealants.</u>	<u>Waterproofing</u>
(a) Sikasil 728NS/SL	(a) Sikaplan WP 1100-15HL/20HL
(b) Sika Polysulphide	(b) Sikalastic 450h/450l
(c) Sikaflex Construction +	(c) Sika Cemflex
(d) Sikaflex PRO-3	(d) Sika Latex Power & Sika Latex Super
(e) Sikadur Combiflex SG	(e) Sika 101h
(f) Sikaflex 11 FC	(f) Sika Top 107 Seal IN
(g) Sikaflex Pro 3 SL	(g) Sika Top 109 Seal IN
(h) Sikaflex 402 Airport	(h) Sika 2
(j) Sika Emseal Joint Systems	(i) Sika 4a
(k) SikaSeal 106 Construction	(k) Sika Swell P Profile
(l) Sikaflex 118 Extreme Grab	(l) Sika Fuko Smart

(m) Sikaflex 406 KC	(m) Sika Injection 101 IN
(n) SikaHyflex 160 Construction	(n) Sika Waterbar h
Refurbishment	(o) Sikalastic 830N
(a) Sikawrap glass Fibre.	(p) Sikalastic 842BG
(b) Sikawrap Carbon Fibre	(q) Sikalastic 618 MTC
(c) Sika Anchofix 2+ Tropical	(r) Sika Shield P24 PE IN-3mm/P24 MG IN-3mm/P24 PE IN – 4mm/P24 MG IN-4mm
(d) Sikadur 31 IN	(s) Sikaplan 12G/15G
(e) Sikadur 32 IN	(t) SikaProof 808/A+12/T10
(f) Sikadur 32 LP IN	(u) Sika Swell A/S2
(g) Sikadur 41 IN	(v) Sika WP Shield 103F/102F
(h) Sikadur 43 IN	(w) Sika Fuko VT1/VT2/Eco1
(j) Sika FerroGard 903	(x) Sarnafil G 410L/G476/S327L
(k) Sika Ferrogard 950 IN	(y) Sikalastic 590 IN
(l) Sikagard 550 W IN	(z) Sika Shield P35 PE IN-3mm/P35 MG IN-3mm/ P35 PE IN-4mm/P35 MG IN-4mm/Sikaproof 312/315/612
(m) Sikacrete 145 IN	(aa) Sika Shield P24 S IN -3mm/P24 S IN-4mm
(n) Sikacrete 155 UW IN	(ab) Sikalastic 851/851R/901
(o) Sikacrete 145 IN/ 165 IN	(ac) Sika Injection 202IN/201CE/306/307/310
(p) Sika Carbo Dur	(ad) Sika MultiSeal
(q) Sikadur 12 Pronto	(ae) SikaCim Pink
(r) Sika Top 77	(af) Sika Raintite I
(s) Sika Top 122.	(ag) Sika FlexiCoat 1K
(t) Sika Top 122HS.	(ah) Sikalastic 520 Cool Coat Fibres IN/ Sikalastic 10 Primer W
(u) Sika Top Armatec 108	(aj) Sika Cemcrete
(v) Sika Top Armatec 110 Epo Ce	(ak) Sika Control WT 200 P IN
(w) Sikagard 551S Elastic Primer	(al) SikaSeal Tape F
(x) Sikagard PU UR/Sikagard PU UR (W)	(am) SikaShield W159 ED 1,5mm
(y) Sika MonoTop 122 F/R	(an) Sikalastic 853 RAP
(z) SikaGrout Precast 40	(ao) Sika Monotop 151 Migrating
(aa) Sikagard 5310 Coal Tar	(ap) Sika Shield P22 PE IN-3mm
(ab) Sikagard 552 W IN	Grout
(ac) Sikagard 625 Clearcoat	(a) Sika Grout 104 IN
(ad) Sika Anchorfix 3030	(b) Sika Grout 214 IN
(ae) Sikawrap FX 50	(c) Intraplast EP.
(af) Sika carbodur BC Rod	(d) Sikacem 130 Intraplast
(ag) Sika Carbodur NSM	(e) Sikacem 135 Intraplast
(ah) Sika Monotop 412N	(f) Sikadur 42 IN
(aj) Sikagard XT	(g) Sikadur 42 HES IN
(ak) Sika Rustoff 100	(h) Sikadur 52
Flooring	(j) Sikadur 53 UF
(a) Sika Chapdur IN	(k) Rokkon 1
(b) Sikafloor3 Quartztop IN	(l) RokkonR
(c) Sikafloor 20N Purcem	(m) Sikadur 42 MP (IN)
(d) Sikafloor 41 Purcem	Grout Contd...
(e) Sikafloor 49 Purcem	(n) Sikadur 55 LP IN
Flooring contd...	(o) Sikagrout 60 RR
(f) Sikafloor 31 Purcem IN	(p) Sikagrout 295 IN
(g) Sikafloor 81 EpoCem	Admixture
(h) Sikafloor 82 EpoCem	(a) Sika AER
(j) Sikafloor 105	(b) Sika FerroGard-901(IN)
(k) Sikafloor 161 HC	(c) Sika Rapid 1
(l) Sikafloor 220 W Conductive	(d) Sika Antifreeze
(m) Sikafloor 262 AS N	(e) Sikament
(n) Sikafloor 264 HC N	(f) Sikament 4003NS
(o) Sikafloor 390 N	(g) Sikament 4211 PQ
(p) Sikafloor 381 ECF	(h) Sikament NN
(q) Sikafloor 7530	(j) Sikament 1016NS
(r) Sikafloor Curehard 24	(k) Sikament 2002NS
(s) Sikafloor Proseal 22	(l) Sika ViscoCrete
(t) Sikagard 63	(m) SikaPlast
(u) Sikagard 63 N	(n) Sikaplast 4201NS
(v) Sikagard 67	(o) Sikaplast 3001NS
(w) Sika Ceram	(p) Sika Viscocrete 20 HE.
(x) Sika Tilofix	
(y) Sika Wall Décor	

(z) Sikafloor 2350 ESD	(q) Sika ViscoFlow
(aa) Sikafloor 315	(r) Sika Plastiment
(ab) Sikafloor 325	(s) Sika Plastocrete
(ac) Sikafloor 359 N	(t) Sika Singunit
(ad) Sikafloor 44 Purcem EDF	(u) Singunit L54AF
(ae) Sikafloor 326	(v) Sika Singunit Powder K
(af) Sika Extender T	(w) Sika Antisol
(ag) Sikafloor Joint S/EXA/XS/X	(x) Antisol EWP.
(ah)Sikafloor Leitset (Earthing Kit)	(aa) Sigunit Powder (K)
(aj) Sikafloor 290 Primer	(ab) Sika Separol
(ak) Sikafloor 291	(ac) SikaRapid C100
(al) Sikagard 720 Epocem IN	(ad) Sikament 3070NS/2009PQ
(am) Sikafloor Multidur System	(ae) Sika Viscocrete 4107PQ
(an) Sika Colourflake IN	(af) Sikaplast 3144PQ
(ao) Sika Block Joining Mortar	(ag) Sika Control-WT 200 P(IN)
(ap) Sika Tilogrout/Epoxy Tilogrout	
(aq) Sika Ceram Grey/155/212/255 (White & Grey)/288 (White & Grey)	

(g) **M/s Thermax Ltd**: Approved vide letter No 43285/CMPT/671/Des-2 dated 24 May 2024 and approval is valid upto 23 May 2025:-

Admixtures. (i) Tecnos 94 (ii) Tecnos 95 (iii) Tecnos RP (iv) Neutrol 100 (v) Neutrol 200 (vi) Neutrol 500 (vii) Accelerator NT (viii) Warep 1000/L (ix) Warep 1000/P (x) MuCis AD 28 Tecnos Joint Sealant (i) MaxFlex PS (ii) MaxFlex PU1 (iii) MaxFlex PSPR (iv) MaxFlex PUPR (v) MaxFlex ACS (vi) MaxFlex PS 500	FLOOR HARDENER (i) TecFloor HT (ii) TecFloor HTS Epoxy/Polyurethane Industrial Flooring (i) TecFloor EC 500 (ii) TecFloor ET 1000/2000/3000/ 4000 (iii) TecFloor UL (iv) TecFloor PU CEM (v) TecFloor EC 100 (vi) TecFloor PR (vii) TecFloor ESD Curing Compound (i) Maxcure CC 75 (ii) Maxcure CC 80 (iii) Maxcure CC 90 (iv) Maxcure RR (v) Maxcure MRA 102
Water Proofing Chemicals/Materials (i) Elastplast Rol 10 MuCis (ii) Anticorr 280 II MuCis (iii) Tecnoseal V1 (iv) Maxshield PF 900 (v) CRYs TECO PWD (vi) Maxshield Roofkot (vii) Maxshield Wallkot (viii) Maxshield T15 (ix) Maxshield P 600 (x) Maxshield Primer (xi) MuCis Mia 200 (xii) Maxshield PF 100 PW Reinforcement/Concrete Protective Coatings (i) T-Guard AC (ii) T-Guard WBP (iii) T-Guard EC 200 (iv) T-Guard ENC (v) T-Guard CTE 45 (vi) T-Guard CTE 65 (vii) T-Guard BC (viii) T-Guard BCP	Repair & Rehabilitation, Bonding Agents & Grouts Contd/.. (vii) Maxtreat Carbon Rod (viii) Maxtreat Laminate (ix) Maxtreat EHS (x) Seismocrete UHP (xi) Rapido fix (xii) Flash Tixo (xiii) Maxtreat EFC (xiv) Maxtreat EPG (xv) Maxtreat Primer (xvi) Maxtreat Saturant (xvii) Maxtreat Glue (xviii) Maxtreat LM (xix) TM-Bond AR (xx) TM-Bond EP (xxi) TM-Bond SG (xxii) TM-Bond SBR (xxiii) Maxtite MP (xxiv) Maxtite MG (xxv) Maxtite Grout EP (xxvi) Maxtite Grout (xxvii) Maxtite Block Fix



Repair & Rehabilitation, Bonding Agents & Grouts	(xxviii) Maxtite LG
(i) BS 66 MuCis	(xxix) MaxGrout 100
(ii) BS 5F	(xxx) MaxGrout MMA
(iii) Maxtreat Patchup	(xxxi) MaxGrout E 10
(iv) MuCis Protezione Ferro Mono	(xxxii) MaxGrout PAF
(v) Maxtreat Fibrenet C	(xxxiii) MaxGrout 45
(vi) Maxtreat Fibrenet G	(xxxiv) MaxGrout 60
	(xxxv) MaxGrout LE

(h) **M/s Hindcon Chemicals Limited**, approved vide letter No 43285/CMPT/674/Des-2 dated 03 Jun 2024 and approval is valid upto 02 Jun 2027:-

(a) Waterproofing Compounds (i) Hind Proof No – 1 (ii) Hind Proof No – 2 (iii) Hind Proof No – 3 (iv) Hind Plug – S (v) Hind Crystal Seal	(e) Grouts & Repairing Mortar (i) Hind Plast EGA (ii) Hind Grout – GP (iii) Hind Grout – HS (iv) Hind HS MC (v) Hind Tile Grout
(b) Admixture (i) Hind Plast – IWA (ii) Hind Plast Super (iii) Hind Plast Super SCA (iv) Hind Plast Super – A	(f) Floor Topping/Hardening (i) Hind Emetop – M (ii) Hind Emetop – NM (iii) Hind Coat Prime (iv) Hind Coat – FC (v) Hind Selfoor 1000 (vi) Hind FLC-EUV
(c) Concreting Aids (i) Hind Mould Release OB (ii) Hind Mould Release WT (iii) Hind Cure – AL (iv) Hind Cure – WP (v) Hind Bond EBA (vi) Hind Silica M (vii) Hind Fibre Glass (viii) Hind PP Fibre	(g) Sealants (i) Hind Sealant – E (ii) Hind Sealant – PS (iii) Hind Sealant – PPU (iv) Hind Sealant – BP (v) Hind Silicone Sealant
(d) Protective and Waterproofing Coatings (i) Hind Crete Plus – WPM (ii) Hind Crete Plus – WPM (E) (iii) Hind Styrene – BR (iv) Hind Anti Rust (v) Hind Anti Rust (EZ) (vi) Hind Hydraproof Ceramic (vii) Hind Hydroproof (APP) (viii) Hind Manine Cote	(h) Epoxy Grout Mortar (i) Hind ERS – 21 (LV) (ii) Hind ERS – 2115, 2118/2120 (iii) Hind Anchorlok (j) Tile Adhesive (i) Hind Fix – TA

(j) **M/s Fosroc Chemicals**, approved vide letter No 43285/CMPT/677/Des-2 dated 26 Nov 2024 and approval is valid upto 25 Nov 2025 :-

Admixtures (a) Auramix 400 (b) Auramix 300 (c) Conplast SP430	Repair & Rehabilitation / Bonding Agents / Grouts
Curing Compounds (a) Concure WB (b) Concure LP90 (c) Concure 1315	(a) Renderoc S2 (b) Nitomortar S (c) Renderoc RG (d) Renderoc HS Xtra
Joint Sealant (a) Colpor 200 PF - Cold applied, high performance, pitch free, polyurethane pavement joint sealant	(e) Nitowrap CWS (Nitowrap EP (CF)) (f) Nitowrap GW (Nitowrap EP (GF)) (g) Nitowrap CPS (Nitowrap (CFP)) (h) Nitobond EP (i) Nitobond AR (k) Nitobond SBR

(b) Expoband One Reinforcement / Concrete Protective Coatings / Systems (a) Nitozinc Primer (b) Dekguard S (c) Nitocote EP410 (d) Nitocote EP405 (e) Nitocote UR512 (f) Nitocote BCS300 (g) Nitocote ET140 (h) Nitocote ET550 (j) Nitocote SN522 Reinforcement / Concrete Protective Coatings / Systems Contd/... Membrane & Liquid Membrane / Coatings (a) Proofex Engage (b) Proofex PGP (c) Proofex ORG (d) Proofex OGP (e) Proofex Self Adhesive PR20 (f) Proofex Self Adhesive Geotext (g) Proofex Self Adhesive Antiroot (h) Fosroc Polyurea WPE (j) Brushbond (k) Brushbond RFX (l) Nitocote CM210 (m) Brushbond Roof Guard (n) Brushbond TI Flexicoat (o) Nitoproof 600 std.	(l) Nitofill EPLV (m) Conbextra EP10 (n) Conbextra GP2 (o) Conbextra GP3, (p) Lokfix Epoxy / Polyurethane Industrial Flooring (a) Nitoflor SL 2000 (b) Nitoflor FC 150 (c) Nitoflor TF 5000 (d) Nitoflor EU5 (e) Nitoflor SL Conductive (f) Nitoflor SL Dissipative (g) Trafficguard UR150 (h) Nitoflor SL 3000UT Waterproofing Chemicals / Materials (a) Conplast (b) Supercas SW 05 (Supercast SW20) (c) Supercast PVC Concrete Surface Improvement (a) Reebol Misc Construction Chemicals (a) Cebex 100 (b) Nitoflor Hardtop
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(k) **M/s Shivam Tar Products**, approved vide letter No 43285/CMPT/678/Des-2 dated 29 Nov 2024 and approval is valid upto 28 Nov 2025 :-

App Membrane
(a) Shivam brand Superior Multi Polyester felt and Multi Polyplas

PEB/LGSF CATEGORY

(a) **PEB**

Sl. No	Name of firm	Product Description	Approval letter No and date	Valid upto
i.	M/s EPACK Polymers (P) Limited	Designing, Manufacturing, Supply and Execution of Steel Structures i.e. (PEB)	43285/CMPT/680/Des-2 dt 24 Dec 2024.	23 Dec 2025
ii.	M/s Smith Structures India Pvt Ltd	Designing, Manufacturing, Supply and Execution of Steel Structures i.e. (PEB)	43285/CMPT/652/Des-2 dated 16 Feb 2023	15 Feb 2025
iii.	M/s BNAL Prefabs Pvt Ltd	Designing, Manufacturing, Supply and Execution of Steel Structures i.e. (PEB)	43285/CMPT/667/Des-2 dt 15 Jan 2024.	14 Jan 2027
iv.	M/s Clading Projects Pvt Ltd	Designing, Manufacturing, Supply and Execution of Steel Structures i.e. (PEB)	43285/CMPT/669/Des-2 dt 12 Feb 2024.	11 Feb 2026
v.	M/s Moonwalk Infraprojects Pvt Ltd	Designing, Manufacturing, Supply and Execution of Steel Structures i.e. (PEB)	43285/CMPT/676/Des-2 dt 07 Nov 2024.	06 Nov 2026



(b) LGSE

Sl. No	Name of firm	Product Description	Approval letter No and date	Valid upto
i	M/s Nipani Infra & Industries Pvt Ltd	Light Gauge Steel Frame (LGSE)	43285/CMPT/673/Des-2 dated 03 Jun 2024	02 Jun 2025

➤ As per policy No 05/2024, further renewal/approval for cranes shall be accorded at CEs Comd/ADGs level.

Note:-

1. Approval letters issued to various firms shall be referred for further details of products approved.



B/R Items make

SI No.	Item Name	Makes
1.	2.	3.
1.	Non skid/Glazed Ceramic and Vitrified tiles	Kajaria Johnson Orient Bell Ltd (Brand –Orient Bell) Somany Ceramics Ltd (Brand: Somany) NITCO
2.	Wooden flooring	HIL Ltd Greenpanel Industries Ltd Armstrong Action Tesa
3.	Exterior Paints	Asian Paints Ltd Berger Paints India Ltd Kansai Nerolac Paints Ltd
4.	Interior Paint	Asian Paints Ltd Berger Paints India Ltd Kansai Nerolac Paints Ltd
5.	Synthetic enamel /Oil Paint	Asian Paints Ltd (Apcolite Premium Gloss) Berger Paints India Ltd (Luxol Hi-Gloss) Kansai Nerolac Paints Ltd (Synthetic Hi-gloss Enamel)
6.	Cement base paint	Super Snowcem Duracem Plus Acro Paints Ltd
7.	High Build Textured & Wall finishes	Asian Paints Ltd Berger Paints India Ltd Kansai Nerolac Paints Ltd
8.	UPVC Shutters for doors, windows , ventilators & Frames	Fenesta Koemmerling Aluplast Prominace NCL Veka Ltd (Brand : NCL Veka)
9.	Factory made Wooden flush door Panel/Gauge shutters for doors & widows	Rama Woods Crafts Satna A-1 Teak Products Pvt Ltd Greenply Industries Ltd Century Plyboard (India) Ltd (Brand-Century Doors) Jain wood Industries
10.	Pre-painted Steel Windows, Ventilators & Door Frames	Tata Pravesh NCL Buildtek Limited Elixir Met Form Pvt Ltd Ashish Industries
11.	Metal False Ceiling	PR Ceiling Products Manraj Ceiling Products Pvt Ltd (Brand: Royal Kraft) Armstrong
12.	Gypsum Board false ceiling/Gypsum Plaster	Everest Industries Ltd PR Ceiling Products Ltd Gyproc Armstrong USG Boral Yamuna Interiors Pvt Ltd (Brand : Black cobra) JK Cements Ltd

SI No.	Item Name	Makes
1.	2.	3.
13.	Non-Asbestos Fibre Cement Board (Confirming to IS-14862-2000) False ceiling	Everest Industries Ltd Calsi Prima Duragreen
14.	Glass reinforced Gypsum (GRG) False ceiling	Gyproc Armstrong USG Boral
15.	Plain Particle board/ Particle Board ceiling, Pre-laminated Particle board	Kitply Century Ply Greenply
16.	Aluminium composite Panels (ACP)	Aludecor Alstrong Alucobond Alstone
17.	Laminates/Veneers	Greenlam Laminates Century Laminates Kitply
18.	Plywood for General purpose	Century Ply Greenply Kitply
19.	CP Bath fittings and accessories	M/s Blue star sanitary industries pvt ltd (Silver shine). Jaquar & Co Pvt Ltd (Brand: Jaquar) Kajaria Bathware Pvt Ltd Kohler
20.	Vitreous China Sanitary ware WHB/WC/Urinal	Jaquar& Co Pvt Ltd (Brand : Jaquar) Kajaria Bathware Pvt Ltd Hindware
21.	Metropole & concealed flushing cistern	Jaquar Grohe Hindware Kohler
22.	Stainless Steel Sinks/ Plate rack	M/s Blue star sanitary industries pvt ltd (Silver shine). Johnson Nirali Hindware
23.	CPVC pipes and fittings	Astral Ltd (Brand : CPVC Pro) Ashirvad Supreme Savour Fair Manufacturing Co Pvt Ltd (Brand- SFMC)
24.	UPVC pipes and fittings	Astral Ltd (Brand : Aquasafe & Aquarius) Ashirvad Supreme Savour Fair Manufacturing Co Pvt Ltd (Brand- SFMC)
25.	HDPE pipe /MDPE Pipe/ PVC pipes and fittings	Finolex Astral Ltd (Brand : HDPE Pro) RC Plasto Tanks & Pipes Pvt Ltd
26.	PPR pipes and fittings	Prince Finolex Supreme Savour Fair Manufacturing Co Pvt Ltd (Brand- SFMC)

SI No.	Item Name	Makes
1.	2.	3.
27.	ERW MS pipe	Surya Roshini Ltd Tata Jindal
28.	PVC Soil, Waste , Rainwater (SWR) pipes and fittings [Confirming to IS-13592 for pipes & IS-14735 for fittings]	Astral Ltd (Brand : Drain Master) HIL Ltd Supreme
	PVC UG drainage pipes Confirming to IS-16098 (Part-I)	Astral Ltd (Brand : Foam Core) Prince Finolex
30.	DWC UG drainage pipes Confirming to IS-16098 (Part-II)	Astral Ltd (Brand : D-rex) Prince Finolex
31.	DI pipe and fittings	TATA Electro Steel Jindal Saw Ltd Electrotherm India Ltd (Brand-Electrotherm)
32.	GI Pipe and fittings	TATA Jindal Hisar Surya Roshini Ltd
33.	Ready Mix concrete	Ultra Tech ACC JK Lashmi Cement Lafarge Ramco
34.	AAC Block	Ultra Tech ACC Birla Aerocon Ascolite Siporex
35.	AAC Block Jointing Mortar	Birla Aerocon Smartfix Jointing Mortar ACC Concrete + Ultratech Fixo Block Dilite Fix thin layer Jointing Polymer Mortar of M/s Petralite Industries
36.	BUILDERS HARDWARE	Novapan GLACIAR Brands Classic New Delhi M/S Shri Balaji Industries Sarswati Round Road, Ajamabad Mathura (UP). DP Garg &Co. Mepro M/S Elte Enterprises C/6 Shalimar Hardware 133, Jarg Mahal, Dhobitalao, Bombay M/S Mohan Metal Ind.
37.	Mortice lock	Godrej Harrison Links Lock
38.	Drapery Rod	Vista Levolor DECO Windows Dorset India LUXAFLEX
39.	Venetian Blinds	Vista Levolor Johnson Blinds Classic Blind
40.	Barbed wire/Chain link/	A-1 Fence Product Company Pvt Ltd

	Concertina coil/Razor Wire	M/s Shiva Engineering Company Secure Fencing, Delhi Eco Netting Nagpur OM Wires and Wire Product, Kolkatta Mysore Wire netting Co Pvt Ltd, Bangalore Asian Fence Wire Product, Hyderabad
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SI No.	Item Name	Makes
1.	2.	3.
41.	Plain/ Corrugated Galvalume sheet	M/S Ispat Industries Ltd M/S Kamdhenu Ltd TATA Blue Scope JSW COLOURON+
42.	Non-Asbestos Plain/ Corrugated Sheets	M/s Ramco AC Sheets Charminar Visaka RBL
43.	Adhasive	Fevicol Pidilite Vemicol Araldite Anabond
44.	Wall Care Putty	Birla white wall putty JK wall putty Asian wall putty Berger Dulux Nerolac wall putty Shalimar
45.	Sheet Glass/ Frosted Glass	Modi Guard Saint gobain AIS Atul Glass Industries Gold Fish Trupti
46.	Oil Putty	Shalimar Hardware Atul Dyes and Chemicals Berger
47.	Brass Float Valve	Leader Zoloto Upadhyay
48.	PTMT Float Valve	Prayag Polymers Polytuf Vectus
49.	HDPE Water Storage Tanks	Sintex Polycon Supreme
50.	Hydraulic Door closer	Godrej Hafele Harrison
51.	Floor Door Closer	Godrej Hafele Harrison
52.	Transparent Polycarbonate Roofing Sheets	Everest Saraswati Plastotech India Pvt Ltd Palram Industries Ltd
53.	Tile adhesive	JK Lakshmi Cement Tile Adhesive Myk Laticrete Tile Adhesive BASF India Ltd tile adhesive Fosroc India tile adhesive
54.	PET Panel/ Acoustic Panel / PET Ceiling / Accoustic Ceiling	Times Fiberfill Pvt Ltd Hunter Douglas India Woven Image Accoustic Panel
55.	Road Furniture	Dark Eye Green Eye 3M

SI No.	Item Name	Makes
1.	2.	3.
56.	Branded Furniture	Godrej Durian Euroacoustic Products Ltd
57.	Modular Kitchen	Godrej Interio Kohler Hettachi India Pvt Ltd Sleek Kitchen
58.	Single Component UV Resistance PU coating for roof & wall	Smart Care from Asian Paints Berger Dulux
59.	PU MAGNUM	Smart Care from Asian Paints Dr Fixit SIKKA
60.	SEWER BRICKS	M/S Ritu Bricks Pvt Ltd, Bhilwara Rajasthan, M/S Red Ceramics, Limited, Kolkata. M/S Prayag Bricks, Varanasi.
61.	SLUICE VALVE/ REFLUX/NRV/AIR RELEASE/FOOT VALVE	Kirloskar Leader BIR Kartar Venus Kejriwal Zoloto AUDCO VC Upadhyay L&T
62.	STOP VALVES/ GATE VALVES	Zoloto Leader Audoc Venus Kartar BIR
63.	MS/ERW pipe	TATA Jindal SAIL
64.	Interlocking Tiles / Exterior Tiles / Paver Block	Unistone NITCO Ultra Johnson.
65.	PVC Tiles/ Sheet	Primer polyfilm Ltd. Wonder Floor Armstrong
66.	Glass Mosaic tiles	Jhonson Italia NITCO
67.	Terrazzo tiles / PPC Tiles/ PPC Checkered tiles	NITCO Eurocon Duracrete

E/M Items make

SI No.	Item Name	Makes
1.	2.	3.
1.	Lifts/Elevators	Otis Elevator company India Ltd Kone India Schindler India Pvt Ltd Hitachi Lifts India Pvt. Ltd Mitshubishi Thyssen Krupp
2.	Engine	Kirloskar Cummins Greeves Cotton Caterpillar Eicher Engines
3.	Alternator	Kirloskar Stamford Crompton Jyoti Bharat Bijlee
4.	DG Set assembled with sound proof canopy	Kirloskar Cummins Greeves Cotton Sudhir Sterling
5.	Single/Double Girder EOT Cranes, Goliath Cranes, Jib Cranes	Safex Energy Pvt. Ltd Pioneer Cranes & Elevators Pvt Ltd Hercules Hoists Ltd Dinesh Crane
6.	Compact Sub Station	Seimens Schneider Crompton Greaves ABB Indian Transformers & Electricals Pvt Ltd. (Brand- ITE Gurgaon) Voltamp Electricals pvt ltd
7.	Transformer 11/0.433 KV upto 500 KVA copper wound	Crompton Schneider Indian transformers & electricals Pvt Ltd [Brand : ITE Gurgaon] Voltamp Electricals pvt ltd
8.	Transformer stepdown 11/0.433 KV above 500 KVA copper wound	Crompton Schneider Indian transformers & electricals Pvt Ltd [Brand : ITE Gurgaon] Voltamp Electricals pvt ltd
9.	Transformer stepdown 33/11 KV upt 10 MVA & 33/0.433 KV copper wound	Crompton Schneider Indian transformers & electricals Pvt Ltd [Brand : ITE Gurgaon] Siemens
10.	HT Current & Potential Transformer	Schneider Crompton Greaves Siemens ABB
11.	Chiller for Central AC Plant	Daikin Carrier Trane Hitachi

SI No.	Item Name	Makes
1.	2.	3.
12.	Cooling Coil/AHU	Trane Blue Star Zeco System Air Carrier
13.	Cooling Tower	Paharpur Mihir Delta
14.	Expansion Valves/Thermostat/Humidistat	Danfoss Sporlon Indfoss Honeywell
15.	Package type Compressor/Condenser/Cooling coil	Bluestar Hitachi Daikin Carrier
16.	Split Type AC and Window Type AC	O General Mitsubishi Electric Hitachi Daikin Carrier
17.	VCB/SF6 Circuit breakers/ HT Switchgears panels upto 36 KV	Schneider ABB Siemens Crompton Greaves Larsen and Turbo
18.	HT Ring Main Units (RMU) upto 36 KV	Schneider ABB Siemens Crompton Greaves Larsen and Turbo
19.	APFC relay	L&T Schneider Ducati
20.	Power factor improvement capacitor	L&T MD XL Ultra Schneider Siemens ABB
21.	APFC panels (Fabricators)	C & S Electric Schneider Indo Asian Power Systems and Control Jalandhar Indian Transformers & Electricals Pvt Ltd. (Brand- ITE Gurgaon)
22.	HT XLPE Cable upto 33 KV as per IS	Havells India Ltd. Polycab Wires Pvt Ltd Gloster Cables Ltd Grandlay Electricals (India)
23.	Modular Switch/ Socket/Fan regulator/ Bell push & mounting accessories	Havells India Ltd (Brand : Carbtree) Anchor Electrical Pvt Ltd Legrand Schneider Zencelo
24.	Non- Modular Switch/ Socket/Fan regulator/ Lamp holder/ Ceiling rose/Bell push/Call bell (Polycarbonate body only)	Havells India Ltd (Brand : Havells Reo) Anchor Penta PC Legrand Schneider Zencelo

SI No.	Item Name	Makes
1.	2.	3.
25.	Ceiling Fans ISI marked & not less than 4 BEE star rating / Exhaust Fans/ Air circulators/ Wall Mounting Fans/Cabin fans/Fresh Air fans	Havells Bajaj Orient Usha Khaitan
26.	BLDC ceiling fan	Havells Bajaj Orient Atomberg Khaitan
27.	LED Lights & light Fittings for Indoor and Outdoor use	Philips General Electrics Osram Bajaj
28.	Solar Based Street Light fittings	Havells Osram Philips Bajaj Crompton
29.	POTENTIAL TRANSFORMER (PTs) AND CURRENT TRANSFORMER (CTs) VOLTAGE CLASS 33 KV & 11 KV	Crompton Greaves Kappa ABB Pragati
30.	ELECTRO MECHANICAL/ SOLID STATE MICRO PROCESSOR BASED RELAYS	ABB Siemens Schneider L&T C&S
31.	LT XLPE cable 1100V grade (as per IS 7098/1988 Part-I	Gloster Polycab KEI Finolex Grandlay Electricals (India)
32.	DIGITAL RELAY	L&T JVS ABB Ashida C&S CG
33.	Air insulator trunk bus bars	C&S Legrand Schneider L&T
34.	COLD/HEAT SHRINKAGE CABLE JOINTS 33KV/11KV GRADE & BELOW	Cabseal 3M Denson Reychem
35.	LT PANELS/ FEEDERPILLAR BOX	Universal Switchgear control Schneider Bentec (Brand :Benlo) L & T Indian Transformers & Electricals Pvt Ltd. (Brand- ITE Gurgaon)
36.	AIR CIRCUIT BREAKERS (ACBS)	L&T Siemens Crompton Greaves Legrand ABB Schneider

SI No.	Item Name	Makes
1.	2.	3.
37.	MOULDED CASE CIRCUIT BREAKERS (MCCBs), SFU	Schneider L&T Siemens Legrand
38.	CHANGE OVER SWITCHES	L&T Legrand C&G
39.	Distribution Board (SPN/TPN)	Schneider Legrand L&T GE
40.	MCCB/ MCB/MCB PLUG SOCKET/ELCB/ RCCB & MCB DBs WITH PLUG-SOCKET	ABB Legrand L&T Schneider
41.	ACSR CONDUCTOR	Jaipuria Brothers ALIND Apar Industries Oswal Cables
42.	SOLAR WATER HEATER	Supreme V-Guard Havells Recold
43.	GANG OPERATED AIR BREAK ISOLATORS & DO FUSES FOR 11 KA.33KV SYSTEM	Jaipuria Brothers Rashtriya PACTIL BHEL
44.	INSULATORS HT/LT	Jaipuria Brothers Jayshree Insulators Aditya Birla Insulators Allied Ceramics
45.	LIGHTENING ARRESTOR/ SURGE PROTECTION SYSTEM	Jaipuria Brothers Electrolites CG Oblum Schneider PACTIL
46.	STEEL TUBULAR POLES	Calcutta Poles Jindal poles Utkarsh National Tubing Co.
47.	MULTI STRANDED FLAT CABLES/ CONTROL CABLES/ SUBMERSIBLE CABLES	Havells Gloster Polycab KEI Grandlay Electricals (India)
48.	TIMERS (TIMES SWITCHES)	L&T Havells Schneider Legrand

SI No.	Item Name	Makes
1.	2.	3.
49.	ROTARY/ SELECTOR SWITCHES	C&S ABB Legrand BCH Siemens Altos GE L&T
50.	AUTOMATIC/ ELECTRONIC VOLTAGE STABILIZERS	AE ITE Gurgaon Aplab Microtech V-Guard Zenith Volina
51.	ELECTRICAL INSULATION RUBBER MAT	Jyoti Jaipuria Brothers Duratuf (ISI marked)
52.	PCC POLES/RCC POLES	Concrete Udyog Jhansi Mohan Concrete Udyog Lucknow Kusum Industries (MP) (MP SEB) SJ Enterprises (PVVNL approved)
53.	VOLTMETER/AMETER MF METER	Havells L&T AE BCH Schneider
54.	UPS (INDUSTRIAL TYPE)	Hitachi ABB Siemens Schneider
55.	HIGH MAST LIGHT SYSTEM	Bajaj Wipro Philips CG
56.	PVC insulated copper conductor multistranded cable/ wires for house wiring	Havells Polycab Grandlay KEI
57.	Conduit Steel/ERW Steel	Kalinga Jindal AKG Asian Bharat Steel tube Finolex MK India TATA Precision Steel Kraft
58.	Conduit Rigid PVC and Accessories	Jindal AKG Kalinga Premium Finolex Ploycab Asian Presto Plast Plaza National Harsh

59.	Laminated Sheet	Anchor Hylam National
60.	FR PVC Casing Capping	Prestoplast National Plaza AKG Paramount
61.	DOL/STAR Delta starter	BCH Standard Siemens L&T
62.	Heating Elements	Daspass Airex electrical Anupam
63.	AC Contractors 6-1200A	BCH ABB Siemens C&S L&T GE
64.	Smart energy meter	Siemens L&T Secure Schneider Elmeasure Bentec Brand : Benlo HPL Sinhala Udyog Pvt Ltd
65.	UPS < 5KVA	V Guard Sukam Microtek Luminous Amaron
66.	Static Frequency Convertor	Toshiba Siemens ABB Mitsubishi
67.	CENTRIFUGAL PUMP SET	Kirloskar Crompton Grundfos KSB
68.	SUBMERSIBLE PUMP	Kirloskar KSB Grundfos Crompton
69.	VERTICAL TURBINE PUMPS	Jyoti KSB Orthington Kirloskar Grundfos Crompton
70.	HORIZONTAL PUMPS	Kirloskar KSB Jyoti Grundfos

SI No.	Item Name	Makes
1.	2.	3.
71.	UPVC/ HDPE CONDUIT	Finolex Supreme Industries Durlon Reliance Astral Triupati Prince Vectus Neelkamal
72.	AIR COMPRESSOR	BAC Ingersoll ELGC equipments ELGI Indo Air
73.	BATTERY	Exide Okaya Amaron Luminous AMCO
74.	FIRE PUMP/ JOCKEY PUMP	Kirloskar KSB Grundfos CRI
75.	WATER HEATER	Racold CG Havells Jaguar Usha
76.	WATER LEVEL INDICATOR (MECHANICAL)	RMCO Kabir Flowtech DB Instruments
77.	Air Diffuser/ Grill	Carrier MHP MAPRO ATE
78.	Galvanized Steel sheet for ducting	TATA SAIL Jindal
79.	Thermostat, Humidistat	Danfoss Sporion Indfoss Honeywell
80.	Air Purge/ Air vent valve	Anergy Rapid control Oventrop
81.	Pressure Gauge	H Guru Scientific Zenith Fiebig
82.	Temperature Gauge	H Guru Scientific Precision
83.	Motorised Butterfly Valve	Belimo Siemens Honeywell
84.	3 Way flow control valve	Belimo Honeywell, Anergy Rapid Control

SI No.	Item Name	Makes
1.	2.	3.
85.	Flow switch	Danfoss Anergy Honeywell
86.	HP/LP control	Danfoss Indfoss Johnson
87.	Non return valve	Kirloskar Leader Zoloto Audco Upadhyay
88.	Pot/Y Strainer	Sant Rapid control Emerold, Leader
89.	Balancing Valve	Leader Sant Rapid control
90.	Butterfly/ Ball valve	Kirloskar Leader Zoloto, Audco Upadhyay, IVC
91.	Nitrite Rubber Insulation	BASF (India) Ltd Beardsell Armacell Lloyd
92.	Expanded Polystyrene Insulation	Styrene BASF (India) Ltd Armacell, Lloyd
93.	Pump Monoblock/ Centrifugal/ Submersible	Kirloskar CG, Jyoti KSB
94.	Hot water Generator	Thermax Rapid Coll Zenith
95.	PVC Insulated cable 1100 V grade ISI marked FRLS/FRLSH internal wiring cables with copper conductor	Havells Polycab Gloster KEI Grandlay Electricals (India)
96.	PVC insulated Cables ISI marked upto 1100 volts copper/Aluminium conductor sheathed/ unsheathed as per IS 694	Havells Polycab Gloster KEI Grandlay Electricals (India)
97.	PVC Conduit	Prince Plaza AKG M/s Richa Cables Pvt Ltd PrestoPlast
98.	Smart Electric Meters	Seimens L&T Secure HPL Elmeasure India Pvt Ltd Sinhali Udyog Pvt Ltd Schneider Electric Pvt Ltd

Appendix ‘B’

Material Testing & Testing Charges

Notes

1. Levels of testing shown in Legend as A, B & C, are defined as under: -

1.1 Level ‘A’

- (a) Level ‘A’, Site lab shall be established by the contractor.
- (b) “Site Lab” means site lab established by contractor at the work site for such tests. This lab shall house all the facilities including T&P, machinery, equipment, manpower etc required for conducting tests. This lab shall be operative for entire duration of the contract till its completion. Tests shall be carried out in the presence of Engineer-in-charge to be nominated by the GE. Random check of compliance of frequency of testing shall be done by the GE. “Setting up site laboratory is mandatory for all works Costing Rs. 1 crore (Rupees one crore) and above. The Contractor may it his option set up site lab for work Costing less than Rs. 1 Crore (Rupees one crore) also without any extra cost to Government.”The testing laboratory shall include the following minimum machinery and testing equipments:-

Srl No	Testing equipment
(a)	Concrete cube testing machine of minimum capacity 100 tons
(b)	Cube moulds : 15 cm x 15 cm x 15 cm – 24 Nos & 70.6 mm x 70.6 mm x 70.6 mm – 09 Nos
(c)	Slump cone, tamping rod
(d)	Vicat’s Apparatus
(e)	Slandered Sand
(f)	Moisture meter
(g)	Digital Balance (with battery backup) – 10 Kg to 0.001 gm accuracy
(h)	Digital balance – 50 Kg to 0.001 Kg accuracy
(i)	Core cutter
(j)	Hot Air Oven – Temperature range 50° C to 300° C
(k)	Measuring Cylinder – 2000 ml, 1000 ml, 500 ml, 100 ml
(l)	Sieves Coarse : 30 cm Dia (25 mm, 20mm, 16mm, 12.5mm, 10 mm, 6.3mm, 4.75mm, Pan & lid) Fine : 20 cm Dia (4.75mm, 2.36mm, 1.18mm, 600 mic, 150 mic, Pan & lid
(m)	Thermometer - 0° C to 100° C with accuracy of 1° C
(n)	Megger and earth resistance tester
(o)	Pumps and pressure gauges for hydraulic testing
(p)	Curing tank (min 2000 ltr capacity)
(q)	Miscellaneous Sand Scoop, Spatula, straight edge gauged trowel, steel foot rules, scale, mortar pan, spade, shovels, filter paper and wax
(r)	Other equipment for site test as outlined in BIS
(s)	Optical instrument to measure reflectance of marble grit plaster
(t)	Total station for survey and lay out
(u)	Rebound hammer test equipment for checking strength of concrete
(v)	Hilti tool – PS200 Ferro scan for rebar verification, checking concrete coverage or equivalent

- (c) Records shall be maintained at work site. These test results shall be signed by contractor of his authorised representative and aforesaid departmental official.
- (d) Within 15 days of placement of work order No.1 site lab shall be established and fact reported by the contractor to GE in writing who will verify the fact and satisfy himself regarding the facilities provided. Thereafter GE shall issue a certificate to this effect in writing listing out equipment particulars etc of material test. Only after issue of this certificate by GE the tests shall be carried out and materials so approved shall be incorporated in the work.

Material Testing & Testing Charges
Notes (cond...)

- (e) Manpower, materials and infrastructure like electricity, water etc required for conducting these tests shall be provided by the contractor.
- (f) Remedial measure if any required to achieve/obtain desired results for each test shall be taken promptly by contractor.
- (g) Tenderer is deemed to have catered for above provisions in his quoted Lump Sum/ Contract Sum.
- (h) In case during any point of time contractor fails to adhere to the laid down frequency of the tests for any reasons whatsoever which in the absolute opinion of GE are beyond the control of the contractor he shall get the tests done from any other lab whose name shall be approved by GE in writing. The testing charges payable by contractor to such lab shall be borne by the contractor. Contractor's quoted lump sum/ Contract Sum is deemed to include for this eventuality and nothing extra shall be payable to the contractor. No extension of time shall be admissible on this account.
- (j) However, incase GE in his absolute opinion considers that contractor is intentionally not adhering to the laid down frequencies of tests, he shall reserve the right to deduct penal recovery which shall be double the rates of tests indicated in Appendix 'B' for level 'A'. However, besides effecting penal recovery for non compliance of contractual testing frequency, simultaneously GE will get tests done from Zonal lab as per laid down frequency and necessary testing charges given against level 'B' shall also be recovered from running bills. Incase facilities are not available to conduct such tests in Zonal lab GE will get them tested from any source and necessary testing charges paid by the GE shall be debited to the running payments. GE's decision shall be final and binding in such cases.

Testing charges for level 'A' indicated in Appendix 'B' are applicable only for the purpose of penal recovery as elaborated above.

1.2 Level 'B':

- (a) "Command Test Lab/ Zonal Lab" means lab of HQ CE CC Lucknow/ lab of HQ CE Jabalpur Zone, Jabalpur respectively.
- (b) The tests shall be conducted as per frequencies laid down for these tests in this labs for which Contractor shall provide all requisite facilities like sample, cubes materials etc. transportation to those labs for testing purpose. It will be Contractor's responsibility to adhere to the laid down frequency of testing. Test results shall be sent by lab to the GE whose copies can be made by Contractor at his own expense. Testing charges for the tests so conducted shall be recovered at the rates indicated in Appendix 'B' from the running payments. The Contractor's quoted lump-sum/ Contract Sum is deemed to include for above provision.
- (c) Provision of Para (h) above of Level 'A' shall be applicable to level 'B' also.

1.3 Level 'C':

- (a) Level 'C' lab stands for National Test House/ SEMT Wing Pune located in CME Pune 31/ Local Government Engineering College.
- (b) Rest provisions contained in Para (b) of level 'B' above shall be applicable here except that Contractor shall obtain test results from those labs and hand over to GE. The testing charges payable to these labs for conducting these tests shall be borne by the Contractor and his quoted lump-sum/ Contract Sum is deemed to include this provision.

- 2. Tests/ method of testing/ frequency of testing for Materials not listed in this Appendix 'B' shall also be mandatory & shall be carried out as per the relevant IS .

gend:

SITE LAB A			ZONAL LAB B		NATIONAL TEST HOUSE/ SEMT WING PUNE/ ENGINEERING C		
Sl No	Material	Tests	Method of Testing	Frequency of Tests	Level of Test	Rate	Remarks
1	2	3	4	5	6	7	8
1.	Bricks	As per IS:5454 as given under :-					
				Lot size	Sample Size	Permissible No of Defective	
	i) Compressive Strength	IS:3495 (Part-II)	1001-	5	0	i) A	330/-
	ii) Water Absorption	IS:3495 (Part-II)	10001-35000	10	0	ii) A	330/
	iii) Efflorescence	IS:3495 (Part-II)	35001-50000	35001-50000	0	iii) A	330/-
2.	Coarse aggregate	i) Sieve analysis	IS : 2386 (Part I)	One test for every 15 Cu M of aggregates or part thereof brought to site.	i) A	660/	
	ii) Flakiness Index	IS : 2386 (Part I)			ii) A	250/-	
	iii) Estimation of deleterious	IS : 2386 (Part I)			iii) A	600/	
	iv) Organic impurities	IS : 2386 (Part I)		One test per source of supply.	iv) B	275/-	
	v) Moisture content	IS : 2386 (Part-II)		Regularly as required.	v) A	330/-	
	vi) Specific Gravity.	IS : 2386 (Part-II)		One test for each source of supply	vi) B	330/-	
3.	Fine aggregate	i) Sieve analysis,	IS: 2386 (Part I)	One test for every 15 Cu M of fine aggregate	i) A	660/-	
	ii) Test for clay, silt & Impurities.	IS: 2386 (Part I)		or part thereof when brought to site.	ii) A	500/-	
	iii) Specific Gravity.	IS: 2386 (Part II)		One for each source of supply.	iii) B	330/-	
	iv) Moisture content	IS: 2386 (Part II)		Regularly as required subject to 2 tests/ day, when used.	iv) A	330/-	
	v)						
	vi) Test for organic	IS: 2386 (Part II)		One test for each source of supply	v) B	275/-	

Sl No	Material	Tests	Method of Testing	Frequency of Tests	Level of Test	Rate Rs	Remarks
1	2	3	4	5	6	7	8
4.	Cement	i) Setting time.	IS-4031-63 Re-affirmed 1930	Once for each consignment or as and when required.	i) B	500/-	
		ii) Soundness	IS-4031-63 Re-affirmed 1930	Once for each consignment or as and when required	ii) B	550/-	
		iii) Compressive strength	IS-4031-63 Re-affirmed 1930	Once for each consignment or as and when required	iii) B	550/-	
		iv) Fineness	IS-4031-63 Re-affirmed 1930	Once for each consignment or as and when required	iv) B	275/-	
5.	Structural Concrete (M-25 grade)& above	i) Slump test or compacting factor test or Ver Bee time	IS : 119	The minimum frequency of sampling of concrete of each grade shall be as under :- Qty of concrete in the Wks (Cu) 1 – 51 6 – 152 16 – 303 31 – 504 51 and above4 + 1**	i) A	300/-	a) Random samples shall be carried to cover mixing units
		ii) Compressive strength	IS : 516		ii) A	900/-	b) Refer IS: 456 14 for frequency of sampling.
							** For each additional 50 Cu M or part thereof.
6.	PCC block for walling						

Sl No.	Material	Tests	Method of Testing	Frequency of Tests	Level of	Rate	Remarks
1	2	3	4	5	6	7	8
	a) Hollow block for walling	i) Compressive strength ii) Water absorption iii) Density	IS: 2156-1984 (Appendix 'R') IS: 2156-1984 (Appendix 'R') IS: 2156-1984 (Appendix 'A')	8 blocks out of 14. 3 blocks out of 14. 5 block s out of 14.	i) A ii) B iii) B	900/- 330/- 330/-	Samples: 14 blocks from consignments of average 5000 blocks or part thereof
	b) Solid block for walling	i) Compressive strength ii) Water absorption iii) Density	IS : 2185 IS : 2185 IS : 2185	12 Blocks out of 18. 3 blocks out of 18. 3 blocks out of 18.	i) A ii) B iii) B	900/- 330/- 330/-	Samples: 18 blocks from consignment of average 1000 blocks or part thereof.
	7. Cement flooring tiles / terrazzo tiles	i) Water absorption ii) Wet transverse strength iii) Resistance to wear	IS:1237 (Appendix ' D') IS:1237 (Appendix ' E') IS:1237 (Appendix ' F')	6 tiles out of 18 6 tiles out of 18 6 tiles out of 18	i) B ii) B iii) C	330/- 660/- 1000/-	Samples: 18 tiles from each source of supply selected
	8. Burnt clay roofing tiles (hand made) (IS: 2690 Part II)	i) Water absorption. ii) Compressive strength	IS : 3495 (Part II) IS : 3495 (Part I)	6 tiles out of 12 6 tiles out of 12	i) A ii) A	216/- 180/-	Samples: 12 tiles from each source of supply selected at random a. Length 150 to 250 mm b. Width 100 to 200 mm c. Thickness 35 to 50 mm
	9. Mangalore Pattern	i) Water absorption. ii) Breaking load.	IS : 654 (Appendix ' A') IS : 654 (Appendix ' C')	6 tiles out of 32 6 tiles out of 32	i) A ii) A	180/- 120/-	Samples: 32 tiles from each consignment of 3000 tiles or

Sl No	Material	Tests	Method of Testing	Frequency of Tests	Level of Test	Rate Rs.	Remarks
1	2	3	4	5	6	7	8
roofing tiles							
part thereof. These tiles shall be checked for dimensions							
10.	Timber	i) Specific gravity & weight ii) Moisture content.	IS : 1708 - 1960	Minimum 3 samples from a lot of 4 Cu M or	i) B	120/-	
11.	Water for construction purposes	i) Test for acidity. ii) Test for alkalinity. iii) Test for total dissolved solid (TDS) content.	IS : 456 & 3015 IS : 456 & 3015 IS : 456 & 3015	Once at the stage of approval of source of water. Once at the stage of approval of source of water Once at the stage of approval of source of water	i) B ii) B iii) B	500/- 500/- 500/-	Also refer clause 43 of spec. 456 and its subsequent sub clauses regarding suitability of water.
12.	Welding of steelwork	i) Visual Inspection Test.	IS: 822-1970 Clause 2.1	100% by visual inspection.	i) A	360/-	Specialised tests, their method & frequency are to be decided on consideration of their importance by the Accepting Officer.
13.	Timber panelled & glazed door/	Dimensions sizes, workmanship and.	IS : 1003 – 1977 (Part I)	Frequency of sampling from each lot shall be as under			

Sl N	Material	Tests	Method of Testing	Frequency of Tests		Level of Test	Rate Rs.	Remarks
1	2	3	4	5		6	7	8
window shutters (including Factory made shutters)	finish			Lot Size	Sample Size			
	Strength test :		IS : 1303– 1990	26 to 50	5	i) A	180/-	From each lot 5% of the factory made shutters shall be
	Slamming		IS : 1303– 1990	51 to 100	8			manufacturer tested
	Impact indentation		IS : 1303– 1990	101to 150	13			for strength tests.
	Shock resistance		IS : 1303– 1990	151 to 300	20			
	Edge loading		IS : 1303– 1990	301 to 500	32			
				501 to 1000	50			
				1001 and above	80			
14.	Plywood (IS : 303 – 1989)	Moisture content	IS : 1734 – 1983 (Part I)	Six test pieces cut from each of the boards selected as per Table shall be subjected to tests.	i) C		240/-	Sampling shall be as per IS : 7635-1975
15.	Wood particle-board (Medium Density)	Density	IS:2360-1977 (Part-III)	Three test specimens from each sample (size 150 x 75 mm)	i) C		60/-	Sampling shall be as per IS: 3087 - 83 with moisture meter.
		Moisture content.	IS:2360-1977 (Part-III)	-ditto-	ii) A, B		60/-	
		Water absorption	IS:2360-1977 (Part-16)	-ditto- (size 300 x 300 mm)	iii) A		60/-	
		Swelling due to surface	IS:2360-1977 (Part-16)	-ditto- (size 125 x 100 mm)	iv) A		60/-	
		Swelling in water	IS:2360-1977 (Part-16)	-ditto - (size 200 x 100 mm)	v) A		60/-	
		Modulus of rupture.	IS:2360-1977 (Part-4)	Three test specimen as per IS:2380-77	vi) B		90/-	
		Screw with strength	IS:2360-1977 (Part-4)	Three test specimen as per IS:2385	vii) C		120/-	

Sl N	Material	Tests	Method of Testing	Frequency of Tests	Level of Test	Rate Rs.	Remarks
1	2	3	4	5	6	7	8
16.	Reinforcement Steel	Physical tests up to 16mm dia (normal mass, tensile elongation, bend and	-	As mentioned Particular Specifications Part-II	i) B	2500/-	
		Physical tests more than 16mm dia (normal mass, tensile elongation, bend and rebend.	-	As mentioned Particular Specifications Part-II	ii) B	2750/-	

STEEL SUPPLY & ACCEPTANCE REGISTER

1. CA No & Name of Work
2. Contract No
3. Name of Manufacturer’ s T.C. No
4. Manufacturer

5. Random Test Details
- a) Physical test report from (Name of NABL approved Lab/ Government Engg College) vide their letter No ()
- b) Chemical test report from (Name of NABL approved Lab/ Government Engg College) vide their letter No ()

6. Types of steel Dia & Qty (a) Type..... TMT/ CRS (b) Dia mm (c) Actual Wt MT (d) Conversion Wt MT.

	Chemical Test						Mechanical Test					Remark	
	Carbon %	Sulphur %	Phospho %	Mangan %	Silicon %	Corrosio resistant element	Wt per	Stress (N/mm ²).2%	Tensile Strength (N/mm ²)	Elongatio %	Bend		Re-bend Test
a) As per IS 1786-2008													
b) As per manufacture , s test certificate													
c) As per independent test													

Remarks with signature

Contractor

Accepted/Rejected

Engineer-in-Charge

Garrison Engineer

Remarks of BOO/ Inspecting Officer/

Appendix 'D'

CEMENT SUPPLY & ACCEPTANCE REGISTER

1. CA No & Name of Work
2. Control No ^{\$\$\$} (see below)
3. Name of Manufacturer/ Brand Name/ Grade of Cement (a) Manufacture (Name of manufacturer) (b) Brand () (c) Grade ()
4. Qty of Cement & Lot No/ Week No (in Bags): (Quantity (in MT) (b) Lot No/ Week ()
5. Manufacturer' s test Certificates No ()
6. Random Test Details
- (a) Physical test report from (Name of approved Lab/ Engg College) vide their letter No ()
- (b) Chemical test report from (Name of approved Lab/ Engg College) vide their letter No ()

7. Details of physical & chemical properties:

PHYSICAL REQUIREMENTS (AS PER IS 4031)		CHEMICAL REQUIREMENTS (AS PER IS 4032)	
RESULTS	Compressive strength (Mpa)	28 Days	Chlorides (%)
		07 Days	Alkalis (%)
		03 Days	Loss on ignition (%)
	Initial Setting Time (Minutes)		Sulphuric Anhydride (%)
	Soundness by Auto Clave		Magnesium (%)
	Soundness by Le Chatellar		Insoluble Residue (%)
	Specific Surface area (M ² /Kg)		Lime Saturation Factor (Ratio)
			Lime Saturation Factor (Ratio)
			Standard Consistency (%)
			Temp during testing °C

As per relevant IS
As per manufacture' s test certificate
As per random test certificate

Remarks with signature

Remarks of BOO/ Inspecting Officer/

Accepted/ Rejected

Junior

Engineer-in-Charge

Garrison

Signature of Contractor
Dated :

Dy Dir/ AD (Contracts)
For Accepting Officer

^{\$\$\$} to be allotted serially by the Garrison Engineer

PARTICULAR SPECIFICATIONS

1. GENERAL

- 1.1 The furniture shall be manufactured in accordance with the drawings read in conjunction with Particular Specifications and Key Specifications. Key specifications shall take precedence over the particular specifications/drawing where are at variance.
- 1.2 The rates quoted against each item of furniture in Schedule ‘A’/ BOQ will be deemed to allow for any minor details of furniture which are obviously and fairly intended and may have not been shown in drawings or specified in particular specifications/ Key Specifications but which are essentially required in order to the good trade practice.
- 1.3 All materials to be supplied by the Contractor for incorporation in the work shall be new and of the best quality and not in any way inferior to the samples kept in the office of the GE.

2. Samples of Materials

- 2.1 Samples of all materials shall be submitted by contractor to GE for getting his approval before incorporating the material in work.
- 2.2 Samples of the following materials (as applicable to the contract), supplied by the contractor to the GE/AGE (I) shall not be returned to the contractor on completion of work, but shall be retained by the department for future reference and contractor’s tendered rates shall be deemed to be included on this account :-

(a)	Teak/Deodar wood	-	Not less than 100 x 50 x 500mm size
(b)	Chir/Sal wood	-	65 x 50 x 100 mm size
(c)	Cane Plastic	-	50 gms in one piece
(d)	Nylon Newar	-	2 RM
(e)	Cotton Newar	-	100 gms in one piece
(f)	Hessain Cloth, long cloth, tapestry	-	1 RM
(g)	Conduit pipe (Round/Square)	-	300mm long in the piece for each specified size
(h)	Alu/steel sheet	-	Size 300 x 300 mm
(j)	Knob, hinges, hasp & staples, shoes, catch spring and other fittings as required in work not mentioned above	-	1 No for each size

- 2.3 GE/AGE (I) may direct the contractor to supply samples of any other material not listed above for his approval in such sizes as decided by GE/ AGE (I) without any extra cost to the Govt.
- 2.4 All samples shall bear a slip containing signatures of GE/ AGE (I) and contractor in token of approval of the same. The slip shall be pasted to the sample and sealed. The slip shall indicate the CA No. and date of approval thereof. The contractor shall be required to be complete all supplies/ articles strictly according to the approved samples.

PARTICULAR SPECIFICATIONS (Contd...)**3. NYLON NEWAR**

3.1 Nylon Newar for GI charpoy shall be 50 mm wide, best quality available conforming to samples kept in GE's office/ F & S yard. The total weight of nylon newar per charpoy shall not be less than 1.50 Kg and shall be got approved before incorporating in the work. The minimum strands shall be 15 No on short rail and 33 No on long rail.

4. TIMBER

4.1 Timber shall be as indicated in the respective drawings and/ or specified in Key Specification here-in-after.

4.2 Where teak wood is indicated on drawing or specified hereinafter it shall be best quality well seasoned MP Teak wood 'TECTONA GRANDIS'. Where no wood is indicated in drawings, teak wood shall be used except where specifically indicated otherwise in Key Specifications. Where SAL wood is specified here-in-after it shall be best quality well seasoned SAL wood 'SHOREA ROBUSTA'. All timber shall be the best of its kind, it shall be fully seasoned, maximum moisture content shall not exceed 15% and timber shall be of natural growth, free from shakes, knot, dot, cracks, large loose or decayed knots, borer holes, soft spots & all other defects & blemishes. Knots upto 1/2" diameter may however be accepted if

- (i) they are not likely to become loose or are dead knots.
- (ii) they are not in clusters or groups.
- (iii) they do not occur on edges or joints or on underside of member in tension.
- (iv) they do not distinguish and prominently show cut in the finished articles.

4.3 All timber shall be wrought, sand papered smooth and shall have corners and edges rounded wherever shown on drawings.

4.4 Boarding, fillets and scantling etc shall be straight, square, sawn and planned true and smooth to the dimension shown on drawings. However for wooden members where any dimension has been specified to be 20 mm or more tolerance of 1 mm will be allowed in respect of each of such dimension of the member.

4.5 Every plank shall be in one length and no joints shall be permitted.

4.6 Width of Plank in timber: Except where planks are specifically indicated on drawings to be in one piece, width of planks shall be as under:

- (i) Up to and including 200 mm width, planks shall be in one piece.
- (ii) Over 200 mm and upto 400 mm, planks shall be in two pieces of equal width.
- (iii) Over 400 mm in width shall be made up of a planks of equal width nearest to 200 mm".

5.0 Particle board/Ply Wood

5.1 Un-veneered particle board shall be flat pressed, BWP grade bonded with phenol formaldehyde synthetic resin adhesive ISI marked (IS-3087) (Type-1 Part-I) all as specified under Clause 12.13 of MES Schedule Part-I (2009).

5.2 Veneered particle board shall be three layers flat pressed with commercial or teak veneer (one side or both sides) as indicated on drawing/specified and shall be BWP grade bonded with phenol formaldehyde synthetic resin adhesive ISI marked (IS-3097) Grade-I, Type-I for commercial veneer and Type-2 for decorative veneer all as specified under Clause 12.14 of MES Schedule Part-I (2009).

PARTICULAR SPECIFICATIONS (Contd...)

- 5.3 Plywood shall be BWR grade bonded with phenol formaldehyde synthetic resin adhesive ISI marked (IS-303 for general-purpose plywood and IS-1328 for decorative face plywood). Facing shall be of teak veneer or commercial veneer as shown on drawing/ specified. The quality requirement of each face of ply wood as given in Table-1 of the IS, shall not be inferior than type B. The faces of a plywood shall be reasonably smooth with face veneers of uniform thickness.
- 5.4 **PRE-LAMINATED PARTICLE BOARD**
- Pre-laminated particleboard shall be BWR grade, flat pressed bonded with phenol formaldehyde synthetic resin adhesive with melamine finish; ISI marked IS-12823 (Grade I, Type I) with pre-lamination of approved shade one side & with balancing white coat on other side or prelaminate on both sides as shown on drawings/ specified. Colour, shade, tint and design of lamination shall be as approved by the GE.
6. **GI Pipes and Fittings**
- GI pipes shall be mild steel galvanized tubes bearing ISI mark of IS-1239 (Part-I). The pipe shall be welded pipes, medium grade. The GI elbows & other fittings as required shall be ISI marked of IS-1239 (Part-II)/ IS-1879 (Part-I to X), well shaped having all the three mouths at right angles. The GI check nuts shall be of heavy quality/ grade, well shaped.
7. **Mild Steel Sheets**
- These shall be plain black mild steel sheet of thickness as required and of quality and makes as approved by GE.
8. **CONDUIT PIPE AND FITTINGS**
- All conduit fittings and accessories shall be rigid steel conduit conforming to IS-9537. All fittings and accessories shall conform to IS-2667 and 3837. Bending of steel conduit shall be done properly without deforming of conduit at bends.
9. **FOAM**
- Foam shall be of 32 density of required thickness as shown on drawings and make as approved by GE.
10. **NYLON NEWAR**
- Nylon newar shall be of virgin quality 50 to 55 mm wide and as approved by GE.
11. **COTTON NEWAR**
- Cotton newar shall be best quality 50 mm wide of Make- DCM/ Modi as approved by GE.
12. **TAPESTRY**
- Tapestry cloth shall be superior quality of the range not less than Rs. 300/- per metre as approved by GE.
13. **REXINE**
- Rexine shall be best quality of approved shade and range not less than Rs. 300/- per metre as approved by GE.
14. **MARKIN CLOTH**
- It shall be new and of best quality of range not less than Rs. 50/- per metre as approved by GE.

PARTICULAR SPECIFICATIONS (Contd...)

15. **HESSIAN CLOTH**

The hessian cloth shall be of best quality and as approved by GE.

16. **SHEET GLASS**

Sheet glass shall be ordinary quality or 'B' quality conforming to IS-2835. Sheet glass shall be flat, transparent and clear as judged by the naked eye. It may however posses a light tint when viewed edge wise. Sheet shall be free from any cracks and other defects. Tolerance on the thickness of glass sheet be + 0.2 mm for the normal thickness of glass sheet i.e. 2 to 4 mm. The glass sheet shall be provided as approved by GE of thickness as mentioned in drawings/ key specifications.

17. **CANE WORK**

17.1 Plastic cane type 12 of IS : 5378 having not more than 5 knots in one length of approx 200 gm shall be used. The materials shall be smooth glossy and edges shall be free from sharp cuts.

17.2 The plastic cane to be used shall be white and of virgin quality of approved quality and shall be of size given below:-

Srl Nos.	For position	Width	Thickness
(a)	For seat and back	2.00mm	0.40mm
(b)	For border	3.00mm to 3.20mm	0.60mm
(c)	For chair Verandah	4.00 mm	0.60mm

18. **MILD STEEL**

Mild steel tubes shall be of seamless square cross section as indicated on drawings conforming to relevant IS of minimum wall thickness 1.6mm unless otherwise specified.

19.. **CLAMP**

Welded clamps shown for 15mm dia conduit pipe of MNF set in drawing, shall be 17 mm dia and 16 guage, washer shall be welded at the bottom of the clamp.

20. **Iron/ Brass/ Aluminum Mongery, Fittings etc**

All fittings including iron mongery/ brass/ aluminum mongery shall be approved heavy quality. The contractor shall produce samples of all iron/ brass/ aluminum mongary required in the work and shall obtain written approval of the GE, before incorporation in the work. Aluminum fittings shall be anodized.

21. **Screws/ Pins**

21.1 Nails shall not be used except in sofa or where Specifications Section-II specified in particular. Pins for joints (except for charpoys Newar, Charpoys wooden, bed with MNF and panels for shutters for which no pins are to be provided) shall be of bamboo. Screws for fixing various members of furniture i.e. plywood, particle board, block board etc., shall be mild steel wood screws.

21.2 Steel Iron mongery shall be fixed with iron screws of appropriate size and brass fittings with brass wood screws. Screws for brass fittings shall be 'NETTLE-FOLD' or other equal approved finish to match with the fittings. Screws for aluminum fittings shall be chromium plated brass screws.

PARTICULAR SPECIFICATIONS (Contd...)

- 21.3 Screws shall not be thinner than designation 8 & of length not less than twice the thickness of board/ members to be fixed.
- 21.4 Nails shall confirm to sample kept in GE's office.
- 21.5 Steel wood screws shall conform to IS-451 and shall be clearly finished and shall be true and concentric with the shank. Slots in the head shall be clear, straight and free from burrs and central with regard to the head. Threads shall be clear and well defined. Screws shall be in self colour condition.
22. **DOWELS & PINS**
- Dowels and pins for securing 'mortice & tenon' joints where required shall be of solid bamboo of good quality.
23. **Synthetic Glue**
- It shall be brand 'Fevicol or "Vemicol' or other equivalent suitable for jointing timber as approved by the GE.
24. **RINGS/SHOES TO TOES**
- Irrespective of what is shown on drg, contractor shall provide best quality locally available Rings/ Shoes under the legs of; chairs, tables. etc of hard rubber/ PVC free from cracks and uniform texture as approved by the GE/ AGE (I).
25. **WELDING**
- Welding shall be metal arc electric welding and shall be done in an approved manner. All welds shall be fillet weld and actual throat shall not be less than 3 mm. Welding shall be done by trained and approved welders. All welded joints shall be neatly filled with the metallic putty if required to the satisfaction of the Engineer-in-Charge before applying priming coat of paint.
26. **WORKMANSHIP**
- 26.1 The work shall be executed in a sound manner. Every part shall be true and well fitted and shall conform to the highest standard of workmanship obtained from high-class cabinet makers.
- 26.2 All wood work shall be wrought and sand papered on all faces.
- 26.3 The word 'Frame' as applied to wood work shall be understood as including all the best known method of jointing wood works together with mortice and tenon joints, secret dovetailed joints or other approved materials.
- 26.4 Framed joints shall be made to fit properly without any wedging or making up.
- 26.5 All framed wood work and paneling shall be cramped together with and stacked under cover for some time before pinning and wedging. Any portion that shrinks warps or develops shakes or other defects shall be removed or replaced by the contractor.
- 26.6 All wood work shall be finished to smooth, true, and clean surface with sand paper before applying any treatment specified.
- 25.7 Edges/ corners where required shall be slightly rounded.
- 26.8 Shelf and plank shall be fixed with wooden bearers with screws at distance not exceeding 150 mm centers in order to ensure that shelf & plank is secured at two places on each bearer.
- 26.9 Hidden/ Unexposed surface of wooden members of furniture shall be treated with linseed oil.
27. **PAINTING**
- 27.1 All paints and allied materials shall be of quality not inferior to that required by the relevant IS paints etc and shall be ready mixed. The colour and tint of paint, unless indicated otherwise, shall be approved by the GE. Painting wherever indicated in Key Specifications shall consist of

PARTICULAR SPECIFICATIONS (Contd...)

two coats of synthetic enamel paint over one coat of primer. Paints used for under coat, finished coat and primer coat shall be of same manufacturer. The contractor is required to bring the entire quantity of paint and primer of 1st quality/ brand of approved manufacturer in factory sealed containers from the list of makes as specified here in after.

27.2 Preparation of new steel/ iron work surfaces :-

(a) The surfaces shall be thoroughly cleaned of dirt fluxing material, other foreign matters & scrapped thoroughly with hand scraper followed by wire brushing (first with coarse & then with fine wire brushes and finally sand papering the surface to remove all mill, scale & rust). The surface shall then be wiped finally with mineral turpentine to remove oil, greased & perspiration left by hand marks.

(b) Temporary rust protective materials shall be applied to steel sheets to protect during transport and storage; it shall be removed with suitable solvent as a preliminary to other preparatory treatment.

(c) Surfaces already pretreated or primed in a factory shall be carefully inspected and damaged areas shall be thoroughly degreased and cleaned of all rust and touched.

28. POLISHING**27.1 General**

French polish shall be applied to all wooden furniture except where any other type of finish is indicated.

28.2 Finishing

In General, internal surfaces of drawers & the like and rails of under sides of chair sections, table tops and the like shall be left untreated. In the event of any dispute as to which are the surfaces to be polished and which are to be left untreated and sand papered, the GE's decision shall be final and binding.

29. FRENCH POLISH

Furniture will be delivered in the F & S yard of GE in an unpolished state. It shall be polished in the Yard as under :-

(a) Preparation of surfaces

Remove plane marks with a wooden scraper and smooth surfaces with sand paper No. 2. Fill and stop bore holes with paste filler prepared by mixing plaster of Paris and water to a creamy consistency and adding a resin in quantity required to match/ obtain the desired surface. Alternatively patent filler as approved by GE may be used. When the surfaces dry up, wipe off superfluous filler, and set aside for 24 hours for the surface to harden, thereafter rub surface with sand paper No. 1/2 until it is thoroughly smooth and clean-up.

(b) Polishing

French polish shall conform to IS-348 - 1985. Take a wad of cotton wool and partially saturated it with the polish, enclose the wad in a piece of fine cloth and rub it hard along the grain with light even pressure. When the wad showed any sign of sticking, it should be slightly dipped in linseed oil and continue rubbing until a thinly coated semi-gloss appearance is obtained. Set aside for about two hours to permit surface coat to harden. Rub surface with sand paper No. '0' to remove any raised grain. Repeat polish to the surface as before & when a clear grained smooth surface is obtained it shall be allowed to harden for about one hour. Rub surface again with No. '0' sand paper, recharge wad as before and apply to the surface in circular motion until the surface is covered allover, charge the wad with wax polish & apply with straight strokes in direction of the grains until the required gloss is obtained to the approval of the GE.

(c) Wooden article for which no finish is indicated shall be French polished as specified above.

PARTICULAR SPECIFICATIONS (Contd...)

30. **LIST OF APPROVED MAKE OF MATERIALS :** List of approved manufacturer of products for which specific brand name are given here under to be incorporated in works :-

SL No.	NAME OF MATERIALS/ ITEMS	LISTOF MAKES/BRANDS/MANUFACTURES/ SOURCE
1.	PLYWOOD FOR GENERAL PURPOSES (ISI 303 MARKED)	(A) GREENPLY (B) KITPLY (C) CENTURY PLYWOOD
2.	PLAIN & PRELAMINATED PARTICLE BOARD / MDF& HDF BOARDS	(A) ECO (B) NOVAPAN (C) ARCHID (D) BHUTAN (E) Green Panel Max (F) Action Tesa (G) Century Ply
3.	MS PIPE/ ERW /GI PIPES and RIGID STEEL CONDUITS / MS CONDUITS	(A) JINDAL (B) TATA (C) SURYA ROSHNI LTD.
4.	FRENCH POLISH	(A) SHALIMAR (B) ASIAN PAINTS (C) NEROLAC PAINTS
5.	PLASTIC CANE	(A) SHAH (B) PRIMER (C) GARWARE
6.	FOAM	(A) SLEEPWEL (B) JJ FOAM (C) FEATHER FOAM
7.	LOOKING MIRROR	(A) SAINT GOBAIN (B) MODI GUARD (C) GOLDEN FISH
8.	SHEET GLASS	(A) SAINT GOBAIN (B) MODI GUARD (C) GOLDEN FISH
9.	SYNTHETIC ENAMEL PAINT	(A) ASIAN PAINTS (APCOLITE) (B) NEROLAC PAINTS (NEROLAC FULL GLOSS) (C) SHALIMAR PAINTS (SUPERIAC HI GLOSS)
10.	PLAIN FIBRE CEMENT SHEET	(A) M/S RAMCO AC SHEET SWASTIK (B) M/S ETERNIT EVEREST LTD (C) CHARMINAR (D) UPAL
11.	RECEPTACLE/ BATHMAT (PVC)	(A) CELLO (B) SUPREME (C) NEEL KAMAL

PARTICULAR SPECIFICATIONS (Contd...)

SL No.	NAME OF MATERIALS/ ITEMS	LISTOF MAKES/BRANDS/MANUFACTURES/ SOURCE
12.	CHAIR PLASTIC WITH ARMS	(A) CELLO (B) SUPREME (C) NEEL KAMAL
13.	CHAIR REVOLVING	(A) Godrej (B) Methodex (C) Zuori (D) Durian (E) Usha Shriram
14.	Foam	(A) Sleep well (B) JJ Foam (C) Feather Foam
15.	Chair Visitor/Chair Executive	(A) Methodex (B) GODREJ (C) DURAIN (D) NILKAMAL (E) USHA SHRIRAM
16.	Three Seater Metal Bench	(A) Godrej (B) Methodex (C) Durian
17.	Pad Lock	(A) Atoot (B) Godrej (C) Harrison
18.	Executive table	(A) Methodex (B) GODREJ (C) DURAIN (D) NILKAMAL (E) USHA SHRIRAM

NOTE:- Materials/ items for which makes/brands have not been mentioned any where in tender document, same shall be get approved by GE before incorporation in the work. In case of non availability of specified item in makes specified during execution, based on ISI mark, BIS, NABL approved lab report approval shall be obtained from accepting officer, recommended through GE & CWE.

Signature of Contractor

Dy Dir/ Asst Dir (Contracts)
For Accepting Officer

Appendix ‘A’

1. APPROVED CEMENT MANUFACTURERS FOR MES WKS ON PAN INDIA LEVEL
(Updated by E-in-C’s branch letter No. A/90154/ 02/E2 Des-3 dated 09 Jan 2025)

Sr No	Company Name & Brand	Address	Type of Cement
1	The Associated Cement Companies Ltd. Brand: “ACC”	414-421, Splendor Forum (4 th Floor), 3, District Centre, Jasola, New Delhi-110044 Ph- 011 46583600	ALL
2	M/s Ultra Tech Cement Brand: “ULTRATECH”	B Wing, 2 nd Floor, Mahakali Caves Road, Andheri (East) Mumbai – 400093 Ph : 022-66917800	ALL
3	The India Cement	Dhun Building, 827, Anna salai, Chennai-600002	ALL
4	M/s Dalmia Cement (Bharat) Ltd Brand: “DALMIA INFRA PRO”	Dalmiapuram Distt- Truchirappalli Tamil Nadu – 621651	ALL
5	Century Cement Brand: “CENTURY”	Industry House, 159 Church gate Reclamation. Mumbai-400020 Ph-022 22023936	ALL
6	Saurashtra Cement Brand: “SAURASHTRA”	Gala No A-1, Ground Floor, Udhyog, Sadan No 3 MIDC, Central Road, Andheri (East), Mumbai – 400093 Ph-022 32955557/67 Mob.9320290081	ALL
7	The Ramco Cements Ltd. (Formerly Madras Cement) Brand: “RAMCO”	Aurus Corporate Centre, 98-A, Dr RadhakishnanSalai , Mylapore, Chennai-600004 Ph: 044-28478666	ALL
8	Mangalam Cement Ltd Brand: “MANGALAM”	PO Adityanagar, Morak, Dist-Kota, Rajasthan-326520 Ph-9351468076	ALL
9	Birla Corporation Ltd. Brand: “BIRLA”	Birla Building (3 rd &4 th floor), 9/1, R.N. Mukherjee Road Kolkata-700001 Ph-033 30573700	ALL
10	Orient Cement Brand: “BIRLA-A1”	5-9-22/57/D, 2 nd and 3 rd Floor, GP Birla Centre, Adarsh Nagar, Hyderabad-500063 Pin-044 23688600	ALL
11	Nuvoco Vistas Corporation Ltd (Formerly Lafarge Cement) Brand: “NUVOCO”	Equinox Business Park Tower-3, East Wing, 4 th Floor, LBS Marg ,Kurla (west), Kurla Mumbai, Maharashtra-400070	ALL
12	Shree Cement Brand: “SHREE”	Bangur Nagar, Beawar, Disst- Ajmer, Rajasthan-305901 Ph-01462 228101-06	ALL

APPROVED CEMENT MANUFACTURERS FOR MES WKS ON PAN INDIA LEVEL (Contd..)

Sr No	Company Name & Brand	Address	Type of Cement
13	J K Cement Brand: “J K”	Kamla Tower, Kanpur-208001	ALL
14	JK Lakshmi Cement Ltd Brand: “J K LAKSHMI”	Jaykaypuram, Dist-Sirohi, Rajasthan Ph-02971 244409/10	ALL
15	Jaypee Rewa Cement Brand: “JAYPEE”	Jaypee Nagar, P.O- Jaypee Nagar, Rewa-486450 M.P	ALL
16	Ambuja Cement Ltd Brand: “AMBUJA”	Kodinar, PO- Ambujanagar, Taluka- Kodinar, Disst- Junagadh, Gujarat-362715 Ph-02795 237000	ALL
17	M/s Sagar Cements Ltd Brand “SAGAR”	M/s Sagar Cements Ltd Plot No 111, Road No 10, Jubilee Hills, Hyderabad-500 033 Tel: +91-40-23351571, 2335672 Fax: +91-40-2335673 Website: www.sagarcements.in	(a) OPC 43 (b) OPC 53 (c) PPC (d) PSC
18	M/s Chettinad Cement Corporation Ltd. Brand: “CHETTINAD CEMENT”	4 th Floor, Rani Seethai Hall Building, 603, Anna Salai Hall, Chennai-600006 Tel-No 044-42951800 Fax-No.044-28291558 E mail:- info@chettinadcement. com Website-www.chettinadcement.com	(a) OPC 43 Gr (b) PPC
19	M/s My Home Industries Ltd. Brand : “MAHA CEMENT”	9 th Floor, Block-3, My Home Hub, Madhapur, Hyderabad-500081 Ph- 040-66929696 Fax- 040-66929797/98	(a) OPC 43 Gr (b) PPC (c) PSC
20	M/S Wonder Cement Ltd. Brand: “WONDER Cement”	17,Old Fatehpura, SevaMandir Road, Udaipur-313004, Rajasthan (India) Tele: +91-294-33991133 Fax:+ 91-294-3006333 Email ID:- Corp.office @ wonder cement .com	(a) OPC 43 (b) OPC 53 (c) PPC

2. APPROVED TMT STEEL MANUFACTURERS FOR MES WKS**(Updated by E-in-C's branch letter No. 83044/Steel/ 03/E2 Des-3 dated 09 Jan 2025)**

Sl No.	Company Name & Brand	Address	Type of Steel
1	Rashtriya Ispat Nigam Limited (RINL) Brand: "RINL"	Visakhapatnam Steel Plant Visakhapatnam – 530 031 India Tel : (91 891) 518226, 518376 Fax : (91 891) 518316 Email : cmdvsp@itpvis.ap.nic.in	For all types & dia of TMT bars
2	Tata Iron & Steel Company (TISCO or Tata Steel) Brand: "TATA"	Bombay House, 2-4 Homi Modi Street Mumbai – 400 001, India Tel : (91 22) 204 9131 Fax : (91 22) 204 9522, 287 0840 Email : corpcomm@sr.tatasteel.com (Br office for North: Jeevan Tara Bldg. Patel Chowk. New Delhi)	For all types & dia of TMT bars
3	Steel Authority of India Limited (SAIL) Brand: "SAIL"	Central Marketing Organisation, Northern Region, 17 th Floor, scope Minar, Laxmi Nagar Distt. Centre Delhi – 110092	For all types & dia of TMT bars
4.	M/s Gallantt Metal Ltd Brand: "GALLANTT TMX"	Ward 10BC, Polt No. 123 Ground Floor, Gandhi Dham, Kutch, Gujarat - 370201 Tel : 91-2836-228164 Fax : 91-2836-235787 E-mail : gml@gallantt .com Website : www.gallantt .com	TMT Bras of Gde Fe 500 Fe 500D CRS (Size 8-32mm)
5.	M/s Rashmi Metalics Limited, W.B. Brand: RASHMI TMT	Premlata Building 39, Shakespears Sarani 6th Floor, Kolkata-700017 Tele: 033-22894255/56 Fax: 033-22894254 Email- mkt.domesticdip@rashmigroup.com Website: www.rashmigroup.com	TMT Bras of Gde Fe 500 (Size 8-32mm) Fe 500D & Fe 550D (Size 8-25mm)
6.	M/s Bajrang Power & Ispat Ltd., Raipur Brand: GOEL TMT	M/s Bajrang Power & Ispat Ltd., Raipur Vill-Borjhara Urla Industrial Area Raipur-493221(CG) Tele: 0771-4288019/29/39 Fax: 0771-2323601/602, 4288123 Email- infobir@giekgriyo.co.in	TMT Bras of Gde Fe 500 & Fe 500D (Size 8-32mm)
7.	M/s Real Ispat & power Ltd Brand: "G K TMT"	Vrindavan, Near IDBI Bank Civil Lines, Raipur -492001, CG Tel : 91-771-4224000 Fax : 91-771-4224010 E-mail : real@realispat.com Website : www.realispat.com	TMT Bras of Gde Fe 500 Fe 500D (Size 8-36mm)

APPROVED TMT STEEL MANUFACTURERS FOR MES WKS (contd...)

8.	M/s Steel Exchange India Ltd. Brand: "SIMHADRI TMT"	D. No: 1-65/K/60, Plot No. 60 Abhis Hiranya, 1 st Floor Kavuri Hills, Hyderabad Telangana-500081 Tel-040-23403725, Fax-040-23413267 E-mail : info@seil.co.in	TMT Bars of Gde Fe 500 Fe 500D HSCRM
9.	M/s Super Smelters Ltd Kolkata. Brand: "SUPER SHAKTI"	Premlata, 39, Shakespeare Sarani, 3 rd Floor, Kolkata -700017 Tel/ Fax : 033-2289-2734/ 36 E-mail : info@supershakti.in Website :www.supershakti.com	TMT Bras of Gde Fe 500D Fe 550 (Size 8-32mm)
10.	M/s Shyam Steel Industries Ltd Brand: "SHYAM"	Shyam Towers EN-32, Sector- V, Salt Lake, Kolkatta - 700091 Tel-033-40074007, Fax 033-40074010 E-mail : marketing@shyamsteel.com	TMT Bars of Gde Fe 500 Fe 500D CRS
11.	M/s Jai Balaji Industries Ltd Brand: "Balaji Shakti"	5 Bentek street, Kolkata-700001 Delhi Office 510, Block-b, Navraung House 21 Kasturba Gandhi Marg. New Delhi-110001 011-43620219, 43620220 Mob: 7838272772/9958936103 E- mail: info@jaibalajigroup.com	TMT Bars of Gde Fe 500 Fe 500D
12.	M/s MSP Steel & Power Limited, Chattisgarh Brand: MSP TMT 500D	M/s MSP Steel & Power Limited, Chattisgarh 16/S, Block-A, New Alipore Kolkata 700053 Tele: 033 40057777/2398 2239 Mob: 7381028976 Email: contactus@mspsteel.com Website: www.mspteel.com	TMT Bars of Gde Fe 500D (Size 8-32mm)
14.	M/s SPS Steel Rolling Mills Ltd, (WB) Make : ' ELEGANT TMT '	M/s SPS Steel Rolling Mills Ltd, (WB) Regd Office " Diamond Heritage" 16, Stand Road, Room No H523 A, 5 th Floor, Kolkata-700 017 Corp office: " Diamond Prestige, 41 A, A.J.C. Bose Road, 8 th Floor, Room No 801, Kolkata -700 017 Mob no: 9831055568 / 9830281273 Email : info@spsgroup.co.in	TMT Bars of Gde Fe 550D
15.	M/s Sugna metals limited, Hyderabad Brand : ' SUGNA TMT '	M/s Sugna Metals Limited Plot No 76, Vemireddy Enclave, Road No 12, Banjara Hills Hyderabad -500 034(Telangana) Tele-04027664502/27663527 Email : info@sugnatmt.com	TMT Bars of Gde Fe 550D (Size 8-32mm)
16.	M/s Shyam Metalics and Energy Ltd Brand: 'SEL TIGER'	M/s Shyam Metalics and Energy Ltd Viswakarma Building, North west Block 1 st , 2 nd & 3 rd floor 86C, Topsia Road Kolkata- 700 046(WB) Tel-+9133-40113000 Fax-+9133-22852212 Website : www.shyammetalics.com	TMT Bars of Gde Fe 550D (Size 8-32mm)

APPROVED TMT STEEL MANUFACTURERS FOR MES WKS (contd...)

17.	M/s Jindal Steel and Power Ltd. Brand: “JINDAL PANTHAR”	M/s Jindal Steel and Power Ltd, Haryana OP Jindal Road Hissar, Haryana, Haryana, Pin-125005 Tel-+91-1662-222471/84 Fax-+91-1662-222476 www.jindalsteelpower.com	TMT Bars of Gde Fe 500, Fe 500D, Fe 550, Fe 550D & CRS with (Size 8-40mm)
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3. APPROVED STRUCTURAL STEEL MANUFACTURERS FOR MES WKS
(Updated by E-in-C’s branch letter No. 83044/Steel/ 03/E2 Des-3 dated 09 Jan 2025)

SI No.	Company Name & Brand	Address	Type of Steel
1	Rashtriyaspat Nigam Limited (RINL) Brand: “ RINL ”	Visakhapatnam Steel Plant Visakhapatnam – 530 031 India Tel : (91 891) 518226, 518376 Fax : (91 891) 518316 Email : cmdvsp@itpvis.ap.nic.in	Structural Steel (Angle, Beam, Column, Channel, Plate etc)
2	Tata Iron & Steel Company (TISCO or Tata Steel) Brand: “TATA”	Bombay House, 2-4 Homi Modi Street Mumbai – 400 001, India Tel : (91 22) 204 9131 Fax : (91 22) 204 9522, 287 0840 Email : corpcomm@sr.tatasteel.com (Br office for North: Jeevan Tara Bldg. Patel Chowk. New Delhi)	Structural Steel (Angle, Beam, Column, Channel, Plate etc)
3	Steel Authority of India Limited (SAIL) Brand: “SAIL”	Central Marketing Organisation, Northern Region, 17 th Floor, scope Minar, Laxmi Nagar Distt.Centre Delhi – 110092	Structural Steel (Angle, Beam, Column, Channel, Plate etc)
4	M/s Jindal Steels and Power Ltd. Brand: “JINDAL”	Jindal Centre, Plot No. 2, Sector- 32, Gurgaon – 122001 Haryana Tele : 0124 6612000 Fax : 0124 6612125 Website : www.jindalsteelpower.com	Structural Steel (Angle, Beam, Column, Channel, Plate etc)

CONSOLIDATED LIST OF PRODUCTS APPROVED: E-IN-C'S BRANCH AS ON 09 Jan 2025
(PLEASE REFER THE APPROVAL LETTER FOR FURTHER DETAILS
OF PRODUCTS APPROVED)

CIVIL CONSTRUCTION PRODUCTS

1. ALL RUNWAY RELATED PRODUCTS

(a) POLYMER MODIFIED BITUMEN (PMB)

Sl. No	Name of firm	Product Description	Approval letter No and date	Valid upto
i.	M/s Hindustan Colas Ltd	"Hincol" Brand 'Polymer Modified Bitumen (PMB) (Elastomeric SBS Modified) Confirming to IRC SP: 53/2002 or latest, and IS - 15462:2004 and prepared with base bitumen sourced only from any of PSU refineries of India. Source of base mtrl: Govt refineries/ Govt approved PSUs	43285/CMPT/653/Des-2 dt 17 Feb 2023	18 Sep 2025
ii.	M/s Ooms Polymer Modified Bitumen Pvt Ltd	"Ooms Polymer" Brand 'Polymer Modified Bitumen (Elastomeric SBS Modified) Confirming to IRC SP : 53/2002/2010 and IS - 15462:2004/2019 Source of base mtrl : Govt refineries / Govt approved PSUs.	43285/CMPT/660/Des-2 dt 10 Jul 2023	06 Feb 2026
iii.	M/s Kotak Asphalt LLP	Polymer Modified Bitumen (PMB)	43285/CMPT/672/Des-2 dt 27 May 2024	26 May 2026
iv.	M/s Tiki Tar and Shell India Pvt Ltd	"SHELL CARIPHALTE" Brand 'Polymer Modified Bitumen (PMB) Confirming to IRC SP : 53/2010 and IS - 15462:2019 Source of base bitumen : Govt refineries/ Govt approved PSUs	43285/CMPT/675/Des-2 dt 18 Sep 2024	17 Sep 2027

(b) BITUMEN EMULSION

Sl. No	Name of firm	Product Description	Approval letter No and date	Valid upto
i.	M/s Hindustan Colas Ltd	Hincol Bitumen Emulsion confirming to IS-8887:2004 and ASTM D 2397	43285/CMPT/653/Des-2 dt 17 Feb 2023	18 Sep 2025
ii.	M/s Verma Industries	Bitumen Emulsions RS-1 for tack coat applications SS-1 for prime coat application over WMM/WBM	43285/CMPT/659/Des-2 dt 26 Jun 2023	25 Jun 2025
iii.	M/s Kotak Asphalt LLP	Bitumen Emulsions (RS1 & SS1)	43285/CMPT/672/Des-2 dt 27 May 2024	26 May 2026
iv.	M/s Tiki Tar and Shell India Pvt Ltd	"SHELL SPRAMUL" Brand 'Bitumen Emulsions RS-1, SS-1 and CSS-1.	43285/CMPT/675/Des-2 dt 18 Sep 2024	17 Sep 2027



(c) **GLASS GRID / FIBRE GLASS**

Sl. No	Name of firm	Product Description	Approval letter No and date	Valid upto	Remarks
i.	M/s Giridhar Techfab Pvt Ltd	GTF Glass Geogrid,	43285/CMPT/625/Des-2 dt 03 Jan 2022	16 Jan 2025	* Approval of the firm is temp suspended till three firms have been approved.

(d) **POLYMERIC BITUMEN EMULSION (PME)**

Sl. No	Name of firm	Product Description	Approval letter No and date	Valid upto
i	M/s L N Petro Chem Private Limited	Polymer Modified Emulsions Brand Name : EMULCOTE	43285/CMPT/666/Des-2 dt 10 Jan 2024	09 Jan 2027

(e) **OTHER RUNWAY RELATED PRODUCTS**

Sl. No	Name of firm	Product Description	Approval letter No and date	Valid upto
i	M/s ITS Coatings Pvt Ltd	Waterborne Acrylic Airport Marking Paint IS:164 grade brand Name "iTraff"	43285/CMPT/664/Des-2 dt 01 Nov 2023	31 Oct 2025
ii	M/s The Supreme Industries Ltd	DURA BOARD HD 100 DURA ROD	43285/CMPT/679/Des-2 dt 28 Nov 2024	27 Nov 2029

2. **CONSTRUCTION CHEMICALS AND WATERPROOFING PRODUCTS:-**

(a) **M/s Berger Paints India Ltd**

(i) Approved vide letter No 43285/CMPT/670/Des-2 dated 08 Apr 2024 and approval is valid upto 07 Apr 2025 :-

(a) Berger Homeshield Waterproof Putty.	(f) Berger Homeshield Tank Shield PW.
(b) Berger Homeshield Dampstop.	(g) Berger Homeshield Proshield.
(c) Berger Homeshield Cementmix Plus.	(h) Berger Weathercoat Kool & Seal.
(d) Berger Homeshield Advance Latex Plus/Latex Plus.	(i) Berger Weathercoat Roofguard.
(e) Berger Homeshield Latex Shield 2K.	(k) Berger Homeshield Tile Adhesive Plus.
	(l) Berger Homeshield Crackfill Paste.

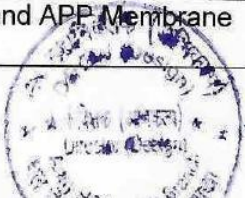
(b) **M/s Tiki Tar Danosa (India) Pvt Ltd:**

(i) Approved vide letter No 43285/CMPT/657/ Des-2 dated 22 May 2023 and approval is valid upto 16 Feb 2026 :-

<u>App Membrane</u>
(a) HYDROSTOP Waterproofing Membrane.

(c) **M/s Torchtar Membranes & Bitumen Product Pvt Ltd**, approved vide letter No 43285/CMPT/656/Des-2 dated 27 Apr 2023 and approval is valid upto as per products :-

(i) Torchtar Brand APP Membrane	-	approval valid up to 20 Jan 2026
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(d) **M/s Pidilite Industries Ltd**, approved vide letter No 43285/CMPT/663/Des-2 dated 26 Sep 2023 and approval is valid upto 25 Sep 2025:-

<u>Epoxy/ Polyurethane Industrial Flooring</u>	
(a) Dr Cipy Cipoxy Range	(g) Dr Cipy Deckfloor Range
(b) Dr Cipy Floorkote Range	(h) Dr Cipy Duraseal Range
(c) Dr Cipy Cipothane Range	(j) Dr Cipy Floortop Range
(d) Dr Cipy Floorcrete Range	(k) Dr Cipy Stathgaurd Range
(e) Dr Cipy Walcote Range	(l) Dr Cipy Cerazzo Range
(f) Dr Cipy Duracrete Range	(m) Dr Cipy Aquoxy Range
	(n) Dr Cipy Cipocem Range

(e) **M/s Bostik India Pvt Ltd**, approved vide letter No 43285/CMPT/655/Des-2 dated 28 Mar 2023 and 43285/CMPT/658/Des-2 dated 14 Jun 2023 approval is valid upto 27 Jan 2026 :-

<u>Construction Chemicals/ Materials</u>	<u>Reinforcement/Concrete Protective Coating/Systems</u>
(a) Bostik LW	(a) Epoxy Coat UW (Block E550 Epoxycote UW)
(b) Bostik Two in One	(b) Procoat PU
<u>Tile Adhesive</u>	(c) Bostik CTE
(a) Fix All	(d) Magic Repellent SB (Block X530 Hydro Repel)
(b) Super Fix All	(e) Magic Repellent WB
(c) Tile Grout	<u>Epoxy/ Polyurethane Flooring</u>
(d) Epoxy Tile Grout	(a) Bostik Ultralevel ESL 1000
<u>Repair & Rehabilitation / Bonding Agents / Grouts</u>	(b) Bostik Ultralevel ESL 2000
(a) Bostik EP Bond	(c) Bostik Ultralevel EUL 2000
(b) Boscocem 475	(d) Bostik ESM
(c) Bostik Plug Leak (Block C920 Power Plug)	<u>Waterproofing Chemicals / Materials</u>
(d) Bostik Patch Fix MC	(a) Boscocem Slurry (Block C530 Boscocem Slurry)
	(b) Bostik K11 Slurry
(e) Bostik Patch Fix Concrete	(c) Bosconcrete
(f) Bostik LVEP	(d) Moisture Seal
(g) Bostik Grout Admix	(e) Bostik CWP (Block C350 Bostik CWP)
(h) Bostik ERM	(f) Hydroment 476 (Block A350 Powermix)
(j) Bostik Anchor Grout	(g) Boscolastic (Block C750 Boscolastic)
(k) Bostik Flow fill Grout GP	<u>Membrane & Liquid Membrane / Coatings</u>
<u>Joint Sealants</u>	(a) Boscoseal PU (Block P530 Boscoseal PU-D)
(a) Bostik Seal N Flex 2K	(b) Elasocoat (Block A550 Boscoseal RC2)
(b) Bostik Seal N Flex 1 Plus P 590	
(c) Bostik Seal N Flex Premium P 795	
<u>Floor Hardner</u>	
(a) Bostik Floor Hardner	

(f) **M/s Sika India Pvt Ltd**, approved vide letter No 43285/CMPT/668/Des-2 dated 29 Jan 2024 and approval is valid upto 28 Jan 2027 :-

<u>Joint Sealants.</u>	<u>Waterproofing</u>
(a) Sikasil 728NS/SL	(a) Sikaplan WP 1100-15HL/20HL
(b) Sika Polysulphide	(b) Sikalastic 450h/450l
(c) Sikaflex Construction +	(c) Sika Cemflex
(d) Sikaflex PRO-3	(d) Sika Latex Power & Sika Latex Super
(e) Sikadur Combiflex SG	(e) Sika 101h
(f) Sikaflex 11 FC	(f) Sika Top 107 Seal IN
(g) Sikaflex Pro 3 SL	(g) Sika Top 109 Seal IN
(h) Sikaflex 402 Airport	(h) Sika 2
(j) Sika Emseal Joint Systems	(i) Sika 4a
(k) SikaSeal 106 Construction	(k) Sika Swell P Profile
(l) Sikaflex 118 Extreme Grab	(l) Sika Fuko Smart

(m) Sikaflex 406 KC	(m) Sika Injection 101 IN
(n) SikaHyflex 160 Construction	(n) Sika Waterbar h
Refurbishment	(o) Sikalastic 830N
(a) Sikawrap glass Fibre.	(p) Sikalastic 842BG
(b) Sikawrap Carbon Fibre	(q) Sikalastic 618 MTC
(c) Sika Anchofix 2+ Tropical	(r) Sika Shield P24 PE IN-3mm/P24 MG IN-3mm/P24 PE IN – 4mm/P24 MG IN-4mm
(d) Sikadur 31 IN	(s) Sikaplan 12G/15G
(e) Sikadur 32 IN	(t) SikaProof 808/A+12/T10
(f) Sikadur 32 LP IN	(u) Sika Swell A/S2
(g) Sikadur 41 IN	(v) Sika WP Shield 103F/102F
(h) Sikadur 43 IN	(w) Sika Fuko VT1/VT2/Eco1
(j) Sika FerroGard 903	(x) Sarnafil G 410L/G476/S327L
(k) Sika Ferrogard 950 IN	(y) Sikalastic 590 IN
(l) Sikagard 550 W IN	(z) Sika Shield P35 PE IN-3mm/P35 MG IN-3mm/ P35 PE IN-4mm/P35 MG IN-4mm/Sikaproof 312/315/612
(m) Sikacrete 145 IN	(aa) Sika Shield P24 S IN -3mm/P24 S IN-4mm
(n) Sikacrete 155 UW IN	(ab) Sikalastic 851/851R/901
(o) Sikacrete 145 IN/ 165 IN	(ac) Sika Injection 202IN/201CE/306/307/310
(p) Sika Carbo Dur	(ad) Sika MultiSeal
(q) Sikadur 12 Pronto	(ae) SikaCim Pink
(r) Sika Top 77	(af) Sika Raintite I
(s) Sika Top 122.	(ag) Sika FlexiCoat 1K
(t) Sika Top 122HS.	(ah) Sikalastic 520 Cool Coat Fibres IN/ Sikalastic 10 Primer W
(u) Sika Top Armatec 108	(aj) Sika Cemcrete
(v) Sika Top Armatec 110 Epo Ce	(ak) Sika Control WT 200 P IN
(w) Sikagard 551S Elastic Primer	(al) SikaSeal Tape F
(x) Sikagard PU UR/Sikagard PU UR (W)	(am) SikaShield W159 ED 1,5mm
(y) Sika MonoTop 122 F/R	(an) Sikalastic 853 RAP
(z) SikaGrout Precast 40	(ao) Sika Monotop 151 Migrating
(aa) Sikagard 5310 Coal Tar	(ap) Sika Shield P22 PE IN-3mm
(ab) Sikagard 552 W IN	Grout
(ac) Sikagard 625 Clearcoat	(a) Sika Grout 104 IN
(ad) Sika Anchorfix 3030	(b) Sika Grout 214 IN
(ae) Sikawrap FX 50	(c) Intraplast EP.
(af) Sika carbodur BC Rod	(d) Sikacem 130 Intraplast
(ag) Sika Carbodur NSM	(e) Sikacem 135 Intraplast
(ah) Sika Monotop 412N	(f) Sikadur 42 IN
(aj) Sikagard XT	(g) Sikadur 42 HES IN
(ak) Sika Rustoff 100	(h) Sikadur 52
Flooring	(j) Sikadur 53 UF
(a) Sika Chapdur IN	(k) Rokkon 1
(b) Sikafloor3 Quartztop IN	(l) RokkonR
(c) Sikafloor 20N Purcem	(m) Sikadur 42 MP (IN)
(d) Sikafloor 41 Purcem	Grout Contd...
(e) Sikafloor 49 Purcem	(n) Sikadur 55 LP IN
Flooring contd...	(o) Sikagrout 60 RR
(f) Sikafloor 31 Purcem IN	(p) Sikagrout 295 IN
(g) Sikafloor 81 EpoCem	Admixture
(h) Sikafloor 82 EpoCem	(a) Sika AER
(j) Sikafloor 105	(b) Sika FerroGard-901(IN)
(k) Sikafloor 161 HC	(c) Sika Rapid 1
(l) Sikafloor 220 W Conductive	(d) Sika Antifreeze
(m) Sikafloor 262 AS N	(e) Sikament
(n) Sikafloor 264 HC N	(f) Sikament 4003NS
(o) Sikafloor 390 N	(g) Sikament 4211 PQ
(p) Sikafloor 381 ECF	(h) Sikament NN
(q) Sikafloor 7530	(j) Sikament 1016NS
(r) Sikafloor Curehard 24	(k) Sikament 2002NS
(s) Sikafloor Proseal 22	(l) Sika ViscoCrete
(t) Sikagard 63	(m) SikaPlast
(u) Sikagard 63 N	(n) Sikaplast 4201NS
(v) Sikagard 67	(o) Sikaplast 3001NS
(w) Sika Ceram	(p) Sika Viscocrete 20 HE.
(x) Sika Tilofix	
(y) Sika Wall Décor	

(z) Sikafloor 2350 ESD	(q) Sika ViscoFlow
(aa) Sikafloor 315	(r) Sika Plastiment
(ab) Sikafloor 325	(s) Sika Plastocrete
(ac) Sikafloor 359 N	(t) Sika Singunit
(ad) Sikafloor 44 Purcem EDF	(u) Singunit L54AF
(ae) Sikafloor 326	(v) Sika Singunit Powder K
(af) Sika Extender T	(w) Sika Antisol
(ag) Sikafloor Joint S/EXA/XS/X	(x) Antisol EWP.
(ah)Sikafloor Leitset (Earthing Kit)	(aa) Sigunit Powder (K)
(aj) Sikafloor 290 Primer	(ab) Sika Separol
(ak) Sikafloor 291	(ac) SikaRapid C100
(al) Sikagard 720 Epocem IN	(ad) Sikament 3070NS/2009PQ
(am) Sikafloor Multidur System	(ae) Sika Viscocrete 4107PQ
(an) Sika Colourflake IN	(af) Sikaplast 3144PQ
(ao) Sika Block Joining Mortar	(ag) Sika Control-WT 200 P(IN)
(ap) Sika Tilogrout/Epoxy Tilogrout	
(aq) Sika Ceram Grey/155/212/255 (White & Grey)/288 (White & Grey)	

(g) **M/s Thermax Ltd**: Approved vide letter No 43285/CMPT/671/Des-2 dated 24 May 2024 and approval is valid upto 23 May 2025:-

Admixtures. (i) Tecnos 94 (ii) Tecnos 95 (iii) Tecnos RP (iv) Neutrol 100 (v) Neutrol 200 (vi) Neutrol 500 (vii) Accelerator NT (viii) Warep 1000/L (ix) Warep 1000/P (x) MuCis AD 28 Tecnos Joint Sealant (i) MaxFlex PS (ii) MaxFlex PU1 (iii) MaxFlex PSPR (iv) MaxFlex PUPR (v) MaxFlex ACS (vi) MaxFlex PS 500	FLOOR HARDENER (i) TecFloor HT (ii) TecFloor HTS Epoxy/Polyurethane Industrial Flooring (i) TecFloor EC 500 (ii) TecFloor ET 1000/2000/3000/ 4000 (iii) TecFloor UL (iv) TecFloor PU CEM (v) TecFloor EC 100 (vi) TecFloor PR (vii) TecFloor ESD Curing Compound (i) Maxcure CC 75 (ii) Maxcure CC 80 (iii) Maxcure CC 90 (iv) Maxcure RR (v) Maxcure MRA 102
Water Proofing Chemicals/Materials (i) Elastplast Rol 10 MuCis (ii) Anticorr 280 II MuCis (iii) Tecnoseal V1 (iv) Maxshield PF 900 (v) CRYs TECO PWD (vi) Maxshield Roofkot (vii) Maxshield Wallkot (viii) Maxshield T15 (ix) Maxshield P 600 (x) Maxshield Primer (xi) MuCis Mia 200 (xii) Maxshield PF 100 PW Reinforcement/Concrete Protective Coatings (i) T-Guard AC (ii) T-Guard WBP (iii) T-Guard EC 200 (iv) T-Guard ENC (v) T-Guard CTE 45 (vi) T-Guard CTE 65 (vii) T-Guard BC (viii) T-Guard BCP	Repair & Rehabilitation, Bonding Agents & Grouts Contd/.. (vii) Maxtreat Carbon Rod (viii) Maxtreat Laminate (ix) Maxtreat EHS (x) Seismocrete UHP (xi) Rapido fix (xii) Flash Tixo (xiii) Maxtreat EFC (xiv) Maxtreat EPG (xv) Maxtreat Primer (xvi) Maxtreat Saturant (xvii) Maxtreat Glue (xviii) Maxtreat LM (xix) TM-Bond AR (xx) TM-Bond EP (xxi) TM-Bond SG (xxii) TM-Bond SBR (xxiii) Maxtite MP (xxiv) Maxtite MG (xxv) Maxtite Grout EP (xxvi) Maxtite Grout (xxvii) Maxtite Block Fix



Repair & Rehabilitation, Bonding Agents & Grouts	(xxviii) Maxtite LG
(i) BS 66 MuCis	(xxix) MaxGrout 100
(ii) BS 5F	(xxx) MaxGrout MMA
(iii) Maxtreat Patchup	(xxxi) MaxGrout E 10
(iv) MuCis Protezione Ferro Mono	(xxxii) MaxGrout PAF
(v) Maxtreat Fibrenet C	(xxxiii) MaxGrout 45
(vi) Maxtreat Fibrenet G	(xxxiv) MaxGrout 60
	(xxxv) MaxGrout LE

(h) **M/s Hindcon Chemicals Limited**, approved vide letter No 43285/CMPT/674/Des-2 dated 03 Jun 2024 and approval is valid upto 02 Jun 2027:-

(a) Waterproofing Compounds (i) Hind Proof No – 1 (ii) Hind Proof No – 2 (iii) Hind Proof No – 3 (iv) Hind Plug – S (v) Hind Crystal Seal	(e) Grouts & Repairing Mortar (i) Hind Plast EGA (ii) Hind Grout – GP (iii) Hind Grout – HS (iv) Hind HS MC (v) Hind Tile Grout
(b) Admixture (i) Hind Plast – IWA (ii) Hind Plast Super (iii) Hind Plast Super SCA (iv) Hind Plast Super – A	(f) Floor Topping/Hardening (i) Hind Emetop – M (ii) Hind Emetop – NM (iii) Hind Coat Prime (iv) Hind Coat – FC (v) Hind Selfoor 1000 (vi) Hind FLC-EUV
(c) Concreting Aids (i) Hind Mould Release OB (ii) Hind Mould Release WT (iii) Hind Cure – AL (iv) Hind Cure – WP (v) Hind Bond EBA (vi) Hind Silica M (vii) Hind Fibre Glass (viii) Hind PP Fibre	(g) Sealants (i) Hind Sealant – E (ii) Hind Sealant – PS (iii) Hind Sealant – PPU (iv) Hind Sealant – BP (v) Hind Silicone Sealant
(d) Protective and Waterproofing Coatings (i) Hind Crete Plus – WPM (ii) Hind Crete Plus – WPM (E) (iii) Hind Styrene – BR (iv) Hind Anti Rust (v) Hind Anti Rust (EZ) (vi) Hind Hydraproof Ceramic (vii) Hind Hydroproof (APP) (viii) Hind Manine Cote	(h) Epoxy Grout Mortar (i) Hind ERS – 21 (LV) (ii) Hind ERS – 2115, 2118/2120 (iii) Hind Anchorlok (j) Tile Adhesive (i) Hind Fix – TA

(j) **M/s Fosroc Chemicals**, approved vide letter No 43285/CMPT/677/Des-2 dated 26 Nov 2024 and approval is valid upto 25 Nov 2025 :-

Admixtures (a) Auramix 400 (b) Auramix 300 (c) Conplast SP430	Repair & Rehabilitation / Bonding Agents / Grouts
Curing Compounds (a) Concure WB (b) Concure LP90 (c) Concure 1315	(a) Renderoc S2 (b) Nitomortar S (c) Renderoc RG (d) Renderoc HS Xtra
Joint Sealant (a) Colpor 200 PF - Cold applied, high performance, pitch free, polyurethane pavement joint sealant	(e) Nitowrap CWS (Nitowrap EP (CF)) (f) Nitowrap GW (Nitowrap EP (GF)) (g) Nitowrap CPS (Nitowrap (CFP)) (h) Nitobond EP (i) Nitobond AR (k) Nitobond SBR

(b) Expoband One Reinforcement / Concrete Protective Coatings / Systems (a) Nitozinc Primer (b) Dekguard S (c) Nitocote EP410 (d) Nitocote EP405 (e) Nitocote UR512 (f) Nitocote BCS300 (g) Nitocote ET140 (h) Nitocote ET550 (j) Nitocote SN522 Reinforcement / Concrete Protective Coatings / Systems Contd/... Membrane & Liquid Membrane / Coatings (a) Proofex Engage (b) Proofex PGP (c) Proofex ORG (d) Proofex OGP (e) Proofex Self Adhesive PR20 (f) Proofex Self Adhesive Geotext (g) Proofex Self Adhesive Antiroot (h) Fosroc Polyurea WPE (j) Brushbond (k) Brushbond RFX (l) Nitocote CM210 (m) Brushbond Roof Guard (n) Brushbond TI Flexicoat (o) Nitoproof 600 std.	(l) Nitofill EPLV (m) Conbextra EP10 (n) Conbextra GP2 (o) Conbextra GP3, (p) Lokfix Epoxy / Polyurethane Industrial Flooring (a) Nitoflor SL 2000 (b) Nitoflor FC 150 (c) Nitoflor TF 5000 (d) Nitoflor EU5 (e) Nitoflor SL Conductive (f) Nitoflor SL Dissipative (g) Trafficguard UR150 (h) Nitoflor SL 3000UT Waterproofing Chemicals / Materials (a) Conplast (b) Supercas SW 05 (Supercast SW20) (c) Supercast PVC Concrete Surface Improvement (a) Reebol Misc Construction Chemicals (a) Cebex 100 (b) Nitoflor Hardtop
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(k) **M/s Shivam Tar Products**, approved vide letter No 43285/CMPT/678/Des-2 dated 29 Nov 2024 and approval is valid upto 28 Nov 2025 :-

App Membrane
(a) Shivam brand Superior Multi Polyester felt and Multi Polyplas

PEB/LGSF CATEGORY

(a) **PEB**

Sl. No	Name of firm	Product Description	Approval letter No and date	Valid upto
i.	M/s EPACK Polymers (P) Limited	Designing, Manufacturing, Supply and Execution of Steel Structures i.e. (PEB)	43285/CMPT/680/Des-2 dt 24 Dec 2024.	23 Dec 2025
ii.	M/s Smith Structures India Pvt Ltd	Designing, Manufacturing, Supply and Execution of Steel Structures i.e. (PEB)	43285/CMPT/652/Des-2 dated 16 Feb 2023	15 Feb 2025
iii.	M/s BNAL Prefabs Pvt Ltd	Designing, Manufacturing, Supply and Execution of Steel Structures i.e. (PEB)	43285/CMPT/667/Des-2 dt 15 Jan 2024.	14 Jan 2027
iv.	M/s Clading Projects Pvt Ltd	Designing, Manufacturing, Supply and Execution of Steel Structures i.e. (PEB)	43285/CMPT/669/Des-2 dt 12 Feb 2024.	11 Feb 2026
v.	M/s Moonwalk Infraprojects Pvt Ltd	Designing, Manufacturing, Supply and Execution of Steel Structures i.e. (PEB)	43285/CMPT/676/Des-2 dt 07 Nov 2024.	06 Nov 2026



(b) LGSF

Sl. No	Name of firm	Product Description	Approval letter No and date	Valid upto
i	M/s Nipani Infra & Industries Pvt Ltd	Light Gauge Steel Frame (LGSF)	43285/CMPT/673/Des-2 dated 03 Jun 2024	02 Jun 2025

➤ As per policy No 05/2024, further renewal/approval for cranes shall be accorded at CEs Comd/ADGs level.

Note:-

1. Approval letters issued to various firms shall be referred for further details of products approved.



B/R Items make

SI No.	Item Name	Makes
1.	2.	3.
1.	Non skid/Glazed Ceramic and Vitrified tiles	Kajaria Johnson Orient Bell Ltd (Brand –Orient Bell) Somany Ceramics Ltd (Brand: Somany) NITCO
2.	Wooden flooring	HIL Ltd Greenpanel Industries Ltd Armstrong Action Tesa
3.	Exterior Paints	Asian Paints Ltd Berger Paints India Ltd Kansai Nerolac Paints Ltd
4.	Interior Paint	Asian Paints Ltd Berger Paints India Ltd Kansai Nerolac Paints Ltd
5.	Synthetic enamel /Oil Paint	Asian Paints Ltd (Apcolite Premium Gloss) Berger Paints India Ltd (Luxol Hi-Gloss) Kansai Nerolac Paints Ltd (Synthetic Hi-gloss Enamel)
6.	Cement base paint	Super Snowcem Duracem Plus Acro Paints Ltd
7.	High Build Textured & Wall finishes	Asian Paints Ltd Berger Paints India Ltd Kansai Nerolac Paints Ltd
8.	UPVC Shutters for doors, windows , ventilators & Frames	Fenesta Koemmerling Aluplast Prominace NCL Veka Ltd (Brand : NCL Veka)
9.	Factory made Wooden flush door Panel/Gauge shutters for doors & widows	Rama Woods Crafts Satna A-1 Teak Products Pvt Ltd Greenply Industries Ltd Century Plyboard (India) Ltd (Brand-Century Doors) Jain wood Industries
10.	Pre-painted Steel Windows, Ventilators & Door Frames	Tata Pravesh NCL Buildtek Limited Elixir Met Form Pvt Ltd Ashish Industries
11.	Metal False Ceiling	PR Ceiling Products Manraj Ceiling Products Pvt Ltd (Brand: Royal Kraft) Armstrong
12.	Gypsum Board false ceiling/Gypsum Plaster	Everest Industries Ltd PR Ceiling Products Ltd Gyproc Armstrong USG Boral Yamuna Interiors Pvt Ltd (Brand : Black cobra) JK Cements Ltd

SI No.	Item Name	Makes
1.	2.	3.
13.	Non-Asbestos Fibre Cement Board (Confirming to IS-14862-2000) False ceiling	Everest Industries Ltd Calsi Prima Duragreen
14.	Glass reinforced Gypsum (GRG) False ceiling	Gyproc Armstrong USG Boral
15.	Plain Particle board/ Particle Board ceiling, Pre-laminated Particle board	Kitply Century Ply Greenply
16.	Aluminium composite Panels (ACP)	Aludecor Alstrong Alucobond Alstone
17.	Laminates/Veneers	Greenlam Laminates Century Laminates Kitply
18.	Plywood for General purpose	Century Ply Greenply Kitply
19.	CP Bath fittings and accessories	M/s Blue star sanitary industries pvt ltd (Silver shine). Jaquar & Co Pvt Ltd (Brand: Jaquar) Kajaria Bathware Pvt Ltd Kohler
20.	Vitreous China Sanitary ware WHB/WC/Urinal	Jaquar& Co Pvt Ltd (Brand : Jaquar) Kajaria Bathware Pvt Ltd Hindware
21.	Metropole & concealed flushing cistern	Jaquar Grohe Hindware Kohler
22.	Stainless Steel Sinks/ Plate rack	M/s Blue star sanitary industries pvt ltd (Silver shine). Johnson Nirali Hindware
23.	CPVC pipes and fittings	Astral Ltd (Brand : CPVC Pro) Ashirvad Supreme Savour Fair Manufacturing Co Pvt Ltd (Brand- SFMC)
24.	UPVC pipes and fittings	Astral Ltd (Brand : Aquasafe & Aquarius) Ashirvad Supreme Savour Fair Manufacturing Co Pvt Ltd (Brand- SFMC)
25.	HDPE pipe /MDPE Pipe/ PVC pipes and fittings	Finolex Astral Ltd (Brand : HDPE Pro) RC Plasto Tanks & Pipes Pvt Ltd
26.	PPR pipes and fittings	Prince Finolex Supreme Savour Fair Manufacturing Co Pvt Ltd (Brand- SFMC)

SI No.	Item Name	Makes
1.	2.	3.
27.	ERW MS pipe	Surya Roshini Ltd Tata Jindal
28.	PVC Soil, Waste , Rainwater (SWR) pipes and fittings [Confirming to IS-13592 for pipes & IS-14735 for fittings]	Astral Ltd (Brand : Drain Master) HIL Ltd Supreme
	PVC UG drainage pipes Confirming to IS-16098 (Part-I)	Astral Ltd (Brand : Foam Core) Prince Finolex
30.	DWC UG drainage pipes Confirming to IS-16098 (Part-II)	Astral Ltd (Brand : D-rex) Prince Finolex
31.	DI pipe and fittings	TATA Electro Steel Jindal Saw Ltd Electrotherm India Ltd (Brand-Electrotherm)
32.	GI Pipe and fittings	TATA Jindal Hisar Surya Roshini Ltd
33.	Ready Mix concrete	Ultra Tech ACC JK Lashmi Cement Lafarge Ramco
34.	AAC Block	Ultra Tech ACC Birla Aerocon Ascolite Siporex
35.	AAC Block Jointing Mortar	Birla Aerocon Smartfix Jointing Mortar ACC Concrete + Ultratech Fixo Block Dilite Fix thin layer Jointing Polymer Mortar of M/s Petralite Industries
36.	BUILDERS HARDWARE	Novapan GLACIAR Brands Classic New Delhi M/S Shri Balaji Industries Sarswati Round Road, Ajamabad Mathura (UP). DP Garg &Co. Mepro M/S Elte Enterprises C/6 Shalimar Hardware 133, Jarg Mahal, Dhobitalao, Bombay M/S Mohan Metal Ind.
37.	Mortice lock	Godrej Harrison Links Lock
38.	Drapery Rod	Vista Levolor DECO Windows Dorset India LUXAFLEX
39.	Venetian Blinds	Vista Levolor Johnson Blinds Classic Blind
40.	Barbed wire/Chain link/	A-1 Fence Product Company Pvt Ltd

	Concertina coil/Razor Wire	M/s Shiva Engineering Company Secure Fencing, Delhi Eco Netting Nagpur OM Wires and Wire Product, Kolkatta Mysore Wire netting Co Pvt Ltd, Bangalore Asian Fence Wire Product, Hyderabad
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SI No.	Item Name	Makes
1.	2.	3.
41.	Plain/ Corrugated Galvalume sheet	M/S Ispat Industries Ltd M/S Kamdhenu Ltd TATA Blue Scope JSW COLOURON+
42.	Non-Asbestos Plain/ Corrugated Sheets	M/s Ramco AC Sheets Charminar Visaka RBL
43.	Adhasive	Fevicol Pidilite Vemicol Araldite Anabond
44.	Wall Care Putty	Birla white wall putty JK wall putty Asian wall putty Berger Dulux Nerolac wall putty Shalimar
45.	Sheet Glass/ Frosted Glass	Modi Guard Saint gobain AIS Atul Glass Industries Gold Fish Trupti
46.	Oil Putty	Shalimar Hardware Atul Dyes and Chemicals Berger
47.	Brass Float Valve	Leader Zoloto Upadhyay
48.	PTMT Float Valve	Prayag Polymers Polytuf Vectus
49.	HDPE Water Storage Tanks	Sintex Polycon Supreme
50.	Hydraulic Door closer	Godrej Hafele Harrison
51.	Floor Door Closer	Godrej Hafele Harrison
52.	Transparent Polycarbonate Roofing Sheets	Everest Saraswati Plastotech India Pvt Ltd Palram Industries Ltd
53.	Tile adhesive	JK Lakshmi Cement Tile Adhesive Myk Laticrete Tile Adhesive BASF India Ltd tile adhesive Fosroc India tile adhesive
54.	PET Panel/ Acoustic Panel / PET Ceiling / Accoustic Ceiling	Times Fiberfill Pvt Ltd Hunter Douglas India Woven Image Accoustic Panel
55.	Road Furniture	Dark Eye Green Eye 3M

SI No.	Item Name	Makes
1.	2.	3.
56.	Branded Furniture	Godrej Durian Euroacoustic Products Ltd
57.	Modular Kitchen	Godrej Interio Kohler Hettachi India Pvt Ltd Sleek Kitchen
58.	Single Component UV Resistance PU coating for roof & wall	Smart Care from Asian Paints Berger Dulux
59.	PU MAGNUM	Smart Care from Asian Paints Dr Fixit SIKKA
60.	SEWER BRICKS	M/S Ritu Bricks Pvt Ltd, Bhilwara Rajasthan, M/S Red Ceramics, Limited, Kolkata. M/S Prayag Bricks, Varanasi.
61.	SLUICE VALVE/ REFLUX/NRV/AIR RELEASE/FOOT VALVE	Kirloskar Leader BIR Kartar Venus Kejriwal Zoloto AUDCO VC Upadhyay L&T
62.	STOP VALVES/ GATE VALVES	Zoloto Leader Audoc Venus Kartar BIR
63.	MS/ERW pipe	TATA Jindal SAIL
64.	Interlocking Tiles / Exterior Tiles / Paver Block	Unistone NITCO Ultra Johnson.
65.	PVC Tiles/ Sheet	Primer polyfilm Ltd. Wonder Floor Armstrong
66.	Glass Mosaic tiles	Jhonson Italia NITCO
67.	Terrazzo tiles / PPC Tiles/ PPC Checkered tiles	NITCO Eurocon Duracrete

E/M Items make

SI No.	Item Name	Makes
1.	2.	3.
1.	Lifts/Elevators	Otis Elevator company India Ltd Kone India Schindler India Pvt Ltd Hitachi Lifts India Pvt. Ltd Mitshubishi Thyssen Krupp
2.	Engine	Kirloskar Cummins Greeves Cotton Caterpillar Eicher Engines
3.	Alternator	Kirloskar Stamford Crompton Jyoti Bharat Bijlee
4.	DG Set assembled with sound proof canopy	Kirloskar Cummins Greeves Cotton Sudhir Sterling
5.	Single/Double Girder EOT Cranes, Goliath Cranes, Jib Cranes	Safex Energy Pvt. Ltd Pioneer Cranes & Elevators Pvt Ltd Hercules Hoists Ltd Dinesh Crane
6.	Compact Sub Station	Seimens Schneider Crompton Greaves ABB Indian Transformers & Electricals Pvt Ltd. (Brand- ITE Gurgaon) Voltamp Electricals pvt ltd
7.	Transformer 11/0.433 KV upto 500 KVA copper wound	Crompton Schneider Indian transformers & electricals Pvt Ltd [Brand : ITE Gurgaon] Voltamp Electricals pvt ltd
8.	Transformer stepdown 11/0.433 KV above 500 KVA copper wound	Crompton Schneider Indian transformers & electricals Pvt Ltd [Brand : ITE Gurgaon] Voltamp Electricals pvt ltd
9.	Transformer stepdown 33/11 KV upt 10 MVA & 33/0.433 KV copper wound	Crompton Schneider Indian transformers & electricals Pvt Ltd [Brand : ITE Gurgaon] Siemens
10.	HT Current & Potential Transformer	Schneider Crompton Greaves Siemens ABB
11.	Chiller for Central AC Plant	Daikin Carrier Trane Hitachi

SI No.	Item Name	Makes
1.	2.	3.
12.	Cooling Coil/AHU	Trane Blue Star Zeco System Air Carrier
13.	Cooling Tower	Paharpur Mihir Delta
14.	Expansion Valves/Thermostat/Humidistat	Danfoss Sporlon Indfoss Honeywell
15.	Package type Compressor/Condenser/Cooling coil	Bluestar Hitachi Daikin Carrier
16.	Split Type AC and Window Type AC	O General Mitsubishi Electric Hitachi Daikin Carrier
17.	VCB/SF6 Circuit breakers/ HT Switchgears panels upto 36 KV	Schneider ABB Siemens Crompton Greaves Larsen and Turbo
18.	HT Ring Main Units (RMU) upto 36 KV	Schneider ABB Siemens Crompton Greaves Larsen and Turbo
19.	APFC relay	L&T Schneider Ducati
20.	Power factor improvement capacitor	L&T MD XL Ultra Schneider Siemens ABB
21.	APFC panels (Fabricators)	C & S Electric Schneider Indo Asian Power Systems and Control Jalandhar Indian Transformers & Electricals Pvt Ltd. (Brand- ITE Gurgaon)
22.	HT XLPE Cable upto 33 KV as per IS	Havells India Ltd. Polycab Wires Pvt Ltd Gloster Cables Ltd Grandlay Electricals (India)
23.	Modular Switch/ Socket/Fan regulator/ Bell push & mounting accessories	Havells India Ltd (Brand : Carbtree) Anchor Electrical Pvt Ltd Legrand Schneider Zencelo
24.	Non- Modular Switch/ Socket/Fan regulator/ Lamp holder/ Ceiling rose/Bell push/Call bell (Polycarbonate body only)	Havells India Ltd (Brand : Havells Reo) Anchor Penta PC Legrand Schneider Zencelo

SI No.	Item Name	Makes
1.	2.	3.
25.	Ceiling Fans ISI marked & not less than 4 BEE star rating / Exhaust Fans/ Air circulators/ Wall Mounting Fans/Cabin fans/Fresh Air fans	Havells Bajaj Orient Usha Khaitan
26.	BLDC ceiling fan	Havells Bajaj Orient Atomberg Khaitan
27.	LED Lights & light Fittings for Indoor and Outdoor use	Philips General Electrics Osram Bajaj
28.	Solar Based Street Light fittings	Havells Osram Philips Bajaj Crompton
29.	POTENTIAL TRANSFORMER (PTs) AND CURRENT TRANSFORMER (CTs) VOLTAGE CLASS 33 KV & 11 KV	Crompton Greaves Kappa ABB Pragati
30.	ELECTRO MECHANICAL/ SOLID STATE MICRO PROCESSOR BASED RELAYS	ABB Siemens Schneider L&T C&S
31.	LT XLPE cable 1100V grade (as per IS 7098/1988 Part-I	Gloster Polycab KEI Finolex Grandlay Electricals (India)
32.	DIGITAL RELAY	L&T JVS ABB Ashida C&S CG
33.	Air insulator trunk bus bars	C&S Legrand Schneider L&T
34.	COLD/HEAT SHRINKAGE CABLE JOINTS 33KV/11KV GRADE & BELOW	Cabseal 3M Denson Reychem
35.	LT PANELS/ FEEDERPILLAR BOX	Universal Switchgear control Schneider Bentec (Brand :Benlo) L & T Indian Transformers & Electricals Pvt Ltd. (Brand- ITE Gurgaon)
36.	AIR CIRCUIT BREAKERS (ACBS)	L&T Siemens Crompton Greaves Legrand ABB Schneider

SI No.	Item Name	Makes
1.	2.	3.
37.	MOULDED CASE CIRCUIT BREAKERS (MCCBs), SFU	Schneider L&T Siemens Legrand
38.	CHANGE OVER SWITCHES	L&T Legrand C&G
39.	Distribution Board (SPN/TPN)	Schneider Legrand L&T GE
40.	MCCB/ MCB/MCB PLUG SOCKET/ELCB/ RCCB & MCB DBs WITH PLUG-SOCKET	ABB Legrand L&T Schneider
41.	ACSR CONDUCTOR	Jaipuria Brothers ALIND Apar Industries Oswal Cables
42.	SOLAR WATER HEATER	Supreme V-Guard Havells Recold
43.	GANG OPERATED AIR BREAK ISOLATORS & DO FUSES FOR 11 KA.33KV SYSTEM	Jaipuria Brothers Rashtriya PACTIL BHEL
44.	INSULATORS HT/LT	Jaipuria Brothers Jayshree Insulators Aditya Birla Insulators Allied Ceramics
45.	LIGHTENING ARRESTOR/ SURGE PROTECTION SYSTEM	Jaipuria Brothers Electrolites CG Oblum Schneider PACTIL
46.	STEEL TUBULAR POLES	Calcutta Poles Jindal poles Utkarsh National Tubing Co.
47.	MULTI STRANDED FLAT CABLES/ CONTROL CABLES/ SUBMERSIBLE CABLES	Havells Gloster Polycab KEI Grandlay Electricals (India)
48.	TIMERS (TIMES SWITCHES)	L&T Havells Schneider Legrand

SI No.	Item Name	Makes
1.	2.	3.
49.	ROTARY/ SELECTOR SWITCHES	C&S ABB Legrand BCH Siemens Altos GE L&T
50.	AUTOMATIC/ ELECTRONIC VOLTAGE STABILIZERS	AE ITE Gurgaon Aplab Microtech V-Guard Zenith Volina
51.	ELECTRICAL INSULATION RUBBER MAT	Jyoti Jaipuria Brothers Duratuf (ISI marked)
52.	PCC POLES/RCC POLES	Concrete Udyog Jhansi Mohan Concrete Udyog Lucknow Kusum Industries (MP) (MP SEB) SJ Enterprises (PVVNL approved)
53.	VOLTMETER/AMETER MF METER	Havells L&T AE BCH Schneider
54.	UPS (INDUSTRIAL TYPE)	Hitachi ABB Siemens Schneider
55.	HIGH MAST LIGHT SYSTEM	Bajaj Wipro Philips CG
56.	PVC insulated copper conductor multistranded cable/ wires for house wiring	Havells Polycab Grandlay KEI
57.	Conduit Steel/ERW Steel	Kalinga Jindal AKG Asian Bharat Steel tube Finolex MK India TATA Precision Steel Kraft
58.	Conduit Rigid PVC and Accessories	Jindal AKG Kalinga Premium Finolex Ploycab Asian Presto Plast Plaza National Harsh

59.	Laminated Sheet	Anchor Hylam National
60.	FR PVC Casing Capping	Prestoplast National Plaza AKG Paramount
61.	DOL/STAR Delta starter	BCH Standard Siemens L&T
62.	Heating Elements	Daspass Airex electrical Anupam
63.	AC Contractors 6-1200A	BCH ABB Siemens C&S L&T GE
64.	Smart energy meter	Siemens L&T Secure Schneider Elmeasure Bentec Brand : Benlo HPL Sinhala Udyog Pvt Ltd
65.	UPS < 5KVA	V Guard Sukam Microtek Luminous Amaron
66.	Static Frequency Convertor	Toshiba Siemens ABB Mitsubishi
67.	CENTRIFUGAL PUMP SET	Kirloskar Crompton Grundfos KSB
68.	SUBMERSIBLE PUMP	Kirloskar KSB Grundfos Crompton
69.	VERTICAL TURBINE PUMPS	Jyoti KSB Orthington Kirloskar Grundfos Crompton
70.	HORIZONTAL PUMPS	Kirloskar KSB Jyoti Grundfos

SI No.	Item Name	Makes
1.	2.	3.
71.	UPVC/ HDPE CONDUIT	Finolex Supreme Industries Durlon Reliance Astral Triupati Prince Vectus Neelkamal
72.	AIR COMPRESSOR	BAC Ingersoll ELGC equipments ELGI Indo Air
73.	BATTERY	Exide Okaya Amaron Luminous AMCO
74.	FIRE PUMP/ JOCKEY PUMP	Kirloskar KSB Grundfos CRI
75.	WATER HEATER	Racold CG Havells Jaguar Usha
76.	WATER LEVEL INDICATOR (MECHANICAL)	RMCO Kabir Flowtech DB Instruments
77.	Air Diffuser/ Grill	Carrier MHP MAPRO ATE
78.	Galvanized Steel sheet for ducting	TATA SAIL Jindal
79.	Thermostat, Humidistat	Danfoss Sporion Indfoss Honeywell
80.	Air Purge/ Air vent valve	Anergy Rapid control Oventrop
81.	Pressure Gauge	H Guru Scientific Zenith Fiebig
82.	Temperature Gauge	H Guru Scientific Precision
83.	Motorised Butterfly Valve	Belimo Siemens Honeywell
84.	3 Way flow control valve	Belimo Honeywell, Anergy Rapid Control

SI No.	Item Name	Makes
1.	2.	3.
85.	Flow switch	Danfoss Anergy Honeywell
86.	HP/LP control	Danfoss Indfoss Johnson
87.	Non return valve	Kirloskar Leader Zoloto Audco Upadhyay
88.	Pot/Y Strainer	Sant Rapid control Emerold, Leader
89.	Balancing Valve	Leader Sant Rapid control
90.	Butterfly/ Ball valve	Kirloskar Leader Zoloto, Audco Upadhyay, IVC
91.	Nitrite Rubber Insulation	BASF (India) Ltd Beardsell Armacell Lloyd
92.	Expanded Polystyrene Insulation	Styrene BASF (India) Ltd Armacell, Lloyd
93.	Pump Monoblock/ Centrifugal/ Submersible	Kirloskar CG, Jyoti KSB
94.	Hot water Generator	Thermax Rapid Coll Zenith
95.	PVC Insulated cable 1100 V grade ISI marked FRLS/FRLSH internal wiring cables with copper conductor	Havells Polycab Gloster KEI Grandlay Electricals (India)
96.	PVC insulated Cables ISI marked upto 1100 volts copper/Aluminium conductor sheathed/ unsheathed as per IS 694	Havells Polycab Gloster KEI Grandlay Electricals (India)
97.	PVC Conduit	Prince Plaza AKG M/s Richa Cables Pvt Ltd PrestoPlast
98.	Smart Electric Meters	Seimens L&T Secure HPL Elmeasure India Pvt Ltd Sinhali Udyog Pvt Ltd Schneider Electric Pvt Ltd

Appendix ‘B’

Material Testing & Testing Charges

Notes

1. Levels of testing shown in Legend as A, B & C, are defined as under: -

1.1 Level ‘A’

- (a) Level ‘A’, Site lab shall be established by the contractor.
- (b) “Site Lab” means site lab established by contractor at the work site for such tests. This lab shall house all the facilities including T&P, machinery, equipment, manpower etc required for conducting tests. This lab shall be operative for entire duration of the contract till its completion. Tests shall be carried out in the presence of Engineer-in-charge to be nominated by the GE. Random check of compliance of frequency of testing shall be done by the GE. “Setting up site laboratory is mandatory for all works Costing Rs. 1 crore (Rupees one crore) and above. The Contractor may it his option set up site lab for work Costing less than Rs. 1 Crore (Rupees one crore) also without any extra cost to Government.”The testing laboratory shall include the following minimum machinery and testing equipments:-

Srl No	Testing equipment
(a)	Concrete cube testing machine of minimum capacity 100 tons
(b)	Cube moulds : 15 cm x 15 cm x 15 cm – 24 Nos & 70.6 mm x 70.6 mm x 70.6 mm – 09 Nos
(c)	Slump cone, tamping rod
(d)	Vicat’s Apparatus
(e)	Slandered Sand
(f)	Moisture meter
(g)	Digital Balance (with battery backup) – 10 Kg to 0.001 gm accuracy
(h)	Digital balance – 50 Kg to 0.001 Kg accuracy
(i)	Core cutter
(j)	Hot Air Oven – Temperature range 50° C to 300° C
(k)	Measuring Cylinder – 2000 ml, 1000 ml, 500 ml, 100 ml
(l)	Sieves Coarse : 30 cm Dia (25 mm, 20mm, 16mm, 12.5mm, 10 mm, 6.3mm, 4.75mm, Pan & lid) Fine : 20 cm Dia (4.75mm, 2.36mm, 1.18mm, 600 mic, 150 mic, Pan & lid
(m)	Thermometer - 0° C to 100° C with accuracy of 1° C
(n)	Megger and earth resistance tester
(o)	Pumps and pressure gauges for hydraulic testing
(p)	Curing tank (min 2000 ltr capacity)
(q)	Miscellaneous Sand Scoop, Spatula, straight edge gauged trowel, steel foot rules, scale, mortar pan, spade, shovels, filter paper and wax
(r)	Other equipment for site test as outlined in BIS
(s)	Optical instrument to measure reflectance of marble grit plaster
(t)	Total station for survey and lay out
(u)	Rebound hammer test equipment for checking strength of concrete
(v)	Hilti tool – PS200 Ferro scan for rebar verification, checking concrete coverage or equivalent

- (c) Records shall be maintained at work site. These test results shall be signed by contractor of his authorised representative and aforesaid departmental official.
- (d) Within 15 days of placement of work order No.1 site lab shall be established and fact reported by the contractor to GE in writing who will verify the fact and satisfy himself regarding the facilities provided. Thereafter GE shall issue a certificate to this effect in writing listing out equipment particulars etc of material test. Only after issue of this certificate by GE the tests shall be carried out and materials so approved shall be incorporated in the work.

Material Testing & Testing Charges
Notes (cond...)

- (e) Manpower, materials and infrastructure like electricity, water etc required for conducting these tests shall be provided by the contractor.
- (f) Remedial measure if any required to achieve/obtain desired results for each test shall be taken promptly by contractor.
- (g) Tenderer is deemed to have catered for above provisions in his quoted Lump Sum/ Contract Sum.
- (h) In case during any point of time contractor fails to adhere to the laid down frequency of the tests for any reasons whatsoever which in the absolute opinion of GE are beyond the control of the contractor he shall get the tests done from any other lab whose name shall be approved by GE in writing. The testing charges payable by contractor to such lab shall be borne by the contractor. Contractor's quoted lump sum/ Contract Sum is deemed to include for this eventuality and nothing extra shall be payable to the contractor. No extension of time shall be admissible on this account.
- (j) However, incase GE in his absolute opinion considers that contractor is intentionally not adhering to the laid down frequencies of tests, he shall reserve the right to deduct penal recovery which shall be double the rates of tests indicated in Appendix 'B' for level 'A'. However, besides effecting penal recovery for non compliance of contractual testing frequency, simultaneously GE will get tests done from Zonal lab as per laid down frequency and necessary testing charges given against level 'B' shall also be recovered from running bills. Incase facilities are not available to conduct such tests in Zonal lab GE will get them tested from any source and necessary testing charges paid by the GE shall be debited to the running payments. GE's decision shall be final and binding in such cases.

Testing charges for level 'A' indicated in Appendix 'B' are applicable only for the purpose of penal recovery as elaborated above.

1.2 Level 'B':

- (a) "Command Test Lab/ Zonal Lab" means lab of HQ CE CC Lucknow/ lab of HQ CE Jabalpur Zone, Jabalpur respectively.
- (b) The tests shall be conducted as per frequencies laid down for these tests in this labs for which Contractor shall provide all requisite facilities like sample, cubes materials etc. transportation to those labs for testing purpose. It will be Contractor's responsibility to adhere to the laid down frequency of testing. Test results shall be sent by lab to the GE whose copies can be made by Contractor at his own expense. Testing charges for the tests so conducted shall be recovered at the rates indicated in Appendix 'B' from the running payments. The Contractor's quoted lump-sum/ Contract Sum is deemed to include for above provision.
- (c) Provision of Para (h) above of Level 'A' shall be applicable to level 'B' also.

1.3 Level 'C':

- (a) Level 'C' lab stands for National Test House/ SEMT Wing Pune located in CME Pune 31/ Local Government Engineering College.
- (b) Rest provisions contained in Para (b) of level 'B' above shall be applicable here except that Contractor shall obtain test results from those labs and hand over to GE. The testing charges payable to these labs for conducting these tests shall be borne by the Contractor and his quoted lump-sum/ Contract Sum is deemed to include this provision.

- 2. Tests/ method of testing/ frequency of testing for Materials not listed in this Appendix 'B' shall also be mandatory & shall be carried out as per the relevant IS .

gend:

SITE LAB A			ZONAL LAB B		NATIONAL TEST HOUSE/ SEMT WING PUNE/ ENGINEERING C		
Sl No	Material	Tests	Method of Testing	Frequency of Tests	Level of Test	Rate	Remarks
1	2	3	4	5	6	7	8
1.	Bricks	As per IS:5454 as given under :-					
				Lot size	Sample Size	Permissible No of Defective	
	i) Compressive Strength	IS:3495 (Part-II)	1001-	5	0	i) A	330/-
	ii) Water Absorption	IS:3495 (Part-II)	10001-35000	10	0	ii) A	330/
	iii) Efflorescence	IS:3495 (Part-II)	35001-50000	35001-50000	0	iii) A	330/-
2.	Coarse aggregate	i) Sieve analysis	IS : 2386 (Part I)	One test for every 15 Cu M of aggregates or part thereof brought to site.	i) A	660/	
	ii) Flakiness Index	IS : 2386 (Part I)			ii) A	250/-	
	iii) Estimation of deleterious	IS : 2386 (Part I)			iii) A	600/	
	iv) Organic impurities	IS : 2386 (Part I)		One test per source of supply.	iv) B	275/-	
	v) Moisture content	IS : 2386 (Part-II)		Regularly as required.	v) A	330/-	
	vi) Specific Gravity.	IS : 2386 (Part-II)		One test for each source of supply	vi) B	330/-	
3.	Fine aggregate	i) Sieve analysis,	IS: 2386 (Part I)	One test for every 15 Cu M of fine aggregate	i) A	660/-	
	ii) Test for clay, silt & Impurities.	IS: 2386 (Part I)		or part thereof when brought to site.	ii) A	500/-	
	iii) Specific Gravity.	IS: 2386 (Part II)		One for each source of supply.	iii) B	330/-	
	iv) Moisture content	IS: 2386 (Part II)		Regularly as required subject to 2 tests/ day, when used.	iv) A	330/-	
	v)						
	vi) Test for organic	IS: 2386 (Part II)		One test for each source of supply	v) B	275/-	

Sl No	Material	Tests	Method of Testing	Frequency of Tests	Level of Test	Rate Rs	Remarks
1	2	3	4	5	6	7	8
4.	Cement	i) Setting time.	IS-4031-63 Re-affirmed 1930	Once for each consignment or as and when required.	i) B	500/-	
		ii) Soundness	IS-4031-63 Re-affirmed 1930	Once for each consignment or as and when required	ii) B	550/-	
		iii) Compressive strength	IS-4031-63 Re-affirmed 1930	Once for each consignment or as and when required	iii) B	550/-	
		iv) Fineness	IS-4031-63 Re-affirmed 1930	Once for each consignment or as and when required	iv) B	275/-	
5.	Structural Concrete (M-25 grade)& above	i) Slump test or compacting factor test or Ver Bee time	IS : 119	The minimum frequency of sampling of concrete of each grade shall be as under :- Qty of concrete in the Wks (Cu) 1 – 51 6 – 152 16 – 303 31 – 504 51 and above4 + 1**	i) A	300/-	a) Random shall be carried to cover mixing units
		ii) Compressive strength	IS : 516		ii) A	900/-	b) Refer IS: 456 14 for frequency of sampling.
							** For each additional 50 Cu M or part thereof.
6.	PCC block for walling						

Sl No.	Material	Tests	Method of Testing	Frequency of Tests	Level of	Rate	Remarks
1	2	3	4	5	6	7	8
1	a) Hollow block for walling	i) Compressive strength	IS: 2156-1984 (Appendix 'R')	8 blocks out of 14.	i) A	900/-	Samples: 14 blocks from
		ii) Water absorption	IS: 2156-1984 (Appendix 'R')	3 blocks out of 14.	ii) B	330/-	consignments of average 5000
		iii) Density	IS: 2156-1984 (Appendix 'A')	5 block s out of 14.	iii) B	330/-	blocks or part thereof
	b) Solid block for walling	i) Compressive strength	IS : 2185	12 Blocks out of 18.	i) A	900/-	Samples: 18 blocks from
		ii) Water absorption	IS : 2185	3 blocks out of 18.	ii) B	330/-	consignment of average 1000
		iii) Density	IS : 2185	3 blocks out of 18.	iii) B	330/-	blocks or part thereof.
	7. Cement flooring tiles / terrazzo tiles	i) Water absorption	IS:1237 (Appendix ' D')	6 tiles out of 18	i) B	330/-	Samples: 18 tiles from each
		ii) Wet transverse strength	IS:1237 (Appendix ' E')	6 tiles out of 18	ii) B	660/-	source of supply selected
		iii) Resistance to wear	IS:1237 (Appendix ' F')	6 tiles out of 18	iii) C	1000/-	
8.	Burnt clay roofing tiles (hand made)	i) Water absorption.	IS : 3495 (Part II)	6 tiles out of 12	i) A	216/-	Samples: 12 tiles from each
		ii) Compressive strength	IS : 3495 (Part I)	6 tiles out of 12	ii) A	180/-	source of supply selected at random
	(IS: 2690 Part II)						a. Length 150 to 250 mm b. Width 100 to 200 mm c. Thickness 35 to 50 mm
9.	Mangalore Pattern	i) Water absorption.	IS : 654 (Appendix ' A')	6 tiles out of 32	i) A	180/-	Samples: 32 tiles from each
		ii) Breaking load.	IS : 654 (Appendix ' C')	6 tiles out of 32	ii) A	120/-	consignment of 3000 tiles or

Sl No	Material	Tests	Method of Testing	Frequency of Tests	Level of Test	Rate Rs.	Remarks
1	2	3	4	5	6	7	8
roofing tiles							
part thereof. These tiles shall be checked for dimensions							
10.	Timber	i) Specific gravity & weight ii) Moisture content.	IS : 1708 - 1960	Minimum 3 samples from a lot of 4 Cu M or	i) B	120/-	
11.	Water for construction purposes	i) Test for acidity. ii) Test for alkalinity. iii) Test for total dissolved solid (TDS) content.	IS : 456 & 3015 IS : 456 & 3015 IS : 456 & 3015	Once at the stage of approval of source of water. Once at the stage of approval of source of water Once at the stage of approval of source of water	i) B ii) B iii) B	500/- 500/- 500/-	Also refer clause 43 of spec. 456 and its subsequent sub clauses regarding suitability of water.
12.	Welding of steelwork	i) Visual Inspection Test.	IS: 822-1970 Clause 2.1	100% by visual inspection.	i) A	360/-	Specialised tests, their method & frequency are to be decided on consideration of their importance by the Accepting Officer.
13.	Timber panelled & glazed door/	Dimensions sizes, workmanship and.	IS : 1003 – 1977 (Part I)	Frequency of sampling from each lot shall be as under			

Sl N	Material	Tests	Method of Testing	Frequency of Tests		Level of Test	Rate Rs.	Remarks
1	2	3	4	5		6	7	8
	window shutters	finish		Lot Size	Sample Size			
	(including	Strength test :	IS : 1303– 1990	26 to 50	5	i) A	180/-	From each lot 5%
	Factory made	Slamming	IS : 1303– 1990	51 to 100	8			of the factory made
	shutters)	Impact indentation	IS : 1303– 1990	101to 150	13			shutters shall be
		Shock resistance	IS : 1303– 1990	151 to 300	20			manufacturer tested
		Edge loading	IS : 1303– 1990	301 to 500	32			for strength tests.
				501 to 1000	50			
				1001 and above	80			
14.	Plywood	Moisture content	IS : 1734 – 1983	Six test pieces cut from each of the boards		i) C	240/-	Sampling shall be
(IS : 303 – 1989)				selected as per Table shall be subjected to tests.				as per IS : 7635-1975
15.	Wood particle-board	Density	IS:2360-1977 (Part-III)	Three test specimens from each sample (size 150 x 75 mm)		i) C	60/-	Sampling shall be as
	(Medium	Moisture content.	IS:2360-1977 (Part-III)	-ditto-		ii) A, B	60/-	per IS: 3087 - 83 with
	Density)	Water absorption	IS:2360-1977 (Part-16)	-ditto- (size 300 x 300 mm)		iii) A	60/-	moisture meter.
	IS- 3097-.1985	Swelling due to surface	IS:2360-1977 (Part-16)	-ditto- (size 125 x 100 mm)		iv) A	60/-	
				-ditto - (size 200 x 100 mm)		v) A	60/-	
				Three test specimen as per IS:2380-77		vi) B	90/-	
				Three test specimen as per IS:2385		vii) C	120/-	

Sl N	Material	Tests	Method of Testing	Frequency of Tests	Level of Test	Rate Rs.	Remarks
1	2	3	4	5	6	7	8
16.	Reinforcement Steel	Physical tests up to 16mm dia (normal mass, tensile elongation, bend and	-	As mentioned Particular Specifications Part-II	i) B	2500/-	
		Physical tests more than 16mm dia (normal mass, tensile elongation, bend and rebend.	-	As mentioned Particular Specifications Part-II	ii) B	2750/-	

STEEL SUPPLY & ACCEPTANCE REGISTER

1. CA No & Name of Work
2. Contract No
3. Name of Manufacturer’ s T.C. No
4. Manufacturer

5. Random Test Details

a) Physical test report from (Name of NABL approved Lab/ Government Engg College) vide their letter No ()

b) Chemical test report from (Name of NABL approved Lab/ Government Engg College) vide their letter No ()

Types of steel Dia & Qty (a) Type..... TMT/ CRS (b) Dia mm (c) Actual Wt MT (d) Conversion Wt MT.	Chemical Test						Mechanical Test					Remark	
	Carbon %	Sulphur %	Phospho %	Mangan %	Silicon %	Corrosio resistant element	Wt per	Stress (N/mm ²) .2%	Tensile Strength (N/mm ²)	Elongatio %	Bend		Re-bend Test
a) As per IS 1786-2008													
b) As per manufacture , s test certificate													
c) As per independent test													

Remarks with signature

Contractor

Accepted/Rejected

Engineer-in-Charge

Garrison Engineer

Remarks of BOO/ Inspecting Officer/

Appendix 'D'

CEMENT SUPPLY & ACCEPTANCE REGISTER

1. CA No & Name of Work
2. Control No ^{\$\$\$} (see below)
3. Name of Manufacturer/ Brand Name/ Grade of Cement (a) Manufacture (Name of manufacturer) (b) Brand () (c) Grade ()
4. Qty of Cement & Lot No/ Week No (in Bags): (Quantity (in MT) (b) Lot No/ Week ()
5. Manufacturer’ s test Certificates No ()
6. Random Test Details
- (a) Physical test report from (Name of approved Lab/ Engg College) vide their letter No ()
- (b) Chemical test report from (Name of approved Lab/ Engg College) vide their letter No ()

7. Details of physical & chemical properties:

PHYSICAL REQUIREMENTS (AS PER IS 4031)		CHEMICAL REQUIREMENTS (AS PER IS 4032)	
RESULTS	Compressive strength (Mpa)	28 Days	Chlorides (%)
		07 Days	Alkalis (%)
		03 Days	Loss on ignition (%)
	Initial Setting Time (Minutes)		Sulphuric Anhydride (%)
			Magnesium (%)
	Soundness by Auto Clave		Insoluble Residue (%)
			Lime Saturation Factor (Ratio)
	Soundness by Le Chatellar		Lime Saturation Factor (Ratio)
			Standard Consistency (%)
	Specific Surface area (M ² /Kg)		Temp during testing °C

As per relevant IS

As per manufacture’ s test certificate

As per random test certificate

Remarks with signature

Remarks of BOO/ Inspecting Officer/

Accepted/ Rejected

Engineer-in-Charge

Junior

Contractor

Garrison

^{\$\$\$} to be allotted serially by the Garrison Engineer

Signature of Contractor

Dated :

Dy Dir/ AD (Contracts)

For Accepting Officer