

MILITARY ENGINEER SERVICES**NAME OF WORK: PROVN OF WEATHER SHELTER/SHED/PARKING SHED AT AF STN PANAGARH****C O N T E N T S**

SL NO.	DESCRIPTION	SERIAL PAGE NO.	
1	2	3	
1.	Contents	1	
2.	Forwarding letter and Instructions to Bidders	2	6
3.	Notice of Tender (IAFW-2162) including Appendix 'A' and Errata there to.	7	12
4.	Authorization page and Sch 'A' Notes	13	17
5.	Item Rate tender and contract for works {comprising Schedule 'B', 'C' & 'D'- IAFW 1779-A (Revised 1955) including Sch of Credit, if applicable	18	22
6.	General Conditions of contracts IAFW-2249 (1989 Print) including amendments/errata thereto	23	71
7.	Schedule of minimum fair wages	72	
8.	Special Conditions	73	89
9.	Particular specifications	90	143
10.	Appendices of PS (Appx-A and Appx-B)	144	156
11.	Schedule 'A' - BoQ	157	162
12.	Errata/amendment to tender documents		
13.	Relevant correspondences		
14.	Acceptance letter		
15.			

Total pages _____ **Nos,****(SIGNATURE OF CONTRACTOR)**
DATED:**DCWE(Contracts)**
FOR ACCEPTING OFFICER

TELE : 7890 (AF)
: 0343-2528230 (Civ)
E-mail: afpana3-mes@gov.in

REGISTERED POST/E-MAIL
MILITARY ENGINEER SERVICE
HQ CWE(AF) PANAGARH
Air Force Station Arjan Singh
PO – Birudiah, Dist – Burdwan
West Bengal – 713 148
15 Oct 2024

83001/PAN / 06 /E8

M/S

NAME OF WORK: PROVN OF WEATHER SHELTER/SHED/PARKING SHED AT AF STN PANAGARH

Dear Sir(s),

1. Tender documents in respect of above work are uploaded on the site www.defproc.gov.in. The tender is on single stage two 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 up to 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 tender/bid.
3. Bid will be opened on due date and time fixed for opening in the presence of tenderers/bidders or their authorized representatives, who have uploaded their quotation bid and who wish to be present at the time of opening the bids.
4. Your attention is also drawn to instruction on filling and submission of tender attached herewith. You may forward your points on tender documents and/or depute your technical representative for discussion on tender/ drawings and to clarify doubts, if any, on or before as mention web site . You are requested not to write piece meal points and forward your points duly consolidated before due date as mentioned in web site.
5. Un-enlisted 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** along with EARNEST MONEY DEPOSIT (EMD) and tender fee on e-procurement portal and submit the physical documents in the office of 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. Contractor having not executed standing security bond and standing security deposit in any MES formation shall upload scanned copy of EARNEST MONEY DEPOSIT (EMD) mentioned in Notice of Tender and shall ensure receipt of hard copy of EMD in the office of tender issuing authority before date & time fixed for this purpose. In case of failure to abide by any of these two requirements, the finance bid will not be opened.
7. Enlisted contractors of MES shall upload 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.
8. The contractor must ensure that the tender/bid on the proper form is uploaded 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 even if they are received in time.
9. In view of delays due to system failure or other communication related failures, it is suggested that the tender/bid be uploaded, if necessary, sufficiently in advance of the last due date and time fixed.
10. 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 concerned and this office.
11. ANY TENDERER, WHICH PROPOSES ALTERATIONS TO ANY OF THE CONDITION, SPECIFICATIONS LAID DOWN IN THE TENDER DOCUMENTS OR ANY NEW CONDITION, WHATSOEVER, IS LIABLE TO BE REJECTED.

12. The lowest bidder after acceptance shall have to lodge performance Security (05% of the accepted amount) with the Accepting officer within 28 days of receipt of the letter of acceptance/or notified online in the form of following:-
- (a) A Bank Guarantee in the prescribed form from scheduled bank only.
 - (b) Govt securities, FDR or any other Govt. Instruments
13. Tenderers attention is drawn to the fact that drawings forming part of the tender are not enclosed. The tenderer shall be deemed to have full knowledge of the details contained in these drawings
14. The Tenderers attention is drawn to the fact that the **Work Order No 1** shall be **placed** after submission of performance security of requisite amount as per Para 12 here in above in favor of Accepting Officer.

Enclosures : (Tender documents)

Yours faithfully,

SIGNATURE OF CONTRACTOR
DATE : _____

DCWE(CONTRACTS)
FOR ACCEPTING OFFICER

**INSTRUCTIONS FOR COMPLETION OF TENDER DOCUMENTS
TO BE COMPLETED BY THE TENDERER(S)**

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, alongwith their tender/bid :-

- (a) Demand Draft from a Scheduled Bank in favour of Garrison Engineer/CCE concerned.
- (b) Receipted Treasury Challan, the amount being credited to the Revenue Deposit of Garrison Engineer/ CCE.

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.

NOTES :

- a. Earnest Money Deposit (EMO) in the form of cheque/Bank Guarantee etc. will not be accepted. NON-SUBMISSION OF EARNEST MONEY DEPOSIT (EMO) (scanned copy along with 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. PERFORMANCE SECURITY DEPOSIT

2.1 In case the tenderer's bid is accepted then by such successful contractor shall require to lodge an irrevocable Performance Security (@ 05 % of accepted amount) for his proper performance of the contract agreement (not withstanding and/or without prejudice to any other provisions in the contract) with the Accepting Officer within 28 days of receipt of the letter of Acceptance in the form of following forms:-

- (a) A Bank Guarantee from Scheduled bank only in accordance with the form as per Appendix 2.1 of Manual of Contract.
- (b) Government securities, FDR OR Banker's Cheque.

2.2 NOTE:-

- a. Performance Security in the form of DD/Banker's Cheque shall not be admissible.
- b. Failure in compliance of above requirements shall be dealt with condition 19 of IAFW 2249 (GCC).
- c. EMD (Earnest Money Deposit) by bidder (if applicable) as per para 1 here-in-above, shall be adjusted against Performance Security. The extra amount shall be submitted in form as per clause 2.1 here-in-above.
- d. In case a fixed deposit receipt of any Bank is furnished by the contractor to the Government as part of the performance guarantee and the Bank is unable to make payment against the said fixed deposit receipt, the loss caused thereby shall fall on the contractor and the contractor shall forthwith on demand furnish additional security to the Government to make good the deficit.
- e. The **Work Order No 1** shall be placed only after the submission of Performance Security in favor of Accepting Officer to the office of Accepting Officer unless otherwise specified.

3. GENERAL INSTRUCTIONS FOR COMPLIANCE

3.1 The bids received only in the electronic form will be considered. All bids shall be submitted on 'www.defproc.gov.in' portal. Documents should be scanned and forwarded in 'pdf' form and 'xls' form as indicated.

3.2 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 email/ fax/ by hand/ through post will be considered.

3.3 Bid should be DIGITALLY signed using valid DSC. All pages of tender documents, corrections/ alterations shall be signed / initialed by the lowest bidder after acceptance.

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

3.5 The tender shall be signed, dated and witnessed at all places provided for in the documents after acceptance. All corrections shall be initialed. 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.

3.6 In the technical bid, a scanned copy of Power of Attorney in favour of the person uploading the bid using his/her DSC shall be uploaded. In case the digital signatory himself is the sole proprietor, scanned copy of an affidavit on stamp paper of appropriate value to this effect stating that he has authority to bind the firm in all matters pertaining to contract including the Arbitration Clause, shall be attached in 'pdf' form. In case of partnership concern or a limited company, 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 Articles of Association of the Company) in all the matters pertaining to the contracts with Union of India including arbitration clause. A scanned copy of the documents confirming of such authority shall be attached with the tender/bid in 'pdf' form, if not submitted earlier. The person uploading the bid on behalf of another partner(s) or on behalf of a firm or company using his DSC shall upload with the tender/bid a scanned copy (in 'pdf' form) of Power of Attorney duly executed in his favour by such other or all of the Partner(s) or in accordance with constitution of the company in case of company, stating that he has authority to bind such other person of the firm or the Company, as the case may be, in all matters pertaining to the contract including the Arbitration Clause.

3.7 Even in case of Firms or Companies which have already given Power of Attorney to an individual authorizing him to sign tender in pursuance of which bids are being uploaded by such person as a routine, fresh Power of Attorney duly executed in his favour stating specifically that the said person has authority to bind such partners of the Firm, or the Company as the case may be, including the condition relating to Arbitration Clause, should be uploaded in 'pdf' form with the tender/bid; unless such authority has already been given to him by the Firm or the Company. 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.

3.8 Bid (Cover 1 & 2) shall be uploaded online well in time.

3.9 The contractor shall employ Indian Nationals after verifying their antecedents and loyalty. Attention is also drawn to special condition 3 referred hereinafter and also conditions 24 & 25 of IAFW 2249 (General conditions of contract).

3.10 Tenderers/bidders that 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.

3.11 The tenderer/bidder shall quote his rate on the BOQ file only. No alteration to the format will be accepted; else the bid will be disqualified and summarily rejected.

3.12 In case the tenderer/bidder has to revise/ modify the rates quoted in the BOQ (excel sheet) he can do so only in the BOQ, through defproc.gov.in site only before the bid closing time and date.

4. REVOKATION/REVISION OF OFFER UPWARD/ OFFERING VOLUNTARY REDUCTION, AFTER OPENING OF FINANCIAL BID I.E. COVER-II

In the event of any tenderer/bidder revoking his offer or revising his rates upward/ offering voluntary reduction, after opening of cover-II, 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 tenderer/bidder on the freak high rates referred for review shall not be treated as voluntary reduction.

5. CORRIGENDUM

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.

6. BoQ

5.1 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.

5.2 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.

5.3 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.

5.4 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.**

7. C P M (CRITICAL PATH METHOD)

6.1 The project planning for work covered in the scope of tender is based on CPM.

6.2 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.

4.3 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 insufficiency and will affect his class of enlistment and future prospects/invitation to tenders for future works.

8. 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.

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

10. These instructions shall form part of the contract documents.

SIGNATURE OF CONTRACTOR
DATE : _____

DCWE(Contracts)
FOR ACCEPTING OFFICER

MILITARY ENGINEER SERVICES**NOTICE OF TENDER (IAFW-2162)****APPLICABLE FOR LUMP SUM/MEASUREMENT CONTRACTS**

1. A tender is invited for the work as mentioned in Appendix 'A' to this NOTICE INVITING TENDER (NIT) in SINGLE STAGE TWO COVER SYSTEM.
2. The work is estimated to cost as indicated in aforesaid Appendix 'A'. This estimate however, is not a guarantee and it is merely given as rough guide and if the work costs more or less, the tenderer will have no claim on this account. The tender shall be based as mentioned in aforesaid Appendix 'A'.
3. The work is to be completed within the period as indicated in aforesaid NIT/Sch 'A' Notes in accordance with the phasing, if any, indicated in the tender from the date of handing over site, which will be as per Work Order No 1 placed after successful submission of Performance Security as per Condition 19 of IAFW 2249 and as admissible.
4. Normally Contractors whose names are on the MES approved list and within whose financial category the estimated amount would fall, may tender/bid but in case of term contracts, contractors of categories 'E' to 'SS' may tender/bid. Not more than one tender/bid shall be submitted/ uploaded by one contractor or one firm of contractors. 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. A breach of this contract condition will render the tenders/bids of both parties liable to rejection.
5. The **HQ CWE(AF) PANAGARH** will be the Accepting Officer, hereinafter referred to as such for the purpose of this contract.
6. 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.
 - 6.1. Tender forms and conditions of contract and other necessary documents shall be available on www.defproc.gov.in website for download and shall form part of contract agreement in case the tender/bid is accepted.
 - 6.2. 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 96 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 its refund, on receipt of intimation from the Accepting Officer to do that.
 - 6.3. 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 @ 05% of accepted amount to be deposited by him within 28 days from the receipt of intimation of acceptance of tender from Accepting Officer,
 - 6.4 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.

6.5 Copies of the drawings and other document pertaining to the work signed for the purpose of identification by the Accepting Officer or his accredited representative, sample of materials and stores to be supplied by the contractor will also be available for inspection by the tenderer/bidder at the office of Accepting Officer and concerned GE/ GE(I)/ AGE(I) during working hours.

6.6 The tenderers/bidders are advised to visit the site of work by making prior appointment with GE/ GE (I) / AGE(I) who is also the Executing Agency of the work (see NIT). The tenderers/bidders are deemed to have full knowledge of all relevant documents, samples, site etc., whether they have inspected them or not.

6.7 Any tender/bid which proposes any alteration to any of the conditions laid down or which proposes any other condition or prescription whatsoever, is liable to be rejected.

6.8 The uploading of bid 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, tools and plants etc will be issued to him and local conditions and other factors having bearing on the execution of the work.

6.9 Tenderers/bidders must be in possession of a copy of the latest MES Standard Schedule of Rates (SSR:Part-I & SSR:Part-II) including amendments and errata thereto applicable upto bid submission end date.

6.10 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.

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

6.12 Court of the place from where tender has been issued shall alone have jurisdiction to decide any dispute out of or in respect of this tender. After acceptance of tender, Condition 72 (Jurisdiction of Courts) of IAFW-2249 shall be applicable.

- 7.** This Notice Inviting Tender (NIT) including Appendix 'A' and annexure there to, if any shall form part of the contract.

(SIGNATURE OF CONTRACTOR)
DATED:

DCWE(Contracts)
FOR ACCEPTING OFFICER

APPENDIX 'A' TO NOTICE INVITING TENDER (NIT)

1.	Name of Work	PROVN OF WEATHER SHELTER/SHED/PARKING SHED AT AF STN PANAGARH															
2.	Estimated Cost	Rs. 60.16 Lakhs (At par market)															
3.	Period of completion	180 Days															
4.	Cost of tender documents	Rs.1000/- in the shape of DD/Bankers cheque from any schedule Bank in favour GE (AF) PANAGARH and payable at PANAGARH . (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	http://defproc.gov.in and www.mes.gov.in															
6.	Type of contract	The tender shall be based on specifications (IAFW-1779A) and GCC (IAFW-2249) with Schedule 'A' (List of item of Work) to be priced by tenderer. The Tenderer are required to quote their rates against items of Schedule 'A'/BOQ in Open tender Enquiry on Single Bid Two Cover system															
7.	Information and Details:																
	Date of Publishing Bid	} Refer critical dates on http://defproc.gov.in and www.mes.gov.in															
	Date of Opening Bid (Cover No. 1)																
	Date and time of bid opening (Cover No 2)																
8.	Eligibility Criteria:																
	(A) For MES enlisted contractors	All Contractors enlisted with MES in Class ' C ' and above and Category ' a(i) ' 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. Refer Note (g) below															
	(B) For contractors not enlisted with MES	<p>(i) The Firm not enlisted with MES meet the enlistment criteria of Class 'C' and above and Category 'a(i)' i.e. with regard to 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 and 1.5 of section 1 of MES Manual of contracts - 2020 as available in all MES formations as well as MES website (www.mes.gov.in).</p> <p>(ii) Not carrying adverse remarks in Work Load Return (WLR) or any other similar report circulated by any competent engineer authority, if already working in MES.</p> <p>(iii) Not suspended/debarred/blacklisted (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.</p> <p>iv) Details of Works completed and under progress in MES be submitted in the following format:-</p> <table border="1"> <thead> <tr> <th>Srl no.</th><th>CA No.</th><th>Value of CA</th><th>Date of Commencement</th><th>Date of completion</th><th>Extended Date of comp</th></tr> </thead> <tbody> <tr> <td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table> <p>(v) Un-enlisted contractors 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 MES.</p>				Srl no.	CA No.	Value of CA	Date of Commencement	Date of completion	Extended Date of comp						
Srl no.	CA No.	Value of CA	Date of Commencement	Date of completion	Extended Date of comp												
9.	Tender issuing and Accepting Officer	CWE(AF) Panagarh , AF Stn Arjan Singh, WB - 713148 Email- afpana3-mes@gov.in															
10.	Executing Agency	GE (AF) PANAGARH															
11.	Earnest Money	Rs. 1,15,200.00 in form of DD/Banker's cheque from any Schedule/Nationalized bank in favour of GE (AF) PANAGARH and payable at PANAGARH . FDR is not acceptable															

APPENDIX 'A' TO NOTICE INVITING TENDER (NIT) CONTD...**Notes:-**

1. In case after opening of Cover 1, the number of MES enlisted contractors of eligible class as well as eligible un-enlisted contractors, if any, fulfilling the other eligibility criteria given in NIT is less than 7 (Seven), applications in respect of MES contractors of 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 fulfillment of other eligibility criteria given in the NIT. Therefore MES contractor's one class below (two classes below in case of remote and difficult areas) may also bid for this tender. Such contractors (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 TIMES** their present tendering limit.

However in case such contractors fulfill the criteria of up-gradation, to the stipulated eligible class based on past experience of completed works (individual work experience and/or average annual turnover, as applicable) and financial soundness (solvency/financial soundness and working capital), the ceiling of present residual work will not apply and they will be considered for issue of tender. Such bidders shall upload in their Cover-1 bid details related to residual work in hand like 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. Such contractors, if claim to fulfill the criteria of up-gradation shall also upload the requisite information/documents in support of up-gradation. 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 up gradation 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 in Manual on Contracts. Therefore such contractors shall upload the requisite information/documents in the Cover-1.
3. Un-enlisted 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 for checking eligibility: -
 - (a) Application for tender on firm's letterhead.
 - (b) Latest Enlistment letter issued by the registering Authority. (Non-submission of latest enlistment letter may lead to rejection of T-bid: Cover-I)
 - (c) Scanned copy of DD/Bankers cheque towards cost of tender and EMD instruments in case SSD bond is not signed at the time of registration.
 - (d) Scanned copy of Employees provident fund number.
 - (e) Scanned copy of GST registration number.
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 of Contracts – 2020.
 - (e) Details of works being executed in MES or any Govt department incl PSUs, if any.
 - (f) Scanned copy of EPF registration certificate issued by EPFO.
 - (g) GST Registration Number.

APPENDIX 'A' TO NOTICE INVITING TENDER (NIT) CONTD...

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 07 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 un-enlisted 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 un-enlisted 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 tenders 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 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 i.e **Chief Engineer (AF) Shillong Zone** on e-mail Id cezafs2-mes@nic.in with copy to the Accepting Officer before the scheduled date of opening of Cover 2, NHEA shall decide the matter within a period of seven working day 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 (i.e. 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-render or consider the lowest bonafide tender for acceptance.

APPENDIX 'A' TO NOTICE INVITING TENDER (NIT) CONTD...

13. Revoking the offer or revising the rates upward or offering voluntary reduction by the lowest tenderer after bid submission end date shall be considered as a wilful 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. 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.
15. Court of the place from where tender has been issued shall alone have jurisdiction to decide any dispute out of or in respect of this tender. After acceptance of tender, Condition 72 (Jurisdiction of Courts) of IAFW-2249 shall be applicable.

Signature of Contractor

DCWE(Contracts)
For Accepting Officer**File No.** 83001/PAN/ 05 /E8**MILITARY ENGINEER SERVICE**

HQ CWE(AF) PANAGARH

Air Force Station Arjan Singh

PO – Birudiah, Dist – Burdwan

West Bengal – 713 148

Date: 15 Oct 2024

Srl no.	Name of Concerned Officer	Phone No.	E-Mail ID
1	CWE(AF) Panagarh Accepting Officer		afpana3-mes@gov.in
2	EE(QS&C), DCWE(Contracts		dcwecontafpana3-mes@gov.in

CANO.: CWE(AF)/PAN/

OF 2024-25

SERIAL PAGE NO.13

TELE : 7890 (AF)

: 0343-2528230 (Civ)

E-mail: afpana3-mes@gov.in

MILITARY ENGINEER SERVICE

HQ CWE(AF) PANAGARH

Air Force Station Arjan Singh

PO – Birudiah, Dist – Burdwan

West Bengal – 713 148

83001/PAN/ 06 /E8

15 Oct 2024

ITEM RATE TENDER AND CONTRACT FOR WORKS REQUIRED IN THE
PROVN OF WEATHER SHELTER/SHED/PARKING SHED AT AF STN PANAGARH

1. M/s _____ of _____
is/are hereby authorized to tender for the above work. The tender is to be uploaded in the **www.defproc.gov.in** site as per critical dates reflected in website.
2. Any correspondence concerning to this tender should be addressed quoting the reference as given to HQ CWE (AF) Panagarh, West Bengal-713148.
3. THE PRESIDENT OF INDIA DOES NOT BIND HIMSELF, TO ACCEPT THE LOWEST OR ANY OTHER TENDER.

SIGN OF CONTRACTOR

DATE 2023

(SIGNATURE OF OFFICER ISSUING THE
DOCUMENTS)
APPOINTMENT:

DATE 2023

SCHEDULE 'A' NOTES**1. SCOPE OF WORK: -**

1.1 The work required to be completed under said tender is all as described in Schedule "A"/BOQ items and all as specified in particular specifications, drawings (where applicable) and general specifications.

1.2 The entire work consists of 04 (four) job as under:-

- (a) Provision of weather shed for 750 KVA DG Set (02 Nos) (Job No: 31W/ALBWPO/02/24-25)
- (b) Provision of parking shed (Job No: 31W/ALBWPO/01/2024-25)
- (c) Provision of weather shelter at AFS Panagarh (Job No: 31W/ALBWPO/06/2024-25)
- (d) Provision of shed at SRE complex (02 Nos) (Job No: 31W/ALBWPO/07/2024-25)

1.3 The work covered under Srl No 1.2(a) above (ie Provision of weather shed for 750 KVA DG Set) consist of design/drawing and vetting of shed with NIT/Govt Engg College. Submission of 04(four) sets of vetted drawings to GE (AF) Panagarh. It shall be noted that before vetting the drawing, one set of designed drawing shall be submitted to GE for his comment. The GE shall fwd the comment if any within 10 days of submission by the contractor. The contractor shall carry out this aspect within 30 days of issue of work order No.1. The quoted rate of respective items inclusive of all as stated above & no additional claim shall be entertained later on. A copy of tentative drawing for shed of 750 KVA DG Set is enclosed herewith for reference.

2. The quantities shown in column 3 are provisional and tentative. The final quantities of these items shall be finalized as per condition 6 of IAFW 2249 in consultation with Engr-in- charge along with ground conditions. However, these shall not be varied beyond the limits laid down in condition 7 of IAFW-2249, General Conditions of Contract. This contract comprises full, final and entire completion of the works given in Schedule "A"/BOQ, specifications, special conditions and other items required for satisfactory completion of works.

3. UNIT RATES :-

- (a) The description of items of works in various parts of Sch `A'/BOQ are in brief and shall be read together with drawings, specifications, special conditions, method of measurements, preambles, etc., contained in MES Schedule and General Conditions of contracts (IAFW-2249) condition in relevant trade section of MES Schedule and all these documents shall be taken as mutually explanatory of each other.
- (b) All unit rates shall be for `Material & Labour' complete unless otherwise specifically mentioned in the description of respective items. Nothing extra shall be entertained at later stage.
- (c) The contractor shall calculate his own details and insert unit rates in figures in column 5 of Schedule "A" which will further be spelled in words automatically by the software in Col 6 and their extension in Col No. 7 of respective items. However contractors are advised to ascertain the correctness of rates in words corresponding to rates quoted in figures and extension thereof. In case of discrepancies if any, the rates generated in words shall prevail. The aforesaid unit rates shall be based on description of items in Schedule "A"/BOQ, drawings (where mentioned in Schedule "A"/BOQ or specifications), specifications and other general specifications attached herewith.
- (d) It is an express condition of the contract that the unit rates quoted by the Contractor for various items in Schedule "A"/BOQ shall be inclusive of all labour and material required for completion of work (unless specifically mentioned otherwise such as labour only/fixing only) specified here-in-after in particular specifications /special conditions/requirements detailed in particular specifications and full and final completion thereto, irrespective of whether these are mentioned in the description of Schedule "A"/BOQ or not and the contractor will not be paid any extra for the same. The Govt. will not entertain any claim whatsoever on account of inaccuracies, misunderstanding, if any, by the tenderer in the aforesaid unit rates. Further, the unit rates quoted for all items of works shall be deemed to be including cost of all materials, labour, tools and plants, testing and commissioning work in position complete as required for entire completion of work.
- (e) Special conditions given in SSR Part-II and preambles to items given in MES Schedule Part-II under respective trades/items shall be applicable. If any provisions in the description of Schedule "A" and/or in particular specifications is/are at variance with the provisions of special conditions in MES Part II and preambles to SSR items, the provisions in description of Schedule "A"/BOQ items and provisions in particular specifications shall take precedence there over.

SCHEDULE 'A' NOTES

- (f) Method of measurements for all items listed in Schedule "A"/BOQ shall be as given in MES Standard Schedule of Rates Part II unless specifically stated otherwise here-in-after for any particular item(s) of work.
- (g) All materials as required for incorporation in work should be of reputed and approved makes as given in these documents. In case of makes not mentioned in the contract agreement the item shall be ISI marked as approved by GE concerned.
4. The amount in column 7 is not firm but will be treated as the "CONTRACT SUM" referred in IAFW-2249.
5. **PERIOD OF COMPLETION:** - The entire work under the contract shall be completed within **180 Days** from the date of commencement as shown in Work Order No 1.
6. The work under this contract lies in "**RESTRICTED AREA**". The contractor shall consultation with GE shall prepare the plan to execute the work in the restricted area. The resources as managed by the contractor shall be sufficient to complete the work in the time specified here-in-above. The movement pass of the staff of contractor shall be as per latest guideline(s) amended time to time exist at respective station. **The bidder shall strongly advised to visit the site prior to bid to get themselves acquainted with the ground situations at the work site viz-a- viz the scope of work as catered for in the tender documents.** No claim will be entertained for any misunderstanding or any inaccuracy with regard to the site condition and provision made in the tender documents.
7. Tenderers are advised to visit the SITE(s) and ascertain themselves the exact scope of Work and its Working Conditions, viz Working Hours, Availability of Site(s), etc. and quote their Tenders accordingly. Any Claim whatsoever, on such/these accounts will not be entertained by the Government at a later Date/Stage
8. Site for execution of works will be available as soon as the **work order No 1** is placed by the GE concerned. In case it is not possible for the Department to make the entire site available immediately after the work order No 1 is placed, the contractor will have to arrange his working program accordingly. NO claim what so ever for not giving the entire site on placement of work order No 1 and for giving the site gradually will be tenable.
9. The make(s) given for a particular item(s) in Schedule "A"/BOQ supersedes the makes given in List of approved makes of materials. In case of the equivalent in other makes, the equivalent item of other make (as given in Schedule "A"/BOQ or List of approved makes of materials) shall only be approved after obtaining non availability of particular make given. However the contractor shall submit the relevant catalogue, literature and pricelist of item of the make intended to be procured to establish that the item is not inferior to the item as per CAT No. mentioned in Schedule "A"/BOQ and shall obtain prior approval of GE concerned. If makes of any materials/item(s) are neither mentioned in Schedule "A"/BOQ nor in List of approved makes of materials, then it shall be followed from the latest Zonal & IS specifications, marked with statutory body like ISI, BEE etc. Makes & Manufacturers of all item as specified in Schedule "A"/BOQ items shall be as per List of approved makes of materials, unless specified otherwise in Schedule "A"/BOQ item(s).
10. The materials to be incorporated in the work shall be of the make as specified in the particular specifications or as given in List of approved makes of materials, where make of the material has not been specified, materials to be incorporated in the work shall be ISI marked. Where specified firm manufacturers both ISI marked and non ISI marked product, the material incorporation in the work shall be ISI marked and no extra payment shall be admissible on this account. In case the material having ISI certification mark are not manufactured, material conforming to relevant ISI may be incorporated in the work after approval of GE concerned. Where make of the same material has been specified in particular specification as well as in the List of approved makes of materials, to Particular Specification and /or in Sch 'A'/BOQ also, the order of preference shall be decided as under :-
- (a) Make (s) given in Sch 'A'/BOQ.
 - (b) Make (s) given in List of approved makes of materials.
 - (c) Make (s) given in particular specification.
11. The bidder attentions is also invited that the quoted rate shall be **inclusive of all the prevailing taxes** on the work contract such as GST, Sales tax, VAT, Labour welfare cess, EPF, ESIC octroi, royalties etc on the **bid submission end date**. Any change in the tax rate shall be governed as per conditions mentioned at Special condition of subject contract. The bidder(s) are mandatorily registered with EPF authority as per latest EPF act amended time to time.
12. Sand to be used in work shall be local sand. However grading shall be strictly as per sample kept at the office GE concerned and as directed by the GE during sample approval. Every vehicle load of the sand will be permitted for use in work after approval of EIC/GE concerned.

SCHEDULE 'A' NOTES

13. The samples of various items and materials to be incorporated in this work have been displayed by the users for tenderers for quoting the rates accordingly. The tenderers are advised to visit the users sample room along with GE concerned before quoting the rates. Please note that no claim whatsoever on account of any misunderstanding or non-visit of site/sample room shall be entertained at later stage.
14. The rate quoted by the tenderer shall be deemed to include for any minor details of work and /or construction which obviously and fairly intended and which may not have been specifically referred for the execution and completion of the work in a workman like manner and sound construction. In case of deference of opinion between the contractor and GE concerned as to whether it constitutes minor or extra constructional details included in the unit rate quoted or not, the decision of the Accepting officer shall be final, conclusive and binding.
15. **Transformer, DG Sets, VCBs, RMUs, LT/ HT panels, Motors, Pumping sets & HT cable shall be factory tested at manufacturer's/OEM premises before dispatch by representative of accepting officer. Intimation to this effect should reach Accepting Officer at least one month in advance enabling Testing Officer to plan his visit. Presence of contractor or his auth representative is required during factory testing.**
16. All major E/M equipment's viz. Power/Distribution Transformers, HT/LT Panels of any type, APFC Panels, HT/LT Circuit Breakers, Motors, Pumping sets, DG sets, HT CTs/PTs & other metering/protection equipment's, treatment plants etc. are to be procured / brought at site by the contractor / firm in such a planned manner that there is not less than one year (12 months) guarantee / warrantee available as the case may be from the respective OEMs of the items after the physical completion of the project.

17. INSTRUCTIONS ON APPROVAL OF SPECIAL (STAR) RATES.

- 17.1 In case of any deviation, mode of pricing shall be decided by Accepting Officer in terms of Condition 62 of IAFW-2249.
- 17.2 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 the 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.
- 17.3 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 publications 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
- 17.4 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 the contractor after draft check by DCWE(Contract) of CWE office.
- 17.5 After completion of the item of work involving Star Rate, the contractor shall submit the vouchers/literature of product/test certificates (as applicable, decision of GE being final in case of any disagreement) for finalization 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.
- 17.6 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.
18. **The Defect Liability Period shall be as per Condition No 46 as amended vide Amendment No. 49 to General Condition of Contract after the date of satisfactory completion issued by the Garrison Engineer.**

(SIGNATURE OF CONTRACTOR)
DATE

DCWE(Contracts)
For Accepting Officer

FOR SCH 'A'

REF

BOQ

SCHEDULE 'B'**ISSUE OF MATERIALS TO THE CONTRACTOR**
(SEE CONDITION 10 OF IAFW- 2249)

Ser No	Particular	Rate at which stores will be issued to the Contractor		Place of issue of stores (By name)	Remarks
		Unit	Rate (Rs)		
1	2	3	4	5	6

NIL

SIGNATURE OF CONTRACTOR

DATED : _____

DCWE(Contracts)

FOR ACCEPTING OFFICER

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)

SI No	Quantity	Particulars	Details of MES crew supplied	Hire charges per unit per working day	Stand by charges per unit per off day	Place of issue (by name)	Remarks
1	2	3	4	5	6	7	8

- NIL -

SIGNATURE OF CONTRACTOR

DATED : _____

DCWE(Contracts)

FOR ACCEPTING OFFICER

SCHEDULE 'D'**(TRANSPORT TO BE HIRED TO THE CONTRACTOR)**
(See Conditions 16 and 35 of IAFW- 2249)

SI No	Quantity	Particulars	Rate per unit per working day	Place of issue (by name)	Remarks
1	2	3	4	5	6

- NIL -

SIGNATURE OF CONTRACTOR

DATED : _____

DCWE(Contracts)

FOR ACCEPTING OFFICER

SCHEDULE OF CREDIT

BLANK

TENDER

Having examined and perused the following documents:-

1. Specifications signed by DCWE(Contracts).
2. Drawing details in the specifications (if admissible).
3. Schedule 'A', 'B', 'C' and 'D' attached hereto.
4. MES Standard Schedule of Rates-2009, Part-I (Specification) and MES Standard Schedule of Rates Part-II, 2020 (Rates) together with amendment **01 to 122** (herein after and in IAFW-2249 referred to as the MES Schedule) together with amendment **1 to 3** for Standard Schedule of Rates Part-I, and errata/ amendment No, if applicable for Standard Schedule of Rates Part-II.
5. General condition of contracts, IAFW- 2249, (1989 prints) together with Errata No **1 to 20** and Amendments **1 to 49**.
6. Water : Condition 31 Of IAFW- 2249, (General Condition Of Contracts) Water will be supplied by the MES and shall be paid for by the Contractor at Rs. 3.75/- every 1000 worth of work done priced at contract rate.
7. **SHOULD THIS TENDER BE ACCEPTED**

I/WE AGREE.

(a) To execute all the work referred to in the said documents upon the terms and condition contained or referred to therein at the item rates contained in the aforesaid schedule 'A' or at such other rates as may be fixed under the provision of condition 62 of IAFW- 2249 and to carry out such deviations as may be ordered vide condition 7 of IAFW- 2249 upto a maximum of **10% (Ten Percent) for contract sum exceeding Rs.10 lakhs** and **upto a maximum of 20% (Twenty Percent) for contract sum upto Rs.10 lakhs** and further agree to refer to all disputes, as required by condition 70 of IAFW – 2249 to the sole arbitrator of a serving Officer having degree in Engineering or equivalent or having passed final /direct final examination of sub-division –II of Institution of surveyors of India, recognized by the Govt. of India to be appointed by the **ADG NEI Guwahati** or in his absence the Officer Officiating as **ADG NEI Guwahati** if specifically delegated in writing by **ADG NEI Guwahati** whose decision shall be final, conclusive and binding.

The email id of **HQ ADG NEI Guwahati** is **adgnei-mes@gov.in**.

Contd

(In lieu of IAFW-2159, (REVISED- 1955))

TENDER (CONTD.....)

Amount brought from BOQ

For the contract sum of Rs. _____ (in words)

(Rupees _____

_____ only)

Signature _____ (Name in capital letter of Signatory)

In the capacity of _____

Duly Authorised to Sign the tender for and on behalf of _____

Date : _____

Postal Address _____

Witness : 1. _____

2. _____

NAME: _____

ACCEPTANCE

_____ alterations have been made in these documents and as evidence that these alterations were made before the execution of Contract Agreement; they have been initialed by the contractor and **Shri SAURAV ANAND, DCWE(CONTRACT)**.

The said officer(s) is/are hereby authorised to sign and initial on my behalf the documents forming Part of this contract.

The above tender is accepted by me on behalf of the President of India for the contract sum of Rs. _____ (in words only).

(Rupees _____

_____ only) on _____

Signature _____ dated this _____ day of _____

APPOINTMENT : Commander Works Engineer (AF) Panagarh
Air Force Station Arjan Singh, Panagarh
(FOR AND ON BEHALF OF THE PRESIDENT OF INDIA)

GENERAL CONDITIONS OF CONTRACTS (IAFW- 2249-1989 PRINT)
FOR
ITEM RATE CONTRACTS (IAFW-1779A)

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 thereof, as modified, if any, elsewhere in these tender documents.

It is hereby further agreed and declared by me/us that the General Conditions of Contracts (IAFW- 2249-1989 print) including Condition 70 thereof pertaining to settlement of disputes by arbitration, containing 33 pages (serial page Nos 23 to 56) with errata 1 to 20 and amendments No 1 to 49 (serial page Nos 57 to 71) form part of these tender documents.

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 will take precedence over Hindi version.

NOTE :-

In case the tenderer/bidder has not posses of any of the documents referred above, they should obtain a copy from the office of the Accepting Officer or Executing Officer as per NIT before submission of his tender.

Nothing in respect of not referring of IAFW- 2249 (1989 print) along with its errata and amendments shall be admissible after bid submission end date and time.

SIGNATURE OF CONTRACTOR
DATED :

DCWE (Contracts)
FOR ACCEPTING OFFICER

SCHEDULE OF MINIMUM FAIR WAGES

1. It is hereby agreed that the 'Schedule of Minimum Fair Wages' as published vide Govt of India/State Govt/local authorities which is highest and which specifies minimum rates of wages for various categories of workman as applicable on the last due date of receipt of this tender and shall form part of this tender documents. The minimum rates of wages shall consist of all-inclusive rates and include also the wages for weekly day of rest.

2. My/our signature here under accounts 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.

SIGNATURE OF CONTRACTOR**DATED : _____****DCWE (Contracts)****FOR ACCEPTING OFFICER**

SPECIAL CONDITIONS**1. GENERAL**

- 1.1. The following special conditions shall be read in conjunction with the General Conditions of Contracts-IAFW-2249, IAFW-2159 (Revised-1947) including Errata/Amendments there to. If any provision in these special conditions is at variance with that of the aforesaid documents, the former shall be deemed to take precedence there over.

2. INSPECTION OF SITE BY CONTRACTOR AND RESPONSIBILITY TO ASCERTAIN HIS OWN INFORMATION

- 2.1 The tenderer is advised to contact the Garrison Engineer for the purpose of inspection of site(s) and relevant documents other than those sent herewith who will give reasonable facilities thereto. The Tenderers shall also make themselves familiar with the working conditions, accessibility to site(s) of works, availability labour and materials and such other relevant conditions, which effect the execution, and the entire completion of the work. The Tenderers shall be deemed to have inspected the site(s) and made him-self familiar with the working conditions, whether he actually visits the site(s) or not.

3. SECURITY AND PASSES

- 3.1 Refer Conditions 25 of IAFW-2249. The contractor shall employ only Indian Nationals as his representatives, servants and workmen and verify their antecedence and loyalty before employing them for the works. He shall ensure that no person of doubtful antecedent and nationality is, in any way, associated with work. If for reasons of technical collaboration or other considerations the employment of any foreign national is unavoidable, the contractor shall furnish full particulars to this effect to the Accepting Officer at the time of submission of his tender.
- 3.2 The contractor shall, on demand by the Engineer-in-Charge, submit list of his agents, employees and work people concerned and shall satisfy the Engineer-in-Charge to the bonafide of such people.
- 3.3 Security passes will be issued by the Air Force authority which will be arrange by the Engineer-in-Charge as per rules and regulations of the installation/Area in force to control the admission of the contractor, his agents, employees and work people to the site of the work or any part thereof. Passes should be returned at any time on demand by the Engineer-in-Charge or the authorities concerned and in any case on completion of work.
- 3.4 The contractor and his agent, employees and work people shall observe all the rules promulgated by the authority controlling the installation/area in which the work is to be carried out e.g prohibition of smoking and lighting, fire precautions, search of persons on entry and exit, keeping to specific rules, observing specified timing etc. Nothing extra shall be admissible for any man hours etc lost on this account.

4. CONDITION FOR WORKING IN RESTRICTED AREA : All works lies in **Restricted Area. The restrictions for entry to work site and conditions of working in restricted area shall be as under:-**

- (a) **Entry and Exit** : The contractor/his agents/representatives/workmen etc and his materials, carts, trucks or other means of transport etc will be allowed to enter through and leave from only such gate or gates and at such times as the GE or authorities in charge of the restricted area may at their sole discretion permit to be used. Contractor's authorised representative is required to be present at the places of entry and exit for purpose of identifying his carts, trucks, etc to the person in charge of the security of the restricted area.
- (b) **Identity of Workmen** : -
- (i) Every workman shall be in possession of an identity card. The identity card shall be issued after a thorough investigation of antecedents of the labourers by the contractor and attested by Officer-in-Charge of the unit concerned in accordance with the standing rules and regulations of the unit. Contractor shall be responsible for conduct of his workmen, agents or representatives.

SPECIAL CONDITIONS

(ii) **Identity Card or Passes** : The contractor, his agent and representatives are required individually to be in possession of an identity card or pass which will be examined by the security staff at the time of entry into or exit from the restricted area at any time or number of times inside restricted area.

(c) **Search** : Thorough search of all persons and transport shall be carried out at each gate and for as many times the gate is used for entry or exist and may also be carried out any number of times at the site within the restricted area.

(d) **Working Hours** : The units controlling restricted area, usually work during six days in a week and remain closed on the 7th day. The working hours available to the contractor's labour and staff are however appreciate reduced because of the time of entry and exist during working hours. The exact working hours, working days and number of working days observed for these restricted area (s) where works are to be carried out shall be deemed to have been ascertained by contractor before submitting his tender. The tenderer's attention is invited to the fact that numbers of working hours for a unit are prescribed in regulations and that they cannot be increased by the Garrison Engineer or authorities controlling the restricted area. The definition of "working days" as given under condition 1(t) of IAFW-2249 does not apply in case where the works are carried out in restricted area.

(e) **Working 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 authorized in writing to do so by the Garrison Engineer. The GE may at his sole discretion declare any day as holidays or non working day without assigning any reasons for such declaration.

(f) **Fire Precautions :-**

(i) The contractor, his agents, representatives, workmen etc shall strictly observe the order pertaining to fire precautions prevailing within the restricted area.

(ii) Motor transport vehicle, if allowed by the authorities to enter the restricted area must be fitted with the serviceable fire extinguisher.

(g) **Female Searcher** : It the contractor desires to employ female labour or works to be carried out inside the area of factory, depot, park etc, and a female searcher is not borne on the authorised strength of the factory, depot, park etc at the time of submission of tender, he shall be deemed to have allowed in his tender for pay and allowances etc for a female searcher (Class IV servant) calculated for the period female labourers during any month and female's searcher(s) has/have to be employed in addition to the authorised strength of the factory, depot, part etc the salary and allowances paid to the additional female searchers shall be distributed on equitable basis between the contractors employing female labour taking into consideration the value and period of completion of their contracts. The GE's decision in regard to the amount payable on this account by any contractor shall be final and binding.

5. SAFETY PRECAUTIONS

5.1 The contractor shall take every precaution to control traffic of road by keeping danger boards, necessary lighting arrangements, fencing etc and to avoid any damage. In case due to excavation or otherwise the road is to be blocked or other wise the road is to be packed, the contractor shall without any extra cost to the Govt, provide separate by pass and place danger board with red light in the night so that normal traffic will not be disturbed.

5.2 The contractor shall make good any damage to the existing road, building, with the same specifications as existing without any extra cost to the Government. In the event of contractor not fully complying with the above provisions to the satisfaction of the GE, the GE may provide the same for which the expenses incurred shall be recovered from the contractor.

6. TIME AND PROGRESS CHART (CPM CHART)

6.1 The CPM 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. The critical path net work will be drawn jointly by the Garrison Engineer and the contractor soon after acceptance of the tender. The time scheduling of the activities will be done by the contractor so as to finish the work within the stipulated time. On completion of the time schedule, firm calendar date Schedule will be prepared

SPECIAL CONDITIONS

and submitted by the contractor to the Garrison Engineer who will approve it after due scrutiny. The Schedule will be submitted in four copies within two weeks from the date of handing over the site.

- 6.2 During the currency of the contract, the contractor is expected to adhere to the time schedule and his adherence will be a part of the contractor's performance under this contract. During the execution of the work the contractor is expected to participate in the reviews and updating of the network undertaken by the GE. These reviews may be undertaken at the discretion of the GE either as a periodical appraisal measure or when the quantum of work ordered on the contractor is substantially changed through deviation order or amendments. Any revision of the time schedule as result of the review will be submitted by the contractor to the GE within a week for his approval after due scrutiny.
- 6.3. The contractor shall adhere to the revised time schedule thereafter. In case of contractor disagreeing with the revised schedule, the same will be referred to the Accepting Officer whose decision shall be final, conclusive and binding. Garrison Engineer's approval to the revised schedule resulting in a completion date beyond the stipulated date of completion shall not automatically amount to a grant of extension of time. Extension of time shall be considered and decided by the appropriate authority mentioned in condition 11 of IAFW-2249 and separately regulated.
- 6.4. Contractor shall mobilize and employ sufficient resources to achieve the detailed schedule within the broad framework of the accepted methods of working and safety. No additional payment will be made to the Contractor for any multiple shift work or other incentive methods contemplated by him in his work schedule, even though the time schedule is approved by the department.

7. SECURITY OF CLASSIFIED DOCUMENTS

- 7.1 Contractor's special attention is drawn to condition 2-A and 3 of IAFW-2249 (General conditions of contract). The contractor shall not communicate any classified information regarding works whether to some contractor 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 works.

8. CONTRACTOR'S REPRESENTATIVES, AGENTS AND WORKMEN

The contractor shall employ only Indian National as his representative, servants and workmen after verifying their antecedents and loyalty. He shall ensure that no person of doubtful antecedents and Nationality is in any ways associated with the works. If for reasons of technical collaborate or consideration, the employment of any foreign national is unavoidable, the contractor shall furnish full particulars to this affect to the Accepting Officer at the time of submission of his tender. The GE shall order the contractor to cease to employ in connection with this contract any representative, agents, servants and workmen or employee whose continued employment in his opinion is undesirable. The contractor shall not be allowed any compensation on this account.

9. MINIMUM WAGES PAYABLE

- 9.1 Refer condition 58 of IAFW-2249. The schedule of Minimum Fair Wages is not enclosed to these tender documents. The contractor shall not pay wages including all allowances lower than Minimum Wages for labour as fixed by the Government of India/State Govt/Union Territory under Minimum Wages Act a contract labour (Abolition and Regulation Act) whichever is higher.
- 9.2. Contractor's attention is also drawn amongst other things to the "explanation to the schedule of minimum wages referred above.
- 9.3. The fair wages referred to in condition 58 of the IAFW-2249 will be deemed to be the same as the minimum wages payable as referred to above as upto date from time to time.
- 9.4. Schedule of minimum wages is not enclosed alongwith tender documents. However, contractor shall be deemed to have verified the minimum fair wages payable as on the last due date of receipt of tender.
- 9.5. 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.

SPECIAL CONDITIONS**10. ROYALTIES**

- 10.1 Reference condition 14 of General conditions of contracts IAFW-2249. No quarries on Defence land are available. The rates quoted by contractor deemed to include any royalties leviable by any Civil/ any other authorities. No claim on this account can be entertained by Government.

11 LAND FOR TEMPORARY WORKSHOP, STORES ETC

- 11.1 Separate land will be allotted to the contractor for storage of materials, temporary workshop and offices for which he shall pay the nominal rent of Rs.1/- per year or part of year as mentioned in clause 24 of IAFW-2249. The land/open space available with in vicinity of site of work as directed by GE may also be used by the contractor for this purpose but free of charges
- 11.2 The area so occupied shall be vacated by the certified date of completion and site of work shall be cleared as stipulated in the condition 49 of IAFW-2249.

12. WATER : REFER TO CONDITION 31 OF IAFW-2249

- 12.1 Water will be supplied by MES to the contractor at points shown on site plan from piped system and shall be paid by the contractor @ Rs 3.75 per Rs 1000/- worth of work done priced at contract rates on specific request from the contractor. The contractor shall arrange at his own expense for storage of water and lifting pumping, carrying of conveying water to the site of work as required. In case water points are not marked on the site plan, the water shall be supplied at one point at decided by GE. If the contractor wants to arrange their own water, the GE shall first ascertain the quality of water fit for construction process by testing of water (the cost shall be borne by contractor). This procedure shall be repeated if the source of arranging water is changed during execution.
- 12.2. The supply of water may not be continuous. The contractor shall be deemed to have ascertained the hours of availability of water before submitting his tender. The MES do not guarantee the continuity of water supply and no compensation shall be allowed for intermittent or inadequate water supply and break down in the system. If the supply is not sufficient the contractor shall make his own arrangement to supplement the water supply at his own cost. For this purpose the contractor shall be allowed to install hand pumps at the site of work at places as directed by the Engineer-in-Charge without any charges from the contractor on this account. The contractor shall remove the hand pumps as and when asked to do so by Engineer-in-Charge or GE and in any case on completion of work. No compensation whatsoever shall be admissible to the contractor if the GE requires him to remove the pumps before completion of work.

13 COOPERATION WITH OTHER AGENCIES

- 13.1. The contractor shall permit free access and generally afford reasonable facilities to other agencies or departmental workmen engaged by the government to carryout their part of the work, if any, under separate arrangements.

14 ELECTRIC SUPPLY

- 14.1 Electricity will be supplied by MES. The Contractor will be charged for electric energy consumed at the following rates: -
- (i) At Eighteen rupees and zero three paise per unit for lighting.
 - (ii) At Eighteen rupees and zero three paise per unit for Power.
- 14.2. Electric supply required for works shall be made available by the MES at the incoming terminal of the main switch marked on the layout plan. If point is not marked, the GE shall decide it. The main switch KWH meter to register the electric energy supplied shall be provided and installed by MES. The contractor shall provide all necessary connection cables fittings etc from the main switch in order to ensure proper and suitable supply of electricity. Government will not guarantee continuity of supply and no compensation whatsoever shall be allowed for supply becoming intermittent or for breakdown in the system or any other reason whatsoever.

SPECIAL CONDITIONS**15 RECORD OF CONSUMPTION OF CEMENT**

- 15.1 For the purpose of keeping the record of cement consumed in the works. The contractor shall maintain a pucca bound register with serially numbered pages initialed by the Engineer-in-Charge, showing quantity of cement received used in the work and balance at the end of each day. The register shall be signed daily by representative of MES and the contractor in token of verification of its correctness and will be checked by Engineer-in-Charge, at-least once a week and on the days cement is brought to site by the Contractor.
- 15.2 The aforesaid provision will not, however absolve the contractor of his responsibility to justify the consumption of cement at the time of finalisation of his account.
- 15.3 The register shall be kept at site in the safe custody of the contractor's representative during the progress of the work and shall on demand, be produced for verification to the Inspecting Officer(s).
- 15.4 On completion of the work, the contractor shall deposit the cement register with the Engineer in charge for record with MES.

16. RETENTION MONEY/COMPENSATION FOR THE DELAY ETC

- 16.1 For the purpose of calculating retention money under condition 64 of IAFW-2249 and compensation for delay in completion of work condition 50 of IAFW-2249, water recovery and trade tax and Income tax (at sources) etc, the value of contract as revised by variation in prices-wages of labour under modified condition 63 of IAFW-2249 shall be taken into account.

17 PERIOD FOR KEEPING THE TENDER OPEN

- 17.1 The tender shall remain open for acceptance for a period of **60 (Sixty) days** from the date on which the tenders are due to be submitted excluding the date of submission of tender.

18. DAMAGE TO EXISTING WORK

- 18.1 Any damage done to the existing structure during the execution of work, shall be made good by the contractor at his own cost and the site of work left clean & tidy on completion. Rectification or reinstatement, making good etc shall conform to the standard of materials originally used in the work and finished work shall match with the existing work in all respects to entire satisfaction of GE. In case of any dispute on this account matter shall be referred to the next higher authority whose decision in this account shall be final and binding.

19. UNIT RATE IN SCHEDULE 'A'

- 19.1 The unit rate in Schedule 'A' quoted by the tenderer shall be deemed to include for any minor details of construction, which are obviously and fairly intended and which may not have been referred to in these documents but are essential for the execution of work.
- 19.2 In case of difference of opinion as to whether or not a certain items of work constitutes minor details of construction is included in the contractor's price, the decision of the Accepting Officer shall be final, binding and conclusive.

20. MATERIALS IN METRIC SIZES

- 20.1** If the materials (other than those issued under schedule 'B') are not available in metric sizes as given in Sch 'A' or specified or shown on drawings the contractor shall provide materials in equivalent sizes which should not be less than the metric size dimensions under any circumstances at no extra cost to the government.

SPECIAL CONDITIONS**21. ACCEPTANCE QUALITY OF WORK AND FINISHES**

- 21.1 To determine the acceptable standard of workmanship, material/final finishes and layout of fittings etc, the GE shall order the contractor to construct some portion of work in advance within the time specified herein below. In case of repetitive type of construction, such as married accommodation, sample accommodation shall consist of the one complete quarter of such type as specified in schedule 'A' for non repetitive type construction such as OTM accommodation, certain repetitive portion of the building including a portion of sanitary annexes block may be termed as "Sample Accommodation". All work and services of the "Sample Accn" such as RCC work, joineries, ceiling, plastering, flooring plumbing, water supply and Electrification with their fittings and fixtures, builders hardware, finishes etc complete all as per drawings and specifications shall be got completed under the close supervision of Engineer-in-Charge within the period as specified in Sch 'A'. It will be obligatory on the part of the contractor to complete the sample accommodation within specified period.
- 21.2 The work on sample accn shall be at least two/three stage, corresponding stage ahead construction, subject to the over riding conditions that the entire work of sample accn shall be completed within the stipulated period.
- 21.3 On approval of the stages and workmanship of construction of sample accommodation quarters shall be separately entered and approved in stage passing register giving reference to block and quarter number for easy identification even a later date the same shall be marked as guiding sample for the remaining constructions.

22. MATERIALS AND SAMPLES

- 22.1 Refer condition 10 of IAFW-2249 and clause 1.6 & 1.7 of MES schedule.
- 22.2 Material provided by the contractor for incorporation in the works shall, unless otherwise specified in the Particular specification be ISI marked. ISI means Indian Standards as issued by the Bureau of Indian Standards. Wherever in the specifications 'IS' is referred to, it means the edition with all amendments, current on the due date of receipt of the tender documents.
- 22.3 The tenderer is advised to inspect other materials which are displayed in the Office of GE, before submitting his tender. The tenderer shall be deemed to have inspected the samples and satisfied himself as to the nature and quality of materials, he is required to incorporated in the work irrespective of whether he has actually inspected them or not. The materials to be incorporated in the work by the contractor shall be IS marked or shall be equal or superior in quality to samples displayed and shall comply with the specifications given hereinafter.
- 22.4 The contractor shall produce samples of all materials, articles, fittings, accessories etc, that he proposes to use and get these approved in writing by the Garrison Engineer within reasonable time from the date of commencement of work as per work order. The materials, article, etc as approved shall be labeled as such and shall be signed by the GE and contractor's representative. These samples shall be kept in the custody of the Garrison Engineer / Engineer-in-Charge.
- 22.5 The contractor shall not procure materials unless the samples are first got approved by the Garrison Engineer.
- 22.6 The brand of all materials, articles, fittings, etc approved together with the names of the manufacturers and firms from which supplies have been arranged shall be recorded.
- (a) A list of items / articles which are having ISI certification mark and readily available are given in Appendix 'A'. It is mandatory that ISI certified marked items/articles as listed in Appendix 'A' shall be incorporated in the work.
- (b) The Govt reserves the right to get the items/articles as listed in Appendix 'A' tested in approved laboratories. The cost of sample for testing shall be borne by the contractor and the remaining expenses such as cost of transportation of sample to laboratory and testing fee shall be

SPECIAL CONDITIONS

borne by the Govt, if the test result is found to be satisfactory. However, in the event of the test result being found unsatisfactory, the entire cost of testing including cost of samples shall be borne by the contractor. Government may get more than one sample of the same materials tested and the cost of such testing shall be borne by the Government.

23. BLANK**24. PRODUCTION OF VOUCHERS**

- 24.1 The quantity of materials such as cement, steel, paints, water proofing compound, chemicals for anti-termite treatment and the like, as directed by the Engineer-in-Charge (the quantity of which cannot be checked after incorporation in works) shall be recorded in measurement books and signed by the contractor and the Engineer-in-Charge as a check to ensure that the required quantity has been brought to site for incorporation in the work.
- 24.2 Materials brought to site shall be stored as directed by the Engineer-in Charge and those already recorded in Measurement Book shall be suitably marked for identification.
- 24.3 Materials to be Procured by Contractors:-
- i. Vouchers in respect of cement, steel, major E/M equipment like transformers, DG Sets, Electric Panel, VCBs, RMUs, Electric Cables (HT/LT), HT equipments, pumps, motors, AC and lift along with equipment, Crane, refrigerators, Chillier, AHUs etc. will be submitted invariably.
 - ii. For all original works, the contractor shall submit the purchase voucher for the items which loses their identity after using on ground like paints, ATT chemicals, water proofing chemicals.
However, in this contract the purchase voucher shall be submitted for following items:
 - a. **Paver Block**
 - iii. Original purchase vouchers shall be defaced by the Engineer-in Charge and photocopies shall be kept in record. Genuineness of purchase voucher shall be verified by the Engineer in Charge before considering the same for making payment.
 - iv. The contractor shall ensure that the materials are brought to site in original sealed containers/packing, bearing manufacturer's marking except in the cases of the requirement of materials being less than smallest packing.
 - v. Bitumen shall be purchased directly from main manufacturers only. In case of small quantity, the Accepting Officer may allow procurement of Bitumen from authorized dealers of main manufacturers.
 - vi. Purchase vouchers for the same shall be defaced by the Engineer-in-Charge, indicating reference to the Contract number under his dated signature and photocopies thereof shall be kept on record so as to avoid their being used again.
 - vii. The vouchers will clearly indicate the Contract number and the IS No and specific alternative to which the material conforms in case of various alternatives in IS. In case the contractor procures the Bitumen mix from Hot Mix Plant, the copy of voucher of Bitumen provided by the main manufacturer to the Hot Mix Plant shall be submitted by the contractor.
- 24.4 The vouchers shall be endorsed, dated and initialed by the Engineer-in-Charge giving the contract number and name of work. A certified copy of each of such vouchers signed both by Engineer-in-Charge and the contractor shall be kept on record.
- 24.5 When the cost of each category of material is less than Rs. 1000/- production of voucher may not be insisted upon, if the Garrison Engineer is otherwise satisfied with the quality of material brought by contractor.

SPECIAL CONDITIONS**25. HANDING OVER OF SITE**

- 25.1 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(s) available on the award of work, the contractor will have to arrange his working programmer accordingly. No claim whatsoever, for not giving entire site (s) on award of work and for giving site gradually, will be tenable.
- 25.2 If the work is to be executed in occupied/semi occupied buildings. The buildings may be made available in a phased manner by the Engineer-in-Charge in consultation with the Users. The contractor shall take this fact into account before quoting his rates. Nothing extra shall be admissible on this account.

26. LABOUR (REGULATION & ABOLITION) ACT

- 26.1 Contract labour (Regulation & Abolition) Act 1970 is applicable to MES contractors. Rates quoted by the tender shall be deemed to take into account the cost etc., required to comply with the provisions contained in the said act and the rules framed under the said act.
- 26.2 Refer condition 58 of IAFW-2249. The "Schedule of Minimum Wages" as published vide Govt of India Notification as available on date of receipt of tender forms part of these tender documents. However, the contractor shall not pay wages lower than minimum wages for labour as fixed by the Govt, of India/State Govt/Union territory under Minimum Wages Act or contract labour (Abolition and Regulation Act), whichever is higher.

27. RELEASE OF PERFORMANCE SECURITY DEPOSIT

Performance Security deposit deposited by the contractor as per clause 19 of IAFW-2249 shall be released to the contractor after the expiration of the defects liability period (vide Condition No-46 of IAFW-2249) by GE provided always that the contractor shall first have been paid the final bill and have rendered a "No Demand Certificate (IAFA-451).

28. STACK MEASUREMENTS

- 28.1 Refer Special Conditions 20.A.1.2 of MES Schedule Part II.
- 28.2 Soling, Stone chipping for premixed carpet, etc. shall be stacked at suitable level places and their measurements recorded in measurement book and signed and dated by the MES representative and the contractor as a check to ensure that the required quantities have been brought at site for incorporation in the work. No deductions shall be made in the stack measurement for unevenness of ground.
- 28.3 This provision, however, shall not absolve the contractor from providing more materials required to complete the work to the required specification and to repair potholes, cracks, etc. that may occur during rolling.

29. 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 etc.). No reimbursement/refund for variation/in rates of taxes, duties, Royalties, Octroi & other levies, and/or imposition/abolition of any new/existing taxes, duties, Royalties, Octroi & other levies shall be made except as provided in sub para (b) here-in-below.
- (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, 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 rates 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 rates of "taxes directly related to Contract value" with reference to prevailing rates on last due date for 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

SPECIAL CONDITIONS

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 his 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 thereto which he may be in a position to supply. The Contractors shall submit the other documentary proof/information's 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 information's as the GE may require.

(iv) Reimbursement for increase in percentage rates/imposition of "taxes directly related to Contract value" shall be made only if the Contractor necessarily & 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."

(c) Any tender which proposes any alteration to the above condition and/or which proposes the element of Sales Tax separately over and above the quoted lump sum/unit price will be treated as conditional tender and is liable for rejection.

30. ADVANCES ON ACCOUNT OF NON-PERISHABLE MATERIALS WHOSE ESTIMATED COST AT MARKET RATE EXCEED RS. 50.00 LAKHS.

30.1 Add the following in continuation mentioned in the General condition of contract "Provided further, the contractor may be paid advance on account to the full value of the materials which are non-perishable as per GE only, brought on the site, on his furnishing Guarantee Bond(s)/FDRs from a Scheduled Bank to the name of concerned GE for the amount of the retention money which should otherwise be recoverable from him under Contract.

30.2 The Bank Guarantee Bonds shall be executed for a period and on a form as directed by the Accepting Officer. The contractor shall further arrange to extend the period of Guarantee Bond (s) if and when necessary, as directed by the Accepting Officer or shall furnish fresh guarantee bond (s) of similar value in lieu. It will be noted that advance on account to the full value to materials brought on the site is permissible only in respect of fittings and other manufactured items which do not lose their identity. Materials like bricks, aggregate, pre-cast concrete and similar items shall not be taken in the list.

31. CLEANING DOWN (REFER CONDITION 49 OF IAFW-2249)

31.1 The contractor shall clean all floors, walls, remove cement, lime, paint marks/drops etc clean the joinery glass panes etc, touch up all painters work and carry out all other necessary items of work in connection therewith and leave the whole premises clean and tidy before handing over the building. No extra payment shall be claimed by the contractor for this operation.

32. OUT OF POCKET EXPENSES

32.1 No out of pocket expenses incurred by the tender in submitting his tender, will be reimbursed whether his tender is accepted or not.

33. OFFICIAL SECRET ACT

33.1 The contractor shall be bound by the Official Secret Act –1923.

34. CONTRACTOR'S PLANT / EQUIPMENT AT SITE

34.1 The contractor shall furnish to the Engineer-in-Charge every morning distribution return of his plants / equipment on the site of work stating the following particulars :-

(i) Particulars of plants / equipment's and their make, manufacturers Model No. if any, Registration No if any, capacity, year of manufacture and year of purchase etc.

(ii) Total No (Quantity) on site of work.

SPECIAL CONDITIONS

- (iii) Location, indicating No, (Quantity) at each location on the site of work.
- (iv) Purchase value on the date of purchase. For the purpose of the condition, plants /equipment, vehicle No, i.e of trucks and lorries but neither the workman's tools nor any manually operated tools / equipment shall be given. The Engineer-in-Charge shall record the particulars supplied by the contractor in the works diary and send the return to the GE for record in his office.

35. LOSS OR DAMAGE ON A/C OF ENEMY ACTION

If as a result of enemy action the Contractor suffers any loss or damage the Government shall reimburse to the Contractor such loss or damage to the extent and in the manner hereinafter provided :-

- (i) The loss suffered by him on account of any damage or destruction of his plant / equipment [as defined in special condition 35.1 above] or materials or any part or parts thereof. (The amount of loss assessed by the Accepting Officer of the contract shall be final and binding).
- (ii) The compensation paid by him under any law for the time being in force to any workman employed by him for any injury caused to him or to be workman's legal successors for loss of the workman's life.
- (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 in wiring by the GE / OC concerned or in the absence of such orders, reasonable precautions. No reimbursement shall be payable nor shall any compensation be payable for any plant / equipment or materials not lying on site of work at the time of enemy action.

36. STORAGE OF MATERIALS

- 36.1 The contractor shall not be provided with storage accommodation at the site. The contractor shall make his own arrangement as per condition 10 of IAFW-2249 and as directed by the Engineer-in-Charge.

37. BANK GUARANTEE BOND

- 37.1 In case the contractor desires to furnish Bank Guarantee in lieu of retention money/security deposit, the guarantee bond shall be executed as per specimen prescribed by the Govt of India, Min of Defence on non-judicial stamp papers of appropriate value from schedule Bank. In case of the BGB is executed from a non-schedule bank the same shall be supported with cover from Reserve Bank of India. Guarantee Bond shall come into force after the same is accepted by the Accepting Officer.

38. BLANK**39. OUT PUT OF ROAD ROLLER (Reference condition 15 of IAFW-2249)**

- 39.1 Road roller required for the execution of work shall be arranged by the contractor from his own sources without any extra cost of the Govt and a log book for each road roller shall be maintained by him for recording hour of working of the road roller. The entries in the log book shall be signed by the contractor or his authorized representative and by the Engineer-in-Charge.
- 39.2 To ensure proper consolidation, roller must work for at least the number of days assessed on the basis of output given here- in- after. If the roller has not worked for the number of days so assessed recovery shall be effected from the contractor for the number of days failing short of the days assessed on the basis of output stipulated at the rate of Rs. 1800/- per working day of 8 hours for 8 to 12 tone power roller.
- 39.3 The above provision shall not, however absolve the contractor of his responsibility of properly consolidating surfaces as required under the provisions of the contract.
- 39.4 Output of road roller per day of Eight Hours working (8 to 12 tone power roller) :-

SPECIAL CONDITIONS

(a) Consolidation of formation surfaces/sub-grade	-	1850 Sqm
(b) Consolidation of stone soling 23 cm thick with 8 to 10 Tonne Roller	-	518 Sqm
(c) All as per (b) above but 15 cm thick	-	800 Sqm
(d) Consolidation of waterbound macadam (stone metal) 11 cm spread thickness including spreading and consolidation with blinding materials	-	248 Sqm
(e) All as per (d) above but 7.5 cm	-	372 Sqm
(f) Consolidation of single cot surface dressing	-	774 Sqm
(g) All as per (f) above but two coat surface dressing	-	558 Sqm
(h) Consolidation of 2.50 cm thick premixed carpet including seal coat	-	600 Sqm
(j) Consolidation of 2 cm thick premixed carpet including seal coat	-	744 Sqm
(k) Consolidation of bituminous mixture 2 parts of broken stone metal and one part of sand and bitumen, consolidated thickness 4 cms.	-	372 Sqm

40 GUARANTEE FOR ANTI-TERMITE TREATMENT.

- 40.1 Should the GE, at any time during construction or reconstruction or prior to the expiration of period of **ten years** after the certified date of completion of work as per contract finds that buildings have been infested with termites, the contractor shall on demand in writing from the GE ,specifying the building(s) complained or not-with-standing the same may have been inadvertently passed, certified and paid for forthwith under take to carry out such treatment as may be necessary to render (the said building) free from termite infestation at his own expense for period of ten years from the certified date of completion and in the event or failing to do so with in a period to be specified by the GE in his demand aforesaid,

the GE shall undertake such treatment at the risk and expenses in respect of the contractor. The liability of the contractor under this condition shall not extend beyond the period of ten years from the certified date of completion unless the GE has previously given notice to the contractor .Conditions of contract (IAFW-2249) shall be deemed to be amended to the extend as mentioned above.

- 40.2 An amount of security deposit equal to 5% on the amount of anti-termite treatment at rate for the building for which treatment to be carried out subject to minimum of **Rs. 7,500/- (Rupees Seven thousand Five hundred only)** whichever is more shall be retained by the Government from the contractor's payment (i.e final bill) or in form of FDR as security deposit for the efficiency of the anti-termite treatment carried out and will be refunded to the contractor after expiry of the period of ten years from the certified date of completion by the GE provided there are no termite infestation in the buildings.

41 GUARANTEE OF WATER PROOFING TREATMENT TO BUILDINGS IN CONTRACTS INCLUDING SPECIAL WATER PROOFING TREATMENT

- 41.1 Should the GE, at any time during construction or reconstruction or prior to the expiration of period of **ten years** after the certified date of completion of work as per contract finds that there is any defects in the water treatment carried out in buildings, the contractor shall on demand in writing from the GE ,specifying the building(s) complained or not-with-standing the same may have been inadvertently passed, certified and paid for forthwith under take to carry out such treatment as may be necessary to render (the said building) free from any leakage and seepage from water proofing treatment at his own expense for period of ten years from the certified date of completion and in the event or failing to do so within a period to be specified by the GE in his demand aforesaid, the GE shall undertake such treatment at the risk and expenses in respect of the contractor. The liability of the contractor under this condition shall not extend beyond the period of ten years from the certified date of completion unless the GE has previously given notice to the contractor .Conditions of contract (IAFW-2249) shall be deemed to be amended to the extend as mentioned above.

- 41.2 The contractor shall furnish guarantee in favour of the Garrison Engineer for the efficacy of the water-proofing treatment during the guarantee period where the work is got executed through a specialist firm; the contractor shall obtain guarantee from such specialist firm in his favour. The

SPECIAL CONDITIONS

contractor in turn shall furnish guarantee to GE duly endorsing therewith a copy of guarantee secured by him from specialist firm.

- 41.3 The amount shall be retained from final bill or in the form of FDR for an amount equal to as per Clause 40.2 here-in-above.

42. ELECTRICAL LICENSE:

- 42.1 The successful bidder shall obtain a valid Electrical License of required class in their name or shall engage an agency having valid Electrical License of required class through proper agreement / MOU for execution of the subject work / all the electrical works to the extent Rule 29 under Part – III of Central Electricity Authority [Measures Relating to Safety and Electric Supply] Regulation, 2010 is applicable and forming part of the subject work. All the electrical works / electrical component of works shall be executed by you or through such agency only having valid Electrical License of required class. The Electrical License shall be obtained from the concerned authorities of State Government / Union Territory where the works are to be executed. Any violation of this condition shall be sufficient reason for cancelling the contract awarded.
- 42.2 Prior to commencement of electrical work / electrical component of works, copy of valid Electrical License in the name of the contractor or copy of agreement with agency having valid Electrical License along with agency's Electrical License shall be submitted by the contractor to the GE through AGE. If the contractor does not possess valid Electrical License and intends to get the electrical works / electrical component of works executed through agency having valid Electrical License and with whom he has agreement, prior approval of such agency shall be obtained from the GE.
- 42.3 In addition, supervisor for execution of electrical works / electrical component of works employed by the contractor shall possess Supervisor Certificate of competency issued by concerned State Government / Union Territory and the workers / tradesmen for execution of electrical works / electrical component works shall hold necessary Permit issued by the concerned State Government / Union Territory. Reference of Electrical License and details of supervisor's certificate of competency and permit of tradesmen employed for execution of electrical works / electrical component of works shall be duly incorporated in the Works Dairy and relevant site documents respectively for the whole period during which such work is executed.

43. QUALIFIED TRADESMEN (Applicable for Works Costing Rupees One Crore or More)

- 43.1 In compliance with 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)/National Academy of Construction (NAC) Hyderabad and similar reputed and recognized Institutes by State/Central Government, to execute the works of their respective trades. 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 a list of such tradesmen along with requisite certificates to GE 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 tradesman possesses requisite qualification, skill and expertise commensurate with the nature of work, shall be final and binding. No compensation whatsoever on this account shall be admissible.

44. TESTING OF MATERIALS:

- 44.1 The following shall be noted:
- (a) A LEVEL TESTS FOR WORKS COSTING 100 LAKHS AND ABOVE: The contractor shall set up site laboratory for testing of materials (except Sch 'B' materials) for 'A' level tests as listed in Appx 'A'. The contractor shall arrange all equipment/ machines for the tests specified in Appx 'A' as A level tests at his own cost with prior approval of GE. This cost shall be included in the lump-sum costs quoted by the contractor. The contractor shall employ a competent technical representative as approved by the GE for the purpose of

SPECIAL CONDITIONS

testing and all such tests shall be carried out in the presence of Eng-incharge. The successful tests result thereof shall be recorded and signed jointly by the contractor and the Eng-in-charge. The charges for these tests i.e. A level tests carried out in site laboratory of the contractor shall not be recovered. In case, the contractor has not set up the site laboratory and the tests are carried out in zonal or any other laboratory set up/approved by GE, the recovery shall be made at rates applicable i.e. as given in Appx 'A'.

- (b) A LEVEL TESTS FOR WORKS COSTING UPTO 100 LAKHS: The contractor may set up site laboratory at his option for works costing upto 100 lakhs. The other stipulations will be same as specified in preceding para 31.1. However in case the contractor has not set up the site laboratory and tests are carried out in zonal or any other laboratory approved/set up by GE/AGE(I), the recovery shall be made at rates applicable ie as given in Appx 'A'.
- (c) B & C LEVEL TESTS: For tests of 'B' & 'C' level as indicated in Appx 'A', the contractor shall provide all facilities for testing of materials at CTL Jorhat / CTL Shillong or from approved test house/Engineering College at his own cost. The lump sum/rates quoted by the contractor shall deemed to be inclusive of these tests. The rates of various tests conducted in laboratory of MES are indicated in Appx 'A'. The contractor shall bear the actual charges of 'C' level tests (to be done in labs other than MES labs) irrespective of rates indicated in Appx 'A'. Wherever it is convenient to get 'B' level test done at approved test house/Engg. College, the same can be done at the cost of the contractor and no separate recoveries will be made by the Department for the same.

44.2 The recoveries on account of testing charges wherever applicable shall be effected from the running account payments due to the contractor payable after completion of the respective tests or whenever the test is due whichever is earlier.

(SIGNATURE OF CONTRACTOR)
DATE

DCWE(Contracts)
For Accepting Officer

SPECIAL CONDITIONS**APPENDIX –‘A’**

SI No	Material	Tests	Method of testing	Frequency of tests			Level of test	Rate	Remarks
1	2	3	4	5			6	7	8
1	Brick	1) Compressive strength	IS03495 (Part-II)	As per IS-5454 as given under :-			A	330/-	Checks for visual and Dimensional characteristics shall also be carried out as per IS-5454
		2) Water absorption	IS-3495 (Part-II)	Lost size	Sample size	Permissible Nos of defective bricks	A	330/-	A
				1001 to 35000	5	0			
		3) Efflorescence	IS-3495 (Part-I)	10001 to 35000	10	0	A	330/-	
2	Coarse Aggregate	1) Sieve Analysis	IS-3495 (Part-I)	One test for every 15 cum of aggregates of part thereof brought to site.			A	660/-	
		2) Flakiness Index	IS-2386 (Part-I)	One test for every 15 cum of aggregates or part thereof brought to site.			A	250/-	
		3) Estimation of deleterious materials	IS-2386 (Part-I)	One test for every 100 cum of aggregate or part thereof.			A	600/-	
		4) Organic impurities	IS-2386 (Part-I)	One test per source of supply.			C	275/-	
		5) Moisture content	IS-2386 (Part-II)	Regularly as Required			A	330/-	
		6) Specific Analysis	IS-2386 (Part-I)	One test for every 15 cum of FA or part thereof when brought to site.			A	330/-	
3	Fine aggregate	1) Sieve Analysis	IS-2386 (Part-I)	One test for every 15 cum of FA or part thereof when brought to site.			A	660/-	
		2) Test for clay, silt and impurities.	IS-2386 (Part-I)	One test for every 15 cum of FA or part thereof of when brought to site.			A	500/-	
		3) Specific gravity	IS-2386 (Part-II)	One for each source of supply			B	330/-	
		4) Test for organic impurities	IS-2386 (Part-II)	One test for each source of supply.			C	275/-	
		5) Moisture content	IS-2386 (Part-II)	Regularly as required subject to 2 tests / per day when being used.			A	330/-	

SPECIAL CONDITIONS**APPENDIX –‘A’(Contd..)**

1	2	3	4	5	6	7	8
4	Cement	1) Setting time	IS-4031-63 Reaffirmed 1980	Once for each consignment or as and when required.	B	500/-	
		2) Soundness	IS-4031-63 Reaffirmed 1980	Once for each consignment or as and when required.	C	550/-	
		3) Compressive strength	IS-4031-63 Reaffirmed 1980	Once for each consignment or as and when required.	B	550/-	
		4) Fineness	IS-4031-63 Reaffirmed 1980 IS-199	Once for each consignment or as and when required.	C	275/-	
5	Structural concrete	1) Slump test or compacting factor test or VEE-BEE time	IS-119	The Min frequency of sampling of concrete of each grade shall be as under :-	A	300/-	(i) Random sample shall be carried out to cover mixing units.
		2) Compressive strength	IS-516	Qty of conc. In the work (M ³) 1-5 6-15 16-30 31-50 51 and above	No of samples 1 2 3 4 4+1 for each addl 50 CuM. Or part thereof	A	900/- 2) As per IS-456-2000 clause. 14 for frequency of sampling.
6	Cement flooring Tiles / Terrazzo tiles	1) Water absorption	IS-1237 (Appx 'D')	6 Tiles out of 18	B	330/-	Samples 18 tiles from each source of supply selected at Random.
		2) Wet Transverse	IS-1237 (Appx 'F')	6 Tiles out of 18	B	660/-	
		3) Resistance to wear	IS-1237 (Appx 'F')	6 Tiles out of 18	C	1000 /	
7	Timber	1) Specific gravity and weight	IS-1708-1960	Minimum 3 samples from a lot of 4 Cum or 250 pieces of seasoned timber.	B	250/-	
		2) Moisture content	IS-1708-1960		A	250/-	

SPECIAL CONDITIONS**APPENDIX – 'A' (Contd..)**

APPENDIX A (Contd.)								
1	2	3	4	5	6	7	8	
8	Water for Constn purpose	1) Test for acidity	IS-456 & 3015	Once at the state of approval of source of water	B	500/-	Also refer clause 4.3 of IS-456 and its subsequent clauses regarding suitability of water.	
		2) Test for alkalinity	IS-456 & 3015					
		3) Test for solid content	IS-456 & 3015					
9	Welding of steel work	Visual Inspection Test	IS:822-1970 Clause 7.1	100% by visual inspection		750/-	Specialized tests, their method and frequency to be decided on consideration of their importance by the Accepting Officer.	
10	Timber paneled and glazed door/window shutters (including factory made shutter)	(a) Dimensions, sizes workmanship and finish	IS : 1003-1977 (Pt-I)	Frequency of sampling from each lot shall be as under :-		A	240/-	
				1	2			
				Lot size	Sample size			
				26 to 50	5			
				51 to 100	8			
				101 to 150	13			
				151 to 300	20			
				301 to 500	32			
				501 to 1000	50			
				1001 and above	80			
		(b) STRENGTH TE	IS-1303-1990	From each lot 5% of the factory made shutter shall be manufacture tested for strength tests.				
		1) Slamming						
		2) Impact Indentation	IS-1303-1990					
		3) Shock resistance	IS-1303-1990					
		4)Edge loading	IS-1303-1990					

SPECIAL CONDITIONS**APPENDIX –‘A’(Contd..)**

1	2	3	4	5	6	7	8
11	Ply wood (IS-303-1989)	(a) Moisture content	IS-1734-1983 (Part-I)	Six test pieces cut from each of the Boards selected as per table-I shall be subjected to tests	B	500/-	Sampling shall be as per IS-7835-1975 Table-2
12	Veneered wood particle board (Medium Density) IS-3097 – 1985)	(a) Density	IS-635 (Part-I)	Three test specimen from each sample (size 15 mm x 75 mm)	C	125/-	Sampling shall be done as per IS-3487-83 Clause 2 with moisture meter.
		(b) Moisture content	IS-2360 (Part-III)	Three test specimen from each sample (size 150 mm x 75 mm)	A&B	125/-	IS-3487-83 clause 2 with moisture
		(c) Water absorption	IS-2360 – (Part-16)	Three test specimen from each sample (size 300 mm x 300 mm)	A	125/-	Moisture meter.
		(d) Swelling due to surface absorption	IS-2360 (Part-17)	Three test specimen from each sample (size 125 mm x 100 mm)	A	125/-	
		(e) Swelling in water	IS-2360 (Part-17)	Three test specimen from each sample (size 200mm x 100 mm)	A	125/-	
		(f) Modules of rupture	IS-2360 (Part-IV)	Three test specimen as per IS-2380-1977. Three test as per specimens as per IS-2385.	B	180/-	
		(g) Screw withdrawal strength	IS-2360 (Part-IV)	Three test specimens as per IS-2380-1977. Three test specimens as per IS-2385.	C	250/-	
	LEGEND A-Site Lab	B-Zonal Lab	C-National test house / SEMT WING / Engg. College				

SIGNATURE OF CONTRACTOR**Dated: 2024****DCWE(Contracts)
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. 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 MES Schedule - 2009 Part-I and MES Schedule-2020 Part II including errata/amendments as applicable till date 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 Para pertaining to general workmanship for brick work, iron and steel work etc. have not been made but provision therein as required for work are applicable.
- 1.3. 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.
- 1.4. 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.
- 1.5. 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.
- 1.6. 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: -
 - (a) Reinforcement for any RCC member not indicated in the drawings but required in structure or codal requirement.
 - (b) Dwarf wall in situations like verandah, passage etc. not indicated in drawings.
 - (c) Lintels over doors, windows and openings have not been shown in drawings.
 - (d) Builder's hardware for doors/windows etc. though not indicated on drawings but is essential for usage.
- 1.7. 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.

2. MATERIALS

- 2.1 The materials and articles, which have been specified from certain makes/manufacturers, shall be of makes/manufacturers as specified. If the manufacturers specified in tender documents make both ISI marked and conforming to IS specification, the materials/articles shall be ISI marked of specified manufacturers.
- 2.2 The materials and articles, which have not been specified in tender documents by makes/manufacturers, shall be as under:
 - 2.2.1 If ISI marked materials are being manufactured, the same shall be ISI marked. For list of ISI marked manufacturers, refer website of BIS i.e. www.bis.org.in.
 - 2.2.2 If ISI marked materials are not being manufactured, the same shall be conforming to IS specifications.
- 2.3 The relevant Indian Standards shall be of latest revision including amendments of relevant Indian standards of the latest publication (Edition) including amendments/revision thereof without any price adjustment in the quoted lump sum.
- 2.4 A list of certain items for which ISI marked products are available in market and are to be provided in this contract are given in Appendix 'A'.

PARTICULAR SPECIFICATIONS

- 2.5 A list of certain items for which specific manufacturers/make only are to be provided in this contract (other than steel and cement) are given in Appendix 'B'.
- 2.6 Manufactured materials/articles shall be brought at site in original sealed containers/packing bearing manufacturer's marking unless the quantity required is a fraction of smallest packing.
- 2.7 Materials such as bricks, aggregates etc, shall generally conform to the samples kept in GE's office in addition to their conformity with relevant specifications given in the tender documents/latest Indian standards. The sources and sample for all such materials shall be got approved from GE in writing before these materials are brought at site in bulk. The sources of some of the materials as applicable to the place of execution of the work are indicated in Appendix 'C' given here-in-after for the guidance of the tenderer.
- 2.8 Letters conveying approval of samples/materials by Garrison Engineer shall interlia mention sources of supply, name of manufacturer, trade name/brand (if applicable) and reference to clause of tender documents containing specifications of Particular materials.
- 2.9 Contractor at his own may procure materials from any other sources without any extra cost to the Department provided that the same conform to respective IS as stated here-in-before.

3. EXCAVATION AND EARTHWORK

- 3.1 **Preparatory Work :** Before setting out the building and commencing the construction, the contractor shall carry out the preparatory work, such as removal of grass, vegetation etc trimming/surface dressing of the area as per Clause 3.6 and 3.10 of MES Schedule, to the entire satisfaction of Engineer-in-Charge. The area referred to implies the entire building plot extending up to 3 M all around the outer perimeter of the building block. The cost of such work as may be necessary shall be deemed to be included in the contractor's lump sum quoted in Schedule A part-I.

3.2 **Excavation General :**

- a) Unit rate for buildings in Schedule 'A' Part - I shall include for excavation and earth work in any type of soil (Soft/loose and/or hard/dense soil) (Type of soil shall get ascertained by the bidder before quoting of tender either by visiting the site or by GE) . In case other type of strata is met with, it shall be ordered in writing as deviation. For purpose of deviation, rate of excavation and earth work in any type of soil shall be considered as average rate of excavation and earth work in soft/loose soil and hard/dense soil.
- (b) Boulders / rock obtained from excavation shall become property of the contractor for which he will be charged at the rate of Rs 400/- per cum of stacked measurement. The method of measurements shall be as laid down in clause 3.1 on page No 18 & 19 of SSR 2020 Part-II. The measurement shall be properly recorded in MB and signed by the Engr-in- Charge, GE and contractor.
- c) In case timbering to excavation is required and specifically ordered by the GE in writing, it shall be paid as deviation.
- d) Dewatering /pumping of water where required shall be carried out as described in Clause 3.17 of MES Schedule. The cost of such work as may be necessary shall be deemed to be included in the contractor's quoted lump sum.
- e) Blasting in any form is not permitted.

3.3 **Filling in Trenches/under Floors:**

- 3.3.1 The approved earth from excavation in foundations shall be used for filling under floors. The earth for filling shall be free from all debris, bricks bats/stones, vegetation etc.. Any additional earth required for the purpose of filling shall be arranged by contractor from outside of Ministry of Defence land without any extra cost to the department.
- 3.3.2 Filling under floors/sides of trenches shall be in layers n. exceeding 25cm thick and each layer shall be watered, compacted and rammed as approved and directed by the Engineer-in-Charge.
- 3.3.3 Surplus soil if any after re-use in respect of work under schedule 'A' part-I shall be removed and spread at places as directed by the Engineer-in-Charge, not exceeding 1.50 Km . Cost of the same shall deemed to be inclusive in quoted lump sum of schedule 'A' part-I.

3.4 **Trenches for Foundation and Pipes :**

- 3.4.1 The excavation shall be restricted to dimensions shown in the MES Schedule. Excavation made, in excess of required depth, shall be made good by the contractor with cement concrete (1:5:10) type D-2 without any extra cost to the Govt.
- 3.4.2 The beds of the trenches shall be watered and well rammed and any depressions thus formed shall be filled with approved earth as required to level and slope as directed by Engineer-in-Charge.

PARTICULAR SPECIFICATIONS**3.6 Foundation and Plinth**

- 3.6.1 The lump sum of works under Schedule 'A' Part I shall be for the construction of buildings as per the contract drawings. Any change in foundation/plinth, necessitated due to undulating ground, which may have to be carried as per the decision of the GE, shall be adjusted through a proper deviation order.
- 3.6.2 For the purpose of reckoning the depth of the foundation, the average level of the ground after surface excavation/dressing shall be considered.

3.7 Hard Core:

- 3.7.1 The material for hard core shall be of broken/crushed stone to gauge n.exc. 63 mm available, best quality and as per sample kept in GE's office.
- 3.7.2 Hard core shall be of stones/boulders (broken to gauge) not exceeding 63mm. Hard core shall be deposited, spread and leveled in layers not exceeding 15cm thick and well watered, rammed to a true surface and compacted. The thickness of the hard core specified or indicated in the drawings is the thickness after consolidation and where not specifically mentioned, it shall be 100 mm consolidated thickness.

3.8 Trenches for Electrical Cables

- (i) The trenches shall be excavated in reasonably straight lines. Wherever there is a change in direction, a suitable curvature shall be adopted complying with the requirements of above clause of radius of cable.
- (ii) Where gradients and changes in depth are unavoidable, these shall be gradual.
- (iii) The bottom of the trench shall be level and free from stone, brick bats etc.
- (iv) The excavation should be done suitable means manual or mechanical. The excavated soil shall be stacked firmly by the side of the trench such that it may not fall back into trench.
- (v) Adequate precautions should be taken not to damage any existing cable(s), pipes water lines communication lines or any other installations in the route. The approval of EIC/Ge shall be taken when cover or bricks are encountered. However, if the same is damaged, the contractor with its own coat shall repair the damaged cable as per standard engineering practice as per standard codal provision and MES SSR Pt-I.
- (vi) If there is any danger of a trench collapsing or endangering adjacent structures, the sides should be well shored up with sheeting as the excavation proceeds. Where necessary these may even be left in place when backfilling the trench.

4 CEMENT

- 4.1 **TYPE OF CEMENT** :- The Cement used shall be of 43 grade Ordinary Portland cement conforming to IS : 8112 – 1989 or Portland Pozzolana cement conforming to IS : 1489 –Part-I : 1991 Specification for Portland Pozzolana cement ,Part-I fly ash based. Cement bags shall bear ISI certification mark and date of manufacture.

- 4.2 The following checks and procedure shall be followed before the cement supplied by the contractor is accepted and is approved for incorporation in the work :-

- 4.2.1 **PROCUREMENT** : The Cement supplied by the contractor will be procured from main producers of cement as per given Appx-B if total requirement in the work is more than 1200 Bags. The particulars of cement along with the date of manufacture shall be given by the contractor for every lot of cement separately. The documents in support of the purchases of cement shall be verified by the Engineer-in-Charge and GE.

The contractor shall furnish the particulars of the manufacturers of cement alongwith the date of manufacture to the GE for every lot of cement separately. The documents in support of the purchases of cement shall be verified by the site staff and GE. **The cement so brought shall be fresh and in no case older than 60 days from the date of manufacture.** Before placing the order for cement by the contractor, he shall obtain written approval from the GE regarding name of manufacture, quantity of cement etc. Based on the CPM Chart finalized, monthly requirement of cement and the proposed date wise Schedule of deliveries for bringing the cement at site shall be worked out by the contractor and the same shall be submitted to the GE for information and approval. The cement shall be consumed in the work within three months after receipt. Cement shall conform to the requirements of IS specification and each bag of cement shall bear relevant ISI Mark. The weight of each consignment shall be verified randomly by the GE and recorded. The content of cement shall be checked at random to verify the actual weight of cement per bag.

4.2.2 USE OF PPC

For using PPC, the following requirements should be met :-

- (a) PPC should meet the strength criteria of 43 Grade OPC as laid down in IS-8112-1989.
- (b) The minimum period for curing and striking off form work shall be as under in lieu of that specified in clause 4.11.6.3 of MES Schedule Pt-I :-

PARTICULAR SPECIFICATIONS

	Curing : - Structural RCC work, PCC work, Plastering etc	:	14 days
	Striking off Formwork from Walls, columns and vertical sides of beams	:	3 to 4 days
	Slabs (Props left under)	:	14 days
	Beams soffits (Props left under)	:	14 days
	Removal of props to slab/beam		
(aa)	Spanning upto 6 M span		16 days
(ab)	Spanning beyond 6 M span		22 days
(vi)	For cantilever portion of slab form work with support shall be retained until the completion of the casting of the entire frame work of the building.		

(c) Mixing of OPC & PPC shall not be permitted in the same buildings except for plaster and mortar. **In RCC overhead tank and underground / semi-underground water tanks, only OPC shall be used.**

(d) While procuring PPC, the following requirements are to be ensured and certificate to the effect is to be obtained by the contractor for each batch from the manufacturer and the same shall be submitted to the GE for approval to procure PPC.

- (i) The quality of fly ash is strictly as per IS-1489 (Part-I) - 1991 and as amended up to date.
- (ii) Fly ash is inter-ground with clinker not mixed with clinker.
- (iii) The fly ash content in PPC does not exceed the limits laid down in IS-1489 (Part-I)- 1991 and as amended up to date.

4.2.3 TESTING OF CEMENT

The manufacturer/ main producer shall carry out inspections and testing of cement in accordance with the relevant BIS provisions. The Contractor shall submit the Manufacturer's Test Certificate alongwith 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. The Engineer-in-Charge shall record these details in the Cement Acceptance Register (Annexure 'IV') given here in after, after due verification. The GE shall also organize independent physical testing of random samples of cement drawn from each lot from Command Test Lab or Zonal lab as per relevant BIS and record the results in the relevant portion of Cement Acceptance Register (Annexure 'IV'). The random samples of cement to be tested shall be drawn as per MES Quality Assurance Manual (It may be seen in any zonal CE office).. The cost of materials for testing, samples, conveyance etc shall be borne by the contractor irrespective of the test result. However the cost of testing charges shall be governed in terms of condition 10(A) of IAFW 2249. In case as per the result of independent test, the cement is found to be not of requisite standard despite manufacturer's test certificate, the contractor shall remove the total consignment from the site within 24 hrs at his own cost after written rejection order of consignment by the GE.

4.2.3.1 The record of random samples selected by the GE for testing shall be properly maintained in the cement testing register giving cross reference to relevant consignment of cement and quantity received etc.

4.2.3.2 The contractor shall be required to set up adequate testing facilities at site to the entire satisfaction of GE for conducting setting time test and compressive strength test as per BIS for the samples collected from the lot brought at site. These tests shall be carried out within 7 days of receipt of cement at site. The test can alternatively be carried out at the Zonal laboratory, or Command Test Lab so designated by GE. Cost of tests at Zonal Lab shall be borne by the contractor.

The contractor shall be allowed to use the cement only after satisfactory compressive strength of 7 days. 7 days strength will be relied upon to accept the lot of cement; 28 days compressive strength test will be final criteria to accept/reject the lot.

4.2.4 **STORAGE** : A temporary cement storage shed of appropriate capacity shall be constructed by the contractor at the site for keeping the consignments of cement as and when brought at site. The cement shed shall meet the following requirement :-

- (a) The roof, walls, doors, windows, ventilators of Storage accommodation shall not allow any leakage, seepage and dampness.
- (b) Suitable dunnage of height not less than 200mm shall be provided to prevent

PARTICULAR SPECIFICATIONS

deterioration due to moisture or intrusion of foreign matters.

(c) Each cement consignment shall be staked separately, similarly the tested and untested cement shall be segregated and stored separately with distinct identification.

(d) Cement bags shall be stacked at least 200mm away from the walls and adequate protective top cover shall also be provided.

(e) Stacks in no case shall be higher than 10 bags and the stacks shall be arranged in header & stretcher fashion.

(f) The cement godown shall be provided with two locks at each door. The key of one lock at each door shall remain with Engineer-in-Charge and the key of the other lock with contractor or his authorized agent at site of works so that cement is removed from the go down as and when required with the knowledge of both the parties.

(g) The store shed shall be inspected once a day for ensuring proper preservation of cement bags & also for the purpose of taking out cement as per daily requirement.

4.2.5 **DOCUMENTATION** : The contractor shall submit original vouchers from the manufacturer for the total quantity of cement supplied under each consignment to be incorporated in the work. All consignments received at the work site shall be inspected by GE and documents verified before acceptance. The original vouchers and the Test Certificates shall be defaced by the Engineer-in-Charge, signed by contractor 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. This register will be signed by JE, 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 cement shall also be suitably recorded in the Measurement Book (Not to abstracted) for record purposes before incorporation in the work and shall be signed by the Engineer-in-Charge and the Contractor.

4.2.6 **WATER PROOFING COMPOUND**

4.2.6.1 Wherever water proofing is specified/indicated on Sch 'A', provide water proofing with water proofing compound mixed with cement concrete/plaster mortar by adding integral water proofing compound (conforming to IS-2645-1975 specification for integral cement water proofing compound) as per the manufacturer's instructions. In case of deviations, the same shall be considered at 3% by weight of cement.

4.3 to 4.5 BLANK

4.6 **SPECIFICATION FOR DESIGN MIX CONCRETE M-25/30 GRADE**

4.6.1 This shall be done as per clause No 4.11.2.1 on page 60 and 61 of MES SSR Part-I. Volumetric mixing of concrete will not be permitted. Weigh batching alongwith system of measured water either through calibrated pump or calibrated tank is to be adopted strictly for all design mix concrete work.

4.7 **BATCHING**

Irrespective of what is specified in MES SSR and else wherein these tender documents, **weigh batching & mixing** shall be carried out for all design mix concrete mixture with computerized weight batching and automated water control system with printout facility. Volumetric mixing of concrete will not be permitted. Weigh batching along with system of measured water either through calibrated pump or calibrated tank is to be adopted strictly for all design mix concrete work.

PARTICULAR SPECIFICATIONS**4.8 MIX PROPORTION AND STRENGTH**

(i)	Strength to be achieved	As per IS-456-2000
(ii)	Type of cement	As per clause 4.1 here-in-before
(iii)	Target mean strength of cement concrete	To be taken as per mix designed as per IS-10262 clause 2.2
(iv)	Aggregate/cement ratio by weight	As per mix design based on IS 10262 and IS-456-2000
(v)	Workability	As per clause 7.1 of IS-456-2000 slump shall be 25 mm to 75 mm compacting factor 0.85 to 0.92
(vi)	Max free water cement ratio	As per mix design based on IS-10262 and IS-456-2000
(vii)	Degree of quality control	Good (Refer Appx 'A' of IS-10262)
(viii)	Durability	Exposure - Moderate
(ix)	Minimum cement content	(a) For OPC:- 370 Kg/Cum for M-25 grade concrete, 390 Kg/Cum for M-30 grade concrete and 410 Kg/cum for M-35 grade concrete (b) For PPC:- -385 Kg/Cum for M-25 grade concrete, 405 Kg/Cum for M-30 grade concrete and 425 Kg/cum for M-35 grade concrete
(x)	Type of aggregate	Crushed stone aggregate
(xi)	Max nominal size of aggregate	20mm or as specified

NOTE

- (i) In case there is any variation of cement content between design mix approved and minimum cement indicated here-in-before, there shall be no price adjustment for the same and contractor shall have no claim what so ever for using more quantity of cement
- (ii) If cement contents as per actual mix design are worked out lower than minimum cement content indicated here-in-before, the contractor shall have to provide minimum cement content indicated here-in-before and nothing extra shall be payable on this account.
- (iii) Lump sum amount quoted by the contractor shall deemed to be include the cost for quantity of cement as per design mix and nothing extra on this account shall be admissible
- (iv) No element of wastage of cement shall be allowed while working out the cement consumption details for design mix concrete work.
- (v) Mix design shall be prepared based on SP-23, handbook on concrete mixes and IS-10262. Recommendations guide lines for concrete mix design.

4.9. APPROVAL OF DESIGN MIX

(a) Soon after commencement of work, contractor shall arrange the design mix. Design mix concrete shall be got carried out from Govt Approved Lab/Govt Institutions/IIT/NIT/Command Test Lab. Cost of designing the mix shall be borne by the Contractor. Cost of designing the mix in Command Test laboratory shall be Rs 5000 per design mix and shall be recovered from RARs/final bill. For testing at Command Lab, cost of materials and transportation shall borne by the contractor. **The design mix shall be got approved from GE before implementation in the work.** In case contractor fails to submit the samples of design mix soon after commencement of work, the delay shall solely be attributable to the contractor and no claim of whatsoever nature shall be admissible on this account.

(b) As soon as possible after receiving the design mix from the above agency same shall be verified at site by casting the final cubes.

(c) Frequency of sampling shall be as per clause 15 of IS-456. Each sample shall consist of three numbers of preliminary test cubes (except as stated in para (d) below) of size 15x15x15 cm, and shall be made as per clause 2.8, 2.9 and 2.10 of IS-516. The concrete cube shall be tested as per IS-516 at site laboratory. The cubes will be tested after 28 days from the date of casting.

(d) One sample for every design mix in the initial stage shall consist of seven numbers of preliminary test cubes of size 15x15x15 cm, and shall be made as per clause 2.8, 2.9 and 2.10 of IS-516. The concrete cube shall be tested as per IS-516 at site laboratory. Out of seven cubes, three will be tested after seven days (on 8th day) from the date of casting and three will be tested after 28 days from the date of casting & one No. cube shall be kept for record.

(e) The test after seven days (ie on 8th days) is intended only to give an early indication of the strength likely to be achieved. The strength thus achieved should be comparable with the above design mix report with specified design parameter. However, 28 days compressive strength shall alone be the criterion for acceptance and rejection of the concrete.

(f) GE can also carryout seven days strength test of more samples at his option. However if the

PARTICULAR SPECIFICATIONS

test report is found satisfactory, then the cost of testing including cost of cubes shall be borne by the Deptt. But if the result is found unsatisfactory, then the cost of cubes and cost of testing shall be borne by the contractor. The cost of conveyance of test cubes shall however be borne by the contractor in all cases.

(g) On the result of the above test, the mix actually to be used shall be agreed to and approved by the GE. The approval of the GE shall not relieve the contractor of his responsibility for obtaining the required minimum strength of quality concrete in the works.

(h) All testing charges including cost of cubes, conveyance, etc shall be born by the contractor except that the cost of optional seven days test be regularized as stipulated in para (f) here-in-before.

4.10 ACCEPTANCE CRITERIA

(a) The contractor shall be deemed to comply with the strength requirement as per clause 16 of IS-456.

(b) Whenever there is any change in the type of grading of material, the mix should be rechecked and modified suitably to the desired compressive strength.

(c) Standard deviation to be rechecked after collecting the result of actual concrete work (compressive strength actually achieved at site) to review for Design mix.

4.10.1 Testing of cubes shall be carried out at the site laboratory as per **Annexure 'I'**

PARTICULAR SPECIFICATIONS**Annexure 'IV'****CEMENT SUPPLY & ACCEPTANCE REGISTER**

- 1 CA No & Name of work :
- 2 Control No*
- 3 Name of manufacture/Brand Name/Gde of cement (A) Manufacture _____ (b Brand _____ (c) Grade _____
- 4 Qty of cement & Lot No/Week No (in Bags) : Qty _____ (b) Lot No/Week No _____
- 5 Manufacture's test certificates No _____
- 6 Random test Details (a) Physical test report from _____ vide their letter No _____ (Name of Approved Lab/Engg College)
(b) Chemical test report from _____ vide their letter No _____ ((Name of approved Lab/Engg College)
- 7 Details of physical & chemical properties :-

	Physical Requirements (As per IS 4031)									Chemical Requirements (As per IS 4031)								
	Specific Surfaces Area (Sqm/Kg)	Soundness by Le Chatelier	Soundness by Auto Clave	Initial Setting Time (Minute)	Final settings Time (Minute)	Compressive strengths (Mpa)			Temp during testing° C	Standard consistency (%)	Lime saturation factor (Ratio)	Alumina Iron Ratio (Ratio)	Insoluble Residue (%)	Magnesium (%)	Sulphuric Anhydride (%)	Loss on ignition(%)	Alkalies (%)	Chlorides (%)
						03 days	07 days	28 days										
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
As per relevant IS																		
As per manufacture's test certificate																		
As per random test																		

Remarks with Signature

Accepted/Rejected

Contractor

Junior Engineer

Engineer-in-Charge

GE

Remarks of BOO/Inspecting Officer/CWE

* To be allotted serially by the GE consignment wise

SIGNATURE OF CONTRACTOR

DATE : _____

DCWE(Contracts)

FOR ACCEPTING OFFICER

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PARTICULAR SPECIFICATIONS**5. WORKMANSHIP**

- 5.1. To determine acceptable standard of work and workmanship and also with a view to implementing necessary changes, if required (through deviation) in final finished and in layout of fittings etc the contractor shall execute and complete various stages of work viz. excavation, foundation concrete, walling up to plinth/lintel/roof levels, roofing, flooring, joinery, finishes, services (i.e. Internal electrification/water supply), plumbing and sanitary fittings and the like under the close supervision to the Engineer-in-Charge and in accordance with instructions issued to the contractors from time to time by the GE or Engineer-in-Charge.
- 5.2. Sample of workmanship for each stage of items required in the execution of work shall be examined and approved by the GE from time to time immediately after completion of the respective stage of each time of work or a portion thereof. On such approval the said work shall be suitably identified and marked as directed by the GE and signed by both the GE and contractor's authorized representative. Approved sample shall serve as guiding sample of workmanship for further works to be executed which (i.e. further works) shall generally conform to or shall be superior to the approved sample.

6. CONCRETE

- 6.1. **Coarse Aggregate** : Coarse aggregate for all concrete shall be graded crushed hard granite, trap or basalt stone as approved by the GE and shall conform to the requirements laid down in clause 4.4 of MES schedule Part I. Hand broken stone aggregate shall not be permitted for use in the work. Size and grading of aggregate shall be as per clause 4.4.7.1 of MES Schedule Part I.

5.5.1 Grading of Coarse Aggregate : Graded aggregate of nominal sizes given hereunder, shall be used, unless specified otherwise, in the specifications here-in-after :-

- (a) Reinforced Cement Concrete (Nominal mix)
 - (i) Under 30mm thickness : 12.5mm graded
 - (ii) 30 to 80mm thickness : 20mm graded
 - (iii) Exceeding 80mm thickness : 25mm graded
- (b) Reinforced cement concrete (Design mix) : As per design Mix approved.
- (c) Plain Cement concrete in Foundation of Brick/Stone, Walls, Pillars, Floors & Sub-base to Floors.
 - (i) Under 30mm thickness : 12.5mm graded
 - (ii) 30 to 80mm thickness : 20mm graded
 - (iii) Exceeding 80mm thickness : 40mm graded

- 6.2. **Fine Aggregate**: Fine aggregate for all concrete work shall be naturally occurring river sand conforming to the specification in Para 4.4.7.2 of MES schedule Part I. Use of sand conforming to grading Zone IV of IS 383 (1970 second revision or as amended) shall not be allowed for RCC works.

- 6.3. **Water** : Water shall conform to the requirement stipulated in IS-456 and as per Clause 4.9 of MES Schedule (Part-I).

- 6.4. The type and grade of concrete shall be as shown on drawings. In case of any discrepancy between structural and architectural drawings the provisions in structural drawings in respect of type and grade of concrete shall supersede. If the details are missing on drawings concrete shall be of following mix/grade at the situation mentioned below: -

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PARTICULAR SPECIFICATIONS

SRL No.	SITUATION	MIX AND TYPE OF CONCRETE
(a)	Lean concrete under brick foundation	PCC M-7.5 (Nominal mix) using 40 mm Graded (machine crushed or hand broken) stone aggregate.
(b)	PCC for plinth protection, sub base of floor and drain	PCC M-10 (Nominal Mix) using 20 mm graded (machine crushed) stone aggregate.
(c)	PCC in all other location not specified elsewhere	PCC M-15 (Nominal Mix) using 20 mm graded (machine crushed) stone aggregate.
(d)	All RCC works (except water retaining Str).	M-25 (Design mix) using 20mm graded (machine crushed) stone aggregate.
(e)	All RCC works (in water retaining Str).	M-30 (Design mix) using 20mm graded (machine crushed) stone aggregate.

6.5 CONSOLIDATION OF CONCRETE : All reinforced cement concrete shall be consolidated by mechanical vibrators or as specified in other technical documents. Consolidation by tamping may be resorted to with the prior permission of GE in writing in locations where it is not practicable in the opinion of GE to operate the vibrator or where quantity of concrete is small. Care shall be taken to ensure that concrete is not over vibrated so as to cause segregation.

6.6 PLACING AND COMPACTION OF CONCRETE

6.6.1. Concrete shall be transported immediately after mixing without delay and incorporated in works at the position of laying as early as possible from the time of discharge from the mixer. Concrete shall be deposited and spread to such depths that when compacted and finished it shall conform to the grade and cross section required and to ensure the thickness required.

6.6.2. In order to obtain adequate compaction the concrete shall be spread so as to stand proud of the finished level and produce a surcharge with in screed and internal vibrator.

6.7 Period of curing and striking off form-work for concrete with ordinary Portland cement shall be as given in IS 456:2000. The minimum period before striking off formwork while using PPC cement shall be increased suitably as directed by GE. Contractor shall note that no compensation whatsoever for such increased time of striking off formwork shall be admissible.

6.8 Sampling and testing of concrete shall be carried out for concrete of all design mixes and Nominal Mixes except in cases where the total quantity of concrete work in the contract as a whole is less than 5 cubic meter, by drawing sample (each sample comprising of 3 test specimen for the particular strength) test of the frequency given here in after.

CONCRETE IN THE WORK CUM/DAYS WORK	No. OF SAMPLES
01-05	1
06-15	2
16-30	3
31-50	4
51 and above additional	4 plus one sample for additional 50 cum or part thereof.

NOTE :-

- (i) At least one sample shall be taken from each shift.
- (ii) Testing charges of all concrete cubes including the cost of materials, cost of Transportation and testing charges shall be borne by the contractor.

6.9 BATCHING & MIXING : Concrete for all PCC and RCC design mix shall be mixed in hopper type

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PARTICULAR SPECIFICATIONS

concrete mixture unless otherwise specified and ingredients shall be measured by weight using weigh batchers.

6.10 Cast in Situ/Precast Articles:

(a) PCC cills, RCC shelves may be cast in situ or pre-cast at the discretion of the contractor. In the event of deviation with regard to these items, pricing shall be done at appropriate rate in SSR for cast-in-situ articles. Top of such pre-cast articles shall be distinctly marked.

(b) Unless otherwise specified all pre-cast concrete articles shall be set and jointed in cement mortar (1:4).

6.10.1 Pre - cast RCC Jallies : It shall be provided wherever indicated and as shown on drawings. Pre - cast RCC jallies shall be set in cement mortar 1:3. Thickness of jallies shall be as indicated on the drawing(s). Where thickness is not indicated, it shall be 50mm thick.

6.11 Throating/Weathering: Throating to projections of RCC/PCC beyond external faces of the walls where shown on drawings and where RCC chajja are not provided with downward fascia, shall be formed in the concrete while casting, by planting fillets/bar of 20mm diameter in the form work and finished smooth.

6.12 RCC Chajja: RCC chajja shall be provided as per details shown on drawings.

6.12.1 The top surface of chajjas shall be finished with 10mm thick cement plaster in cement mortar (1 : 3) with mixture of approved water proofing compound as per manufacturer's instructions while the concrete is green viz before the final setting time. 75mm PCC M-15 (Nominal mix) using 12.5mm graded stone aggregate shall be provided at the junction of wall and chajjas before external plastering, 10mm wide 5mm deep vertical groove shall be provided between RCC and brick wall. Chajjas shall be casted monolithic along with the casting of lintel band/beam.

6.13 Lintel: Lintel shall be provided over openings as per details given in TD/Main drawings.

6.14 Concrete Filling: Where the required height of wall openings, is not obtained with adequate size of bricks, the same shall be obtained by providing PCC of grade M-10 (Nominal Mix)(12.5 mm graded aggregate). The filling with plaster shall not be carried out.

6.15 Bearing of RCC Structural Members: All RCC beams/rafters resting on Brick wall shall be provided with PCC bed blocks cast in PCC of grade M-15 (Nominal mix) . Bed blocks shall be twice the width of beams in length covering the entire thickness of wall and of depth 150mm, unless otherwise shown on drawings. The bearing of lintels shall comprise of full PCC block with vertical joints in brick work staggered. No treatment shall be provided under bearing of RCC bands.

7.0 PLINTH PROTECTION :

Plinth protection where indicated shall be in 50 mm thick PCC M-10 (Nominal mix) using 20 mm graded stone aggregate over 75 mm thick hard core of broken brick aggregate of gauge not exceeding 63 mm over 30 cm compacted earth filling in layers over rammed earth along with PCC saucer drain 25cm wide all as shown in drawing on all sides of buildings. Irrespective of whatever shown on drawing the width of plinth protection (including drain) shall be 1000 mm (750 mm plinth protection and 250 mm width of drains) from external face of wall. Top of plinth protection concrete shall be finished fair without using extra cement. Construction joints shall be provided at 3 meter intervals and at corners with 50 mm deep and 10 mm wide joints as specified in clause 13.32.3 of MES Schedule Part I. **The joints shall be filled with bituminous sealing compound grade 'A' of make specified in Appex'B' of PS.**

8.0 FORMWORK:

8.1 Refer clause No 7.15 on pages 142 of MES Sch Part –I. Form work shall be of **STEEL ONLY** unless otherwise specified for sides, bottom, surface including Telescopic, adjustable type steel props for all type of main structural member of buildings. The main structural member shall be as per standard engineering practice and related Indian Standard amended time to time.

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PARTICULAR SPECIFICATIONS

However contractor may use plywood shuttering (surfaces) for lintel, lintel bands, chajjas, facias, fins, railings without any price adjustment.

8.2 Shuttering, props and Design of formwork shall be got approved by the Engineer-in-Charge before commencement of work and recorded in works passing register.

8.3 All propping and centering should be either of steel tubes with extension or built up sections of rolled steels. Steel props shall rest firmly on steel plates / wooden planks/PCC solid surface. The contractor will ensure that there is no uneven settlement below the steel plates / wooden planks/PCC solid surface, if any undulation found it will be corrected by him without any extra cost. **The bricks shall not be used below vertical props to adjust / makeup length of props.** The props consisting of ballies / bamboos or brick pillars as mentioned in clause no 7.15.4 of MES schedule Part I shall not be permitted to use. Quality assurance measures (in accordance with IS 456-2000): Quality Assurance Measures as laid down in clause 10, 11, 12, 13, 15, 16 and 17 of IS 456 – 2000 shall be strictly followed.

8.4 CENTERING/STAGING

8.4.1 Staging should be as designed with required extension pieces as approved by EIC to ensure proper slopes, as per design for slabs/beams etc and as per levels as shown in drawings . All the staging shall be either of tubular steel structure with adequate bracings as approved or made of built up structural sections from structural steel sections.

8.4.2 In case of structures with two or more floors , the weight of concrete, centering and shuttering of any upper floor being cast shall be suitably supported on one floor below the top most floor already cast.

8.4.3 Form work and concreting of upper floor shall not be done until concrete of lower floor has set at least for 14 days.

8.4.4 The bidder shall be responsible for the failure of formwork due to lack of its structural stability and strength. Nothing can be admitted in this regard. The bidder is also requested to take prior approval regarding its stability and strength before commencing any further work from GE. Irrespective of above, in case the formwork fails, contractor should make the formwork correct without any extra price adjustment.

8.5 SHUTTERING

8.5.1 Shuttering used for concreting should be sufficiently stiffened. The shuttering should also be properly repaired before use and properly cleaned to avoid stains, honey combing, seepage of slurry through joints etc.

8.6 GENERAL REQUIREMENT OF FORMWORK

8.6.1 The formwork shall be rigid and so constructed as to retain the shape and dimensions of the member being cast. It shall have sufficient strength and rigidity to withstand the load of concrete, vibrations, movement of men, materials and plants and any other incidental loads without excessive deflection beyond permissible limits. Before concreting is started, the props and wedges shall be thoroughly checked to see that these are intact, and are not loose. While concreting is in progress, a constant watch shall be kept on the props and immediate remedial measures taken as soon as any of these gets loosened. Care shall be taken that props and wedges do not get loose for the minimum period specified for the removal of formwork.

8.6.2 In case of multi-storeyed structures, the weight of concrete and formwork of any upper floor shall be suitably supported on at least two floors below the same.

8.6.3 In case the height of centering exceeds 3.50 metres, the props may be provided in multi-stages. All the

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PARTICULAR SPECIFICATIONS

props shall be firmly braced in both directions horizontally.

8.6.4 All bolts and nuts shall be countersunk and well ground to provide a smooth plain surface on metal forms.

8.6.5 Where concrete is required to have a rounded edge, beveled edge or moulded edge, provision shall be made in the form itself. Opening for fan clamps and other fitting connected with services shall be provided in the shuttering as directed by the EIC.

8.7 SURFACE TREATMENT TO SHUTTERING

7.7.1 Forms shall be thoroughly cleaned of all dust, dirt, wood shavings and other matter by washing with water. The surface shall then be coated with **soap solution** before concreting is done. Soap solution shall be prepared by dissolving yellow soap in water to get consistency of paint. Alternatively a coat of raw linseed oil/refined pale paraffin mineral oil of approved manufacturer may be applied. Care shall be taken that the coating does not get on construction joint surface and reinforcement bars. It shall also not cause softening or permanent staining of concrete surface nor shall impede the wetting of surfaces to be water-cured. Special care shall be taken in case of small grooves. The form strips shall be oiled coated thoroughly so as to prevent swelling of the forms and consequent damages to the concrete on removal of forms.

8.8 ERECTION OR ASSEMBLY OF FORMS

7.8.1 Formwork shall be erected true to line, vertical or battered to proper slope as required and free from twist. It shall be so assembled as to facilitate easing, and removal of the various parts in proper sequence without jarring the concrete. For columns etc., where concreting is done in stages one side of the formwork shall be made in suitable parts and shall be capable of being fixed securely and quickly in position. The complete formwork for its stability and its positions shall be inspected and approved by the EIC before placing reinforcement and laying concrete. The formwork shall conform to the shapes, lines and dimensions as shown on the drawings or as indicated, within the tolerance given under clause no 7.15.8 of SSR Part-I.

8.9 STRIKING/REMOVAL OF FORMS

7.9.1 Forms shall be removed gently. They shall be eased carefully in order to prevent the load being suddenly transferred to concrete. The minimum period that shall elapse after the concrete has been laid and before form work is eased and removed is given in section-4: Concrete, for ordinary Portland cement and should be in accordance with provisions of latest IS 456.

Notes :-

1 : For other types of cement, the stripping time recommended for ordinary Portland cement may be suitably modified. If Portland pozzolana or low heat cement has been used for concrete, the stripping period will be increased suitably as indicated or directed by EIC.

2 : The number of props left under, their sizes and disposition shall be such as to be able to safely carry the full dead load of the slabs, beams or arch as the case may be, together with any live load likely to occur during curing or further construction.

3 : For rapid hardening cement periods will be suitably decreased as indicated or directed by EIC. However for vertical side of slabs, beams and columns forms should be retained for at least 24 hrs.

4 : In case of cantilever slabs and beams , the centering shall remain till structures for counter acting or bearing down have been erected and have attained sufficient strength.

5 : Proper precautions should be taken to allow for the decrease in the rate of hardening that occurs with all types of cement in cold weather and accordingly stripping time shall be

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PARTICULAR SPECIFICATIONS

increased.

6 : Work damaged through or careless removal of forms shall be reconstructed.

8.10 REUSE

Before reuse, the forms shall be thoroughly scraped, cleaned and joints gone over and repaired where necessary. Inside surface shall be retreated to prevent adhesion of concrete.

8.11 INSPECTION OF FORM WORK

The completed form work shall be inspected and approved by the EIC before the reinforcement bars are placed in position. Proper form work should be adopted for concreting so as to avoid honey combing, blow holes, grout loss, stains or discolouration of any defects of concrete etc. Proper and accurate alignment and profile of finished concrete surface shall be ensured by proper designing and erection of form work which will be approved by EIC. Shuttering surface before concreting should be free from any defect/ deposited and fully cleaned so as to give perfectly straight smooth concrete surface. Shuttering surface should be therefore checked for any damage to its surface and excessive roughness before use.

8.12 EXPOSED SURFACE OF CONCRETE.

8.12.1 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.

8.12.2 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.

8.12.3 Exposed surface of columns, beams, lintels, bands and similar items which are not covered under clause 6.1.1 & 6.1.2 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.

8.12.4 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.

8.12.5 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 Schedule 'A', Section-I.

9. BRICK WORKS**9.1 Materials**

(a) **FLY ASH BRICKS** : Fly ash bricks shall be cement bonded and shall have smooth rectangular spaces with sharp and square corners. The bricks shall be free from any honeycombing and other defects. Bricks shall be machine moulded and shall be made from the mixture of suitable good quality of fly ash, sand and cement and other required materials as per the latest relevant IS code (IS 12894:2002). The shape and size of bricks are as per latest IS code (IS 12894:2002). The size of bricks is of non-modular type.

The bricks are being tested for following **physical characteristics** :

(a) Compressive strength (minimum crushing strength 75 Kg/CmSq): Tested as per IS 3495 (Part-

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PARTICULAR SPECIFICATIONS

l). The wet compressive strength of any individual brick shall not fall below the minimum average wet compressive strength specified for the corresponding class of bricks by more than 20 percent.

(b) Drying Shrinkage: The average drying shrinkage of the bricks when tested by the method described in IS 4139, being the average of three units, shall not exceed 0.15 percent.

(c) Efflorescence Test (efflorescence shall be "Moderate"): The bricks when tested in accordance with the procedure laid down in IS 3495 (Part-3), shall have the rating of efflorescence not more than "moderate" up to class 12.5 and „slight“ for higher classes.

(d) Water Absorption (water absorption shall be within 13-15% by weight): The bricks, when tested in accordance with the procedure laid down in IS 3495 (Part-2), after immersion in cold water for 24 hr shall have average water absorption not more than 20 percent by mass up to class 12.5 and 15 percent by mass for higher classes.

- (b) **Burnt Clay Bricks** : Bricks shall be kiln burnt 250mm X 125mm X 75mm. Nominal size, locally available best quality with minimum crushing strength 75 Kg/Sq cm. The dimensions of bricks shall not vary more than + or – 8% of the dimensions given above of nominal size. Bricks shall be kiln burnt locally available, best quality conforming to the samples kept in GE's office. Unless otherwise specified in Schedule 'A'/ Notes on drawings brick shall have average compressive strength of 75 Kg/Sqcm and conforming to IS - 1077. The physical properties of the bricks shall be as per clause 5.6.1 to 5.6.8 of the MES Schedule Part-I. Centre line dimensions shall invariably be maintained. In all other respect, brick shall conform to requirements of sub class 'B'.
- (c) Fly Ash / Burnt Clay Brick shall be got **tested** by the department in Site Laboratory or in Command / Zonal Laboratory/ Govt institutions/ Govt approved lab and the contractor shall bear the cost of testing at the rates as per Appendix 'D'. **Lintel/Tie beams/Roof Beams shall not be cast directly over brick work.** The last course of the wall shall be built after the form work underneath the slabs or beams is removed.
- (d) **Contractor may use Brunt clay bricks in case of non availability of fly Ash Bricks in sufficient quantities in nearby local areas as certified by the GE can be used without any price adjustment.** However for pricing of deviation, the average rate of clay brick work and fly ash brick work given SSR Part-I 2010 shall be applicable subject to quoted percentage of contractor against respective part of schedule.
- (e) Clay brick work and fly ash brick work should not be mixed together in any particular building i.e only one type of brick work either clay or fly ash brick work should be used for particular entire building.

9.1.2 **Sand** : Sand for mortar shall be as specified in Clause 5.4 of MES Schedule Part-I.

9.1.3 The contractor shall produce brick etc, as require for such testing and carry the bricks to the place of testing as directed by the Engineer-in-Charge without extra cost to the Govt. Brick walls 750mm, 625mm, 500mm, 375mm, 250mm and 125mm thick shall mean 3 bricks, 2½ bricks, 2 bricks and 1½ bricks , 1 bricks and half brick thick wall respectively and vice-versa. Sub class 'B' bricks or brick works with sub class 'B' bricks mentioned in items of various parts of Schedule 'A' and in MES Schedule shall be deemed to be same as first class brick or brick work with first class bricks as specified above. In case of deviation, irrespective of size/type of bricks used brick work shall be priced at appropriate rate for sub class 'B' bricks(old size) as given in the MES Schedule, irrespective of the fact that locally available best quality bricks have been used.

9.1.4 Half brick thick wall of height more than 90cm shall be reinforced with **two Nos 8 mm dia TMT bar** horizontally at every fourth course starting from floor level. The first layer of reinforcement shall be started with 2nd course of brick work above floor level.

Contd/.....

PARTICULAR SPECIFICATIONS

- 9.1.5 At the junction of RCC wall/column and brick wall, 40 mm x 3 mm Flat Iron wall ties shall be provided at every fourth course of brick work starting from the floor level as shown/specified on TD Drg/BoQ.
- 9.1.6 In the event of deviations, brick work as specified above, shall be priced at the applicable rates in MES Schedule (Part-II) for M & L sub class 'B' bricks (old size), subject to contractor's percentage, as applicable.
- 9.1.7 Provision contained in clause 5.23.1 of SSR Part –I shall not be applicable.
- 9.2 (a) Unless otherwise shown/specified on drawing/BoQ Mix of mortar for brick work shall be in cement sand mortar (1:6). However in foundation irrespective of whatever is specified on drawing/BoQ the mortar shall be of mix C:M (1:4).
- (b) Brick work less than one brick thick wall shall be in cement sand mortar (1:4).
- 9.3.1 Width of concrete lintels, beams, cills, and the like coming in conjunction with brick walls/pillars shall be kept to the actual width of brick work of that place unless otherwise have been specifically shown, in which case, the width as shown on structural drawings shall be maintained.
- 9.3.2 Centre line dimensions of rooms, verandahs, etc shown in drawing 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 height shall be maintained as shown on the drawings.
- 9.3.3 Mortar bed joints shall be such that four courses of brick work and three joints taken consecutively shall measure 3cm to 4cm in addition to the combined height of bricks themselves. The provision regarding above, made in Para 3.26 of MES Schedule shall be deemed to be modified accordingly and no price adjustment shall be done on this account.
- 9.4. **Window Cill** Irrespective of whatsoever shown on main drawings 18-20mm thick Pre polished Mirror finished Marble/Granite in Offrs Md Accn, Adm bldg. and wherever specified or PCC/Kotastone in OTM, other md Accn and wherever specified window cill set in 15mm cement mortar (1:3) shall be provided to required shape with drip course extended up to 150 mm to both sides of opening in masonry wall.

9A AAC BLOCK MASONARY

- 9A.1 AAC block (**Grade-1 as per IS 2185**) shall be cement bonded and shall have smooth rectangular spaces with sharp and square corners. The blocks shall be free from any honeycombing and other defects. Blocks shall be machine molded and shall be made from the mixture of suitable good quality of fly ash, sand, cement and other required materials as per the latest relevant IS code (IS 2185 pt-3:1984). The shape and size of bricks are as per latest IS code (IS 2185 pt-3:1984).

The blocks are being tested for following **physical characteristics as per latest relevant IS code (IS IS 2185 pt-3:1984)**:

- a. **Dimensions:** The dimension of the block is such that it will fits the required wall thickness. However, the wall thickness for external wall shall be not less than 200 mm and internal wall is not less than 100mm. The requirement of thickness will be specified in drg/BoQ.
- b. **Compressive strength:** The avg minimum strength of twelve units block shall have not less than 4N/mm² (04mpa) with oven dry density of 551 to 650 kg/m³. The same shall be tested as per sample collection and method specified in latest IS code IS 2185 pt-3:1984.
- c. **Water Absorptions:** The block shall have the water absorption not more than 20 % by weight.

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PARTICULAR SPECIFICATIONS

- d. **Dry Shrinkage:** The block of grade-1 shall have not shrinkage more than 0.05 % when tested as per latest relevant IS code.

9A.2 The brief specifications of blocks are as under:

PARAMETERS	SPECIFICATIONS (as per IS code 2185 Pt-3:1984
Grade of AAc Blocks	Grade-1
Density Oven Dry	550-650 kg/m ³
Compressive strength	Not less than 4N/mm ² (MPa)
Shear Strength	0.6 N/m ²
Modulus of Elasticity	2040 Mpa
Coefficient of Thermal Expansion	$8.1 \times 10^{-6} \text{ K}^{-1}$
Water Absorption	Not more than 20%
Thermal Conductivity	0.16 w/m ⁰ K
Thermal resistance	0.46 m ² - ⁰ k/w
Drying Shrinkage	Not more than 0.05%
Fire resistance	4 Hrs (for 200 mm wall)
Sound Transmission class rating	44db for 200 mm wall

9A.3 Method of construction

The method of construction of block shall be governed by latest amended IS 6041: However certain conditions shall also be followed on the ground:

- The blocks shall be stacked at dry place on level platform at least 100 mm above the ground to avoid effect of entering moisture and any damages.
- The top and side surface of the block shall be moistened after completion of work. It is also advisable to not to use prolong soaking of blocks before use but the top & side surface shall be moistened before placing of mortar over the blocks to avoid any loss of moist from mortar.
- When the height more than 120cm, the wall shall be reinforced with **two Nos 8 mm dia TMT bar** horizontally at 120 cm starting from floor level. The first layer of reinforcement shall be started with 2nd course of masonry work above floor level.
- Chases in the wall for electric supply or water supply or any other purpose shall be carried out before plastering work.
- At the junction of RCC wall/column and masonry, 40 mm x 3 mm Flat Iron wall ties shall be provided at every fourth course starting from the floor level as shown/specified on TD Drg/BoQ. The top junction of beam and column shall be filled with wire mesh and chemical grout or PCC M-10 of 6 mm size graded aggregate.

10 **CRUMPLE JOINT.**

10.1 Crumple joint shall be provided all as per details shown on drg and in accordance with the following specifications:-

(a) Aluminum sheet 0.63mm thick shall be fixed to cover the gap.

(b) Metal cradle wherever indicated shall be of PGI sheet 20 gauge thick and having zinc coating of 120 grams/sqm.

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PARTICULAR SPECIFICATIONS

(c) All other details shall be shown on drgs.

10.2 WATER PROOFING TREATMENT OVER CRUMPLE JOINT :

Water proofing treatment over crumple joints shall be provided with polymeric bituminous membrane with tiling as specified here-in-under :-

(i) The dried surface of slab laid in slope of 1:15 shall be painted with one coat of bituminous primer @ 0.40 litre/sqm conforming to IS:3384.

(ii) A layer of APP based polymeric membrane 4 mm thick minimum weighing not less than 4 kg/sqm as approved by GE, reinforced with polyester non woven fabric (weighing not less than 150 grams/sqm) shall be provided. Application of polymeric membrane by torch application, side overlaps shall be minimum 75 mm and the end laps shall be minimum 100 mm and sealing all overlap & joints as per manufacturer's instructions. For parapets, membrane shall be taken to a height of min 60 cm and then inserted inside the parapet in a groove. The same shall be finished by a membrane flashing.

11 DAMP PROOF COURSE

11.1 The damp proof course shall consist of 40mm thick PCC of grade M-15 (Nominal mix) type B0 mixed with water proofing compound with a coat of bitumen of industrial type of grade 85/25 at the rate of 1.5Kg/Sqm and blinded with clean dry sand at the rate of 0.05 Cum/Sqm polythene film 200μ thick over bitumen shall be provided over DPL. **Damp proof course shall be provided on external, internal, partition and dwarf wall.**

11.2 Water proofing compound for damp proof course and in all other locations where specified under this contract shall be liquid type conform to relevant IS- 2645. It shall be mixed with cement concrete in the proportion and manner as given in manufacturer's instruction. Deviations if any shall be priced at the rate of 3% by weight of cement.

11.3 Damp proof course shall be provided under door openings below floor by providing a vertical DPC along the sides of the drop.

12. STEEL & IRON WORK**12.1. GENERAL**

12.1.1. Refer relevant Clause No. of MES Schedule Part-I and as approved by GE. All Steels require to incorporate in the Work shall be Contractor's Supply only unless otherwise specified in the tender documents.

12.1.2 Quality of steel to be incorporated in the work shall be as follows: -

S.No	Type of Steel	Remarks
(i)	High strength deformed steel bars produced by Thermo Mechanical treatment process (In short called as TMT bars) for reinforcement.	Of Grade Fe 500 D or superior quality as latest available and meeting all requirement of IS 1786-2008.
(ii)	Mild steel for miscellaneous works	Shall conform to IS-432(Part-I) 1982 Reaffirmed-1989. Grade wherever not shown/ indicated otherwise shall be of Grade I.
(iii)	Structural steel (Except Hollow Sections)	Structural Member: - Steel for general Structural purpose shall be grade E-250 (Fe-410 W quality A) ISI marked (IS-2062-2011) for all type of steel Structures including those subject to dynamic

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PARTICULAR SPECIFICATIONS

		loading and where fatigue, wide fluctuation of stresses, reversal of stresses and great restraint are involved. Steel other than Structural Steel : - Steel sections in grills/guard bars, railing, flat iron, hold fast, fencing, steel chowkats, etc and in various members of steel windows and steel doors shall be of ordinary quality conforming to IS 15911:2010 Grade E-165.
(iv)	Hollow steel sections for structural use	Hollow steel sections for structural steel section shall be conforming to IS-4923-1997 and grade of steel shall be YSt 310. This steel shall be provided in the location mentioned in the drawings or as specified in Schedule 'A' (BOQ).
(iv)	Galvanised steel sheets (Plain & corrugated)	Conforming to IS-277. Galvanized steel sheet shall be of Grade O (120 gm/Sqm zinc coating). The corrugation of CGI sheet shall be Grade 'B'.
(v)	Fabric reinforcement for concrete	Conforming to IS-1566

Notes: - (a) For pricing deviations involving TMT bars the rates given in SSR (subject to contractor's percentage) shall be applied irrespective of the grade of TMT bars.

(b) For pricing deviations involving steel for general structural purpose Grade Fe-410WA, the rate shall be applicable as per Grade Fe-410-W given in SSR Part II adjusted by applicable percentage for respective parts of Schedule 'A'.

(c) All laps and crossings shall be tied with mild steel wire (annealed) of size not less than 0.9 mm dia.

12.2 SOURCE OF PROCUREMENT

12.2.1 REINFORCEMENT STEEL (TMT STEEL) :- TMT steel bars of all sizes shall be procured directly from primary producer as listed in Appx-B here – in – after.

12.2.2 STRUCTURAL STEEL (EXCEPT HOLLOW STEEL SECTIONS) :- Structural steel any section/plate (except hollow steel sections) shall be procured from main producers as listed in Appx-B here – in – after.

12.2.3. However, in case of its non-availability with above mentioned primary producers, the same can be procured from approved secondary producers with a reduction of 5% (Five percent) of the accepted rates of structural steel. In case the desired section of structural steel is not rolled / manufactured by above mentioned primary producers, there shall be no price adjustment in use of structural steel procured from approved secondary producers for such sections of structural steel. In case the quality of structural steel i.e. A, B or C is not mentioned in drawings then quality A shall be used.

12.2.4. Steel section for railings, gate, fencing, guard bars, grills, steel chowkhat, holdfasts etc which do not constitute structural members, can be procured from main producers/ secondary producer/ BIS marked manufacturers or their authorized dealers at the option of contractor without any price adjustment. Tests will not be insisted upon for such steel sections.

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PARTICULAR SPECIFICATIONS

- 12.3 All finished steel shall be well and clearly rolled to the dimensions, sections and weights specified. The finished material shall be reasonably free from cracks, surface flaws, laminations, rough jagged and imperfect edges and any other harmful defects and shall be finished in a proper manner. Tolerance on size and weight of reinforcement bars shall not be more than as specified in clause 10.17.4 and 10.17.5 of SSR Part I and as specified in IS-1786 and IS-2062 and as per relevant IS codes.
- 12.4 Contractor will give to GE manufacturer's test certificate (IN ORIGINAL) alongwith the test sheet giving result of each mechanical test and the chemical composition of steel (as per IS 1786-2008) for reinforcement steel or authenticated copy thereof duly signed by manufacturer with each consignment. The documents such as original purchase vouchers and test certificates in support of the purchases of steel shall be produced by the contractor to the site staff & GE for verification and record.

12.5 APPROVAL OF STEEL BROUGHT BY THE CONTRACTOR

Following action shall be taken by GE before incorporating steel procured by the contractor for the work :-

- (a) Physical verification of steel received to confirm the actual quantity of steel as well as to verify aspects brought out in foregoing.
- (b) GE will obtain original machine numbered purchase vouchers of manufacturer from contractor
- (c) Verify the documents listed in Ser (b) & foregoing given by the contractor from the manufacturer.
- (d) No consignment or part thereof will be allowed to be incorporated in the work until and unless the test results of independent testing are obtained and the consignment is passed by GE Schedule of procurement will be prepared keeping in view the time lost for testing etc.
- (e) Three samples of pieces (3.00m long) of each section of each consignment will be retained at the project site till completion of the work. These samples will be suitably marked and properly preserved.

12.6 TESTING OF STEEL

12.6.1 (a) The manufacturers of steel are to carry out inspection and testing of steel in accordance with the relevant BIS provisions. The contractor shall submit manufacturer's test certificate in original or authenticated attested true copy by the manufacturers only along with the test sheet giving the result of each mechanical test as applicable in accordance with relevant IS provision and the chemical composition of the steel or authenticated copy with each consignment. The Engineer-in-Charge shall record these details in a steel acceptance register which will be signed by the Junior Engineer, Engineer-in-Charge, GE and Contractor as given in the format as Annexure I to Appendix 'A' here-in-after, after due verification and Engineer-in-Charge shall send a certified true copy of test sheet to GE for his records.

(b) Independent testing of steel / structural steel / GI Sheets and fabric reinforcement for concrete by the GE shall be optional at the discretion of the GE in case of procurement of steel from main producers and testing charges shall be borne in accordance with Condition 10A of IAFW 2249 i.e. testing charges shall be borne by the Department if the test results are found in order otherwise these shall be borne by the Contractor.

(c) Independent testing of steel/ structural steel/GI sheets and fabric reinforcement by the GE shall be mandatory in case of procurement of steel from secondary producers and testing charges shall be borne by the Contractor irrespective of the outcome of test results.

(d) For independent testing, random samples of steel drawn from various lots and shall be got tested from a National Test House, SEMT CME, Regional Research Labs or Government approved Labs, Zonal Labs, etc. as per the minimum frequency given below. Samples from each lot shall be

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PARTICULAR SPECIFICATIONS

also tested for quality and elongation. The elongation shall not be less than 18%.

(e) In all cases mentioned above contractor at his cost shall provide all facilities required for the testing. Cost of materials consumed in tests shall also be borne by contractor.

12.6.2 Ultimate tensile strength elongation, bend and rebend test for reinforcement steel bars shall be carried out as per clause 1 and test specimen shall be as per clause 11 and delivery inspection shall be as per clause 12 of IS-1786. Bend tests and tensile tests for structural steel shall be carried out as per IS-2062.

12.6.3 FREQUENCY OF SAMPLING FOR INDEPENDENT TESTING BY GE

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

(a) STEEL FOR CONCRETE REINFORCEMENT

(i) Bars size less than 10mm: One sample (3 specimen for each test for every 25 tonnes or part thereof)

(ii) Bars size 10mm to 16mm : One sample (3 specimen for each test for every 35 tonnes or part thereof)

(iii) Bars size over 16mm : One sample (3 specimen for each test for every 45 tonnes or part thereof)

(b) STRUCTURAL STEEL

(i) Tensile test : 1 test for every 25 tonnes of steel or part thereof.

(ii) Bend test : 1 test for every 25 tonnes of steel or part thereof.

12.6.3.2 The testing by GE as per above frequency is mandatory before payment is released to the contractor in case of structural steel from secondary producers. The GE may also increase the 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 test results.

12.6.3.3 Test shall not be insisted upon for the steel required for guard bars, holdfasts, grills and such other allied items.

12.6.3.4 In case test results of testing pursuant to clause 1.6.3 are not within the acceptable limits, then that consignment of steel shall stand rejected and contractor shall remove the same from site at his own cost. The rejected material shall not be incorporated in the work. The contractor shall have no claim on this account.

12.6.3.5 Cost of test samples as per frequency given in clause 1.6.3 above shall be borne by the contractor irrespective of test results.

12.7 DOCUMENTATION

12.7.1 Original purchase vouchers from the manufacturer, and original or authenticated test certificates of the manufacturers for the total quantity of steel supplied under each consignment to be incorporated in the work shall be produced to the Engineer-in-Charge of the work by the contractor. All consignments received at the work site shall be inspected by the GE alongwith the relevant documents before acceptance. The original vouchers and the test certificates shall be defaced and signed by the Engineer-in-Charge and kept on record in the office of the GE duly authenticated and with cross reference to the control number recorded in the steel acceptance

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PARTICULAR SPECIFICATIONS

register. The steel acceptance register shall be signed by JE, Engineer-in-Charge, GE and contractor. The entire quantity of all consignments shall also be suitably recorded in the measurements book for record purposes as 'NOT TO BE ABSTRACTED' before incorporation in the work and shall be signed by the Engineer-in-Charge and contractor. The following provisions shall also be complied:-

- (a) All original vouchers will be kept in a file serially numbered and to be kept in GE's office.
- (b) Test certificates of each steel consignment will be kept in a file, serially numbered and be kept in GE's office.
- (c) Steel Acceptance Register as per Annx '2' will be maintained by the GE
- (d) In/Out Register for details of receipt, acceptance/rejection and consumption of steel will be maintained as per Annx '1'.
- (e) Register containing results of independent and additional testing by GE.
- (f) Inspection registers.

12.7.2 CWE/GE will check the documents personally, connected with the steel, at least once a month and record of these check will be kept in the Inspection Register (Para 1.7.1(f) above).

12.8 STORAGE ACCEPTANCE/PRESERVATION OF STEEL

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

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

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

12.9 CONVERSION WEIGHT OF STEEL

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

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

1.9.3 Advance on account of payment made towards these cut pieces shall be adjusted from advance on account of payment immediately falling due and before removal of such cut pieces from site.

12.10 PAYMENT IN RAR

12.10.1 Payment of the steel brought by the contractor should only be released by the GE after taking action on points enumerated in paras here-in-before and after completing the documentation mentioned here-in-before in this regard.

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PARTICULAR SPECIFICATIONS

12.10.2 Before procurement of steel, contract and structural drawing shall be read thoroughly and various grades/types of steel to be incorporated in the work shall be identified by contractor and got approved by the GE.

12.11 SAFETY OF STEEL

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

12.12 Movement of steel shall be recorded in In/Out steel register as per following pro-forma. Each entry in the register shall be signed by the contractor and Engineer-in-Charge.

IN/OUT STEEL REGISTER

Srl No	Date	Steel IN			Steel OUT			Qty Balance
		Qty (Tons)	Section	Control No	Qty (Tons)	Section	Reasons*	
1	2	3	4	5	6	7	8	9

*** NOTE :-**

(i) The following reasons may be mentioned for taking out steel from storage:-

- (a) For testing purpose.
- (b) For use in work.
- (c) Rejected steel taken out of site.

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

12A WATER PROOFING TREATMENT TO RCC ROOF :

12A.1 Water proofing treatment to the building shall be carried out as follows :-

[A] Water Proofing treatment to NON ACCESSIBLE RCC Roof : Water proofing treatment to the buildings with non accessible RCC roof shall be carried out as follows:-

(a) Over the RCC roof slab, 10 mm thick plaster in CM (1:4) shall be provided mixed with water proofing compound, ISI marked as per manufacturer instructions. The plaster shall be provided when the concrete is green. The plaster surface shall be steel troweled to get a smooth surface

(b) After the plaster has dried up, the membrane treatment shall be applied as under :-

(i) The plastered surface shall be prepared by thoroughly wire brushing, washed, dried up and cleaned of all foreign matter and dust.

(ii) On the prepared surface, one coat of approved bituminous primer @ 0.40 Ltr per Sqm shall be applied. The primer and the membrane to be used shall be of same manufacturer.

(iii) Over the primed surface, 3 mm thick APP modified polymeric membrane with non-woven polyester reinforcement shall be laid by torch application method. Technical characteristics of the membrane shall be as under :-

CHARACTERISTIC	SPECIFICATIONS
(i) Thickness	Minimum 3mm
(ii) Weight	Minimum 3.50 Kg per Sqm of membrane
(iii) Softening point	Min 150° C.
(iv) Cold flexibility	(-)5° C
(v) Reinforcement	Non-woven polyester Mat Minimum 160 gm /m ² .
(vi) Tensile strength:-	

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PARTICULAR SPECIFICATIONS

Lengthwise	> 650N / 5cm
Crosswise	> 450N / 5cm
(vii) Elongation :-	
Lengthwise	Min 40%
Crosswise	Min 35%
(viii) Heat Resistance	Does not Drip at 120°C
(ix) Tear Strength :-	
Lengthwise, N	> 300
Crosswise, N	> 250
(x) Water Absorption, %	<0.15

The side overlaps shall be minimum 75mm and the end laps shall be minimum 100 mm. All overlaps and joints shall be sealed as per manufacturer's instructions.

(iv) The finished surface shall be given bituminous based aluminum paint @ 0.11Kg/M² as per manufacturer's instructions.

(c) For parapets/vertical surfaces of walls, the membrane shall be taken to a height of min 60 cm & then inserted inside the parapet in a groove. The same shall be finished by a membrane flashing.

(d) All angles and abutments should be sealed well with extra care to ensure full bondage.

(e) The entire work of APP membrane treatment to plastered RCC roof slabs shall be carried out by engaging **authorized applicator of the manufacturer**. For this purpose, contractor shall submit the details of authorized applicator alongwith supporting documents to GE well in time and the work shall be executed only after written approval by GE. However the main contractor shall give guarantee for efficiency of water proofing treatment for a period of ten years as specified here-in-before.

(f) Random samples of Polymeric Water Proofing membrane, as selected by GE, shall be got tested from National Test House / Govt approved lab where such facilities exists before incorporation in the work. Cost of testing shall be borne by the contractor.

(g) In case the test results does not meet the specifications given above, the entire lot shall be rejected by the GE. In such a case, the contractor shall bring the fresh lot of desired quantity of APP modified Water Proofing Membrane and the same procedure of testing repeated till the time satisfactory test results are obtained. Nothing extra will be paid to contractor on this account.

[B] Water Proofing treatment to ACCESSIBLE RCC Roof/ Terrace :-

(a) Over the RCC roof slab, 10 mm thick plaster in CM (1:4) shall be provided mixed with water proofing compound, ISI marked as per manufacturer instructions. The plaster shall be provided when the concrete is green. The plaster surface shall be steel troweled to get a smooth surface.

(b) After the plaster has dried up, the membrane treatment shall be applied as under :-

(i) The plastered surface shall be prepared by thoroughly wire brushing, washed, dried up and cleaned of all foreign matter and dust.

(ii) On the prepared surface, one coat of approved bituminous primer @ 0.40 Ltr per Sqm shall be applied. The primer and the membrane to be used shall be of same manufacturer.

(iii) Over the primed surface 4 mm thick APP modified polymeric membrane with non-woven polyester reinforcement weighing not less than 4Kg/SM, shall be laid by torch application method. All other properties of APP modified polymeric membrane shall be all as specified in Para (A) (iii) here-in-before. The side overlaps shall be minimum 100 mm and the end laps shall be minimum 100 mm. All overlaps and joints shall be sealed as per manufacturer's instructions.

(iv) Provide 20-22mm thick the hydraulically pressed concrete tiles of size 250 X 250mm as per IS-1237 laid

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PARTICULAR SPECIFICATIONS

over 15mm thick bedding in cement mortar (1:4), joints grouted and flush pointed in cement mortar (1:3) mixed with Sika Flex (AP) of quantity all as per manufacturer instruction. The tiles shall be laid either through authorized applicator who has laid the APP membrane or by the contractor under the supervision of the authorized applicator of APP membrane.

- (c) For parapets/vertical surfaces of walls, the membrane shall be taken to a height of min 60 cm & then inserted inside the parapet in a groove. The same shall be finished by a membrane flashing.
- (d) All angles and abutments should be sealed well with extra care to ensure full bondage.
- (e) The entire work of APP membrane treatment to plastered RCC roof slabs shall be carried out by engaging **authorized applicator of the manufacturer**. For this purpose, contractor shall submit the details of authorized applicator alongwith supporting documents to GE well in time and the work shall be executed only after written approval by GE. However the main contractor shall give guarantee for efficiency of water proofing treatment for a period of ten years as specified here-in-before.
- (f) Random samples of Polymeric Water Proofing membrane, as selected by GE, shall be got tested from National Test House / Govt approved lab where such facilities exists before incorporation in the work. Cost of testing shall be borne by the contractor.
- (g) In case the test results does not meet the specifications given above, the entire lot shall be rejected by the GE. In such a case, the contractor shall bring the fresh lot of desired quantity of APP modified Water Proofing Membrane and the same procedure of testing repeated till the time satisfactory test results are obtained. Nothing extra will be paid to contractor on this account.

12B WATER PROOFING TREATMENT TO SUNKEN FLOOR

12B.1 Treatment to sunken floor shall be carried out as under :-

- (i) Cleaning top surface of floor slab and laying 50mm thick (average) PCC of grade M-10 (Nominal Mix), mixed with WPC as per manufacturer instruction laid in slope 1 : 20 towards spouts including coveting corners.
- ii) 15mm thick plastering in CM (1:4) on sides mixed with water proofing compound as per manufacturer instruction.
- iii) Applying first layer of slurry at the rate of 0.488Kg/Sqm mixed with acrylic based polymer modified cementious compound at the rate of 0.253 Kg/sqm. This layer shall allowed to air cure for 4 hours.
- iv) Applying second layer of slurry at the rate of 0.242Kg/Sqm mixed with acrylic based polymer modified cementious compound at the rate of 0.126 Kg/sqm. This layer shall allowed to air cure for 4 hours followed with water curing for 48 hours.
- iii) Applying a coat of industrial bitumen 85/25 penetration @ 1.50Kg/Sq.m on plastered & concrete surfaces.
- iv) Laying a layer of 200 micron polythene film.
- vi) Two nos 25mm bore GI medium grade 450mm long spout shall be provided through external wall to drain out accumulated water.
- vii) Sunken floor shall be tested for water tightness by filling water for 72 hrs before and after treatment work is carried out and ensure that no leakage/seepage exists.
- viii) Sunken portion shall be filled with lean cement concrete of grade M-7.5 using broken brick aggregates.

12C TESTING OF WATER PROOFING TREATMENT

12C.1 After the water proofing treatment is completed, leak proof tests shall be done by ponding. For this purpose in roof, mud, mortar, fillet ponds shall be made longitudinally one meter apart over entire

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PARTICULAR SPECIFICATIONS

treated surface of roof to form pond of suitable size as directed by the Engineer-in-Charge. (These ponds shall be filled with potable water so that an average 50 mm (minimum 25mm and maximum 75mm) height of water is maintained during the test period.

- 12C.2 Tests shall be carried out continuously for a period of 48 hours. Any seepage notified shall be rectified by the contractor and making good the defective portion to entire satisfaction of the GE, who will pass this stage.
- 12C.3 All mud fillet bends shall be removed and surface made clear and tidy after completion of satisfactory testing.
- 12C.4 Satisfactory completion of test shall not absolve the contractor from his responsibility of rectification of defects, which may arise during defect liability period.

13. WOOD WORK AND JOINERY**13.1 Timber**

- 13.1.1 Timber for all joinery and wood work shall conform to specifications given in clause 7.3 of the MES Schedule and shall be within the permissible limits of defects defined in Clauses 7.4 and 7.5 of the MES Schedule Part-I .
- 13.1.2 Timber shall be well seasoned, weathered, air or kiln dried, at the discretion of the contractor but without any price adjustments. The moisture content of timber shall not exceed the limits laid down vide Clause 7.7 of the MES Schedule Part-I.

13.2 Preservation of Timber

- 13.2.1 Preservative/ anti-termite treatment shall be carried out to all wood work and joinery fabricated by the contractor at site. Factory made Ply/Boards are also deemed to be provided with antitermite treatment.
- 13.2.2 Chemical used for anti-termite treatment to wood work and joinery shall be **COPPER NAPHTHANATE, ASCU** or any other chemical specified in IS-401, applied in any one of the manners specified in ibid IS.
- 13.3 Except where specifically indicated elsewhere in these particular specifications, the species of timber for joinery/furniture items fabricated at site and prefabricated wood products i.e. Plywood, particle/block/medium density fiber (MDF) board etc, shall be as specified here under :-

- i) Fully paneled or partly paneled/glazed/wire gauged shutters : Factory made as per IS-1003 – 2nd Class Hard Wood (Sal/Hollock/Kalasisir/Chaplash/Bijisal/Benteak).
- ii) Frames of built-in cupboards/cabinets and furniture items if indicated of timber on drawings Second Class hard wood (Sal/Hollock/Kalasisir/Chaplash/Bijisal/Benteak).
- iii) Paneled/flush shutters of built-in cupboards/cabinate and furniture items as indicated on drawings and fabricated at site : Frame of second class hardwood and facing/inserts as indicated on drawings.
- iv) Edging/beading for particle/block/medium density fibre board exposed to view in shutters, shelves and tops of built-in furniture, cupboards and cabinets, handrail of stair : Teak/Shishu wood.
- v) Gutties, plugs, cleats/stoppers, beading and fillets for shutters and frames : Second Class hardwood, (Sal/Kalasisir/Chaplash/Hollock).
- vi) All other woodwork and joinery not otherwise specified : Second Class hardwood, (Sal/Kalasisir/Chaplash/Hollock).

13.4.3 FRAME**(a) Wooden Frame:-****Contd/.....**

PARTICULAR SPECIFICATIONS

Timber for door, window and ventilators frames shall be as specified. Timber shall be sawn in the direction of the grains. All members of a frame shall be of the same species of timber and shall be straight without any warp or bow. Frames shall have smooth, well-planed (wrought) surfaces except the surfaces touching the walls, lintels, sill etc., which may be left clean sawn. Rebates, rounding or moulding shall be done before the members are jointed into frames. The depth of the rebate for housing the shutters shall be 15 mm, and the width of the rebates shall be equal to the thickness of the shutters. A tolerance of ± 2 mm shall be permitted in the specified finished dimensions of timber sections in frames

FIXING: The frames shall be got approved by the Engineer-in-Charge before being painted, oiled or otherwise treated and before fixing in position. The surface of the frames abutting masonry or concrete and the portions of the frames embedded in floors shall be given a coating of coal tar. Frames shall be fixed to the abutting masonry or concrete with holdfasts or metallic fasteners as specified. After fixing, the jamb posts of the frames shall be plugged suitably and finished neat. Vertical members of the door frames shall be embedded in the floor for the full thickness of the floor finish and shall be suitably strutted and wedged in order to prevent warping during construction. A minimum of three hold fasts shall be fixed on each side of door and window frames one at centre point and other two at 30 cm from the top and bottom of the frames. In case of window and ventilator frames of less than 1 m in height two hold fasts shall be fixed on each side at quarter point of the frames.

(b) Steel Frame:-

Frame shall be made from pressed steel frame using CR steel of thickness 1.25 mm conforming to latest IS 513:2008. The size of frame will be as specified in the drawing/BoQ and shall be suitable to take appropriate thick shutter. Vertical members of the door frames shall be embedded in the floor for the full thickness of the floor finish and both end shall be fixed with either flat of 32x5mm or two 8 mm (mim) TMT bar). The frame shall be inclusive of Mild steel hinge of appropriate size but not less than 100 mm. Hinges shall be made of steel 2.5 mm thick with zinc coated removable pin of 6 mm diameter. The space between the two leaves of the hinge when closed shall be 3 mm and the leaf that is not welded to the frame shall have four counter sunk holes to take No. 10 cross recessed head wood screws. The steel frame shall be painted with one coat of primer before fixing on the wall of with required hold fast or metallic fasteners. After fixing to coat of approved synthetic enamel of approved color shall be carried out to give smooth finish to the satisfaction of Engr-in-Charge.

13.4.3 SHUTTER**13.4 Paneled Door Shutters/Wire gauge shutters**

13.4.1 Door shutters shall be factory made using 2nd class hardwood conforming to IS-1003(Part-I). Styles and rails shall be kiln seasoned and chemically treated (under vacuum pressure). Panel inserts of timber, plywood, block board, veneered particle board, fibre board wire gauze or float glass as per requirements. The thickness shall be as specified in drawings/BoQ. All members of the shutters shall be straight without any warp or bow and shall have smooth well-planned face at right angles to each other. Any warp or bow shall not exceed 1.5 mm for door shutter and 1 mm for window and ventilator shutters the right angle for the shutter shall be checked by measuring the diagonals and the difference between the two diagonals should not be more than 3 mm. Generally paneled glazed or paneled and glazed shutter shall conform to IS 1003 (Pt. 1 & 2).

13.4.2 Paneling

The panel inserts shall be either framed into the grooves or housed in the rebate of stiles and rails. Timber, plywood, and particle board panels as given in para 9.2 of this sub head and shall be fixed only with grooves. The depth of the groove shall be 12 mm and its width

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PARTICULAR SPECIFICATIONS

shall accommodate the panel inserts such that the faces are closely fitted to the sides of the groove. Panel inserts shall be framed into the grooves of stiles and rails to the full depth of the groove leaving space of 1.5 mm. Width and depth of the rebate shall be equal to half the thickness of stiles and rails. Glass panels, asbestos panels wire gauze panels and panel inserts of cupboard shutters shall be housed in the rebates of stiles and rails.

12.4.2.1 Timber Panels: Timber panels shall be preferably made of timber of large width; the minimum width and thickness of the panel shall be 100 mm, and 15 mm respectively. When made from more than one piece, the pieces shall be jointed with a continuous tongued and grooved joint glued together and reinforced with headless nails at regular intervals not exceeding 100 mm. Depth and thickness of such joint shall be equal to one-third of thickness of panel. The panels shall be designed such that no single panel exceeds 0.5 square metre in area. The grains of timber panels shall run along the longer dimensions of the panels. All panels shall be of the same species of timber unless otherwise specified.

13.4.2.2 Plywood Panels : Plywood boards used for paneling of shutters shall be BWP type or grade as specified as under:-
Plywood boards are formed by gluing and pressing three or more layers of veneers with the grains of adjacent veneers running at right angles to each other. The veneers shall be either rotary cut or sliced and shall be sufficiently smooth to permit an even spread of glue. Face veneers may be either decorative on both sides or one side commercial and the other decorative. Plywood shall be of BWP grade or BWR grade as per IS 303.

Each panels shall be a single piece of thickness, 9 mm for two or more panel construction and 12 mm thickness for single panel construction unless otherwise specified.
13.4.2.3 Veneered Particle Board Panels : Veneered Particle board used for panelling of shutters shall be Exterior Grade bonded with BWP type synthetic resin adhesive conforming to IS 848 for grade I veneered particle board as specified as under:-

Veneered Particle Boards with core of FPT-1 or graded board Grade-I particle board (IS 3087) with commercial or general purpose veneer (Type-1) or decorative veneers on both faces or with decorative veneer on one face and commercial /general purpose veneers on the other Type-2. Face veneers are bonded using adhesives under the influence of heat and pressure.

Each panel shall be a single piece of thickness 12 mm unless otherwise specified

13.4.3 Fiber Board Panels : Fiber board used for paneling of shutters shall be Exterior Grade bonded with BWP type synthetic resin adhesive Each fiber board panel shall be a single piece unless otherwise specified.

13.4.4 Wire Gauze Panels: Wire Gauze used for paneling of shutters shall be woven with 0.63 mm dia galvanized mild steel wire or stainless steel as specified in the Drg or BoQ to form average aperture size as per requirements.
Wire Cloth which shall generally conform to IS 1568 shall be regularly woven with equally spaced galvanized mild steel wires in both warp and weft directions. The wire cloth shall be properly selvaged by one or more wires in each edge.
Mesh : Average width of aperture and the nominal diameter of the wire shall be as under:

Average width of Aperture	Nominal dia. of wire
Mm	mm
1.40	0.63
1.18	0.56

PARTICULAR SPECIFICATIONS

1.00

0.50

13.4.5 Width of aperture and dia of wire cloth shall be as specified in drg or BoQ. Unless otherwise stated, wire cloth of 1.40 mm average aperture width woven with 0.63 mm nominal dia galvanised mild steel/stainless steel wire shall be used. Fly-proof wire cloth (aperture 1.40 mm) is generally provided in Kitchen and dining areas while wire cloth of smaller aperture is used in mosquito proof shutters.

Wire gauze shall be securely housed into the rebates of stiles and rails by giving right angles bend turned back and fixed by means of suitable staples at intervals of 75 mm and over this wooden beading shall be fixed. The space between the rebate and the beading shall be fixed with putty to give a neat finish. Each wire gauze panel shall be a single piece, and the panels shall be so designed that no single panels exceed 0.5 sqm in area. However, care shall be taken to prevent sagging of wire gauge, of panel by providing and fixing 20 x 20 mm square or equivalent beading to the external face to the required patterns as decided by the Engineer-in-Charge.

13.4.6 Glass Panels : Glass paneling (Glazing) shall be done as specified. Glazing in the shutters of doors, windows and ventilators of bath, WC and Lavatories shall be provided with frosted glass the weight of which shall be not less than 10 kg/sqm. Frosted glass panes shall be fixed with frosted face on the inside. Glass panels shall be fixed by providing a thin layer of putty conforming to IS 419 applied between glass pane and all along the length of the rebate and also between glass panes and wooden beading.

13.4.7 Putty: Putty can be prepared by mixing one part of white lead with three parts of finely powdered chalk and then adding boiled linseed oil to the mixture to form a stiff paste and adding varnish to the paste at the rate of 1 litre of varnish to 18 kg of paste. Fixing of glass panes without beading shall not be permitted. Glazing shall be done after the shutters have been primed and prepared for painting, so that wood may not draw oil out of putty.

13.4.8 Finish : Panels of shutters shall be flat and well sanded to a smooth and level surface.

13.5 Prelaminated Particle Board Panels:

shall be 12 mm thick three layered, flat pressed, veneered particle board BWR conforming to IS-3097 exterior grade (grade 1) solid core, general purpose commercial veneered on inside and decorative veneered on outside, the shade of veneering shall be approved by GE. The details and specifications unless otherwise specified of Panel Shutters and mosquito proof door shutters shall be as per TD drg. Factory shall be approved/nominated from the any one of those in the list mentioned in **Appendix 'B'** to Particular Specifications here-in-after, which are located and active in the area as suggested by the contractor and approved by the GE. The door / window to be got approved from the GE duly factory visit prior to placing order for bulk delivery of all types of door / window for incorporation of work.

- 13.4.2 Panelled shutters & Wire gauge shutters shall be provided with beading around the panel insert on both sides of shutter. Size of beading irrespective what is shown in TD drawing, shall be 20mm in width and tapered thickness from 10mm to 5mm.

13.4.3 **Frame (Door):**

(a) Wherever, the Frame as specified made of pressed steel frame using CR steel of thickness 1.25 mm confirming to latest IS 513:2008. The size of frame will be 60X165mm or 60x 105mm or as specified in the drawings/BoQ. The Gap b/w frame and brickwork and the jamb will be filled with PCC (M-10 Nominal mix). Both will be done simultaneously.

13.5 **Flush Door Shutters**

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PARTICULAR SPECIFICATIONS

Frame (Door): Frame shall be made from pressed steel frame using CR steel of thickness 1.25 mm conforming to latest IS 513:2008. The size of frame will be 60X105mm. The Gap b/w frame and brickwork and the jamb will be filled with PCC (M-10 Nominal mix). Both will be done simultaneously.

Door Shutter: 35/30 mm thick flush door shutter (best quality) shall be fixed with above door frame. The teak wood particle board core finished flush door with decorative veneered outside and commercial veneered inside, shall conform to IS 2202(Part 1):1999. The shade of veneering shall be approved by GE. The details and specifications unless otherwise specified of Flush door shutters shall be as per TD drg.

13.6 Wood based products :- Wherever shown on drawings or indicated elsewhere in the specifications for built- in furniture wood based products shall be as specified below :-

13.6.1.1 Un-veneered Particle Board Shall be flat pressed, three layered, medium density, phenol-formaldehyde synthetic resin bonded (BWR type adhesive) and stamped IS : 3087, specification for wood particle board (medium density) for general purposes.

13.6.1.2 Veneered Particle Board :It shall comply with the requirements of IS : 3097,specifications for veneered particle boards. The board shall be exterior grade with solid core, general purpose type (commercial type) or decorative type as specified/indicated. The decorative type boards shall have teak veneer on one or both faces of the board as indicated/ specified.

13.6.2 Pre-laminated Particle Board : Shall be flat pressed, three layered type wood particle board, phenol formaldehyde synthetic resin adhesive bounded (BWP type adhesive), stamped IS : 3087 and IS : 12823 (for decorative lamination Severe),one or both sides pre-laminated as indicated/specified. In case of one side pre-lamination the other side of the board shall have a balancing lamination.

13.6.3 Ply wood : General purpose ply wood shall be BWR grade, type BB conforming to the requirements of IS : 303. Teak veneered decorative ply wood shall be of grade-1 (with BWP type synthetic resin bonded),type-1 quality conforming to IS : 1328. Teak ply wood shall have teak veneer on one or both faces as indicated/ specified.

13.6.4 FRP DOORS & frames for WC, Bath and toilets :-

Irrespective whatever shown on drawings, doors and frame of WC, Bath and toilets shall be of fibre glass reinforced plastic (FRP) and as specified here under :-

(a) FRP frames shall be of cross section 90mm x 45mm having single rebate of 32mm x 15mm to receive shutter of 30mm thickness. Door frame laminate shall be 2mm thick and shall be filled with suitable wooden block in all the three legs. MS stay shall be provided at the bottom to steady the frame.

(b) The thickness of FRP shutters shall be 30mm & thickness of FRP sheet shall be 03mm Shutters shall be in depressed panel design and colour as approved by GE and shall be include extra reinforcement on edges. The core of shutter in styles and rails area shall be of polyurethane foam the panel area shall have ply-FRP sandwich construction having 4mm thick ply to have embedded wooden blocks for taking fixtures shutter shall have recesses to take hinge to fix with frame. The whole shutter shall have resistant to mild acid/alkali. Aluminium mongery to FRP shutter shall be fixed as per manufacturer's instructions. Any tenderer offering FRP shutter with more thickness of FRP will not be paid any thing extra cost to dept.

(c) BLANK

(d) 03 Nos MS hold fasts/lugs on either side shall be fixed as per manufacturers instructions. Other joineries shall be provided as shown for relevant drawings for PVC doors.

13.7 Decorative Laminates : Decorative laminates where indicated on drawings shall be 1mm thick plastic laminated sheet type I as specified in Clause 12.7 of MES Schedule Part-I. The laminates shall be fixed to base with approved adhesive as per manufacturer's instructions.

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PARTICULAR SPECIFICATIONS**13.8 Workmanship**

- 13.8.1 Joinery shall be wrought all over, Timber surface exposed to view shall be wrought and for surface not exposed to view shall be clean sawn. The workmanship and fixing of joinery shall be as per Clauses 8.15 to 8.28 of MES Schedule Part -I.
- 13.8.2 The dimensions of the various components of joinery (other than block board shutters) shown on drawings, wherever at variance shall supersede the standard dimensions mentioned in the MES Schedule. However, for pricing deviation involving any joinery work the rates in MES Schedule for the corresponding joinery item shall be applicable without any price adjustment for variation in dimensions given in clause 8.25.5 of MES Schedule.
- 13.8.3 Unless otherwise specified, all work both carpenter's and joiner's shall hold full dimensions shown on drawings except that an allowance of 1.5mm shall be allowed for each wrought face. Wooden beads and fillets shall however, hold the full dimensions as shown on drawings. The contractor shall also maintain the overall sizes of the doors and windows etc as shown on drawings.
- 13.8.4 Timber up to 3M length shall be in one piece.
- 13.8.5 Plugging to walls, shall be done with wooden plugs as per clause 7.29 of MES Schedule Part-I and specified here-in-before.

BUILDER'S HARD WARE**14. General**

- 14.1 **Item and Quantities:** All Builders hard ware shall be of Aluminium anodised except butt hinges which shall be mild steel cold rolled medium weight . Hardware fittings shall be provided according to the scales indicated on the schedule of iron mongery on the relevant drawing and in conformity with any note that may be appearing on a particular drawing.
- 14.1.2 **Sizes:** In case the size of particular fitting is not given in the drawing, it shall be of size as per common engineering practice as directed and approved by the GE.
- 14.1.3 All articles of builders hardware shall bear ISI marking. In case any item/fittings with ISI mark is not manufactured than it shall conform to the relevant IS specifications and the specifications given in the MES Schedule for the relevant item.
- 14.1.4 Screws used for fixing items of builders hardware shall be as specified in clause 9.2.6 of MES Schedule Part-I and shall match the material of respective builder hardware.
- 14.1.5 Articles of builders hardware, for built-in-furniture, where specified of aluminum, these shall be of anodised aluminium
- 14.2 **ARTICLES**
- 14.2.1 **Hinges**
Butt Hinges: Butt hinges shall be of mild steel cold rolled medium weight all as specified in clause 9.7.2 of MES Schedule Part I.
- 14.2.2 **Tower bolts :** Barrel Tower bolts shall be Aluminium anodised conforming to specifications given in MES Schedule. Diameter and length of bolt shall be 250 mm and 12 mm respectively. The tower bolts should be ISI Marked.
- 14.2.3 **Mortice Lock and Latch (vertical type)**
This should generally conform to IS 2209.The size of the mortice lock shall be 100 mm as specified and

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PARTICULAR SPECIFICATIONS

directed by GE. The type of mortice lock shall be approved by GE. The measured length shall not vary more than 3 mm from the length specified. This should also conform to clause 9.9.2 of MES Schedule Part I.

14.2.3.1 **Non-interchangeable Keys** : Testing of non-interchangeable keys shall be as per IS 2209. The clear depth of the body shall not be more than 15 mm. The fore end shall be firmly fitted to the body suitably by counter sunk head screw. The latch bolt shall be of specified material and of section not less than 12 x 16 mm for all sizes of locks. If made of two piece construction both parts shall be rivetted. Ordinary lever mechanism with not less than two levers shall be provided. False levers shall not be used. Lever shall be fitted with one spring of phosphor bronze or steel wire and shall withstand the tests as provided in IS 2209. Locking bolts, spring and strike plate shall conform to IS 2209.

14.2.3.2 **Handles** : These shall conform to IS 4992.

14.2.3.3 **Keys** : Each lock shall be provided with two keys.

14.2.5 **Mortice Lock and Latch (Rebated)**

These are designed for use in double leaved doors. These should generally conform to IS 6607. The size of the mortice lock shall be 100 mm as specified and directed by GE. The type of mortice lock shall be approved by GE. The measured length shall not vary more than 3 mm from the length specified. This should also conform to clause 9.9.3 of MES Schedule Part I

14.2.5.1 **Handles, Keys,** : These shall be same as specified in clause 14.2.3 here-in-before

14.2.6 **Door Handles** : Handle shall be aluminium anodised with finger plate 5 mm thick and dia of rail is 10 mm (ISI Marked) wherever shown on drgs. These should generally conform to IS 208 and clause 9.11 of MES Schedule Part I. The shape and pattern of Handle shall be approved by the GE.

14.2.7 **Hanging Rubber Door Stopper**

Door Stopper shall be rubber. Aluminium stopper shall be anodised and the anodic coating shall not be less than grade AC-10 of IS 1868. The size and pattern of the door stopper shall be approved by the Engineer-in-Charge. The size shall be determined by its length.

14.2.8 **Door Springs**

14.2.8.1 **Door Springs Rat Tail Type** : All wire gauzed shutters shall be provided with door springs Rat Tail Type made of mild steel all as specified in clause 9.7.8 of MES Schedule Part-I.

14.2.9 **Pegs** : Pegs where shown on drgs shall be of aluminium anodised cast integral with base plate. If the same is shown to be fixed on wall, the same shall be fixed on second class HW Base.

14.2.10 **Towel Rails** : Towel rails shall be chromium plated 'D' shape with flanged ends for fixing. It shall be of minimum dia 19mm and 75cm long, in case length not mentioned in drawings

14.2.11 **Wire Cloth** : wire cloth to be used for wire gauzed shutter shall be of galvanized mild steel wire cloth conforming to IS having "not less than 0.50 mm dia" of wire and 1.18 mm average width of aperture all as specified in SSR Part I

14.2.12 **Curtain Rods with Brackets(CR)** : Curtain rod with brackets and end cap shall be provided to door and window and openings of rooms as indicated on drawings. The brackets shall be of CP brass decorative type as approved by GE. Curtain rods shall be of stainless steel (SS) of not less than 25 mm dia, crimped type with powder coating and shall be extended up to 150 mm on both side of opening with SS clamp. The clamp shall be properly fixed to wall with satisfaction of EIC/GE.

14.2.13 **Fan Hooks** : Fan hooks shall be provided all as shown on drgs and as directed. The lump sum tendered by the contractor for building under Sch 'A' Part-I shall be deemed to include for the cost of the same

14.2.14 **Hasp and Staple** : Shall be aluminum alloy (anodised), safety pattern conforming to IS : 363-1976.

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PARTICULAR SPECIFICATIONS

14.2.15 **Pelmet box (PB):** Pelmet box(PB) wherever shown on drawing shall be of type B and shall be provided as shown in Drg.

15. ALUMINUM WORK**15.1 ALUMINUM DOORS AND WINDOW ANODISED ALUMINUM DOORS, WINDOWS AND VENTILATORS****(a) MATERIAL:**

Aluminum work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS: 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required neoprene gasket. Aluminum sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminum snap beading for glazing / paneling, C.P. brass / stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge. The permissible dimensional tolerances of the extruded sections shall be as per IS 6477 and shall be such as not to impair the proper and smooth functioning/operation and appearance of door and windows.

Glass pane for aluminum window shall be selected quality made of **float glass**, conforming to IS-14900 and fixing arrangements shall be as per details shown on drawings and as per manufacturer's instructions. **Thickness of glass pane shall be 4.0 mm (weight not less than 10 kg/sqm).**

The ventilator should be fixed with 5.0 mm thick floated glass.

(b) WORKMANSHIP:

- (i) Minimum average thickness of anodizing (coating of anodizing) on all aluminum section and fittings shall be 25 micron and shall conform to IS: 1868-1996.
- (ii) All aluminum section and fittings shall be powder coated (minimum thickness of powder coating 50 micron)
- (iii) Testing of anodizing coating shall be in accordance with IS : 5523 -1983.
- (iv) Aluminum window frame shall be provided with the provision of double/triple guiding channel (weight not less than 0.85 kg/mtr for bottom & 0.75 kg/mtr for side and top for double weight not less than 1.20 kg/mtr for bottom & 1.00 kg/mtr for side and top for triple) shall be as shown in drawing. The frame shall be attached with wall as per manufacturer's instructions either through jamb method or through high strength self-drilling screw (mim 4 No.) or as directed by EIC/GE and laid as per drawing.
- (v) PVC protected sheeting shall be used while fixing the frame of doors/windows and ventilators to avoid damages, scratches etc.
- (vi) The weight of aluminum top and bottom shutter frame shall not be less than 0.45kg/mtr and interlocking shutter frame shall not be less than 0.60 kg/ mtr. The same for other vertical shutter frame shall not be less than 0.45kg/mtr. If there any sub frame is required then its weight shall not be less than 0.5 kg/ mtr. Aluminum cleat angle, Aluminum snap beading for glazing / paneling, C.P. brass / stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge.
- (vii) The contractor should arrange the fabricated door and window as per manufactures' instructions.

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PARTICULAR SPECIFICATIONS**15.2 ALUMINUM DOOR:**

Specifications of door having nomenclature indicating Al door as shown in drawing are as below:

Frame (Door): Frame shall be made of aluminium extruded built up standard tubular sections/appropriate Z sections and other sections of approved make conforming to IS 733 and IS:1285. The weight shall not be less than 2.5 kg/mtr. The frame shall be attached with wall as per manufacturer's instructions either through jamb method or through high strength self-drilling screw (mim 4 No.).

Door Shutter: Shutters shall be made of aluminium extruded built up standard tubular sections/appropriate Z sections and other sections of approved make conforming to IS 733 and IS:1285. The weight of Styles shall not be less than 2.50 kg/mtr. The weight of lock/middle rails shall not be less than 3.00 kg/mtr. The weight of top and bottom rails shall not be less than 1.4 kg/mtr. Panel inserts shall be 12 mm thick three layered, flat pressed, ISI marked, veneered particle board BWR conforming to IS 3097 exterior grade(grade 1) solid core, general purpose commercial veneered on inside and decorative veneered on outside, the shade of veneering shall be approved by GE. The panel shall be mechanically/manually wherever required including cleat angle, Aluminium snap beading for glazing/panelling, C.P. brass / stainless steel screws, all complete as per architectural drawing and with the directions of GE/EIC.

16. FLOORING**16.1 General**

16.1.1 Floor/Sub floor shall be provided as specified in clause 13.25 of MES schedule Part I and as indicated in schedule of finishes and in other drawings.

16.1.2 Floor/Sub floor shall be laid to levels and the falls as shown on drawing or as directed by Engineer-in-Charge floor shall be sunk to the required depth as shown on drawing. PCC concrete sub floor need not be laid in alternate bays.

16.1.3 The floor/sub floor shall be carried through all openings in walls cement concrete flooring cast-in-situ shall be carried out all as specified in clause 13.32 MES Schedule Part -I.

16.1.4 A coat of neat slurry 3 Kg per Sqm shall be applied before laying screed bed over RCC slab.

16.2 The details of various types of flooring and the corresponding location shall be all as mentioned and indicated in the schedule of finishes subject to following :-

- (i) Hard core shall be of broken stone or boulders of gauge not exceeding 63mm.
- (ii) The thickness of hard core, coarse sand, fly ash and sand / moorum filling mentioned in the schedule of finishes shall be compacted thickness.
- (iii) M -10 grade of concrete shall be of type C2 (using 40mm graded stone aggregate).
- (iv) Polished Kota stone shall be of machine cut pre-polished (mirror finished) and thickness shall be all as mentioned in the schedule of finishes. The stone slab shall be hard, even, sound, durable, tough, and regular in shape of shade as approved.
- (v) Unless otherwise shown/mentioned in the drawings PCC case-in-situ flooring shall be provided with 3 mm thick, 38 mm wide glass dividing strips all as specified.
- (vi) Unless otherwise shown /mentioned in the drawings PCC sub base shall be provided with

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PARTICULAR SPECIFICATIONS

75mm thick PCC M-10 (Nominal Mix) with using 40mm graded aggregate over 300mm thick coarse sand filling over rammed earth.

(viii) Blank.

(ix) Irrespective of whatever shown on drawing/schedule of finishes, 150 micron polythene film shall be laid over sand filling.

The compact thickness of coarse sand/moorum filling shall be as specified/ directed by Engineer – in – Charge or as per site conditions with full specification as per MES SSR part-1.

16.3 CERAMIC TILES

16.3.1 All type ceramic tiles shall be conforming to IS 13712 - 2006 & IS 15622 -2006.

16.3.2 Refer Clause nos. 13.14, 13.15, 13.40 & 13.41 of MES Schedule, Part-I.

16.3.3 The size of tiles shall be provided as mentioned on drawings or schedule of finishes unless otherwise specified the size of tiles shall not be less than 600mm x 600mm x 7 – 8 mm for matt finish ceramic colored floor tiles.

16.3.4 The matt finish floor tiles shall be heavy duty dust pressed (grade -5), scratch resistance of minimum 5 on Mohr's scale and shall have a bending strength 350kg/sqm.

16.3.5 FIXING/LAYING OF CERAMIC TILES FLOOR : The fixing and laying of tiles are done as per drawings or schedule of finishes, Otherwise, the ceramic tiles shall be laid on screed bed of 15 mm thick cement mortar(1:6) over 50 mm thick PCC(1:2:4) , exposed edges with mitred joint and jointed with neat cement slurry @ 3 Kg cement per square meter area.

16.4 KOTA STONE : The fixing of 20-25 mm thick machine cut Mirror Polished Kota Stone along with its sizes are done in Designer Floor Pattern as per direction of GE/EIC or scheduled of finishes..

16.4.1 Where shown on drawing/Schedule of finishes / Sch 'A', provide Kota Stone slab flooring as under: -

- (a) The slabs shall be of selected quality, hard sound, dense and homogeneous in texture, free from cracks, decay, weathering and flaws. They shall be machine cut to required size and shall be of uniform colour as approved GE. The Slab shall have top face polished before being brought to site. The stone slab/tile shall be uniform thickness and colour.
- (b) Every slab shall be cut to required size and shape and fine chisel dressed on sides to full depth so that straight edge laid alongside of the stone shall be in full contact with it. The sides (edges) shall be table rubbed with coarse sand or machine rubbed before laying. All angles shall be free from chippings and surface shall be true and plain. The thickness of slab shall be 18 to 20 mm.
- (c) The size of mirror polished Kota Stone should be incoherent with schedule of finishes attached with tender.
- (d) Laying, polishing and finishing shall be carried out all as specified in clause No 13.47.2 and 13.47.3 of MES Schedule Part - I. Mirror polishing shall be carried out as directed by Engineer-in-Charge.

16.5 NON SKID CERAMIC TILES FLOORING

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PARTICULAR SPECIFICATIONS

16.5.1 The size of tiles shall be provided as mentioned on drawings or schedule of finishes unless otherwise specified the size of tiles shall not be less than 400 mm x 400 mm x 7 – 8 mm for matt finish ceramic colored floor tiles.

The non skid ceramic tiles shall be heavy duty dust pressed (grade -5), scratch resistance of minimum 5 on Mohr's scale.

The fixing of tile shall be as specified in schedule of finishes as per direction of GE/ EIC.

The shade of tiles shall be approved by GE, hydraulically pressed, high temperature (around 1200 degree C) in single operation having breaking strength 350 to 400 kg per sqm and weighing 14 kg per sqm and shall be laid and jointed with white cement paste pigment.

TABLE-I

Ser No.	Characteristics	Ceramic Wall Tiles	Non-Skid Ceramic Floor Tiles	Ceramic Fully vitrified tiles	Method of Test, Ref to Part of IS 13630
1	2	3	4	5	6
	(i) Classification according to their water absorption (Group)	Group B-III	Group B-II	Group B-Ia	
	(ii) Size (Minimum Nominal Size)	300mmx200 mm	300mmx300 mm	600mmx600 mm	
	(iii) Thickness (Minimum)	6 mm	7 mm	10 mm	
	(iv) Color	Light	Light	Light	
(B)	Dimensions and Surface Quality				
	(i)Length and width :-				
	(a)The deviation in percent of the average working size of each tile (2 or 4 sides) from the work size (W):	±0.2	±0.1	±0.1	Part-1
	(b) The deviation in percent of the average working size of each tile (2 or 4 sides) from the average size of the 10 test specimen (20 or 40 sides):-	±0.15	±0.1	±0.1	Part-1
	ii) Thickness :- The deviation, in percent of the average working thickness of each tile from the work size thickness:-	±4.0	±5.0	±4.0	Part-1
	iii)Straightness of sides (Facial sides) The maximum deviation from straightness, in percent related to the corresponding work sizes:	±0.15	±0.1	±0.1	Part-1

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PARTICULAR SPECIFICATIONS

	iv) Rectangularity The maximum deviation from rectangularity in percent related to the corresponding work sizes:	±0.15	±0.1	±0.1	Part-1
	v) Surface flatness The maximum deviation from flatness, in percent:-				Part-1
	(a) Centre curvature, related to diagonal calculated from the work sizes	±0.22	±0.5	±0.2	Part-1
	b) Edge curvature, related to the corresponding work size	±0.22	±0.5	±0.2	Part-1
	c) Warpage, related to the diagonal calculated from the work-sizes	±0.22	±0.5	±0.2	Part-1
	vi) Surface quality ³	Minimum 95 percent of tiles shall be free from visible defects that would impair the appearance of a major area of tiles.			Part-1
(C)	Physical Properties				
	i) Water absorption, % by mass	10 ≤ E < 20	Average 3 <E≤ 6, Individual Max 6.2	Average ≤ 0.08 , Individual Max 1.0	Part-2
	ii) Modulus of rupture, in N/mm ²	Average 12 for thickness < 7.5 mm Average 15 for thickness ≥ 7.5 mm	Average 30, , Individual minimum 28	Average 47, Individual minimum 44	Part-6
	iii) Breaking strength, in N	200 for ≤ 7.5mm thickness, Minimum 500 for >7.5mm thickness, Minimum	500 for ≤ 7.5mm thickness, Minimum 1000 for >7.5mm thickness Minimum	1500 for >7.5mm thickness Minimum	Part-6
	iv) Scratch hardness of surface (Mohs' scale)				
	(a) Residential applications	3, Minimum	5,Minimum	6,Minimum	Part-13
	v) Resistance to abrasion of glazed tiles Class 1 to V	-			

PARTICULAR SPECIFICATIONS

	(a) Residential applications		(a) Class II with 600 Revolutions for Wet Abrasion Test (PEI Method) (b) Class II with 1000 Revolutions for Dry Abrasion Test (MCC Method)		Part-11
	vi) Co-efficient of linear thermal expansion from ambient temperature to 100°C (K ⁻¹)	9 x 10 ⁻⁶ K ⁻¹ , Maximum	9 x 10 ⁻⁶ K ⁻¹ , Maximum	9 x 10 ⁻⁶ K ⁻¹ , Maximum	Part-4
	vii) Thermal shock resistance	10 cycles, Minimum	10 cycles, Minimum	10 cycles, Minimum	Part- 5
	viii) Craze resistance glazed tiles	4 cycles at 7.5 bar, Minimum	4 cycles at 7.5 bar, Minimum	4 cycles at 7.5 bar, Minimum	Part- 9
	(ix) Bulk density, in (g/cc)	-	-	2.2 (Minimum)	Part- 2
(D)	Chemical Properties				
	(i) Resistance to staining of glazed tiles	Class 1, Minimum	Class 1, Minimum	-	Part- 7
	ii) Resistance to household chemicals and swimming pool water cleansers except to cleansing agents containing hydrofluoric acid and its compounds Glazed tiles	Class AA, Minimum	Class AA, Minimum	Class AA, Minimum	Part- 7

17 FINISHES

17.1 Plastered surfaces of masonry wall shall be plastered 15mm thick with cement mortar (1:4) on even/uneven surface of walls finished even and fair without using extra cement. The thickness of plaster on concrete surface shall be provided to match the adjoining surface of wall.

17.2 COLOR WASH/ WHITE WASH

17.2.1 White washing and color washing shall be done as per clause 15.12 of MES SSR Part-1.

17.2.2 The plaster surface of masonry wall shall be finished with two coats of color wash over a coat of white wash as per direction of GE/ EIC. No finish shall be executed until a sample of the finish to the required colour and shade has been approved by the EIC.

17.3 PAINTING

17.3.1 Internal and external faces of all steel window/Ventilator, steel members, pressed steel frame of panel door shall be painted with two coat of the best quality (ISI marked) (as approved by GE) synthetic enamel paint of approved shade over one coat of red oxide zinc chrome primer.

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PARTICULAR SPECIFICATIONS

- 17.3.2** All painting as far as possible shall be carried out in dry weather and neatly cut in all edges. Other surfaces shall be protected and cleaned as necessary.
- 17.3.3** The contractor shall inform the GE within 4 weeks of the acceptance of the tender the name of the manufacturer and brands of paint he wants to use in the works and submit sample thereto and obtain prior written approval of GE before their use in works. The product of any one of the manufacturers shall be used in the entire project and no mixing of manufacturers shall be permitted.
- 17.3.4** The contractor shall when so required by the GE produce certificates from the manufacturers or their representatives to establish that the brands of paints purchased by the contractor from them satisfy the requirement of the relevant IS or are superior to the quality specified in the relevant IS.
- 17.3.5** The contractor shall ensure that the paints used are actually those that have been approved by the GE. The contractor shall produce the original vouchers, which shall be defaced by endorsing CA No, name of work by the Engineer-in-Charge. Certified true copy of such vouchers shall be kept in MES record. The Engineer-in-Charge shall record the same in measurement books with a note for "Record purpose only". Paints for priming coat, under coat and finishing coat shall be of the same manufacturers.
- 17.3.6** Painting shall be of tints as approved by the GE.
- 17.3.7** The whole quantity of paint required for the works shall be purchased directly from the approved manufacturers or their approved agents brought to site in manufacturers sealed containers and stored properly. They shall be used in works as directed by the GE.
- 17.3.8** Surfaces specified to be painted shall first be passed by the Engineer-in-Charge and marked as such before commencement of painting work. Each coat of paint shall be passed by Engineer-in-Charge before the next coat is applied.
- 17.3.9** The quantity of paint for incorporation in the work to be brought by the contractor shall be in sealed container not more than 4 to 5 Kg/Ltr packing.

18 SANITARY FITTINGS, PLUMBING**18.1 GENERAL**

- 18.1.1** All sanitary fittings unless otherwise indicated shall be white vitreous china first quality.
- 18.1.2** Sanitary fittings shall conform to the relevant IS mentioned.
- 18.1.3** **WASHDOWN WATER CLOSET (EWC)** : Wash-down water closet (EWC) wherever shown on drawing shall conform to latest IS-2556:2004 (Part-12) and their pattern shall be Pattern – 4 (Pedestal WC with independent cistern and concealed S-trap or P-Trap), white, 410 mm high. WC shall be provided with 10 litres capacity PVC low level flushing cistern as mentioned here-in-before and 32mm bore PVC flush pipe for pedestal pattern WC and ISI marked white solid plastic seat and lid, flat with hinging device conforming to IS : 7231, with all fittings and fixtures complete, including cutting and making good the walls and floors wherever required. All other details shall be as per MES schedule Part-I.(18.32.2)
- 18.1.4** **WASHDOWN WATER CLOSET (IWC)(Squatting pans)** : Wash-down water closet (IWC) wherever shown on drawing shall conform to latest IS-2556:2004 (Part-3) and their pattern shall be Orissa type Squatting pan (of size 630 x 450x 320 mm) (Pedestal WC with independent cistern and concealed S-trap or P-Trap), white, WC shall be provided with 10 litres capacity PVC low level flushing cistern as mentioned here-in-before and 32mm bore PVC flush pipe for pedestal pattern WC conforming to IS : 7231, with all fittings and fixtures complete, including cutting and making good the walls and floors wherever required. All other details shall be as per MES schedule Part-I.(18.32.3)
- 18.2** **WASH HAND BASIN (WHB)**

PARTICULAR SPECIFICATIONS

- 18.2.1 Oval Type Wash Hand Basin** : Counter top wash hand basin (recessed), wherever shown on drg be of size 195 x 600 x 425 mm. The wash basin supported over brick wall with plastered finished with black minimum 18 mm thick granite slab on top. All the edges of granite slab shall be grinded with portable power-driven grinder to smoothness and round finish and polished with mirror polish, and the granite slab shall be single piece. 15mm brass chromium plated central hole basin mixture without pop up waste system with 450mm long braided hoses..
- 18.2.2** The WHB of any type including oval shaped shall be provided with the following accessories:-
(i) 32mm bore brass chromium plated waste fittings with gratings.
(ii) A pair of mild steel bracket wherever required.
(iii) 32mm bore low density polyethylene (LDPE) waste pipe of length not less than 60 cm.
- 18.3 MIRROR** : Unless otherwise mentioned in the drawing the mirror shall be of beveled edged, selected quality glass not less than 5.5mm thick, size 600mmx450mm (if no size mentioned in the drawing) mounted on 6mm thick commercial plywood and fixed to wooden plugs with chromium plated from screws and cup washers.
- 18.4 NAHANI/FLOOR TRAP**
- 18.4.1** Unless otherwise shown on drawings Nahani/floor trap shall be positioned at a corner of the floor near the external wall through which the waste water will exit. The trap shall be properly embedded in PCC (1:2:4) type B1 as shown in drawing. The slope of floor shall be such that water flows into the trap from all points without obstruction. The nahani/floor trap shall be inspected for cracks before fixing. The top of the traps should not be more than 25 mm below the finished floor level so that the stainless steel grating resting directly over it is flush with finished floor level. The opening of the trap shall be temporarily locked by means of hessian or jute cloth and shall be ensured that no brick bats, cement slurry, aggregate etc are left. Unless otherwise shown in drawings, traps shall be of 75 mm dia and of CI.
- 18.4.2** All other details shall be as per MES schedule Part-II.(18215).
- 18.5 GULLY TRAPS** : 125 mm dia gully trap shall be of PVC(SWR) connected with PVC (SWR), (Type 'B'). Gully trap shall be bedded and haunched in PCC (1:3:6) type C1.
- 18.6 SOAP DISC** : Soap disc of brass chromium plated shall be provided in the location and as per details shown on the drawing.
- 18.7 SOIL AND WASTE PIPES**
- 18.7.1** Soil waste pipes shall be PVC (SWR), (Type 'B') pipes conforming to IS 13592-2013. PVC (SWR), (Type 'B') and fittings shall be obtained from approved manufacturers. PVC (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. All soil pipes shall be of sizes as indicated on drawings and if nothing is indicated it shall be of 100mm bore. Rubber rings for pipes and fittings shall conform to IS 5382-1985. PVC (SWR) pipes and fittings shall be strong, dimensionally stable and shall be free from defects. All other details shall be as per Clause 18.27A of MES schedule Part-I. The rate of PVC (SWR) pipes are according to Section 18 of MES schedule Part –II,2010.
- 18.7.1.1** All bends/branch pipes for connection between the main pipe and branch and exposed to view shall be provided with access doors. Access doors to fittings shall be provided with 3 mm rubber insertion pickings and secured with set screws to make them air and water tight. All vent pipes shall be carried upto a height of 1.00 meters from the roof level and shall be provided on the top with vent cowl. The top unsupported portion of such pipes shall be secured with stack clamps fixed to the parapet or other part of the structure.
- 18.7.1.2 Laying and Jointing of Pipes**
The pipes shall be cleaned from outside spigot end and inside of the sealing groove of the fitting. Lubricant supplied by the manufacturer shall be applied uniformly to the spigot end and sealing ring. Spigot end shall be passed into the socket containing sealing ring until fully home as per manufacturer's instructions. The method of installation and fixing to wall shall be as per manufacturer's

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PARTICULAR SPECIFICATIONS

instructions.

18.8 **Inspection chamber (IC):** This shall be provided all as shown on the drawing. Brief specifications are as under:-

- (a) Brick work with cement mortar (1:4).
- (b) PCC M-15 (using 40 mm graded stone aggregate) in foundation and PCC M-15 20 mm graded stone aggregate for benching and channels.
- (c) Plaster shall be 15 mm thick in cement mortar (1:4) with integral water proofing compound internally and externally including PCC benching and channels as shown in drawings. PCC channels and benching shall be finished even and smooth using extra cement.
- (d) Precast RCC M15 type B1 manhole cover set and jointed in cement mortar (1:3) shall be placed on the top. 8 mm dia TMT bars @ 100 mm C/C both ways shall be provided as reinforcement.

18.9 **TESTING** : All PVC (SWR) Pipes and fittings shall be tested with water to detect any leakage as per manufacturer's instructions. Water test shall be carried out to drains, soil, waste and vent pipes all as specified in clause 18.79 of MES schedule (Part – I). The result of such test shall be recorded duly signed by both parties.

18.10 **STAINLESS STEEL SINKS:** Refer Para 18.100 of MES SSR Part I. The sink is through type wash basin with full length having cross sectional area of 450 mm x 250 mm as shown on drawing. The sink shall be provided with plug, washer and waste and fixed with a pair of MS cantilever bracket. The sink shall be provided with sufficient no. of opening of suitable size to drain out waste water and be fixed with 100 mm PVC(SWR) pipe as per direction of GE/ EIC. The opening shall be covered with CI nahani trap of same size of opening. The thickness of stainless steel shall not be less than 1.00 mm.

18.11 **BIBTAB/STOPVALVES/ PILLAR TAP SHOWER WITH SHOWER ARM/ SOAP DISC/ TOILET PAPER HOLDER** shall be brass chromium plated and shall be procured from the approved manufacturer refer Appendix 'D'.

18.12 **URINAL**

The urinals shall be provided as per drawing directed by Engineer – in – charge. The partition between urinal block should be of granite stone of width atleast 450mm and height starts from 100mm above platform and up to 1100 mm above platform in single piece as directed by GE/ EIC.

a) Urinals in Officer's toilet shelter:

Half Stall Urinals: Urinals shall be of vitreous china, bowl urinal flat back of size 450x350x300 mm (minimum) white shall conform to IS 2556 (Part -6) 1995: Specification for vitreous sanitary appliances (vitreous china), part 6, Specific requirements for Urinals Sec 2, Half stall urinals. The urinals are connected to sewage pipe with 75 mm UPVC soil pipe (type B) as shown on drawing.

b) Urinals in other than Officer's toilet shelter:

Bowl type Urinals: Urinals shall be of vitreous china, bowl urinal flat back of size 465mmx355mmx265mm (minimum) white shall conform to IS 2556 (Part -6) 1995: Specification for vitreous sanitary appliances (vitreous china), part 6, Specific requirements for Urinals Section 1 Bowl type. The urinals are connected to sewage pipe with 75 mm UPVC soil pipe (type B) as shown on drawing.

19. **INTERNAL ELECTRIFICATION**

19.1 **GENERAL**

19.1.1 The specifications and general rules/conditions contain in MES Schedule 2009 Part – I and Part– II 2010 including errata/amendments there to will generally applicable to the work unless otherwise specified here-in-after.

19.1.2 Specifications for internal electrification given here-in-after are supplementary to those given in MES Schedule and shall be read in conjunction with them. These specifications will take precedence over MES

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PARTICULAR SPECIFICATIONS

Schedule where at variance.

- 19.1.3** The rates quoted by the contractor shall be deemed to include for any minor details of 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 work.
- 19.1.4** The rates quoted for supplying and fixing cables and other equipments shall be deemed to include for necessary dismantling of walls/floors etc and making them good to match with the adjoining surfaces.
- 19.1.5** The contractor shall submit the test certificates from the manufacturers/authorized dealers for the equipments being incorporated in the work.
- 19.1.6** The unit rate quoted by the tenderer for supply and installation of equipments shall be deemed to include the cost of foundations/grouting and supporting iron frames.
- 19.1.7** The contractor shall submit the detailed drawing of the equipments/LT panel board showing the fixing arrangements in the metal enclosure for approval of GE.
- 19.1.8** The contractor shall place orders immediately after commencement of work so that materials are procured in time. Contractor shall intimate to GE delivery dates promised by supplier.
- 19.1.9** Point wiring and sub-main wiring lines shall be as specified in Schedule of Works.

19.2 STANDARD AND QUALITY OF WORK

- 19.2.1** The entire electrical work under this contract shall be carried out in conformity with the provisions contained in the latest edition (including amendments) of Indian Electricity Act 2003, Indian Electricity Supply Act 1948, IS Rules 1956 and relevant IS specification and the rules enforced by the State Government.
- 19.2.2** All electrical work shall be carried out by properly skilled electricians under the supervision of suitably qualified electrical supervisors and the contractors and on demand by Engineer-in-Charge shall produce such evidence either at the commencement of the work or at any time thereafter.

19.3 WORKMANSHIP

- 19.3.1** The work shall be high standard and approved construction in modern electrical works and shall be suitable in every respect for the type of voltage specified and shall be to the satisfaction of Engineer-in-Charge.
- 19.3.2** All the fittings/wirings shall be clear of the doors/windows ventilators and other such locations. The exact positions of switch gears, points, fittings and appliances shall be as shown on drawing. However, the same can be changed by Engineer-in-Charge depending upon the requirement at site. No adjustment in pricing shall be made on this account. "Looping in back" system of wiring shall be used throughout the installations.
- 19.3.3** Cable termination shall be crimped with lugs/studs for connecting to switches/MCBs/DBs.
- 19.3.4** Switches point should be provided at a height of 100 cm and socket outlet point at 15 cm above the floor level, except toilet and kitchen, which are to be provided as directed by GE.

19.4 EQUIPMENTS AND MATERIALS

- 19.4.1** All equipments and materials to be incorporated in the work have ISI certifications mark on them, wherever available. However, if equipments and materials with ISI mark are not available the equipments and materials supplied by the contractor shall comply with relevant IS, issued and if relevant IS has not been issued these shall comply with current relevant IS unless otherwise specified in these tender documents.
- 19.4.2** In case tenderer offer conforms to the standard specifications other than ISI/BIS copies of such standard specifications with English translation and salient points of comparison between two standards shall be submitted along with the tender.
- 19.4.3** Approval of GE as referred to in clause 19.2.1 of MES Schedule Part – I 2009 shall be obtained in writing. Approved samples shall be labeled as such and signed by both the contractor and GE. The samples shall

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PARTICULAR SPECIFICATIONS

be kept in the custody by the GE till the final completion of the work.

19.4.4 The materials shall be brought to the site by the contractor in the original packing of the manufacturer with seal intact or with wrapper of the manufacturer on and shall not be installed unless approved by the Engineer-in-Charge.

19.4.5 All the materials and equipments shall be of the best class capable of satisfactory operation in the tropics with hot and humid atmospheric conditions.

19.5 CABLES

19.5.1 All cables to be used for point wiring/sub main wiring shall be indigenous make and conforming to IS-694-1990 and shall bear IS certification marking and all as specified of MES Schedule Part-I.

19.5.2 The cables shall be with multi-stranded copper conductor PVC insulated unsheathed suitable for 1100 volts, for PVC casing capping as specified. For point/sub main wiring color code of cables as per IE rule shall be maintained.

19.5.2.1 Neutral wire to be taped from the Switch Board etc for each point and not interlinked between each other points of light/ fan.

19.5.2.2 Color code must be maintained in wiring of internal electrification as under:

- (a) Red for phase wire
- (b) Black for neutral wire
- (c) Green for earth wire

19.6 PVC CASING-CAPPING

19.6.1 PVC casing-capping to be used for point wiring/sub main wiring shall be 'Heavy Grade' and all as specified in Para 19.29 of MES Schedule Part-I.

19.7 **FLEXIBLE CABLE** : Flexible cable shall be with tinned annealed stranded copper conductors of 1 Sqmm 3 runs (phase, neutral and earth) with PVC insulation.

19.8 **CEILING ROSES** : Ceiling rose shall be surface type and shall comply with IS-371 having three terminals plate and as specified in Para 19.32 of SSR 2009 Part – I.

19.9 **SWITCHES & SOCKETS** :The switches 5 amps, 15 amps and 16 amperes and socket of 5 & 15 amperes shall be all as specified in the schedule of Works.

19.10 SUB-MAIN WIRING

19.10.1 Refer SSR part-I 2009

19.10.2 For sub-main wiring all cables shall be measured together in single length. The casing-capping for sub main wiring shall also be included in the rate of sub main wiring and nothing extra shall be paid on this account.

19.11 **CEILING FAN/DOWN ROD** : Ceiling fan with down rods will be Supply & Fixing. The contractor shall modify the down rod at no extra cost to suit the height of the fan above floor level and fix the same (modified down rod) suitable for suspending the fan. The down rods shall be fixed to fan hook box all as directed. The cost of flexible wire 3 run only which will be used for connecting fan and connector and new ceiling rose and electronic regulator is deemed to have been included in the cost of supply and fixing of ceiling fan.

19.12 **EXHAUST FAN WITH LOUVER SHUTTER** : The exhaust fan is to be fixed in the wall / other surface after providing required size of opening in the wall / other surface.

19.13 MINIATURE CIRCUIT BREAKER (MCBs) & DISTRIBUTION BOARDS

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PARTICULAR SPECIFICATIONS

- 19.14** Refer Para 19.46 and sub paras of 19.46 of MES Schedule Part-I.
- 19.15** **MCCB** : Refer Para 19.100 and sub paras of MES Schedule Part-I.
- 19.16** **TESTS ON COMPLETION** : The following tests shall be carried out by the contractor after completion of the work in presence of Engineer-in-Charge. The results of such tests shall be recorded and signed by the contractor and Engineer-in-Charge. All testing equipments required to carry out the tests shall be arranged by the contractor without any extra cost. The work which does not with stand satisfactory test shall be retested by the contractor at his own expenses.
- (a) **POLARITY TEST** : A test shall be made to ensure all switches are connected to correct phases or live conductor of supply.
 - (b) **RESISTANCE OF EARTH CONTINUITY PLATE** : Max continuity resistance from any point in the installation including earth continuity wire and earth lead to earth plate shall not exceed two ohm.
 - (c) Effectiveness of earth shall be tested by earth tester.
 - (d) **INSULATION TEST** : The insulation resistance shall be measured between all conductor connected to neutral and phase of supply and result shall be as those specified in IS/IE rules and shall be such to ensure reliable operation of protection devices.
- 19.17** **RECORD DRAWINGS** : On completion of the wiring of the building the contractor shall submit three copies of the line plans of building (Scale: 1:100) indicating actual position of all controls and fittings and actual runs of all mains and sub circuits and such other information which the Engineer-in-Charge may require. Phase and neutral wires shall be shown in different colours.
- 19.18** All screws and washers for fixing switch board should be of brass.
- 19.19** Junction Box cover should be Bakelite laminated sheet 3 mm thick to match with wall surface.
- 19.20** Service cables coming outside should be connected through proper size connector but not directly to MCB/Main switch. The rate of connector is deemed to be included in the unit rate of DB and no separate payment shall be made on this account.
- 19.21** Insulation test by megger to find out the resistance in for the complete electric wiring system of the buildings. Contractor should submit the same in the prescribed test form and getting signature of Engineer-in-Charge and contractor.
- 19.22** Specification for all other materials and workmanship shall be all as mentioned here-in-before.
- 19.23** Provision of earth connections shall be made in the fittings for earthing and cost of this provision will be deemed to be included in the respective items of Sch 'A'. The fitting shall conform to relevant ISI.
- 20** **EXTERNAL ELECTRIFICATIONS**
- 20.1** **Scope of work** : The extent of work under this contract is as indicated in relevant para/section of Schedule 'A', particular specifications and drawings with all reference to clauses in succeeding paragraphs pertain to MES Schedule. The layout of conductors/cable route shall be as directed by the Engineer-in-Charge.
- 20.2** **General requirement** :
- 20.2.1** The requirement pertaining to materials, conformity with Indian Electricity Act and Rules, workmanship, testing , record of installations, safety procedures and fire safety, shall be all as specified in MES Schedule Part –I Clause No.19.2.All the Electrical works shall be got executed through licenced Electrician and the contractor shall produce the EIC in support of Electrician provided by him before commencement of work.
- 20.2.2** The contractor is deemed to have included in rates, cost of making holes/chases where required through

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PARTICULAR SPECIFICATIONS

roads/masonry or concrete work for taking in cable/conduits/pipes and conductor etc, and making good the same to match with existing work without any extra cost.

20.2.3 Electrical Works General :

(a) All electrical 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 also the Regulations of Electric Supply authorities concerned amended from time to time.

(b) Unless otherwise exempted under the Rules of the Indian Electricity Rules, the work of electrical installation shall be carried out under the supervision of a person holding a certificate of competency issued by the recognized authority. The workman shall also hold certificate of competency. Good workmanship is an essential requirement for compliance with these specifications.

(c) The contractor shall adhere to safety procedures instructions for working on low, medium and high voltage mains and apparatus and safety practices listed in IS : 5220, Guide for safety procedures and practices in electrical works shall be followed to the extent applicable. The contractor shall provide workman with safety devices and appliance.

(d) All electrical equipment shall satisfy the requirement laid down in IS : 1646 Code of practice for fire safety of buildings (general) electrical installations and IS : 3034, code of practice for fire safety of electric generating and distribution stations to the extent applicable.

(e) All electrical works shall be systematically tested by the contractor in presence of the Engineer-in-Charge to ensure compliance with the specifications laid down. Test results shall be recorded and signed by the Contractor and the Engineer-in-Charge. If the test results are not acceptable, all repairs and replacements and extra work of removal and relaying or re fixing shall be carried out by the contractor at his expense and installation retested until test results indicate compliance with the prescribed requirements.

(f) The contractor shall supply the three copies of layout diagram of complete External Electrification work executed under this contract to Engineer-in-Charge on completion of work.

20.2.4 **Conductors** : These shall conform to relevant IS specification and as given in MES Schedule Part-I. Laying of conductor should be as per Clause 19.56 to 19.66 of MES Schedule Part-I.

20.3. Under Ground Cables :

20.3.1 LT power cable shall conform to relevant IS specifications and should be laid as mentioned in Clause 19.74 to 19.76, 19.88 to 19.92 of MES Schedule Part-I. Cable terminations and joint kits shall conform to Clauses 19.22.1 and 19.22.2 of MES Schedule Part-I. Testing of underground cable during and after laying should be done as per IS code and as mentioned in MES Schedule Part-I.

20.3.2 XLPE insulated, PVC sheathed HT Cable 11000 volts grade shall conform to IS : 7098 part (II) & shall be manufactured by using either Sio-plass Technology or Dry curing with nitrogen gas technology. Laying of the cables shall be carried out as described in clause 19.74 to 19.76, 19.88 to 19.92 of the MES Schedule Part-I. Testing of the under ground cable during and after laying shall be done as per relevant IS code and as mentioned in MES Schedule Part-I.

20.3.3 **Acceptance Test of HT XLPE Cable** : Before accepting the lot of cable for incorporation in the work, it shall be tested in accordance with clause 18.2.1 of IS-7098 (Part-II) to ensure the quality of the cable supplied.

20.3.4 **Method of laying** : Before laying the cable, the trench shall be provided with a layer of sand of 8cm depth for the purpose of cushioning. After the cable has been uncoiled and laid in to the trenches over the rollers, the cable shall be lifted slightly over the rollers beginning from one end by helpers standing about 10 metre apart and drawn straight. The cables shall then be taken off the rollers by additional helpers lifting the cable and then laid straight into the route. When the cable has been properly straightened, it shall be covered with sand to a depth of 15cm. This is then gently punned down to a depth of 10cm above top of the upper most cable, thus providing a good bedding for the protective cable covers on warning covers which are placed centrally over the cable i.e. by bricks. The punning shall be done by hand, mechanical punners shall not be

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PARTICULAR SPECIFICATIONS

used.

20.3.5 SAND CUSHIONING

Sand for cushioning shall be dry, clean sand, and sand cushioning as specified here in before.

20.4 CABLE COVER

The PCC precast cable cover shall conform to IS and also to the requirement mentioned relevant clause of MES Schedule Part-I.

20.5 CABLE TERMINATION AND JOINTS KIT :

(a) **Cable Termination and Joint Boxes** : Cable boxes for straight through and termination joints shall be in form of 'Kits' with jointing instructions and literature/test certificate. The kit shall also carry the name of manufacturers, date of manufacture and expiry date on the kit also six type of cable for which suitable.

(b) **Cable Termination Accessories** : All the cable termination accessories such as cable sockets, compression joint sleeves, conducting jellies, cable glands, reducing bushes and check nuts etc shall be best quality available or as directed.

20.6 TESTING OF ELECTRICAL EQUIPMENTS AND CABLE

(a) **Test Certificate** : Contractor shall supply CTC of test certificate of all electrical equipments in a neatly bound folder. This will be in addition to production of original test certificate at the time of receipt/payment through RARs without & any extra cost to the department.

(b) Complete equipment shall be tested jointly by Engineer-in-Charge and contractor's qualified Engineer, Record of all test results shall be compiled and submitted to GE for approval. GE shall ensure that all test results are within the specified limits of Indian Standard or laid down specifications as described in Clause 19.2 of SSR Part-I and compare favourable with the original test certificates supplied by the manufacturers of equipments.

(c) After according his approval, GE shall approach higher Engineer authorities for arranging inspection of an Electrical Inspector. However, an advance intimation will be sent regarding probable date of completion at least 30 days in advance for arranging inspection of Electrical Inspector.

(d) The contractor shall ensure that the overload and earth fault relays settings are calibrated in such as manner that take place in this order.

(e) The contractor shall arrange training of two JE E/M and two Electricians for a period of 15 days for operation and maintenance of various equipments installed in this contract.

20.7 TESTING OF CABLE

(a) **Testing during laying** : All new cables shall be megger tested before jointing. After jointing is completed all low voltage cables shall be megger tested and high voltage cables pressure tested before commissioning. The cables shall be tested for :-

- (i) Continuity.
- (ii) Absence of Cross Phasing.
- (iii) Insulation resistance to earth.
- (iv) Insulation resistance between conductors

(b) **Testing after laying and jointing** : Immediately after the initial laying and jointing work is completed, a high voltage test shall be applied to HV cables to ensure that they have not been damaged during or after the laying operations and that there is no flaw in the jointing. The following tests shall also be carried out in all cables :-

- (i) Insulation resistance test sectional and over all.
- (ii) Continuity test sectional and over all.

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PARTICULAR SPECIFICATIONS

- (iii) Full load test.
- (iv) Earth test.

(c) Insulation resistance test shall be carried out between the conductors and conductors and earth by Megger, high voltage test shall be carried out by a plying test voltage between the conductor and earth conductor to sheath as given in Appx 'F' to IS – 1255 and reproduced in clause 19.94 of SSR Part-I.

(d) The contractor shall provide all apparatus required for the test and render all assistance for carrying out tests without any extra cost to the Deptt.

20.8. **Steel tubular Swaged poles & Struts :** The poles shall be painted with two coats of black bituminous paint in all interval surfaces of poles with base plate & taper plug and external surfaces upto the portion embedded in concrete with base plate, the remaining external surfaces shall be painted with two coats of Aluminum paint over a coat of red oxide primer.

20.9. **ACSR CONDUCTORS**

Aluminum conductors galvanized steel reinforced (ACSR) shall be made of seven or more Aluminum and galvanized steel wires built-up in concentric layers. The center wire or wires are of galvanized steel and outer layer or layers of Aluminum. Stranding and size of conductor shall be as indicated in Sch 'A'. Natural grease shall be applied between the layers of wire. Fixing arrangements shall all as specified in clause 19.10 of SSR Part I and as described in Sch 'A' according to code of practice for HT overhead transmission with the approval.

21 **DEMOLITION/DISMANTLING**

21.1 **Precautionary Measure** : Precautionary measure prior to demolition/dismantling as described in SSR Part-I shall be adopted and work shall be executed as per Schedule 'A'.

21.2 **Removal/Site clearance** : Old demolished materials considered under Schedule of credit shall be the property of the contractor and will remove by the contractor at his custody. Debris and other materials if any shall be disposed off and sites to be cleared to the entire satisfaction of the GE.

22. **E/M EQUIPMENTS**

22.1 **All major E/M equipment's viz. Power/Distribution Transformers, HT/LT Panels of any type, APFC Panels, HT/LT Circuit Breakers, Motors, Pumping sets, DG sets, HT CTs/PTs & other metering/protection equipment's, treatment plants etc. are to be procured / brought at site by the contractor / firm in such a planned manner that there is not less than one year (12 months) guarantee / warrantee available as the case may be from the respective OEMs of the items after the physical completion of the project.**

22.2 Design / Drawings including accessories of manufacturers is to be got approved from Engineer-in-Charge and GE for placing of order.

22.3 Contractor shall arrange factory visit by rep of Accepting Officer for inspection / testing of HT U/G cable, transformer, LT Panel etc. Cost of factory visit shall deem to be included in unit rate quoted by contractor.

23 **RECORD DRAWINGS**

23.1 The contractor shall submit two copies of the drawings duly signed by him and the Engineer-in-Charge on completion of the work along with Periodical Services MB register having all the detailed measurement and type of painting used on the wall, door, window, pipes etc.

23.2 Overall layout plan for external water supply scheme showing entire details of the installation complete with actual layout of various pipe lines (indicating clearly different sizes in different colours) various valves and all other information necessary for record, maintenance and operation, all as directed without any extra cost.

23.3 Specification for all other materials and workmanship shall be all as mentioned here-in-before.

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PARTICULAR SPECIFICATIONS

24. EXTERNAL WASHED GRIT PLASTER : External washed grit plaster shall be provided on external surfaces in two layers with followings specifications as shown in Drgs No CA/2008/41835 sheet No. 2/3 dated 02 Nov 2021 as indicated T15 (schedule of finishes). :-

24.1. Under layer (1st layer) shall be **12mm thick (average)** plaster of cement mortar 1:4 (1 cement 4 coarse sand) and shall be brought to true level and plumb by using wooden float after thoroughly wetting the surface. The surface shall be further roughened by furrowing with a scratching tool. The surface shall be kept wet till top layer is applied. Irrespective of what is shown on drawings, GI chicken wire mesh 24 gauge and 20mm mesh shall be fixed all along RCC and masonry work joints in a width of 300 mm with cement slurry and nails before providing under layer of plaster.

24.2. All stone chipping to be washed in clean water before use for top layer.

24.3. Top layer (2nd layer) shall be **15mm thick** with cement plaster white/approved stone chips in proportion of 1:0.5:2 (1 cement : 0.5 coarse sand:2 stone chipping of 10 mm normal size) in panels with groove of size 20x15mm around as per approved pattern. Before application of top coat, the surface of the under coat shall be cleaned and a coat of grey cement slurry @ 2 Kg of cement per Sqm, shall be applied. The top layer shall be applied in uniform thickness and sufficiently pressed with wooden float for proper bonding with the under coat and finished to a true and plumb surface. Finished surface of top coat after the mix has taken the initial set shall be scrubbed and washed with suitable brushes and water mixed with H2SO4 @ 5% scrubbing and washing shall continue till the stone chipping are sufficiently exposed to its natural colour. The top layer shall be applied above over under layer of 12mm thick cement plaster 1:4.

24.4. Stone chipping of size 10 mm nominal size shall be as approved before used in execution.

24.5 Suitable scaffolding to be used shall have sound and strong supporters tied together with horizontal pieces over which scaffolding planks shall rest to ensure that for horizontal supports no holes are made in the wall and as specified in here in before.

24.6. The wooden battens shall be removed very carefully by a special tool so that the edges of grit wash are not damaged.

24.7. Before application of under coat of plaster, the surfaces shall be prepared by raking out joints proper and brushing out the dust and loose mortar and washed thoroughly with water and be kept damp.

24.8 Grooves shall be finished with cement slurry mixed with approved water proofing compound.

25. COLLAPSIBLE STEEL GATE

25.1 Providing and fixing in position collapsible steel shutters with vertical channels 20x10x2 mm and braced with flat iron diagonals 20x5 mm size, with top and bottom rail of T-iron 40x40x6 mm, with 40 mm dia steel pulleys, complete with bolts, nuts, locking arrangement, stoppers, handles, including applying two coat of synthetic enamel paint over a priming coat of approved steel primer incl preparation complete all as specified and directed

26. ROAD/PATH/HARD STANDING/CULVERT

26.1 Before commencement of the work, spot levels on the existing ground shall be taken jointly by the Engineer-in-Charge and the contractor and these levels shall be recorded in level sheet which shall also be signed by the Engineer-in-Charge and the contractor. Levels shall be taken at an interval of 53 metres both longitudinally and transversely or at such other intervals as directed by the GE. Formation level(s) shall be determined and shall be marked using different colours of ink. The quantities of earth work shall be calculated on the basis of these levels.

26.1AThe laying and rolling of bituminous carpet should be carried through Approved agency/vendor using mechanical equipment (mechanical paver) up to satisfaction and direction of GE.

26.2 For the purpose of filling/cutting, the entire area where filling/cutting activity is to be done shall be divided into grids of suitable sizes and quantities shall be computed by using Simpson's Rule for areas and prismoidal formula for computing volumes

The quantity of earth work carried out shall be computed from the following formula and shall be recorded in measurement books :-

- i) Areas of cross sections where number of ordinates are odd and the ordinates are spaced at equal intervals shall be computed by Simpson's rule as under :-

Contd/.....

PARTICULAR SPECIFICATIONS

$$A = D/3 [h_1 + h_n + 2 (h_3 + h_5 + \dots) + 4 (h_2 + h_4 + \dots)]$$

Where A = Area of cross section

D = Distance between equally spaced ordinates.

h_1 = Height of first ordinate.

h_n = Height of last ordinate

$h_3 + h_5 + \dots$ = Sum of heights of odd ordinates

$h_2 + h_4 + \dots$ = Sum of heights of even ordinates

This formula is applicable only when the number of ordinates is odd. If an odd numbers of division has been taken (i.e. the number of ordinates are even), the area of those divisions shall be calculated separately and added to the result of the Simpson's rule applied to the rest of the divisions.

ii) Volume shall be calculated by using Prismoidal formula as under :-

$$V = D/3 [a_1 + a_n + 2 (a_3 + a_5 + \dots) + 4 (a_2 + a_4 + \dots)]$$

Where V = Volume

D = Distance between equally spaced cross section.

a_1 = Area of first cross section.

a_n = Area of last cross section.

$a_3 + a_5 + \dots$ = Sum of area of odd cross section.

$a_2 + a_4 + \dots$ = Sum of area of even cross section.

26.2.1 This formula is applicable only in the case where number of cross sections is odd. In case where number of cross sections is even, volume of last two sections shall be calculated by applying the Trapezoidal formula and added to the volume calculated of the remaining sections by application of Prismoidal formula.

26.2.2 Formation level : Formation level shall mean the level of finished earth surface after filling, rolling and consolidation as specified.

26.3 Drainage of formations : At all times, the formation shall be kept well drained by the contractor. The contractor shall provide such temporary open drains as may be necessary to prevent accumulation of water from rains, drains or other causes. No payment shall be admissible on the account.

26.4 Earth filling and rolling :

24.4.1 Earth for filling in the areas shall be as specified in Clause 3.22.6 of SSR Part-I. The earth shall be approved by GE before filling in the areas.

26.4.2 Earth filling in the areas shall be done under suitable moisture conditions to give a well compacted surface. Earth shall be spread in layers not exceeding 30cm thick each layer, levelled, watered and rolled with 8 to 10 tonne power roller as specified in Clause 3.22.8 of SSR Part-I to obtain well compacted surface. Deduction in earth filling quantity shall be made as specified in MES Schedule for payment purposes. The contractor shall provide all facilities and conveyance for testing optimum moisture contents, dry density etc of soil, as decided by GE, to any approved laboratory and the contractor shall bear the cost of testing.

26.4.3 Top surface and earth filling shall be properly finished to slopes, camber and cross section as directed.

26.4.4 The quantity of earth required for filling the areas is compacted as for the finished measurements with 10% reductions as per Clause 3.6 on Srl Page 21 of SSR Part-II.

27 **Rolling formation surfaces:**

27.1 The formation surfaces shall be rolled to the required gradient and camber with power roller including sprinkling the surfaces with water as required.

27.2 Where rolling is not feasible, prior permission of the GE shall be obtained in writing for hand ramming. The laying of the base course will commence only after the earth consolidation is approved by the GE.

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PARTICULAR SPECIFICATIONS

27.3 Soling shall be provided all as specified in Schedule A and SSR part-I.

28 **Water Bound Macadam** : WBM shall be laid in one layer. Stone aggregate, screening and blinding materials for water bound macadam shall be as specified in Clause 20.A.3 of MES Schedule and conform to the samples kept in GE's Office and approved by the GE before incorporation in the work. Coarse aggregate shall be of grading No 2 (size range 63mm to 40mm). Screenings shall be of grade 'A' as specified in Clause 20.A.3.2 of MES Schedule Part -I. Spreading, rolling, applying screening and watering shall be as specified in Clause 20.A.21.1 to 20.A.21.13 of MES Schedule Part-I. Aggregates of all sizes shall be tested as per frequency given in IS 2386 part-II, III and IV

29 **PAVING BITUMEN AND BITUMEN EMULSION**

29.1 **A) PAVING BITUMEN**

The sample of bitumen VG-10 and VG-30 shall be got approved by the GE before incorporation in the work. VG-10 and VG-30 bitumen shall conform to latest IRC 111 and IS 73. Contractor shall have option to procure the bitumen directly from M/S Indian Oil Corporation, M/S Bharat Petroleum Corporation and M/s Hindustan Petroleum Corporation Limited or any Govt Refinery in sealed container or as specified in Special Condition.

B) BITUMEN EMULSION

The emulsion should be cationic bitumen emulsion type (RS-1) and conform to latest IRC 110 and IS 8887: 2007. The emulsion shall be got approved by the GE before incorporation in the work. The contractor shall produce machine numbered original purchase vouchers obtained from manufacturers for the full quantity required for the work

29.2 **TESTING OF BITUMEN AND BITUMEN EMULSION :**

The contractor shall submit the test certificate for each consignment brought at site. The material shall also be tested at site in field laboratory at stipulated frequency as specified in IS or IRC. Any test which is required to be carried out as per MES Schedule/IS/IRC code, but cannot be performed at field laboratory established by the contractor, shall be carried out at any Govt approved lab/Institution. Expenditure for materials and transportation cost for such test shall be borne by the contractor without any extra claim. In addition the GE may at his option get it tested independently from Command Test Lab mentioned herein above. The contractor shall provide all facilities like material, transportation of material to laboratory etc. for testing by the department. However, no testing charges shall be levied from the department.

30. **Semi dense asphaltic Bituminous Concrete & Bituminous macadam**

30.1 **Materials**

- (a) Bituminous macadam-material shall be Grading 2 as specified in para 20.B.2.5.4 (b) of SSR Part-I.
- (b) Semi-dense concrete – material shall be as specified in para 20.B.2.5.4 (d) of SSR Part-I
- (c) Aggregates of all sizes shall be tested as per frequency given in IS 2386 part-II, III and IV

30.2 **General** Bituminous works shall not be executed during rainy or foggy weather when sub grade, sub base or base coarse is damp or wet, normally when the atmospheric temperature in shade is 16 Degree Centigrade or below.

30.3 **Mix design criteria for bituminous macadam/semi dense asphaltic concrete**

30.3.1 The design requirement shall be all as per clause No. 20.B.2.11 of SSR Part-I. Before commencement of work contractor shall arrange the mix design for bituminous macadam and semi dense asphaltic concrete. Mix design shall be carried out from Command Test Lab / Zonal Lab/Govt Institution/Govt Approved lab/IIT/NIT.

30.3.2 The cost of testing including , material, conveyance etc shall be borne by the contractor. Cost of materials and convenience for test at Command Test Lab shall borne by Contractor.

30.3.3 **Preparation of Mix and Transportation to Site** : The mixing of aggregate and binder shall be

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PARTICULAR SPECIFICATIONS

done in a Hot Mix Plant of adequate capacity either batch type or continuous type having co-ordinating set of essential units such as dryer for heating aggregate, arrangements for grading and batching by weight or volume the required quantities of aggregate, binder heating and control unit for metering out the correct quantity of heated binder together with a paddle mixer for immediate mixing of binder and aggregate. The Hot Mix Plant shall be fitted with temperature measuring devices both for aggregate and bitumen. The binder shall be heated to the temperature appropriate to the bitumen use. The aggregate shall be suitably heated or warmed before loading into the mixing unit of the plant. The correct quantity of aggregate shall thereafter be fed in the plant along with specified quantity of binder. The mixing shall be continued till homogeneous mix is obtained in which all the particles of aggregate are coated uniformly. The variation from the specified temperature should not be more than 10°C on the lower side only.

The temperature of binder at the time of mixing shall be in the range of 150 °C to 177 °C and that of aggregate in the range of 155 °C to 163 °C provided that the difference in the temperature between the binder and the aggregate at no time exceeds 14 °C.

The Hot Mix shall be transported from the mixing plant to the site of work in tripping- trucks or other suitable mechanical vehicles. The vehicles employed for transportation of the Hot Mix shall be clean and covered over transit, if so directed by the Engineer-in-Charge.

The temperature of the mix at time of laying shall be in the range of 121 °C to 163°C.

Calibration certificate from competent authority for hot mix plant/batching plant must be submitted by the contractor before execution of work.

- 30.4. **Spreading the Mix and Finishing** : Spreading of the mix shall be done by means of self propelling mechanical paver with suitable screeds capable of spreading, tamping and finishing the mix true to grade, laying and cross-section without causing segregation, dragging, irregularities or other surface defects and at a speed consistent with character of the machine. The temperature of the mix at time of laying shall be in the range of 121 °C to 163 °C

30.5. **Compaction/Rolling**

- 30.5.1 The mix after spreading shall be thoroughly compacted by 8 - 12 ton road roller. Rollers should move at a speed of not more than 5 km per hour. The roller shall not be permitted to stand on pavement which has not been fully compacted, and necessary precautions shall be taken to prevent dropping of oil, grease, petrol or other foreign matter on the pavement either when the rollers are operating or standing. The wheels of rollers shall be kept moist with water, and the spray system provided with the machine shall be in good working order, to prevent the mixture from adhering to the wheels. Only sufficient moisture to prevent adhesion between the wheels of rollers and the mixture should be used. Surplus water shall not be allowed to stand on the partially compacted pavement. at a speed not more than 5 Km/hr immediately following by paver. The output of road roller shall be as specified in the special condition. The contractor shall advised to jointly prepare the road roller register and accordingly sign the same.

- 30.5.2 **Joints** : Where joints are made, the material shall be fully compacted and the joint made flush in one of the following ways:

(a) All joints shall be cut vertical to the full thickness of the previously laid mix. All loosened material shall be discarded and the vertical face coated with a suitable viscosity grade hot bitumen, or cold applied emulsified bitumen. While spreading the material along the joint the material spread shall overlap 25 mm to 50 mm on the previously laid mix beyond the vertical face of the joint. The thickness of the loose overlap material should be approximately a quarter more than the final compacted thickness. The overlapped mix shall be dragged back to the hot lane so that the roller can press the small excess into the hot side of the joint to obtain a high joint density.

(b) By using two or more pavers operating in echelon, where this is practicable, and in sufficient proximity for adjacent widths to be fully compacted by continuous rolling All longitudinal joints shall be offset at least 300 mm from parallel joints in the layer beneath or as directed, and in a layout approved by the Engineer-in-charge. Joints in the wearing course shall coincide with either the lane edge or the lane marking, whichever is appropriate. Longitudinal joints shall not be situated in wheel track zones.

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PARTICULAR SPECIFICATIONS

30.5.3 Areas of road in –accessible to the roller shall be thoroughly compacted by means of hand tampers. Rolling operation shall be completed in every respect before the temperature falls down below 100°C.

31 ROAD MARKINGS STRIPS

The colour width and layout of road makings shall be in accordance with the Code of Practice for Road Markings with paints, IRC : 35, and as specified in the drawings or as directed by the GE.

31.1 Materials

Road markings shall be of ordinary road marking paint (retro-reflective), hot applied thermoplastic compound as specified in the item.

31.2 Hot Applied Thermoplastic Road Marking**General**

(i) The thermoplastic material shall be homogenously composed of aggregate, pigment, resins and glass reflectorizing beads.

(ii) The thermoplastic compound shall be screeded/extruded on to the pavement surface in a molten state by suitable machine capable of controlled preparation and laying with surface application of glass beads at a specific rate. Upon cooling to ambient pavement temperature, it shall produce an adherent pavement marking of specified thickness and width and capable of resisting deformation by traffic.

(iii) The thermoplastic material shall conform to ASTM D36/BS-3262-(Part I).

(iv) The material shall meet the requirements of these specifications for a period of one year. The thermoplastic material must also melt uniformly with no evidence of skins or unmelted particles for the one year storage period. Any material not meeting the above requirements shall be replaced by the manufacturer/supplier/Contractor.

(v) Marking : Each container of the thermoplastic material shall be clearly and indelibly marked with the following information:

1. The name, trade mark or other means of identification of manufacturer.
2. Batch number
3. Date of manufacture
4. Colour (White or yellow)

5. Maximum application temperature and maximum safe heating temperature.

(vi) Sampling and Testing : The thermoplastic material shall be sampled and tested in accordance with the appropriate ASTM/BS method. The Contractor shall furnish to the GE a copy of certified test reports from the manufacturers of the thermoplastic material showing results of all tests specified herein and shall certify that the material meets all requirements of this Specification.

31.3 Preparation

(i) The material shall be melted in accordance with the manufacturer's instructions in a heater fitted with a mechanical stirrer to give a smooth consistency to the thermoplastic material to avoid local overheating. The temperature of the mass shall be within the range specified by the manufacturer, and shall on no account be allowed to exceed the maximum temperature stated by the manufacturer. The molten material should be used as expeditiously as possible and for thermoplastic material which has natural binders or is otherwise sensitive to prolonged heating, the material shall not be maintained in a molten condition for more than 4 hours.

(ii) After transfer to the laying equipment, the material shall be maintained within the temperature range specified by the manufacturer for achieving the desired consistency for laying.

31.4 Properties of Finished Road Marking

(a) The stripe shall not be slippery when wet.

(b) The marking shall not lift from the pavement in freezing weather.

(c) After application and proper drying, the stripe shall show no appreciable deformation or discolouration under traffic and under road temperatures upto 60°C.

(e) The marking shall not deteriorate by contact with sodium chloride, calcium chloride or oil drippings from traffic. The stripe or marking shall maintain its original dimensions and position. Cold ductility of the material shall be such as to permit normal movement with the road surface without chopping or cracking.

(f) The colour of yellow marking shall conform to IS Colour No. 356 as given in IS 164.

31.5 Application

Marking shall be done by fully /semi automatic paint applicator machine fitted with profile shoe, glass

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PARTICULAR SPECIFICATIONS

beads dispenser, propane tank heater and profile shoe heater, driven by experienced operator as specified in item. For locations where painting cannot be done by machine, approved manual methods shall be used with prior approval of the GE. The Contractor shall maintain control over traffic while painting operations are in progress so as to cause minimum inconvenience to traffic compatible with protecting the workmen. The thermoplastic material shall be applied hot either by screeding or extrusion process. After transfer to the laying apparatus, the material shall be laid at a temperature within the range specified by the manufacturer or otherwise directed by the Engineer-in-Charge for the particular method of laying being used. The paint shall be applied using a screed or extrusion machine. The pavement temperature shall not be less than 10°C during application. All surfaces to be marked shall be thoroughly cleaned of all dust, dirt, grease, oil and all other foreign matter before application of the paint.

Thermoplastic paint shall be applied in intermittent or continuous lines of uniform thickness of at least 2.5 mm unless specified otherwise. Where arrows or letters are to be provided, thermoplastic compound may be hand-sprayed. The minimum thickness specified is exclusive of surface applied glass beads.

The finished lines shall be free from ruggedness on sides and ends and be parallel to the general alignment of the carriageway. The upper surface of the lines shall be level, uniform and free from streaks.

32. POST DELINEATORS

Height of the delineator should be not less than 800 mm above ground. Width not less than 100 mm. Not more than 300 mm below the ground while being installed. As a general rule, Delineators posts should be erected at the edge of the usable shoulders, and in the case of kerbed sections at a distance of 0.6 to 1.5 m from the kerb face. The contractor shall obtain a two years warranty for satisfactory performance including stipulated retro-reflectance of the retro-reflective sheeting and submit the same to the GE at the time of Final Bill.

32.1 Material :

The design, materials to be used and the location of the road delineators shall conform to recommended practice for road delineators, IRC:79, and to relevant drawings and as directed by the GE.

The delineators are to be made of Acrylonitrile Butadiene Styrene (ABS) body fitted with 2 No. 100 mm dia of highly reflective reflectors are mounted on M.S. pipe of 65 mm dia or of size specified otherwise, duly powder coated of minimum 40 microns thickness anti-rust and anti-theft, installed as per direction of Engineer-in-charge. Road delineators may have a circular, rectangular or triangular cross-section, however the side facing the traffic should not be less than 10 cm wide.

33. JOINTS IN FLOORING/PAVEMENT/HARDSTANDING/APRON

33.1 General : Joints shall be of types and dimensions as indicated and located in the drgs/ specified in BoQ as per standard engineering practice.

33.2 Sealing Compounds for Joints in Concrete Pavements ets : . **The joints shall be filled with bituminous sealing compound grade 'A' conforming to IS: 1834 of make specified in Appex'B' of PS**

33.3 Fillers for Expansion Joints : Shall be pre-formed fillers complying with the requirements IS : 1838-1961- specifications for pre-formed fillers for expansion joints.

33.4 Dummy Joints, Construction Joints and Expansion Joints(Using sealing compound): Shall be provided as specified in clause 20.B.7.10.1 to 20.B.7.10.5.2 of the MES Schedule Part-I, except that thickness and depth of various types of joints shall be as indicated in the drgs

34. KERB STONE

Kerb and channel stones are provided on roads having raised berms for foot path etc. These shall be of selected hard stone, sound, durable free from laminations and other structural defects. The length of each kerb and channel stone shall be not less than 49.5 cm except that 29.5 cm long stones shall be

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PARTICULAR SPECIFICATIONS

permitted for closures and for curves. The other dimensions shall be 30 x 20 cm for kerb stones and 30 x 10 cm for channel stones, unless specified otherwise. Kerb and channel stones shall be chisel dressed on exposed surface and edges. The dimensions of the exposed faces of kerb and channel stones shall be of sizes as specified with a tolerance of 10 mm in width and depth. In the case of kerb stones a tolerance of 5 cm shall be allowed in the dimensions of unexposed back and bottom faces and in the case of channel stones a tolerance of 10 mm shall be allowed in thickness.

34.1 Laying

32.1.1 Trenches shall first be made along the edge of the wearing course of the road to receive the kerb stones of cement concrete of specified grade. The bed of the trenches shall be compacted manually with steel rammers to a firm and even surface and then the stones shall be set in cement mortar of specified proportion.

32.1.2 The kerb stones with top 20 cm. wide shall be laid with their length running parallel to the road edge, true in line and gradient at a distance of 30 cm. from the road edge to allow for the channel and shall project about 12.5 cm. above the latter. The channel stones with top 30 cm. wide shall be laid in position in chamber with finished road surface and with sufficient slope towards the road gully chamber. The joints of kerb and channel stones shall be staggered and shall be not more than 10 mm. Wherever specified all joints shall be filled with mortar 1:3 (1 cement : 3 coarse sand) and pointed with mortar 1:2 (1 cement: 2 fine sand) which shall be cured for 7 days.

32.1.3 The necessary drainage openings of specified sizes shall be made through the kerb as per drawings or as directed by the GE for connecting to storm water drains.

Berms and road edges shall be restored and all surplus earth including rubbish etc. disposed of as directed by the Engineer-in-charge. Nothing extra shall be paid for this.

35 FACTORY MADE CEMENT CONCRETE INTERLOCKING PAVER BLOCK**35.1 Base**

Interlocking paver block to be fixed on the bed 50 mm or specified otherwise thick of coarse sand of approved specification and filling the joints with the sand of approved type and quality or as specified and as directed by Engineer-in-charge.

35.2 Interlocking Paver Block

Factory made precast paver block of M-30 or otherwise specified grade to be used. Paver blocks to be of approved brand and manufacturer and of approved quality. Minimum strength as prescribed by manufacturer and as per direction of Engineer-in-Charge for the grade specified to be tested as per method mentioned in specification of Concrete and MES-SSR part-I. The thickness of the paver block shall be as specified in BoQ/ Drg, if nothing is specified than the thickness shall not be less than 60 mm.

35.3 The contractor shall submit the manufacture test reports along with sample approval. The GE shall have liberty to carry out independent test of the sample, the cost of the shall be borne by the contractor.

(SIGNATURE OF CONTRACTOR)
DATE

DCWE(Contracts)
For Accepting Officer

Contd/.....

LIST OF ISI MARKED PRODUCTS TO BE INCORPORATED IN WORKS

1. CONCRETE

- Integral waterproofing Compounds (IS : 2645-1975)
- Plywood for concrete shuttering work (IS : 4990-1993)
- Ordinary Portland Cement
- Portland Pozzolona Cement

2. JOINERY

- a) Wooden Flush Door Shutters, Solid Core type (IS 2202, Part I-1991).
b) Wooden Panel Shutters
c) FRP Doors d) PVC Doors

3. Builders Hardwares

- | | | | |
|-----|---|-----|--|
| (a) | Steel Butt Hinges (IS : 1341 - 1992) | (b) | Non-ferrous Butt Hinges (IS : 205-1992) |
| (c) | Ferrous Tower Bolts (IS : 204, Part I - 1991) | | |
| (d) | Non-ferrous Tower Bolts (IS : 204, Part II-1992) | | |
| (e) | Door Handles (non-ferrous)(IS : 208-1996) | | |
| (f) | Parliament Hinges, Ferrous (IS : 362-1991) | | |
| (g) | Hydraulically operated door closers (IS : 3564-1995) | | |
| (h) | Continuous Piano Hinges (IS : 3818-1992) | | |
| (j) | Non Ferrous Metal Sliding Door Bolts (IS : 2681-1993) | | |
| (k) | Tee and strap Hinges (IS : 206-1992) | (l) | Mild Steel Sliding Door Bolts (IS : 281-1991). |

4. Felt Covering

Glass fibre bitumen felt type-2 grade-I (IS : 7193-1994)

5. Ceiling and Lining

- (a) Plywood for General purposes (IS : 303-1989) (b) Blockboards (IS : 1659-1990)
(c) Veneered Decorative Particle Board (IS : 1328 -1996)
(d) Marine Plywood (IS : 710-1976) (e) Fibre Hardboard (IS : 1658-1977)

6. Flooring

- (a) White Portland Cement (IS : 8042 - 1989)
- (b) Cement Concrete Flooring Tiles (IS : 1237 - 1980)

7. Water supply, Plumbing Drains and Sanitary Appliances

- (a) Pre cast concrete pipes with or without reinforcement (IS : 458-1988)
- (b) Blank
- (c) Flushing Cisterns for water closets and urinals other than plastic (IS : 774-1984)
- (d) Cast copper Alloy screw down bib taps and stop valves (IS : 781-1984)
- (e) Galvanised Mild steel tubes (IS : 1239 Part I (1990)
- (f) Galvainised Mild steel tubes fittings (IS : 1239 Part II-1992)
- (g) Sandcast iron spigot ventilating pipes and fittings (IS : 1729-1979)
- (h) Ball valves (Horizontal plunger type) including Floats for water supply purposes (IS : 1703-1989)
- (j) Cast iron manhole covers and frames (IS 1726-1991)
- (k) AC Pressure Pipes (IS : 1592-1982)

- (l) Automatic Flushing Cisterns (IS : 2326 - 1987)
- (m) Vitreous China Sanitary Appliances
 - (i) Wash down water closets (IS : 2556-1994, Part 2)
 - (ii) Squatting pans (IS : 2556-1994 Part 3)
 - (iii) Wash Basins (IS : 2556-1994, Part 4)
 - (iv) Laboratory Sinks (IS : 2556-1994, Part 5)
 - (v) Urinals, Bowl type and partition plates (IS : 2556-1995, Part VI Section 1)
 - (vi) Half Round Channels (IS : 2556-1995, Part VI Section VII)
 - (vii) Siphonic wash down water closets (IS : 2556 - 1995, Part VIII)
 - (viii) Foot Rests (IS : 2556-1974, Part X)
- (n) Plastic WC Seats and covers (Items shall be heavy duty) (IS : 2548 Part I & II (1983)
- (o) Vertically cast iron pressure pipes for water and sewage (IS : 1537-1976).
- (p) Pillar Taps (IS : 1795-1982)
- (q) Sand cast iron spigot and socket waste and vent pipes, fittings and accessories (IS : 729-1979)
- (r) Centrifugally cast (Spun) Iron pressure pipes for water gas and sewage Spigot and socket soil, waste and ventilating pipes fittings and accessories (IS : 1536-1989)
- (s) Rubber sealing Rings for gas mains, water mains and sewers (IS 5382-1985)
- (t) Cast Iron fittings for pressure pipes for water Gas and sewerage (1538-1993)

8. Electrical Works

- (a) Ceiling Rose (IS : 371-1979)
- (b) BLANK
- (c) Socket Outlet-3 pin plug and socket (IS : 1293-1988) (For makes refer ser 2 of Appx `B'-E/M items)
- (d) Switch fuses (Main & Switch) (IS : 13947 Part III) (For makes refer ser 5 of Appx `B'-E/M items)
- (e) Rigid Steel Conduit (withdrawn) (IS : 1653-1972)
- (f) Rigid Non-Metalic Conduit (IS : 9537-Part III)
- (g) Single core cable polyethylene insulated and PVC sheathed Cable (IS : 1596-1977) (For makes refer ser 1 of Appx `B'-E/M items)
- (h) Starter for tube light (IS : 2215-1984)
- (j) Fluorescent Lamps (IS : 2418-1977 Part I & IV)
- (k) Aluminium Stranded conductor (IS : 398-1976 Part I & II)

9. Anti Termite Treatment Chemical

Chloropyriphos Emulsifiable concentrate (IS 8944-1979)

(SIGNATURE OF CONTRACTOR)
DATED:

DCWE (Contracts)
FOR ACCEPTING OFFICER

APPENDIX B TO PARTICULAR SPECIFICATIONS APPROVED MAKES/NAMES OF FIRMS FOR PRODUCTS TO BE INCORPORATED IN WORK

LIST OF MAKE TO BE INCORPORATED IN WORK

1	2	3
S.No.	MAKE	ADDRESS
<u>Cement</u>		
1	The Associated Cement Companies Ltd.	Brand - "ACC" 414-421, Splendor Forum (4th Floor), 3, District Centre, Jasola, New Delhi – 110044, Ph: 011 -46583600
2	M/S Ultra Tech Cement Ltd	Brand - "ULTRATECH" 'B' Wing, 2nd Floor, Mahakali Caves Road, Andheri (East), Mumbai – 400093' Tele : 022-66917800
3	M/s My Home Industries Ltd	Brand - "MAHA CEMENT" 9th floor, Block-3, My Home Hub, Madhapur, Hyderabad-500081, Phone no: 040-66929696
4	M/S Dalmia Cement (Bharat) Ltd	Brand - "DALMIA CEMENT" Dalmiapuram Distt-Tiruchirappalli Tamil Nadu – 621651
5	M/S Chettinad Cement Corporation Ltd	Brand - "CHETTINAD CEMENT" 4TH floor, rani seethai hall building, 603, Anna salai hall, Chennai-600006, Tele : 044-42951800
6	M/s Kesoram Industries Ltd.	Brand - "BIRLA SHAKTI" Cement division, office no. 613 to 616 white house Block III, 6th floor, 6-3-1192/1/1 Kundan Bagh, Begum Peth, Hyderabad-500016, Tele : 04043344555
7	M/s Century Cements	Brand - "CENTURY" Industry House, 159 Church Gate Reclamation, Mumbai-400020 Tele : 022-22023936
8	M/s Saurashtra Cement	Brand - "SAURASHTRA" Gala No. A-1, Ground Floor, UdhyogSadan No.3 MIDC, Central Road, Andheri (East), Mumbai-400093 Tele : 022-32955557/67 Mobile: +91 -9320290081
9	M/s JSW Cement Ltd.,	Brand - "JSW PSC (Portland slag Cement)" JSW centre, opposite MIMRDA ground Bandra Kurla Complex, Mumbai-400051 Ph – 022-42865047
10	M/s The India Cement	Dhun Building, 827, Anna Salai, Chennai-600002
11	M/s Wonder Cement Ltd.	Brand - "WONDER CEMENT" 17, Old Fatehpura, Seva Mandir Road, Udaipur- 313004, Rajasthan Tele: +91 -294-33991133 Fax: +91 -294-3006333 Email: corp.office@wondercement.com
12	M/S Prism Cement Ltd	
13	M/s Parasakti Cements Ltd.	Brand - "PRASAKTI" 123/3RT Plot # 8-3-214/21 Srinivasa Nagar, Colony (West) Hyderabad-500038 Tele : 040-44119100/200, Fax : 040-23747562
14	The Ramco Cements Ltd. (Formaly Madras Cement)	Brand - "RAMCO" Auras Corporate Centre, 98-A , Dr. Radhakrishnan Salai, Mylapore, Chennai - 600004 Ph: 044-28478666

APPENDIX B TO PARTICULAR SPECIFICATIONS APPROVED MAKES/NAMES OF FIRMS FOR PRODUCTS TO BE INCORPORATED IN WORK

1	2	3
S.No.	MAKE	ADDRESS
15	M/s Mangalam Cement Ltd	Brand - "MANGALAM" PO Adityanagar, Morak, Dist-Kota, Rajasthan-326520 Ph : +91 -9351468076
16	M/s Birla Corporation Ltd	Brand - "BIRLA" Birla Building (3rd & 4th Floor), 9/1, R. N. Mukherjee Road, Kolkata-700001 Tele : 033-30573700
17	M/s Shree Cement	Brand - "SHREE" Bangur Nagar, Beawar, Dist-Ajmer, Rajasthan-305901 Tele : 01462-228101 -06
18	M/s Shree Guru Kripa Cement Pvt. Ltd.	Brand - "SARTAJ" 4/4, Trikuta Nagar, Jammu Tele : 0191 -2472043
19	Nuvoco Vistas Corporation Ltd. (Formerly Lafarge Cement)	Brand - "NUVOCO" Equinox Business Park Tower-3, East Wing, 4th Floor, LBS Marg, Kurla (West), Kurla Mumbai, Maharashtra, Mumbai- 400070
20	M/s Orient Cement	Brand - "ORIENT" 5-9-22/57/D, 2nd and 3rd Floor, GP Birla Centre, Adarsh Nagar, Hyderabad- 500063, Tele : 044-23688600
21	M/s J K Cement	Brand - "J K" Kamla Tower, Kanpur - 208001

APPENDIX B TO PARTICULAR SPECIFICATIONS APPROVED MAKES/NAMES OF FIRMS FOR PRODUCTS TO BE INCORPORATED IN WORK

LIST OF MAKE TO BE INCORPORATED IN WORK

1	2	3	4
S.No.	MAKE	ADDRESS	Steel Grade or Size
TMT BARS			
PRIMARY PRODUCERS			
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	ALL
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@jsr.tatasteel.com	ALL
3	Steel Authority of India Limited (SAIL) Brand: "SAIL"	Central Marketing Organization. Northern Region, 17th Floor, scope Minar, Laxmi Nagar Distt. Centre. Delhi- 110092	ALL
4	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
5	M/S Shyam Steel Industries Ltd Brand: "SHYAM "	Shyam Towers EN-32, Sector-V, Salt Lake. Kolkata-700091, Tel 033-40074007, Fax- 033- 40074010, E-mail - marketing@shyamsteel.com	TMT Bars of Gde Fe 500, Fe 500D & CRS
6	M/S SPS Steel Rolling Mills Ltd Brand: "ELEGANT TMT"	"Diamond Prestige", 41A, A.J.C Bose Road, 8th Floor, Room No 801, Kolkata-700017, Mob-9831055568/8910797649, Telefax : 033-66255252, Email: info@spsgroup.co.in	TMT Bars of Gde Fe 500, Fe 550 & Fe 500D
7	M/S Steel Exchange India Ltd Brand: "SIMHADRI TMT"	My Home Laxminivas Apartments. Ameerpet, Hyderabad-500016, A.P. Tel-040-23403725, Fax-040-23413267, E-mail info@seil.co.in	TMT Bars of Gde Fe 500, Fe 500D & HSCRM
8	M/S Jindal Steels and Power Ltd. Brand: "JINDAL PANTHER"	OP Jindal Road, Hissar, Harayana, PIN-125005 Tel- +91 1662 222471-84 Fax- +91 1662 220476	TMT Bars of Gde Fe 500, Fe 500D & Fe 550, Fe 550D & CRS with sizes (8-40 mm)
9	M/S SRMB Srijan Pvt Ltd. Brand: "SRMB"	SRMB House, 7, khetra das lane Kolkata-700012, Tel : 033- 6600 6600 Fax: 033- 2211 0483	TMT Bars of Gde Fe 500, Fe 500D & Fe 550D (Size 8-32 mm)
10	M/s JSW Steel Ltd Brand: "NEOSTEEL"	JSW Centre, Bandra Kurla Complex, Bandra(East) Mumbai-400051 Tel —022-42861000	TMT Bars of Gde Fe 500, Fe 500D, Fe 550D, CRS (Size 8- 40 mm)
11	M/S Shri Bajrang Power & Ispat Ltd. Brand: "GOEL TMT"	Vill - Borjhara, Urla Industrial Area. Raipur-493 221, Chhattisgarh. Tel : 0771 4288019/29 / 3	TMT Bars of Gde Fe 500 & Fe 500D (Size 8-32 mm)

APPENDIX B TO PARTICULAR SPECIFICATIONS APPROVED MAKES/NAMES OF FIRMS FOR PRODUCTS TO BE INCORPORATED IN WORK

1	2	3	4
S.No.	MAKE	ADDRESS	Steel Grade or Size
12	M/S Real Ispat & Power Ltd Brand: "G K TMT"	Vrindavan, Near IDBI Bank, Civil Lines, Raipur-492001, C.G, Tel: +91-771-4224000, Fax:+91-771-4224010, Email:real@realispat.com, Website : www.realispat.com	TMT Bars of Gde Fe 500, Fe 500D(Size 8-36 mm)
13	M/S Super Smelters Ltd, Kolkata Brand: "SUPER SHAKTI"	Premalata, 39, Shakespeare Sarani, 3rd Floor, Kolkata-700017, Phone-033-2289-2734/36 Email:- info@supershakti.in Website : www.supershakti.in	TMT Bars of Gde Fe500, Fe500D & Fe 550, (Size 8-32 mm)
14	M/s Kamachi Industries Ltd. Brand: "KAMACHI"	ABC Trade Centre, 3rd Floor (Inside Devi Theatre Complex), Old No. 50, New No. 39, Anna Salai, Chennai- 600002, India Tel:+91- 044-42961100, Fax: +91-044-42961122 E-mail: sales@kamachitmt.com Website: www.kamachitmt.com	TMT Bars of Gde Fe 500, Fe 500D, Fe 550, Fe 550D & HCRM (Size 8-40 mm)
15	M/s Gallantt Metal ltd Brand "GALLANTT TMX"	Ward 10 BC, Plot no 123, Ground Floor, Gandhi Dham, Kutch, Gujrat-370201, Tel:+91-2836-228164, Fax: +91-2836-235787, E-mail: gml@gallantt.com Website : www.gallantt.com	TMT Bars of Gde Fe 500, Fe500 D & CRS (Size 8-32 mm)
16	M/s Rashmi Metaliks Ltd Brand: "RASHMI TMT"	Premalata Building, 39, Shakespeare Sarani, 6th Floor, Kolkata-700017, Tel-033-2289-4255/56, Fax: 033-22894254, Email:- mkt.domesticdip@rashmigroup.com Website : www.rashmigroup.com	TMT Bars of Gde Fe 500 (Size 8-32 mm), 500D, Fe 550D (Size 8-25 mm)
17	M/S Shyam Sel and Power Ltd Brand "SEL"	SS Chamber, 5 C.R. Avenue, Kolkata-700072 Tel:+9133-40111000, Fax- +9133-40111031, Website-www.shyamgroup.com	TMT Bars of Gde Fe 500 D (Size 8-32 mm)
18	M/s Shree Nakoda Ispat Ltd Brand : "NAKODA TMT"	Near Railway Crossing, Mowa, P.O Shankar Nagar, Raipur-492007(C.G) Tele:+91-771-2282130, Mob No-78989741, Website- www.nakodagroup.com	TMT Bars of Gde Fe500, Fe500D (Size 8-32 mm)

STRUCTURAL STEEL

PRIMARY PRODUCERS

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	ALL including Hollow section
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@jsr.tatasteel.com	ALL including Hollow section
3	Steel Authority of India Limited(SAIL) Brand: "SAIL"	Central Marketing Organization. Northern Region, 17th Floor, scope Minar, Laxmi Nagar Distt. Centre. Delhi- 110092	ALL including Hollow section
4	M/s Jindal Steels and Power Ltd	Jindal Centre, Plot No. 2, Sector-32, Gurgaon-122 001, Haryana Tel: 0124 661 5000 Fax: 0124 661 2125 Website : www.jindalsteelpower.com	ALL excluding Hollow section

APPENDIX B TO PARTICULAR SPECIFICATIONS APPROVED MAKES/NAMES OF FIRMS FOR PRODUCTS TO BE INCORPORATED IN WORK

S.No	ITEM	MAKES/MANUFACTURER
1	2	3
B/R ITEMS		
1	Chloropyriphos ATT Chemicals	
1(a)	Chloropyriphos ATT Chemicals	Dursban /Trishu/ De-Nocil
2	PVC/UPVC DOOR, WINDOW & CHOWKHAT	
2(a)	PVC/WPC/UPVC Door, Window and Chowkhat/ PVC wall panelling/PVC False ceiling/WPC Jalli/SPC flooring	Kumar Arch Tech Pvt Ltd/Sintex India Ltd/Rajshri Plastiwood Ltd/Fenesta/Accura Polytech Pvt Ltd (Accucel)/Duroplast
2(b)	Solid Panel Foam Doors (Solid/ Glazed Panel)	Fenesta/Kesar/LG Hausys
2(c)	FRP Door Shutters	Fibrewats Technology/KraftoDoor Syntex India Ltd/Jain Wood Industries (Jayna)
2(d)	Natural Fibre Thermo Composite Door / Window Shutter and Frames	Duro-sam(AB Composite Pvt Ltd)/ ELCONS
	WOODEN DOORS & WINDOW	
3(a)	Wooden Panel / Flush Doors & Windows	MP Wood Products Indore/Kitply Kampur/ Ambika Timber Works/ Premier Wood Craft (P) Ltd Kolkata/ Jain Doors Pvt Ltd, Sonipat
3(b)	Steel Roller Door/ Shutter	Gandhi Automation Pvt Ltd /Metal King/ M/s Swastik Rolling
	DOOR & WINDOW FITTINGS	
4(a)	Aluminium door & Window fittings	Bharat/Classic/Alans/Argent/Hettich/Halco
4(b)	MS Stove Enamelled	Mowjee/Crown/ Everlite/Harrison/Godrej
4(c)	Floor Springs/Door Closers/ Accessories	Hardwin/Godrej/Dorset/Everest/Universal
	FALSE CEILING & PARTITION PANELING	
5(a)	PVC False Ceiling	Sintex/Armstrong /Saint Gobain
5(b)	Gypsum Silicate Tiles in False Ceiling/ Wall lining	Armstrong/India Gypsum/Lafarge/Saint Gobain/Everest
5(c)	Mineral Fibre False Ceiling	Saint-Gobain India Pvt. Ltd-Gyproc/ Armstrong/ Lloyed insulation
5(d)	Metal False Ceiling	Armstrong / Unifloors /Nittobo
5(e)	Cement Fibre Board Ceiling.	Everest/Lafarge /Armstrong
5(f)	Anodized Aluminium Partition System with Solid/Glazed panels.	Jindal/Hindalco /Indalco
	CUPBOARDS, CABINETS & WARDROBE	
6(a)	PVC kitchen (Cupboards, Cabinets & Wardrobes)	Kumar Arch Tech Pvt Ltd/ Rajshri Plastiwood/Sintex/Commander/ Accura
	PVC, GALVANIZED SHEETS, PANELLING, PARTITIONS, HUTS & BATHROOMS	
7(a)	Rigid foam PVC sheets from 0.50mm thickness to 40mm thickness	Kumar Arch Tech Pvt Ltd/Rajshri Plastiwood/ Sintex/ Marino
7(b)	Aluminium Composite Panel	Aluminium Tech industries /Aluco Bond/Alstone International
7(c)	Polycarbonate Sheets	Pre-star Infrastructure Pvt Ltd/GE /Fibreways Technology
	SANITARYWARES	
8(a)	CP Bath Fittings	Jaquar & Company Pvt Ltd /Marc/Kohler/Grohe
8(b)	Wash Basins/WCs/ Urinals (Vitreous China sanitary Ware)	Jaquar & Company Pvt Ltd/ Kohler/ Toto
8(c)	SS Sink / Basins	Diamond /Nirali / Kraus / Grohe / Kohler
8(d)	Stainless Steel Kitchen Sink	Prayag Polymer Pvt Ltd/Jain Brothers Sanitation Pvt Ltd/ Cera/ Kohler
8(e)	PTMT Float valves / Ball cocks, Cockroach Traps, Glass shelf, Bath Fittings.	Prayag Polymer Pvt Ltd /Polytuff/Cera
8(f)	SS Plate Rack	Suyog/ Prayag/ Nirali
8(g)	Kitchen Cabinets and Trolleys.	Godrej Interio /Zuari/ Kitchencrafts/ Kitchen concepts/Dream kitchens
8(h)	Concealed Cisterns	Kohler/Grohe/ Hindware/Jaquar
8(j)	Normal or Dual-Flow PVC Flushing Cistern.	Hindware/Cera/Parryware/Jaquar & Company Pvt Ltd/Johnson
8(k)	Glass Mirror.	Jaquar & Company Pvt Ltd/ Cera/ Saint Gobain /Modiguard
8(l)	PVC/Acrylic Toilet Mirror Cabinet.	Parryware/ Prayag/ Commander/ Kohler

APPENDIX B TO PARTICULAR SPECIFICATIONS APPROVED MAKES/NAMES OF FIRMS FOR PRODUCTS TO BE INCORPORATED IN WORK

S.No	ITEM	MAKES/MANUFACTURER
1	2	3
8(m)	Stainless Steel Towel Rail / Towel Rack / Towel Ring / Soap Dish / TPH,etc	Kohler/Grohe/Jaquar
8(n)	Toilet Seat Cover.	Parryware/Cera/Hindware/Jaquar
8(o)	Shower Panels.	Grohe/Kohler/Jaquar/Lauret/Hindware
8(p)	Bath Suites.	Kohler/Grohe/Jaquar
8(q)	Glass WHB.	Zircon/Sparkle glass/Seabird
8(r)	Glass Frameless Shower Enclosures /Cubicles	Cera/Hindware/Lauret/Jaguar
	PAINT/DISTEMPER/POLISH/VARNISHES	
9(a)	Acrylic Washable Distemper / Oil bound Distemper (Interior)	Berger/Nerrolac/ British paint/ Jotun India Pvt Ltd/ Jenson and Nicholson
9(b)	Interior Acrylic / Plastic Emulsion Paint.	Berger/Dulex/Asian paint
9(c)	Synthetic Enamel Paint.	Berger/ Jenson and Nicholson /Asian paint
9(d)	Cement Base Paint.	SnowcemPlus/Berger Paints/ Jenson & Nicholson /Asian paints(Gutucem)/Durocem super cement paint
9(e)	Exterior Acrylic Emulsion Weather Coat Paint	Berger/Dulex/Asian paint
9(f)	French Polish	Berger /J&N/Asian
9(g)	Thermo-plastic Road Marking Paint/Retro-Reflective Paint.	Asian Paint Ltd (Apcomark) /STP/Shalimar Paints Ltd/Berger Paints Ltd/Jenson & Nicholson Paints Ltd
9(h)	Water Based Road Marking Paint.	Jenson & Nicholson Paints Ltd /Berger Paints Ltd/ Asian Paint Ltd (Apcomark)/Shalimar Paints Ltd/Jotun India Pvt Ltd
9(j)	Acid Resistant Paint	Asian/ Berger/Jotun India Pvt Ltd
9(k)	Epoxy Paint/Polyurethane Paint	Fosroc/STP/Pidilite/Asian/Berger / Johnson & Nicholson/Jotun India Pvt Ltd
9(l)	Black Bituminous Paint	Asian/ Berger/ STP
9(m)	White Cement/Wall Putty	Birla white /Berger/J&N/Shalimar paints/ Asian paints/JK white
10	PLYBOARD/MDF&HDF BOARDS	
10(a)	Plywood/Pre-laminate Plywood/Marine Plywood/Veneered	Greenply Industries Ltd (Ply-Board Division)/ Kitply/Century /National Plywood IndsPvt Ltd / Novapan/Jain wood Industries Ltd.
10(b)	Veneered Plain Particle Board/Pre-laminated Particle Board.	Greenply industries ltd (Ply and Board Division)/ Kitply/ Centurilam/ Novapan
10(c)	Gypsum Board.	Lafarge GypsumIndia Ltd /Saint-Gobain India Pvt. Ltd /Gyproc Business(Brand : Gyproc)
10(d)	MDF/HDFBoards	Kitply/National / GreenplyIndustriesLtd (Engineered Panel Division) / Balaji Action Buildwell /Novapan
	TILES	
11(a)	Vitrified Floor Tiles/ Ceramic Glazed Wall Tiles/Ceramic Glazed Floor Tiles/Wall Tiles/Floor and Wall Tiles	Kajaria Ceramics Ltd/ Asian Granito India Ltd Varmora Granito Pvt Ltd / M/s H&R Johnson India/ Somany Ceramics Ltd
11(b)	Precast Concrete Interlocking Paving Blocks.	Ultra Tiles Pvt Ltd/Mehtab/Terra Firma/Ecco Scope /Nitco/A-One tiles
11(c)	Precast Plain Cement tiles/Chequered Cement Tiles for Flooring.	Ultra /Bansal/ Nitco/ Anjali/ Multiwyn/ A-One tiles
11(d)	Precast Terrazzo Tiles for Flooring.	Johnson/Ultra Tiles Pvt .Ltd /Nitco
11(e)	Wooden Laminated Floor Tiles/ Parquet Tiles	Vista/Pergo/Haro/Armstrong & Bruce
11(f)	Glazed Mosaic Tiles.	Hindustan tiles/Johnson/ UltratilePvt. Ltd / M/s National tiles & Industries/Coral /Ceco
11(g)	Heavy duty Exterior vitrified tiles	Johnson (Endura)/Multiwyn /Century/ Cristal / Somany (Durastone) / Orient Bell Ltd
11(h)	Glazed Porcelain elevation wall tiles	Century Porcelain / Porselato Porcelain /Crystal Porcelain
11(j)	Acid resistant Vitrified Tiles	Johnson /Somany /Kajaria
11(k)	Metallic Floor hardener for wear –proof topping	Ironite / Stillonite/Hardonate / Maruti Bitumen Pvt Ltd.
11(l)	Non-Metallic Floor hardener	Fosroc /Fibrex/Sika/BASF/Maruti Bitumen Pvt Ltd. / STP
11(m)	Epoxy resin / Polyurethane based floor coating	Silk Fosroc /BASF /Pidilite Industries/STP

APPENDIX B TO PARTICULAR SPECIFICATIONS APPROVED MAKES/NAMES OF FIRMS FOR PRODUCTS TO BE INCORPORATED IN WORK

S.No	ITEM	MAKES/MANUFACTURER
1	2	3
12	Water Proofing Chemicals / Materials	M/s Shivam Tar Products/ M/s Sika India Pvt Ltd./ M/s IWL India Ltd. / M/s STP Limited / M/s Fosroc Chemicals / M/s Hindcon Chemicals Ltd.
13	Tile Adhesive	Pidilite Industries Ltd / Somany Ceramics Ltd/ Kajaria/ Latecreat STP Ltd
	FENCING	
14(a)	Barbed Wire, Chain link Fence, Purched Tape Concertina Coils, Gabions	Global Technocrats Pvt Ltd / M/s A-1 Fencing Products Company Pvt Ltd / Shiva Engineering Company
	STEEL AND ALUMINIUM JOINERY (DOOR/WINDOWS/ GRILLS/MESH/CUP BOARD/ SHUTTERS / SHELVES	
15(a)	Pressed Steel Frames for Doors/Windows/Ventilators.	M/s BA Enterprises/M/s Multiwyn Industrial Corporation / M/s Doorwyn Industries / M/s Modern Fabricator/ M/s Madhu Industries / M/s Ajanta Ispat/ Alusys
15(b)	Anodized/Powder-Coated Aluminium Frames.	Jinda/Hindalco/Ajit India/ Indal
15(c)	Aluminium Doors / Windows (Solid/Glazed Panel).	Jindal/ Hindalco/ Balco/ Modern Fabricator / Aluminite Pvt Ltd/ Dhiraj / Ajit India Pvt Ltd / Aluminium Door & Window Systems (Brand : ALUPURE)
15(d)	Frameless Glass Doors	Kesar/Super Aluminium/Haresh Aluminium
15(e)	Metal Rolling Shutters and Rolling Grills/Collapsible Gates.	M/s BA Enterprises / M/s Multiwyn Industrial Corporation / M/s Doorwyn Industries / M/s Modern fabricator
	WINDOW GLAZING, GLASS SHELVING, GLASS URINAL PARTITIONS.	
16(a)	Plain Sheet Glass/Float Glass/Frosted Glass.	Saint-Gobain glass/Modi-guard float glass / Asahi India /Hindustan Pilkington glass works
16(b)	Toughened Glass/Laminated Glass.	Safex/Saint Gobain glass /Modiguard float glass /Kesar / Asahi India /Atul Tuf/ Hindustan Pilkington glass works/ Triveni float glass
16(c)	Solar Control and Thermal Insulations Glass.	Evolite/ Envision/SGG EVO
16(d)	Wired Glass.	Saint Gobainglass / Modiguard float glass / Triveni/ Safex/ Atul Tuf/Hindustan Pilkington glass works / Kesar
16(e)	Black Painted Glass Tiles.	Kesar/ Marvel /Dream walls Color glass Paladio/ Italia /Mridul/ Mehtab tiles
16(f)	Tinted/ Coloured Glass	Modiguard / Saint Gobian / Atul Tuf
16(g)	Glass Tops Shelves	Kesar/Ozone/Sparkle Glass
17	Components of PLC based Control Panel	L&T/ Siemens / Schneider / CIMCON
18	HDPE/LDPE WATER TANK	
18(a)	HDPE/LDPE Water Tank / LLDPE Septic Tank	Sintex/ Polycon/Jindal/Astral/ Finolex/ Supreme
19	SEWAGE DISPOSAL	
19(a)	UPVC/PPR/HDPE Pipes for Sewerage	M/s Jain Irrigation/Kisan/Prince/Supreme / Oriplast /Finolex
19(b)	RCC Pipes(NP2/NP3)	Any ISI marked and having BIS license makes.
20	MISCELLANEOUS ITEMS.	
20(a)	CI Centrifugally Cast (Spun) Pipes & Fittings	NecoCentri/ Jindal /Tata Metalic/ Sri kalahasti Pipes Ltd
20(b)	PVC Soil/Waste/Rain Water (SWR) Pipes and Fittings.	Jain irrigation/Kisan/Supreme/Prince/
20(c)	CPVC/UPVC Pipes and Fittings (Water & Sewerage)	Kisan /Supreme/Prince/Jain Irrigation /Oriplast /Finolex/ Fusion
20(d)	HDPE Pipes and Fittings(Water)	Kisan/Jain Irrigation/Supreme/Prince
20(e)	Brass Ball (Float) Valves.	Leader/Kirloskar/Zoloto
20(f)	CI manhole Covers.	AIC/PIC/BIC
20(g)	Construction chemicals like WPC, non metallic hardener, epoxy and polymer based	Fosroc /Pidilite/Bauchemie India /Cico / Roff / Maruti Bitumen Pvt Ltd./STP
20(h)	APP Modified waterproofing membranes	Sika India Pvt Ltd /Fosroc Chemicals / STP Ltd /IWL India Ltd/Tiki Tar Danosa (India) Pvt. Ltd./AR Industrie /Torchtar Membrane & Bitumen Pvt Ltd/ Bengal Bitumen /S N Infratech Pvt Ltd
20(j)	Joint sealing compound grade 'A'/'B'	STP /Chowksy Chemical /Tiki Tar Maruti Bitumen Pvt Ltd /SIKA
20(k)	Polyurethane/Poly-sulphide sealant	Chowksay/ Fosroc / Rallithene/ Bostik/ Maruti Bitumen Pvt Ltd /STP/ SIKA
20(l)	CGI & PGI Sheets	Tata/Jindal /Sail
20(m)	AC Sheets	Charminar / Everest
20(n)	Galvalume/ Zinalume(Pre-painted color coated) sheet for roof & wall	Tata blue scope/JSW steel / Dyna

APPENDIX B TO PARTICULAR SPECIFICATIONS APPROVED MAKES/NAMES OF FIRMS FOR PRODUCTS TO BE INCORPORATED IN WORK

S.N	ITEM	MAKES/MANUFACTURE
1	2	3
E/M ITEMS		
1	MS Conduit	M/s BEC Industries, Kalinga, Jindal, M/s Bharat, AKG, M/s NIC, M/s CTI, M/s Asian, M/s Viraj Industries, RMG
2	Casing Capping & Accessories	M/s Precision, Modi, Presto Plast, Supreme, Polycab, Plaza Cable, Pressfit, Prince, Asian, M/s National
3	PVC conduits (Rigid or Flexible) FRLSRigidPVC Conduits/ Fittings	Anchor, Modi, Pressfit, M/s Precision, M/s Astral, Panasonic Anchor, Polycab, AKG, Plaza
4	Electric Accessories Piano Suitables Ceiling Rose, Call Bells, Buzzers, Lamp Holders/ Sockets Outlet, etc Plug & Socket Boards	Panasonic Anchor, M/s Crabtree, Leader, Legrand, Havells, C&S ELECTRIC, V Guard, M/s Cona, SSK, Kinjal, HPL, Honeywell, Goldmedal, GM, Vinay, Standard
5	Modular Switches/ sockets	Anchor Roma, Legrand, M/s Crabtree, Havells, Indo Asian, Polycab, L&T, Panasonic Anchor, Elleys HiFi, HPL, GoldMedal, C&S ELECTRIC, Finoswitch, BENLO, Honeywell, Vinay, KOLORS, Hagger, Adhunik, Pressfit
6	DBs/MCB (Miniature Circuit Breakers) & MCCB (Moulded Case Circuit Breakers)	Larson & Tubro, Legrand, ABB, Siemens, M/s Schneider, Havells, INDO ASIAN, C&S ELECTRIC, M/s Standard, HPL, Honeywell, VINAY, Panasonic Anchor, KOLORS, BENLO, V Guard, Polycab, Electrocontrol, Voltech, Adhunik, Hagger, Megawin Switchgear-Pvt-Ltd
7	Microprocessor Based MCCB/RCCB LT 415V	Larson & Tubro, Legrand, ABB, Siemens, M/s Schneider, Havells, INDO ASIAN, C&S ELECTRIC, M/s Standard, HPL, Honeywell, Panasonic Anchor, BENLO, V Guard, Polycab, M/s DATAR
8	Flouroscent Lamp, LT Lamp	Phillips, Wipro, Bajaj, M/s GE Lighting(GEC), M/s Osram, Havells, Crompton, HPL, M/s Indo Asian, Surya, M/s Halonix Technologies Pvt Ltd
9	Street light fittings(LED)	Bajaj, Philips, Wipro, Crompton, M/s GE, Havells, Luker, Jaquar, FIEM, M/s Pyrotech Electronics Pvt Ltd, BENLO, Eveready, Orient, Poly Cab, Surya, M/s Pyro Tech Electric Pvt Ltd, M/s Halonix Technologies Pvt Ltd, SYSKA, C&S electric, Asian, Gold Medal, M/s Instra power Ltd, HPL, SHAKTI, M/s Gupta Power Infra Ltd (RHINO), M/s Anchor Electrical Pvt Ltd, M/s Green Surfer Pvt Ltd, M/s Olive Export Pvt Ltd, M/s Adhunik Switchgear, M/s JILCO
10	Flouroscent Tube Light Fitting/LED/Lamp Holder	Bajaj, Wipro, Crompton, Philips, Havells, Surya, Asian
11	Flame proof Light fittings (LED/Fan/Well Glass/ Bulk Head including accessories)	M/s Sudhir, M/s Flexipro Electricals Nashik, M/s Shyam Switchgears Mumbai, Bajaj, Crompton, M/s Batiga
12	Electronic/Photoelectric Switch for Auto OP of Street Light	L&T, GEC, Siemens, Bajaj, Legrand, Indo Asian
13	Solar Street Light Fittings	Havells, Philips, M/s BHEL, M/s Tata, Bajaj, Crompton, M/s Sun Technic, Surya, M/s Goldwin, M/s Kripa, M/s Ptronix, Axxon, Intersolar, SSSPL, Rhino, Jilco
14	LIGHT FITTINGS LED	Bajaj, Philips, Wipro, Crompton, M/s GE(GEC), Havells, Luker, Jaquar, FIEM, M/s Pyrotech Electronics Pvt Ltd, BENLO, Eveready, Orient, Polycab, Surya, M/s Pyrotech Electronics Pvt Ltd, M/s Holonix, SYSKA, C&S electric, Gold Medal, M/s Insta power Ltd, SHAKTI, M/s Gupta Power Infra Ltd (RHINO), M/s Anchor Electrical Pvt Ltd, M/s Green Surfer Pvt Ltd, M/s Olive Export Pvt Ltd, M/s Adhunik Switchgear, JILCO, Osram, Goldwin, SIEMENS, LIGHT TECHNOLOGY, Shakti
15	LED TUBE LIGHTS AND BULBS	Bajaj, Wipro, Philips, Havells, Surya, Osram, M/s GE, Luker, M/s BENTECH Pvt Ltd (BENLO), EVEREADY, ORIENT, Polycab, Jaquar, M/s Halonix Technologies Pvt Ltd (Halonix), M/s Pyrotech electronics Pvt Ltd, FIEM, SYSKA, GOLDMEDAL, Instapower, C&S electric, HPL, RR electric, Shakti, M/s Gupta Power Infra Ltd (RHINO), ANCHOR, Green Surfer, Olive LED, Adhunik, JILCO, Shakti
16	Exhaust fans/ air circulator,	(a) Crompton (b) Khaitan (c) Bajaj (d) Orient (e) Havells (f) M/s Almonard, (g) Usha (h) Polycab (j) Anchor (k) AirTech, Anchor, Halonix, Venus
17	Ceiling fans	(a) Crompton (b) Khaitan (c) Bajaj (d) Orient (e) Polar (f) Havells (g) V-Guard (h) Panasonic (j) RR Fans (k) Polycab, Anchor, Halonix, Venus, Usha
18	Fan regulator	Anchor, Legrand, Havells, Bajaj, Usha, Khaitan, GEC, Liveline,

APPENDIX B TO PARTICULAR SPECIFICATIONS APPROVED MAKES/NAMES OF FIRMS FOR PRODUCTS TO BE INCORPORATED IN WORK

S.No	ITEM	MAKES/MANUFACTURER
1	2	3
19	Electronic Type Fan Regulator	Legrand, Havells, Polycab, Bajaj, Crompton, Orient, M/s VGuard, Panasonic Anchor, GM, RR Fans, Goldmedal
20	Air Curtains	M/s Almonard, M/s Aircon, M/s National, M/s Crompton Greaves, M/s Technocrat, M/s Snehavardhan, M/s Filtrose
21	Geysers	Havells, Bajaj, Usha, M/s Racold, M/s Venus, Jaquar, V Guard, M/s Madhuban, M/s Bharat, M/s Pearl
22	Solar Water Heating System	M/s Tata BP Solar System, M/s BHEL, M/s Best & Crompton Novel, M/s Novel Energy, M/s Solar Eqpt Mfg Noida, M/s Solautomatic Electrical Eqpt, M/s Digific Controls (I) Pvt Ltd, M/s Sollchrome System (I) Ltd, M/s Surya Jyoti Devices, M/s Jain Solar Intersolar, SSSPL
23		
24	Electric Energy Meter Tamper Proof	L&T, M/s Jaspuria Meters, Havells, Secure, Elmeasure, BENLO, HPL,
25	ACB (Air Circuit Breaker) Lt 1100Volts	(a) M/s Havells India Pvt Ltd (b) M/s Larson & Turbo (c) M/s Siemens (d) M/s ABB (e) M/s Schneider electrical (f) M/s Crompton Graves (g) M/s GEC (h) M/s English Electric (j) M/s Novateur Electricals (k) M/s BCH (l) M/s Control & Switchgear
26	UGLT XLPE PVC Insulated Conductor	M/s Cable Corporation of India Mumbai, M/s Havells India Pvt Ltd, M/s Asian Cable co chhattisgarh, M/s Gloster, M/s RPG Cable Ltd Thane, M/s Finolex Cable Ltd Pune, M/s RR Kabel, M/s KEI Ind, M/s Polycab Pvt Ltd, M/s Paragon, M/s Pymen Cables India Ltd, M/s Asian Galaxy Pvt Ltd, M/s Plaza Cable, M/s Grandlay Electricals India, M/s HPL electric & Power Ltd, M/s V-Guard Industries Ltd, M/s Vishal Cables, M/s Ultracab, M/s Universal, SCI
27	UGHT XLPE PVC Insulated Conductor for 3.3/33/22/11 KV System	M/s Cable Corporation of India Mumbai, M/s Havells India Pvt Ltd, M/s UNIVERSAL CABLES LTD, M/s Asian Cable, M/s Gloster, M/s RPG Cable Ltd Thane, M/s Finolex Cable Ltd Pune, M/s RR Kabel, M/s KEI Ind, M/s Polycab Pvt Ltd, M/s Paragon, M/s Industrial Cables Punjab, M/s Pymen Cables India Ltd, M/s Asian Galaxy Pvt Ltd
28	Vacuum Circuit Breaker (VCB) suitable for 36 KV, 22KV and 12KV system including accessories	Siemens, Crompton, ABB, M/s Alstom, M/s BHEL, Larson & Toubro, Schneider, M/s Andrew Yule, C&S Electric, M/s Voltech System & Switchgear VOLTECH, Techno System, M/s MEGAWIN, M/s ITE Gurgaon, Megawin Switchgear-Pvt-Ltd
29	Changeover Switch / Starter / Contactor /DOL/ Star Delta / Synchronising Panel/Single Phase Preventor	Havells, Siemens, Larson & Turbo, ABB, C&G, GE, V Guard, M/s HPL, C&S Electric, Poly Cab, Hagger, M/s Voltech System & Switchgear VOLTECH, Adhunik, BENLO, ITE Gurgaon
30	Main Switch Iron Clad Switch Fuse unit Fuse Switch Unit	Havells, Siemens, Larson & Turbo, C&G, M/s HPL, Standard, Indoasian, C&S Electric, M/s Voltech System & Switchgear VOLTECH, Anchor, V- Guard
31	Transformers 66/11 KV, 33/11 KV, 33/0.433 KV, 22KV/11KV, 22/0.433KV Copper Wound all Rating	ABB, Siemens, Bharat, M/s Crompton & Greaves Mumbai, Schneider, M/s Alstron (GEC), Kirloskar, M/s EMCO, BHEL, M/s Andrew Yule, Voltech, ESSENAR, Silverline Elect, M/s PACTIL, M/s ITE Gurgaon, Voltamp,
32	Transformer 11KV/433Volts Step down Indoor/Outdoor type Upto 1000KVA Capacity Dry Resin Type	M/s Schneider, Crompton, Kirloskar, ABB, ESSENAR, ITE Gurgaon.
33	Transformer 33KV & 11KV Current & Potential	L&T, Siemens, Schneider, M/s Crompton Greaves Mumbai, M/s Laxmi, M/s Kappa Electricals Chennai, M/s Control System, M/s Automatic electrical, M/s Paragati Electrical New Delhi, Jyoti, Transcon
34	Isolation Transformer	M/s Vintek Electronics, M/s Power one Micro System Pvt Ltd, M/s India Techno Indus, M/s Vinitec Electronic Laboratory, Naraina, New Delhi, Volina, Sinetrac, IEco, ITE Gurgaon, Pragati, Power One
35	Transformer 11 KV or 6.6 KV Copper wired 500 KVA and above	C&G, Bharat, M/s Andrew Yule, ABB, Schneider, Kirloskar, ECE, Voltech, SilverLine, M/s Indian Transformers & Electricals, Gurgaon, M/s Pactile, M/s Sankla Udyog Jaipur, M/s Toshiba, M/s PME, Voltamp, M/s EMCO
36	Transformer 11KV/0.433KV Copper Wound Below 500KVA	M/s Volt amp Ltd Baroda, M/s Indo The Transformers, M/s Alsom (GEC), ABB, Schneider, Bharat, Silverline Elect, Rajasthan Transformer, M/s Paston Transformers Bharuch, M/s Indian Transformers & Electricals Gurgaon, M/s PME, Jaybeeti, M/s Everest, M/s Transtrom,
37	Transformers 11/0.433KV Copper wound 100 KVA and Below	M/s PME, Rajasthan Transf, M/s Everest, M/s RK Industries, M/s PACTIL, M/s Kotson, M/s Hi Tech Industries, Jaybeeti, ITE Gurgaon
38	Indicating Lamps (NEON/LED type)	Siemens, ABB, Schneider, L&T, EPCOS, M/s Jaipuria, C&S

APPENDIX B TO PARTICULAR SPECIFICATIONS APPROVED MAKES/NAMES OF FIRMS FOR PRODUCTS TO BE INCORPORATED IN WORK

1 SN	2. ITEM	3. MAKES/MANUFACTURERS
39	Air Break Switch Gang Operated (Isolator) Operated (33 Kv)/(11Kv)	M/s Pacfit Mumbai, M/s Jaipuria Brothers, M/s HEI, MEI, M/s Southern Switch Gear Mumbai, M/s BHEL, M/s ELPRO, M/s Atlas
40	Air Break Switch Gang(Isolator)	MEI, M/s Southern Switch Gear Mumbai, M/s Andrew Yule, C&G
41	LT Relay Numerical / Static / Protective / Auxilary	Siemens, ABB, Schneider, L&T, EPCOS, M/s Jaipuria, VOLTECH. C&S
42	Lightning Arrestors LT/HT	M/s Oblum, M/s BHEL, M/s GEC Elpro, C&G, AREVA , M/s Atlas, M/s Rashtriya, M/s Elpro, M/s Jaipuria
43	HT 11KV, 3Phase, Auto Switch Fuse unit	ABB, ARREVA, M/s Crompton & Greaves, Schneider, C&SELECTRIC, MEI, M/s Southern Switch Gear Mumbai, M/s Andrew Yule, M/s JYOTI, M/s Indian Transformer & Electricals, Gurgaon
44	HT switchgear 33/66/11 KV, 3 Phase, Gas Circuit Breaker, SF6 type	M/s Crompton & Greaves, Schneider, ABB , Siemens
45	Voltmeter Power factor/Ammeter/frequency meter	M/s IMP, M/s Automatic Electric, L&T, Havells, M/s MECO, C&S ELECTRIC, M/s Conserv, Universal, M/s Digitron, HPL
46	Digital Meter with Built in Selector Switch for Voltmeter, Ammeter, Frequency meter, KWH Meter Power analyses	L&T, AE, M/s Enercon, M/s Secure Meter, Havells, HPL, C&S ELECTRIC, M/s Trinity, Neptune, Legrand
47	Automatic Voltage Stabilizer (SERVO CONTROLLED)	(a) AE, Bombay (b) Andrew-yule, (c) Volina (d) Voltamp controls (e) Brenford, (f) M/s Indian Transformer & Electricals, Gurgaon (g) M/s Vintek Electronics (h) M/s Vinitec Electronic Laboratory, Naraina, New Delhi
48	Cable Jointing Kit For 11KV/22KV	(a) M/s Birla 3 M (b) M/s Densons (c) M/s Raychem (d) M/s M-Seal (e) M/s Yamuna Gases & Chemicals
49	PVC Insulated Copper / Aluminium Cable 1100 Volts of all Types	Plaza, Finolex, Anchor, Havells, Nicco, Polycab, RPG, Gloster, RR Kobal, KEI, HPL, Paragon, M/s Para Flex, GM, M/s Dneo Cables Pvt Ltd, M/s Grandlay Electricals India, V Guard, M/s Asian Galaxy Pvt Ltd, Fortune Art Cable, M/s Kalinga, M/s CRI Pumps Pvt Ltd, M/s VK Industries (VINAY), M/s Cosmo Electric Ind Pvt Ltd (KOLARS), Pressfit, Tamra, BONTON, SCI, MES CAB
50	Insulators HT/LT Disc/Pin/Shackle/Loopstring type	(a) M/s BHEL (b) M/s Jayshree (c) M/s W/s Insulators (d) M/s MEI (e) M/s Southern Insulators (f) M/s Modern Insulators (g) M/s Bengal Potteries (h) M/s Pacfil (j) M/s Jaipuria
51	RMU & PSS	Lucy electric , Larson & Toubro, MEGAWIN, M/s Voltech System & Switchgear VOLTECH, C&S ELECTRIC, ITE Gurgaon, Megawin Switchgear-Pvt-Ltd
52	Pole Pre-stressed Concrete	M/s Cement Fabric India Jodhpur, M/s Hindustan Prestressed Concrete Faridabad, M/s Indian PCC poles, M/s Concrete Udyog Jhansi, M/s Sankla Udyog Jhansi, M/s Predo Chandigarh, M/s Sri Balaji Enterprises, Surya, HPL, M/s Bator Concrete Products Aurangabad, M/s Concrete Fabrics Haryana
53	Steel Tubular Poles	(a) M/s India Tube & Co (b) M/s India Electric Poles Mfg Co MH (c) M/s Bombay Tubes (d) M/s National Tubing Company Kanpur (e) M/s Kalinga Tubes (f) M/s Singh Profile Pune (g) M/s Metal Coats Chennai (h) M/s Sohan Lal (j) M/s Bharat Conduit and Steel Works Kanpur (k) M/s Quality Steel Products Ltd Kanpur, Surya, Shivam Metal Shapers, HPL
54	AUTOMATIC POWER FACTOR CORRECTION (APFC) Panels	Larson & Toubro, SIEMENS, GEC, ABB, Epcos, Shakti, Asian, Shreem, M/s BCH, Electro control System , M/s Voltech Manufacturing Co Ltd VOLTECH, Liveline , Havells, M/s Indian Transformer & Electricals, Gurgaon
55	PCC/MCC Panels/ LV Switch Board	Electro Control Systems, M/s Voltech Manufacturing Co Ltd VOLTECH, Techno System, Neptune, C&S electric
56	Electrical Panels (LT)	L&T, Legrand, Standard, SEEPL, NEO Power, C&S ELECTRIC, Accurate, Voltech, Techno, Neptune, Adhunik, Electrocontrol, SMS, ABB, Universal, DVEPL, Siemens, Shalabh, HPL, Standard, Indo-asian, Aarve noida, Rew, GM, PSC, GM&G, ITE Gurgaon, Bhandari, BCH, SPC Electrotech Pvt Ltd.
57	MS Pipes & Fittings	(a) M/s Tata (b) M/s Jindal Ltd Gujrat (c) M/s Swastik (d) M/s Prakash (e) Surya (f) M/s BST (g) M/s Zenith, VPL, AKG, BEC, Bharat Steel
58	CPVC Pipes & Fittings (Chlorinated Polyethylene Chloride)	SMART FIT, M/s Finolex, M/s Dutron, M/s SFMC, M/s Birla Aerocon (HIL Ltd), M/s Vectus Industries Ltd, M/s Ajay Industrial Corpn Ltd, Ashirvad, M/s Ajay Flowguard Delhi, Prayag, HINDWARE, M/s Fusion Industries, Plasto , Avon Plast
59	DG Sets	Engine: M/s Sterling Gen, Cummins, M/s Greaves Cotton, M/s Ashok Leyland, M/s Caterpillar, Ruston, Eicher, Mahindra, Jacksons Alternator : M/s Stamford, Jyoti, Crompton, M/s Alstom, M/s AREVA, M/s Bharat Bijlee

APPENDIX B TO PARTICULAR SPECIFICATIONS APPROVED MAKES/NAMES OF FIRMS FOR PRODUCTS TO BE INCORPORATED IN WORK

1. S.No	2. ITEM	3. MAKES/MANUFACTUR
60	DG Set Assembled with Sound Proof Canopy	Jackson, M/s Sudhir, M/s Greaves Cotton, M/s Cummins India, M/s Meera & Co, M/s Control & Swithgear, Mahindra
61	Precast Concrete Cable cover	Mehtab Tiles, M/s Patel Furniture Mart, M/s Lucky Cement Block Works, M/s Sukhi Enterprises
62	UPS (Offline and online)	M/s Tata Liebert, M/s APLAB, M/s Luminous, M/s Sukam, M/s Protect Services, M/s Microtech, M/s Labotech, M/s Power Conservation Tech, M/s Sinetrac, Liveline, Power one
63	Power Factor Improvement Capacitor Banks	Larson & Tabro, Siemens, EPCOS, GE, ABB, M/s Shreem, Universal, Havells, Crompton
64	Aluminium Conductor Steel Reinforced (ACSR)	M/s All Ind, ICC, M/s Bharat Conductors, M/s NICCO, M/s Indian Aluminium Co, M/s VK Conductors, M/s Ujala, M/s Konark, M/s Gupta Power Infra Ltd, M/s Power Cable Ind
65	High Mast Light	Bajaj, Philips, Crompton, M/s Metal Coats, M/s Utkarsh Tubes & Pipes
66	Induction Motors	Crompton, Kirloskar, M/s Bharat Bijlee, Siemens, M/s NGEF, ABB, Jyoti
67	Gang Operated Devices	M/s Pactil (METRO), M/s Jaipuria, M/s Atlas, M/s ECE, M/s AREAVA, M/s Universal, MEI, GEC, M/s GR Power Tech
68	Centrifugal/Monoblock pumps	(a) Kirloskar (b) Beacon (c) CRI (d) Crompton (e) KSB (f) Wilo Mather (g) Jyoti (h) V Guard (j) M/s BEST (k) M/s Calarna (l) M/s BE (m) M/s Shakti Pumps India Pvt Ltd, Johnson & Jhonson
69	Submersible Pumps/Open Well Pumps	(a) Kirloskar (b) KSB (c) Wilo Mather (d) M/s Jyoti (e) V Guard (f) CRI (g) Kishore Pumps (h) M/s WASP (j) M/s Calama (k) M/s Grindfos Pumps (l) Pvt Ltd (l) Shakti (m) Jasco, beacon, Grandfos, ITT, WASP
70	Non-clog sewage Submersible pump	(a) KSB (b) Kirloskar (c) Wilo Mather (d) Kishor Pumps (e) M/s Grindfos Pumps (l) Pvt Ltd, Jhonson & jhonson
71	Pumps for Fire Fighting	Kirloskar, Wilo Mather, Crompton, M/s Bharat Bijlee
72	Vertical turbine pump	(a) Kirloskar (b) KSB (c) Wilo Mather (d) Jyoti (e) M/s Modi Atlanta (f) M/s Johnson (g) M/s Worthington (h) M/s WASP, Bajaj Atlanta
73	Window type/ Split type AIR CONDITIONER	Carrier, Voltas, M/s Daikin, M/s Hitachi, M/s Godrej, Samsung, M/s Feeder Lloyd, LG, Bluestar
74	Air handling unit,	M/s Bluestar, M/s National, M/s Zeco, M/s Voltas, M/s Universal, M/s Cooltech & Aerothem, M/s Bhupati
75	Cooling towers	M/s Mihir, M/s Paharpur, M/s Advance, Delta, M/s Polo
76	Centrifugal Chillers & Screw Chillers	Carrier, Voltas, M/s Daikin, M/s Hitachi, Kirloskar
77	Fire Fighting Eqpt like Hose Reel, Nozzles, Couplings, Valves Etc	M/s Ceasfire, M/s Safex, M/s Flame Guard Indus, M/s Nitin, KALINGA, VIP, GM, ATUL, AVONPLAST, BAJAJ PLAST, M/s ASIAN

SIGNATURE OF CONTRACTOR

Dated :

DCWE (CONTRACTS)

FOR ACCEPTING OFFICER