PLANNING, DESIGN, FABRICATION, SUPPLY AND LABOUR JOB FOR INSTALLATION, TESTING COMMISSIONING & TRIAL RUN OF 3 MONTHS OF GRAIN STORAGE SILOS SYSTEM OF CAPACITY 2500 MT (1 No's SILOS-1500 MT, 1 No SILO-1000 MT) COMPLETE WITH CLEANING SYSTEM, COLLECTION SYSTEM AND BAGGING UNIT WITH ALL ASSOCIATED ACCESSORIES, INCLUDING CIVIL, MEP WORKS MEANS ALL COMPLETE ON TURNKEY BASIS AND ANNUAL MAINTENANCE FOR THREE YEARS POST DEFECT LIABILITY PERIOD AT HAFED MEGA FOOD PARK, ROHTAK DISTRICT, HARYANASTATE

Issued By:
Haryana State Cooperative Supply and Marketing Federation Limited HAFED Building, Sector 5, Panchkula, Haryana134108

Name of work: -	Planning, Design, fabrication, supply and labour job for installation, testing commissioning & trial run of 3 months of grain storage silos system of capacity 2500MT (1 No SILO-1500 MT, 1 No SILO-1000 MT) complete with cleaning system, collection system and bagging unit with all associated accessories, including Civil MEP works means all complete on turnkey basis and Annual Maintenance for three years post defect liability period at HAFED Mega Food Park, ROHTAK District, Haryana State
Estimated cost:	Rs.470.00 Lakhs
Time Limit: -	6 Months
Earnest Money:	Rs. 9.40 Lakhs

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SECTION-1 (I): PRESS NOTICE

HAFED
NOTICE INVITING TENDERS

E-Tender is invited from the experienced reputed bidders for the following work for HAFED Mega Food Park at IMT Rohtak, Rohtak, Haryana.

Name of the Work	Estimated Cost (Rs. in Lakhs)	Bid Security / Earnest Money (in Rs. Lakhs)	Cost of Bid Document + E-tendering Fee (Rs.)	Time Limit	Date and time for bid preparation & submission
Planning, Design, fabrication, supply and labour job for installation, testing commissioning & trial run of 3 months of grain storage silos system of CAPACITY 2500 MT (1 No SILO- 1500 MT, 1 No SILO- 1000 MT)complete with cleaning system, collection system and bagging unit with all associated accessories, including Civil MEP works means all complete on turnkey basis and Annual Maintenance for three years post defect liability period at HAFED Mega Food Park, ROHTAK, District, Haryana State	470.00	9.40	6000/- (5000+1000)	6 Months	20.11.2020 at 16:01 Hrs to 18.12.2020 at 16:00 Hrs

- The eligibility criteria for the bidders have been defined in the Tender documents.
- The tender document containing details of required work, quantity, specifications, e tendering schedule etc. and other terms & conditions are available on e-tendering portal, i.e.- http://etenders.hry.nic.in
- The interested parties may download the tender document and must remit the funds before 18.12.2020 at 16:00Hrs.
- The date of bid submission is from 20.11.2020 at 16:01 Hrs to 18.12.2020 at 16:00 Hrs through e-Tender portal as mentioned above
- Pre-Bid meeting will be held on 27.11.2020 at 11.00 Hrs .At HAFED Corporate Office,Sector- 5, Panchkula,Haryana.
- The technical bids will be opened on 19.12.2020 at 11.00 Hrs at HAFED Corporate Office, Sector-5,Panchkula(Haryana).The schedule of opening of financial bids will be notified on the e-procurement portal separately after opening of the technical bids
- HAFED reserve the right to reject any/all tenders without assigning any reason whatsoever.

Managing Director

ECTION-1 (II):
DETAILED NOTICE INVITING TENDER/BIDS

E-Tender is invited from the experienced reputed bidders for the following work for HAFED Mega Food Park at IMT Rohtak, Rohtak, Haryana.

Name of the Work	**Estimated Cost (Rs. in Lakhs)**	**Bid Security / Earnest Money (in Rs. Lakhs)**	**Cost of Bid Document + E-tendering Fee (Rs.)**	**Time Limit**	**Date and time for bid preparation & submission**
Planning, Design, fabrication, supply and labour job for installation, testing commissioning & trial run of 3 months of grain storage silos system of CAPACITY 2500 MT (1 No SILO-1500 MT, 1 No SILO- 1000 MT)complete with cleaning system, collection system and bagging unit with all associated accessories, including Civil MEP works means all complete on turnkey basis and Annual Maintenance for three years post defect liability period at HAFED Mega Food Park, ROHTAK, District, Haryana State	470.00	9.40	6000/- (5000+1000)	6 Months	20.11.2020 at 16:01 Hrs to 18.12.2020 at 16:00 Hrs

1. Under this process, the Technical online bid Application as well as online Price Bid shall be invited at single stage under two covers i.e. Technical & Financial Envelope. Eligibility and qualification of the Applicant will be first examined based on the details submitted online under first cover (Technical) with respect to eligibility and qualification criteria prescribed in this Tender Document. The Price Bid under the second cover shall be opened for only those Applicants whose Technical Applications are responsive to eligibility and qualification requirements as per Tender Document.

2. The payment for Tender Document Fee and e-Service Fee shall be made by eligible bidders/contractors online directly through Debit Cards & Internet Banking Accounts the payment can be made online directly through RTGS/NEFT or OTC Please refer to 'Online Payment Guideline' available at the Single e-Procurement portal of GoH (Govt. of Haryana) and also mentioned under the Tender Document. Incase of EMD, bidders can submit the in the form of Bank Guarantee from any Nationalized Bank. The EMD in the form of Bank Guarantee should be remain valid for 165 days from date of Technical bid opening. The Bank Guarantee is required to scan & upload in the online portal. Original Bank Guarantee should be submitted to HAFED Office, Panchkula addressing to Managing Director of HAFED & mentioning the DNIT details on the top of the cover within 3 days of Technical Bid Opening.

3. Intending bidders will be mandatorily required to online sign-up(create useraccount)on the website http://etenders.hry.nic.intobeeligibletoparticipateinthee-Tender.**Theintendedbiddersfailsto upload EMD during the bid submission shall not be allowed to submit his/her bids for the respectiveevent/Tenders.**

4. The interested bidders must remit the funds (Tender Document Fee, e-Service Fee & others as mentioned in the Portal) at least T + 1 working day (Transaction + One Day) in advance i.e. **on or before 00.00.0000 and make payment Vis RTGS/NEFT or OTC to the beneficiary account number specified under the online generated challan. The intended bidder/Agency thereafter will be able to successfully verify their payment online, and submit their bids on or beforethe expiry date & time of the respective event/Tenders at** http://etenders.hry.nic.in

The interest bidders shall have to pay mandatorily e-Service fee (under document fee – Non refundable) of Rs. 1000/- (Rupee One Thousand only) online by using the service of secure electronic gateway. The secure electronic payments gateway is an online interface between bidders & online payment authorization networks.

The payment for document fee/ e-Service fee can be made by eligible bidders online directly through Debit Card & Internet Banking.

5. Tender Documents can be downloaded online from the Portal http://etenders.hry.nic.in by the Contractors registering on the Portal.

6. The bids are required to be submitted on single percentage basis above or below given as estimated cost in this tender document in figures as well as in words in the space provided in section– 7 Tender Form for filling rates (form of bid).

7. As the Bids are to be submitted online, these are required to be encrypted and digitally signed, the Bidders are advised to obtain the same at the earliest. For obtaining Digital Certificate, the Bidders may contact the representative of Next Tenders, the service Providers of Electronic Tendering System or any other service provider.

8. The bidders can submit their tender documents on line as per dates mentioned in the key dated mentioned below:

Sr. No.	**HAFED Stage.**	**Contractor Stage**	**Start Date & Time**	**Expiry Date & Time**
1	Tender Authorization & Publishing	-	20.11.2020 16.01 Hrs	18.12.2020 16.00 Hrs
2	-	Downloading of Tender Document & Bid Preparation	20.11.2020 16.01 Hrs	18.12.2020 16.00 Hrs
3	Pre Bid Meeting		27.11.2020 11.00 Hrs	
4	Corrigendum Issue (if any)		03.12.2020 17.00 Hrs	
5.	-	Submission of Tender Document Fees, EMD, E-Service Fee and (Technical)Documents.	20.11.2020 16.01 Hrs	18.12.2020 16.00 Hrs
6.	Technical Bid Opening	-	19.12.2020 11.00 Hrs	
7.	Commercial Bid Opening / Price Bid	-	Will be notified separately	

CONDITIONS:-

1) Conditional tenders will not be entertained & liable to be rejected.
2) Incase of the day of opening of tenders happens to be holiday, the tenders will be opened on the next working day.The time and place of receipt of tenders and other conditions will remain unchanged.
3) HAFED reserves the right to reject any tender or all the tenders without assigning any reason.
4) The tender without earnest money will not be opened.
5) The jurisdiction of court will be at Panchkula.
6) The financial bids of the bidders who does not satisfy the qualification criteria in the bid documents willnotbeopenedandnoclaimwhatsoeveronthisaccountwillbeconsidered.
7) The bid for the work shall remain open for acceptance during the bid validity period to be reckoned from the date of opening of technical bids. If any bidder / tenderer withdraws his bid / tender before the said period or makes any modifications in the terms and conditions of the bid, the bids security of that bidder may be forfeited.

Managing Director, HAFED,

SECTION-2

INSTRUCTIONS TO BIDDERS (ITB)

Throughout these bidding documents, the terms 'bid' and 'tender' and their derivatives (bidder/tenderer, bidding/tendering, etc.) are synonymous.

Eligibility Criteria: - This Invitation for Bids is open to all bidders who fulfil the qualification criteria prescribed as under:

I. Experience:

Sr. No.	Description of works	DNIT cost (Rs. in Lacs)	The bidder must have successfully executed &completed similar works in last ten years i.e. Grain Storage Silos with allied works(Rs. inLakhs)				
			One work of magnitude of 80% i.e.	Or	Two works ofmagnitude of 50% each i.e.	Or	Three works of magnitude of 40% each i.e.
1	Planning, Design, fabrication, supply and labour job for installation, testing commissioning &trial run of 3 months of grain storage silos system of CAPACITY 2500 MT (1 No SILO-1500 MT, 1 NoSILO-1000 MT)complete with cleaning system, collection system and bagging unit with all associated accessories, including Civil MEP works means all complete on turnkey basis and Annual Maintenance for three years post defect liability period at HAFED Mega Food Park, ROHTAK District, Haryana State	470.00	376.00		235.00		188.00

a) For this, a Certificate from the competent authority shall be submitted along with the applicant incorporating clearly the name of the work, Contract value, billing amount, date of commencement as well as completion of works,satisfactory performance of the Contractor and any other relevant information.

II- Financial Credentials

a) **Turnover:** The bidder should demonstrate an average annual turnover of Rs.3.76 Crores during the last three financial years.

b) **Net worth:** Financial net worth of bidder should be positive as on 31 March of the previous financial year and should be certified by Chartered Accountants.

The net worth shall be worked out as under:

Net Worth = (Paid Up Equity + Reserves) – (Revaluation Reserves + Misc. expenditure not written off and accrued liabilities)

c) Bid Capacity orSolvency:

Bid Capacity: The assessed available Bid Capacity of the Bidder shall not be less than Rs. 4.70 Crores. To be calculated as per follow:

WorkingBidCapacity>Total estimated **cost of work(s) at the time of bidding**. Contractors should calculate the available bid capacity as per given formula.

WBC = 2AN – B

A	Average Annual Turnover of the bidder for last three financial years from similar nature of projects
B	Value of the existing commitments and ongoing works of the bidder to be completed during next 6 months (period of completion of works as per bid)
N	No. of years prescribed for completion of works for which bids are invited i.e. 0.5 in this case.

OR

Solvency Certificate: Solvency of the amount equal to 40% of the estimated cost of the work i.e . Rs. 1.88 Crore. The date of this Certificate must be within 6 months of the date of opening this tender.

The Bidders are advised to raise all their queries and submit their deviations (if any) in the pre bid meeting on any parameter or technical specifications. No deviations will be allowed during execution.

III. Joint Venture or Consortium: JV or Consortium is allowed. The consortium members shall nominate the lead member of the consortium which should be responsible for the overall management, delivery of the project.

a. Joint Ventures are allowed upto maximum of two members to participate in the bid. In case the bidder is a JointVenture(JV), the members shall authorize one of the JV members to act on their behalf as lead member in exercising all the rights and obligations towards the Client under this document, including without limitation to the receiving of instructions and payments from the Client. Though, lead member shall be responsible for the overall management, deliver of the project, all the members of consortium/JV shall be jointly and severally responsible for execution of the works in relation to the project.

b. A Proposal submitted by a JointVenture shall be signed by all members so as to be legally binding on all members, or by an authorized representative who has a written power of attorney signed by each member‘s authorized representative.

c. If the Proposal is submitted by a joint venture, there shall be a Joint Venture Agreement specific for this contract between the constituent firms/ members, indicating clearly, amongst other things, the proposed distribution of responsibilities both financial as well as technical for execution of the work amongst them. A copy of the JV agreement entered into by the Joint Venture members shall be submitted along with the bid

d. In the case of a Joint Venture, a power of attorney for the authorized representative of each JV member,and a power of attorney for the representative of the lead member to represent all JV members shall be submitted along with the proposal.

e. The Lead Partner must individually qualify the financial eligible criteriai.ecriteriaII-(a),(b)and(c)as stipulatedabove

SECTION-3 SUBMISSION OF BIDS

INSTRUCTIONS TO BIDDER ON ELECTRONIC TENDERING SYSTEM

These conditions will over-rule the conditions stated in the tender documents, wherever relevant and applicable.

1. Registration of bidders on e-ProcurementPortal:

All the bidders intending to participate in the tenders process online are required to get registered on the centralized e-Procurement Portal i.e. **https://etenders.hry.nic.in** Please visit the website for more details.

2. Obtaining a DigitalCertificate:

2.1 The Bids submitted online should be encrypted and signed electronically with a Digital Certificate to establish the identity of the bidder bidding online. These Digital certificates are issued by an Approved Certifying Authority, by the Controller of Certifying Authorities, Government ofIndia.

2.2 A Digital Certificate is issued upon receipt of mandatory identity(i.e.

Applicant‟s PAN Card) and Address proofs and verification form duly attested by the Bank Manager / Post Master / Gazetted Officer. Only upon the receipt of the required documents, a digital certificate can be issued. For more details please visit the website – **https://etenders.hry.nic.in**

2.3 The bidders may obtain Class-II or III digital signature certificate from any CertifyingAuthority or Sub-certifying Authority authorized by the Controller of Certifying Authorities or may obtain information and application format and documents required for the issue of digital certificatefrom.

2.4 The bidder must ensure that he/she comply by the online available important guidelines at the portal **https://etenders.hry.nic.in** for Digital Signature Certificate (DSC) including the e- Token carryingDSCs.

2.5 Bid for a particular tender must be submitted online using the digital certificate (Encryption & Signing),whichisusedtoencryptandsignthedataduringthestageofbidpreparation.Incase, during the process of a particular tender, the user loses his digital certificate (due to virus attack,hardwareproblem,operatingsystemor anyotherproblem)hewillnotbeabletosubmit the bid online. Hence, the users are advised **to keep a backup of the certificate** and also keep thecopiesatsafeplaceunderpropersecurity(foritsuseincaseofemergencies).

2.6 In case of online tendering, if the digital certificate issued to the authorized user of a firm is used for signing and submitting a bid, it will be considered equivalent toano-objection certificate/power of attorney /lawful authorization to that User. The firm has to authorize a specific individual through an authorization certificate signed by all partners to use the digital certificate as per Indian Information Technology Act 2000. Unless the certificates are revoked, it will be assumed to represent adequate authority of the user to bid on behalf of the firm in the department tenders as per Information Technology Act 2000. The digital signature of this authorized user will be binding on thefirm.

2.7 In case of any change in the authorization, it shall be the responsibility of management/ partners of the firm to inform the certifying authority about the change and to obtain the digital signatures of the new person/ user on behalf of the firm/ company. The procedure for application of a digital certificate however will remain the same for the newuser.

2.8 The same procedure holds true for the authorized users in a private/ Public limited company. In this case, the authorization certificate will have to be signed by the directors of thecompany.

3. Pre-requisites for onlinebidding:

In order to operate on the electronic tender management system, a user"s machine is required to be set up. A help file on system setup/Pre-requisite can be obtained from NIC or downloaded from the home page of the website - **https://etenders.hry.nic.in** The link for downloading required java applet & DC setup are also available on the Home page of the e-tendering Portal.

4. Online Viewing of Detailed Notice InvitingTenders:

The bidders can view the detailed N.I.T and the time schedule (Key Dates) for all the tenders floated through the single portal e-Procurement system on the Home Page at https://etenders.hry.nic.in

5. Download of TenderDocuments:

The tender documents can be downloaded free of cost from the e- Procurement portal https://etenders.hry.nic.in

6. KeyDates:

The bidders are strictly advised to follow dates and times as indicated in the online Notice Inviting Tenders. The date and time shall be binding on all bidders. All online activities are time tracked and the system enforces time locks that ensure that no activity or transaction can take place outside the start and end dates and the time of the stage as defined in the online Notice Inviting Tenders.

7. Online Payment of Tender Document Fee, Processing fee, Bid Preparation & Submission (Technical & Commercial/ PriceBid):

7.1 Online Payment of Tender Document Fee + Processing fee: The online payment for Tender document fee, Processing Fee & EMD can be done using the secure electronic payment gateway. The Payment for Tender Document Fee and Processing Fee shall be made by bidders/Vendors online directly through Debit Cards & Internet Banking Accounts and the Payment for EMD shall be made online directly through RTGS / NEFT &OTC.

The secure electronic payments gateway is an online interface between contractors and Debit card / online payment authorizationnetworks.

7.2 PREPARATION & SUBMISSION OF onlineAPPLICATIONS/BIDS:

(i) Detailed Tender documents may be downloaded from e-Procurement website **https://etenders.hry.nic.in** and tender mandatorily be submitted online following the instruction appearing on thescreen.

(ii) Scan copy of Document to be submitted / uploaded for Technical bid under online TechnicalEnvelope.Therequireddocuments(refertoDNIT)shallbepreparedandscanned in different file formats (in PDF/JPEG/MS WORD format such that file size is not exceed more than 10 MB) and uploaded during the on-line submission of Technical Envelope.

(iii) FINANCIAL or Price Bid PROPOSAL shall be submitted mandatorilyonline under CommercialEnvelopeandoriginalnottobesubmitted manually)

8. ASSISTANCE TO THEBIDDERS

For queries on Tenders Haryana Portal, Kindly Contact

Note: Bidders are requested to kindly mention the URL of the ortal and Tender ID in the subject shiel emailing any issue along with the contact detail. For any issue/clarification relating to the Tender (s) published kindly contact the repective tender Inviting Authority.

Tel:-0120-4200462,0120-4001002

Mobile:88262-46593

Email:-support.etender@nic.in

For any techincal related queries please call at 24x7 Help Desk number 0120-4001002,0120-4200462,0120-4001005,120-6277787

For support related to Haryana Tenders in addition to help desk you may also contact on email ID eproc.nichry@yahoo.com, Tel:0172-2700275

Timing: Technical support assistance will be available over telephone Monday to Friday (9:00am to 5:30pm) (Helpdesk Support in team shall not be contracted for online bidding on behalf of the contractors).

Note: Contact e-Procurement helpdesk on or before prior to 4 hours of the scheduled closing date and time of respecive e-tendering event. Also, for queries related to e-payment of EMD kinldy contact the helpdesk at least two days prior to closing date and time of the respectiveevent.

Intended bidders mandatorily requried to register their quries if there is any pertaining to the online bidding and the single e-Procurment portal at email address:- https://etenders.hry.nic.in

NOTE:- ***Bidders participating in online tenders shall check the validity of his/ her Digital Signature Certificate before participating in the online Tenders at the portal*** **https://etenders.hry.nic.in**

(Online Payment Guidelines)

Guideline for Online Payments at e-Procurement Portal of Government of Haryana.

Post registration, bidder shall proceed for bidding by using both his digital certificates (one each for encryption and signing) & Password. Bidder shall proceed to select the event/Tenders he is interested in. On the respective Department"s page in the e-Procurement portal, the Bidder would have following options to make payment for tender document fee + Processing fee &EMD:

A. DebitCard
B. NetBanking
C. RTGS/NEFT or Over The Counter(OTC)

Operative Procedures for Bidder Payments

A) Debit Card

The procedure for paying through Debit Card will be as follows:

(i) Bidder selects Debit Card option in e-Procurementportal.

(ii) The e-Procurement portal displays the amount and the card charges to be paid by bidder. The portal also displays the total amount to be paid by thebidder.
(iii) Bidder clicks on "Continue"button.
(iv) The e-Procurement portal takes the bidder to Debit Card payment gatewayscreen.
(v) Bidder enters card credentials and confirmspayment
(vi) The gateway verifies the credentials and confirms with "successful" or "failure" message, which is confirmed back to e-Procurementportal.
(vii) The page is automatically routed back to e-Procurementportal
(viii) The status of the payment is displayed as "successful" ine-Procurement portal.
(ix) In case of successful payment, a success message along with unique transaction ID is passed on to e-Procurement system. The e-tendering portal shall store the unique transaction number in its database along with the date andtimestamp.
(x) The e-Procurement portal allows Bidder to process another payment attempt in case payments are not successful for previousattempt.

B) Net Banking

The procedure for paying through Net Banking will be as follows:
(i) Bidder selects Net Banking option in e-Procurementportal.
(ii) The e-Procurement portal displays the amount to be paid bybidder.
(iii) Bidder clicks on "Continue"button
(iv) The e-Procurement portal takes the bidder to Net Banking payment gateway screen displaying list of Banks
(v) Bidder chooses his / herBank
(vi) The Net Banking gateway redirects Bidder to the Net Banking page of the selectedBank
(vii) Bidder enters his account credentials and confirmspayment
(viii) The Bank verifies the credentials and confirms with "successful" or "failure" message to the Net Banking gateway which is confirmed back to e- Procurementportal.
(ix) The page is automatically routed back to e-Procurementportal
(x) The status of the payment is displayed as "successful" ine-Procurement portal.

(xi) In case of successful payment, a success message along with unique transaction ID is passed on to e-Procurement system. The e-Procurement portal shall store the unique transaction number in its database alongwith the date andtimestamp.

(xii) The e-Procurement portal allows Bidder to process another payment attempt in case payments are not successful for previousattempt.

C) RTGS/NEFT

This solution shall also allow the bidder to make the EMD payment via RTGS/NEFT this shall add to the convenience of those bidders who are not conversant to use net banking option to make the transaction.

Using this module, bidder would be able to pay from their existing bank account through RTGS/NEFT. This would offer a wide reach for more than thousands bank branches and would enable the bidder to make the payment from almost any bank branch acrossIndia.

1. To choose the payment of EMD, the bidder clicks on RTGS/NEFT paymentoption.
2. Upon doing so, the e-Procurement portal will redirect the bidder to a page where it will generate a Challan.
3. This Challan shall include the beneficiary (virtual) account number and other details like beneficiary IFSC codeeach.

RTGS / NEFT Payment Procedure

The bidder shall be required to take a print of the challan and make the RTGS/ NEFT on the basis of the virtual account number period on the challan. This provision will ensure that number confidential details regarding the bidder or tender are disclosed to the bank while remitting the RTGS/NEFT.

The bidder would remit the fund at least one day in advance to the last day and make the payment via RTGS/NEFT to the beneficiary account number as mention in the challan. SBI Bank shall receive this amount and credit the payment gateway service provider intermediary Department/ PSUs Escrow Security Deposit account post validating the first part of the beneficiary account number, i.e., the client code only, In case of validation of client code is not successful, the bank shall return the fund and not credit the Techprocess intermediary Department/PSUs Escrow Security DepositA/c.

D) Over the Counter(OTC)

This solution shall allow the bidder having account with SBI bank, to make the payment from any CMS enables Branch of SBI Bank in India. Bidders can make the payment via cash (if amount is <=[]49,999), Demand Draft or SBI Bank Cheque.

The procedure for paying through OTC mode is as follows:

(i) Bidder selects over the counter remittance option in e-Procurementportal.

(ii) Thee-Procurement portal displays the amount to be paid. Thebidder chooses the bank account number for refund of theamount.

(iii) Bidder clicks on“Continue” Button.

(iv) The e-Procurement portal displays the details of payment. The Bidders click on “Print_Challan” and print the OTCChallan.

(v) Bidder submits the OTC Challan at the counter of any designated bank of SBI Bank with

Cash/Demand Draft/SBI Bank Cheque (Payment in Cash is allowed upto Rs. 49,999/-).

(vi) SBI bank verifies the URL (format to be discussed and decided) and amount with e-Procurement portal prior to accepting thepayment.

(vii) On successful verification from e-Procurement portal, SBI bank accepts the payment. In case of failure, SBI bank shall return back the OTC challan and payment to thebidder.

(viii) SBI bank commits the payment transaction (in case of successful verification from e-Procurement portal) and sends the Bank Transaction number (I-Sure Reference Number) online against the URN andAmount.

(ix) SBI bank will generate receipt for the payment transaction and issues the same to the bidder.(x) The e-Procurement system update the bank transaction number against the URN and Amount based on the details sent by SBI bank online prior to generation of thereceipt.

(x) The status of the payment will be displayed as "verification successful" in e- Procurement Portal,whenthebidderclicksontheverificationoptionintheportal.

Bidderwouldberequiredtouploadthescancopyofreceiptasreceivedfrom SBI Bank as part of proof in next tender portal before submitting the tender.

SECTION 4 (I) CONDITIONS OF CONTRACT

Clause 1:- The time allowed for carrying out of work as entered in the tender shall be strictly observed by the contractor, and shall be reckoned from the date on which the order to Commence work is given to the contractor. The work shall throughout the stipulated period of the contract be proceeded with all due diligence (time being deemed to be the essence of the contract on the part of the contractor). To ensure good progress during the execution of work the contractor shall be bound in all cases in which the time allowed for any work exceeds one months to complete one-fourth of the whole of the work before one fourth of the whole time allowed under the contract has elapsed, one-half of the work before one half of such time has elapsed and three fourth of the work before the three fourth of such time has elapsed. In the event of the contractor failing to comply with this condition he shall be liable to pay compensation as mentionedbelow:-

a) If the work is not initiated or left before the middle stage i.e. the work paid is less than 60% then compensation will be levied @ 2% per week of delay subject to a maximum of 10% of the original tender cost, as advertised in thenewspaper.

b) If 60% work is over and paid and then left incomplete or delayed then percentage compensation will be levied @ 2% per week subject to a maximum of 5% of the tendercost.

c) If 80% work is already paid and then left in-complete or delayed then percentage compensation will be levied at the rate of 2% per week of the tender cost subject to a maximum of 2% of the tender cost.

d) Penalty applicable for AMC Period: In case supplier does not address the issue after information received by HAFED or Contractor's Team and make delay in response, **penalty** shall be **imposed @ 10% of the entire AMC value quoted by the bidder per week for** the maximum limit of 2 weeks. In case the supplier fails to address the issues & submit report / solutions to HAFED even after extended period of 2 weeks with penalty, the security (Performance Bank Guarantee) will be forfeited.

e) The MD, HAFED will have the power to reduce or waive the penalty/compensation after receiving the representation from the contractor and if it is felt that penalty is wrong-fully imposed but such representation will be entertained only after the contractor first completes the work and then makes the representation. The decision of MD, HAFED will be final and will not be challengeable before the arbitrator or any other court of law in thecountry.

f) The date of completion of work will be the one on which the contractor has received the completion certificate from the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED,Rohtak.

Clause 2: In any case, in which under any clause or clauses of this contract the Contractor has rendered himself liable to pay compensation amounting to the whole of his security deposit (whether paid in one sum ordeductedbyinstalments),theGMHAFED,CFP,Rohtak/ExecutiveEngineer,HAFED,Rohtakonbehalf

of the Federation shall have power to adopt any of following course as he may deem best suited to the interest ofFederation.

(a) To rescind the contract of which rescission notice in writing to the Contractor under the hand of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak dispatched by registered post to the address of the Contractor given in the Tender shall be conclusive evidence and in which case the security deposit of the Contractor shall stand forfeited and be absolutely at the disposal of Government.

(b) To employ labour and to supply materials to carry out the work, or any part of the work debiting the Contractor with the cost of the labour and the price of the materials and crediting him with the value of the work done at the same rates as if it had been carried out by the Contractor under the terms of his contract. The certificate of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtakas to the value of the work done, and quantity, rate & amount of the labour and material employed for doing the work shall be final and conclusive against theContractor.

(c) To measure the work of the Contractor and to take such part there-of as shall be unexecuted out of his hands and to give it to another Contractor to complete. In such case, any expends which may be incurred in excess of the sum which would have been paid to the original Contractor shall be borne and paid by the original Contractor. Certificate in writing of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak in respect of work taken out of the hands of original Contractor, and the excess expenditure incurred shall be final and conclusive. This money may be deducted from any money due to him by Government under the contract or otherwise or from his securitydeposit.

In the event of any one or more of the above courses being adopted by the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak, the Contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any material or entered into any engagement or made any advances on account of or with a view to the execution of the work for the performance of the contract and in case the action is taken under any of the provisions aforesaid, the Contractor shall not be entitled to recover or be paid any sum for any work actually executed under the contract, unless and until the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak will have certified in writing the performance of such work and the value payable in respect thereof and he shall only be entitled to be paid the value so certified.

Clause 3: In any case in which any of the powers conferred upon the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak by clause 2 hereof, shall have become exercisable and the same shall not be exercised, the non-exercise thereof shall not constitute a waiver of any of the conditions hereof and such power shall notwithstanding be exercisable in the event of any future case of default by the Contractor and the liability of the Contractor for past and future compensation shall remain unaffected. In the event of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak exercising either of the power (a) or (c) vested in him under the preceding clause he may, if he so desires, take possession of all or any tools, plants materials and stores in or upon the works, or the site there of belonging to the contractor or procured by him and intended to be used for the execution of the work or any part thereof paying or allowing for the same in account at the contract rates or in case of these not being applicable at current market rates to be certified by the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak whose certificate thereof shall befinal.

Otherwise the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak may by notice in writing to the Contractor or his clerk of the works, foreman or other authorized agent require him to remove such tools and plant material or stores from the premises within a time to be specified in such notice. In the event of the Contractor failing to comply with any such requisition, the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak may remove them at the Contractor's expense or sell them by auction or private sale on account of the Contractor and at his risk in all respects and the certificate of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak to the expense of any such removal and the amount of the proceeds and expenses of any such sale be final and conclusive against the Contractor.

Clause 4: If the Contractor shall desire an extension of time for the completion of the work on the groundsof his having unavoidable hindrance in its execution or on any other ground, he shall apply in writing to GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak within 30 days of the date of the hindrance, on account of which he desires such extension as aforesaid. The Federation shall, if in its opinion (which shall be final) reasonable grounds be shown there-for, authorize such extension of time, if any, as may, in its opinion be necessary orproper.

Clause 5 : Contractor shall deliver in the office of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak the work execution progress on fortnight basis. No extra items will be considered during execution from the contractor side as this contract is turn-key.

Clause 6 : Without prejudice to the rights of Federation under any clause hereinafter contained on completion of the work, the contractor shall be furnished with a certificate by the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak of such completion, but no such certificate shall be given, not shall the work be considered to be complete until the contractor shall have removed from the premises on which the work shall be executed all Surplus materials, and rubbish and cleaned of the dirt from all wood works, doors, windows, walls, floors or other parts of this work. In upon or about which the work is to be executed, or of which he may have had possession for the purpose of the execution thereof and the measurements in the said certificate shall be binding and conclusive against the contractor, If the contractor shall fail to comply with the requirements of this clause as to removal of surplus materials and rubbish, and cleaning off dirt on or before the date fixed for the completion of the work, the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak may at the expenses of the contractor, remove such surplus materials and rubbish and dispose off the same as he thinks fit and clean off such dirt aforesaid and the contractor shall forthwith pay the amount of all expenses so incurred and shall have no claim in respect of any such surplus materials as aforesaid except for any sum actually realized by the sale thereof less any expense incurred by GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak in connection therewith

Clause 7 : No payment shall be made for work estimated to cost less than rupees one thousand, till after the whole of the works shall have been completed and a certificate of completion given. But in case of works estimate to cost more than rupees one thousand, the contractor shall be submitting the bill thereof, be entitled to receive a monthly payment proportionate to the part thereof then approved & passed by the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak whose certificate of such approval and passing of the sum so payable shall be final and conclusive against the contractor. But all such intermediate payments shall be regarded as payments by ways of advances against the final payment only and not as payments for work actually done and completed and shall not preclude the requiring of bad,unsoundedandimperfectorunskilfulworktoberemovedandtakenawayandreconstructedorre-erected, or be considered as an admission of the due of performance of the contract, or any part thereof in any respect or according of any claim, nor shall it conclude, determine or affecting any way the powers of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak under these conditions, or any of them as to the final settlement and adjustment of the accounts or otherwise, or in any other way , vary or affect the contract. The final bill shall be submitted by the contractor within one month of the date fixed for completion of the work otherwise the GM's HAFED, CFP, Rohtak/Executive Engineer's, HAFED, Rohtak certificate of the measurement and of the total amount payable for the work accordingly shall be final and binding on allparties.

Clause 7 (a): If Retention in running bills or such part thereof as may be due to the contractor under this contract shall be payable to the contractor after a period of three months has lapsed after payment of final bill.

Clause 8: A bill shall be submitted by the Contractor each month on or before the date fixed by the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak for the work executed in the previous month. The Contractor shall submit all bills on the printed forms available with the department. The charges in the bills shall always be entered at the rates specified in the tender. In case of any extra work ordered in pursuance of these conditions, and not mentioned or provided for in the tender, at the rates hereinafter provided for such work. Final bill in respect of the Contract shall be submitted by the Contractor within 30 days of the date fixed for completion of the Work or the date of the certificate of completion furnished by the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak. GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak shall take or cause to be taken the requisite measurements for the purpose of having the same verified and the claim, as far as admissible, if possible, before the expiry of 10 days from the presentation of the bill. If the Contractor does not submit the bill within the time fixed as aforesaid, the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak may depute a subordinate to measure up the said work in the presence of the Contractor, whose countersignature to the measurement list will be sufficient warrant. GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak may prepare a bill from such list which shall be binding on the Contractor in allrespects.

Clause 9 : The contractor shall submit all bills on the printed forms to be had on application at the office of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak, and the charges in the bill shall always be entered at the rates specified in the tender or in the case of any extra work ordered in pursuance of these conditions, and not mentioned or provided for in the tender at the rates hereinafter provided for such work.

Clause 10 : If the specification of estimate of the work provides for the use of any special description of materials to be supplied from the GM's HAFED, CFP, Rohtak/Executive Engineer's, HAFED, Rohtak store or if it is required that the contractor shall use certain stores to be provided by the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak(such materials and stores and the prices to be charged thereof as hereinafter mentioned being so far as practicable for the convenience of the contractor, but not so as in any way to control the meaning or effect of this contract, specified in the schedule of memorandum, have to be annexed), the contractor shall be supplied with such materials and stores as required from time to time to be used by him for the purposes of the contract only and the value of the full quantity of materials and stores so supplied at the rates specified in the said schedule or memorandum may be set off or deducted from any sums then due on thereafter to become due to the contractor under the contract or otherwise, against or from the security deposit, or the proceeds of sale thereof if the same is held in Government securities, the same or asufficientportionthereofbeinginthiscasesoldforthepurpose.Allmaterialssuppliedtothecontractor,

shall remain the property of the contractor, but shall not on any account be removed from the site of the work without the written permission of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtakand shall at all the 'times be open to inspection by him. Any such materials unused and in perfectly good condition at the time of completion or termination of the contract shall be returned to the GM's HAFED, CFP, Rohtak/Executive Engineer's, HAFED, Rohtak store if by a notice in writing under his hand he shall so require, but the contractor shall not be entitled to return any such material unless with such consent and shall have no claims for compensation on account of any such materials so supplied to him as aforesaid being unused by him or for any wastage in or damage to any suchmaterials.

Clause 11 : The Contractor shall execute the whole and every part of the work in most substantial and workman like manner and both as regards materials and otherwise in every respect in accordance with the specifications. The Contractor shall also conform exactly fully and faithfully to the designs, drawings and instructions in writing relating to the work signed by the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtakand lodged in the office and to which the Contractor shall be entitled to have access at such office, or at the site of the work for the purpose of the inspection during office hours. The Contractor shall, if he so requires, be entitled at his own expense to make or cause to be made copies of the specifications, and of all such designs, drawing and instructions asaforesaid.

Clause 11 (a): The GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak shall have full powers, at all times to object of the employment of any workman, foreman, or other employee on the works by the contractor and if the contractor shall receive notice in writing from the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak requesting the removal of any such man or men from the work the contractor shall comply with the requestforthwith.

No such workman, foreman or other employee after his removal from the works by request of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak shall be re-employed or reinstated on works by the contractor at any time, except with the previous approval in writing of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak.

The contractor shall not be entitled to demand the reason from the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak for requiring the removal of any such workman, foreman or other employees.

Clause 12: The GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak shall have power to make any alteration in, omissions from, addition to or substitutions for the original specifications, drawing designs and instructions that may appear to him to be necessary or advisable during the progress of the work. The Contractor shall be bound to carry out the work in accordance with such instructions given to him in writing signed by the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak. Such alterations, omissions, additions or substitutions shall not invalidate the contract. Such altered, additional or substituted work which the Contractor may be directed to do in the manner above specified as part of the work shall be carried out by the Contractor on same conditions in all respects on which he agreed to do the main work. The time for the completion of the work shall be extended in the proportion the altered, additional or substituted work bears to the original contract work and the certificate of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak shall be conclusive as to such proportion. If the rates for the altered, additional or substituted work cannot be determined in the manner specified above then the Contractor shall, within 7 days of the date of receipt of order to carry out the work, inform the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak of the rate which he intends to charge for such class of work. If the GM HAFED, CFP,

Rohtak/Executive Engineer, HAFED, Rohtak does not agree with this rate, he shall by notice in writing be at liberty to cancel his order to carry out such class of work and arrange to carry it out in such manner as he may consider advisable provided always that if the Contractor shall commence work or incur any expenditure in regard thereto before the rates shall have been determined lastly herein before mentioned, then and in such case he shall be entitled to be paid in respect of the work carried out or expenditure incurred by him prior to the date of determination of the rates as aforesaid according to such rate or rates as shall be fixed by the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak. In the event of a dispute the decision of the Federation shall befinal.

Clause 13 : If at any time after the commencement of the work, the Federation shall for any reason whatsoever not require the whole work, or part thereof, as specified in the contract to be carried out, the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak shall give notice in writing of the fact to the Contractor who shall have no claim to have any payment or compensation whatsoever on account of any profit or advantage, which he might have derived from the execution of the work in full, that which he did not derive in consequence of the full amount of the work not having been carried out. The Contractor shall also not have any claim for compensation by reason of any alterations having been made in the original specifications, drawings, designs and instructions which shall involve any curtailment of the work as originallycontemplated.

Clause 14 : If it shall appear to the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak or his subordinate-in-charge of the work, that any work has been executed with unsound, imperfect or unskilful workmanship or with materials of any inferior description, or that any materials or articles provided by him for the execution of the Work are unsound or of a quality inferior to that contracted for or otherwise not in accordance with the contract, the Contractor shall, on demand in writing which shall be made by GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak specifying the work, materials or articles complained of, notwithstanding that the same may have been passed, certified and paid for, forthwith rectify or remove and reconstruct the work so specified in whole or in part, as the case may require or as the case may be, remove the materials or articles so specified and provide other proper and suitable materials or articles at his own proper charge and cost. In the event of his failing to do so within a period to be specified by the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak in his demand aforesaid, the Contractor shall be liable to pay compensation at the rate of 1% of the estimated cost of the Work (as shown in the tender) for every day not exceeding ten days, while his failure to do so shall continue. In the case of any such failure, the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak may rectify or remove and re-execute the work or remove and replace with others, the materials or articles complained of, as the case may, be at the risk and expense in all respects of the Contractor.

Clause 15 : All work under or in course of execution or executed in pursuance of the contract shall at all times be open to the inspection and supervision of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak and his subordinates and the Contractor shall at all times, during the usual working hours, and at all other times at which reasonable notice of the intention of GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak or his subordinate to visit the Work shall have been given to the Contractor, either himself be present to receive orders and instructions or have a responsible agent duly accredited in writing present for that purpose. Orders given to the Contractor's agent shall be considered to have the same force as if they had been given to the Contractorhimself.

Clause 16 : The Contractor shall give not less than 7 days' notice in writing to the \ GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak or his subordinate-in-charge of the work before covering up or otherwise placing beyond the reach of measurement any work in order that the same may be measured and correct dimensions thereof be taken before the same is so covered up, placed beyond the reach of measurement, and shall not cover up or place beyond the reach of measurement any work without the consent in writing of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak or hissubordinate
- in - charge of the work. If any work shall be covered up or placed beyond the reach of the measurement without such notice having been given or consent obtained the same shall be uncovered at the Contractor's expenses or in default there of no payment of allowances shall he made for such work or the materials with which the same was executed.

Clause 17 : If the Contractor or his workers shall break, deface, injure or destroy any part of building in which they may be working, or any building, road kerb, fence, enclosure, water pipe, cables, drains, electric or telephone posts or wires, trees, grass or cultivated ground contiguous to the premises on which the Work or any part of it is being executed, or if any damage shall happen to the work while in progress from any cause whatever or if any defect, shrinkage or other faults of imperfections appear in the Work within 9 months after a certificate final or otherwise of its completion shall have been given by the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak as aforesaid, the Contractor shall, upon a receipt of a notice in writing in that behalf, make the same good at his own expense. In default, the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak may cause the same to be made good by other workmen and deduct the expense from any sums that may be then, or at anytime thereafter may become due to the Contractor, or from his security deposit or the proceeds of sale thereof or of a sufficient portionthereof.

Clause 18 : The Contractor shall supply at his own cost all materials plant, tools, cranes, appliances, implements, ladders, cordage, tackle, scaffolding and temporary works requisite for proper execution of the work, whether original, altered or substituted and whether included in the Specifications or other documents forming part of the Contract referred to in these conditions or not or which may be necessary for the purpose of satisfying or complying with requirements of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak as to any matter as to which under these conditions he is entitled to be satisfied or which he is entitled to require together with carriage there-for to and from the work. The Contractor shall also supply without charge the requisite number of persons with the means and materials necessary for the purpose of setting out work and counting, weighing and assisting in the measurement or examination at any time and from time to time of the Work or materials. Failing his so doing the same may be provided by the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak at the expense of the Contractor and the expenses may be deducted from any money due to the Contractor or from his security deposit or the proceeds of sales thereof or of sufficient contract portionthereof.

The Contractor shall also provide all necessary fencing and lights required to protect the public from accident. He shall be bound to bear the expenses of defense of every suit, action or other proceedings, at law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and costs which may be awarded in any such suit, action or proceedings to any such persons or which may with the consent of the Contractor be paid to compromising any claim by any suchperson.

Clause 18(a): The final bill of the contractor shall not be paid unless or until he furnishes to the satisfaction of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak a proof of the clarity of submission of all taxes. The contractorshallalso be liable to indemnity the Government against all claims made

proceedings and action taken by any person in respect of the price of the earth removed by the contractor from his land for the work against all losses, damages cost and expenses which the Government may suffer or incurred as a result of a suchclaims.

Clause 19 (a): No labour below the age of 16 years shall be employed on the work.

Clause 19 (b) : The contractor shall not pay his labourers less than the wages paid for similar work in neighbourhood.

Clause 20: No work shall be done on Sunday without the sanction in writing of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak.

Clause 20 (a): In every case in which by virtue of the provisions of section 12, sub- section (1) of the workman's Compensation Act., 1923, Federation is obliged to pay compensation to workman employed by the contractor, in execution of the works, Federation will recover from the contractor the amount of the compensation so paid and without the prejudice to the rights of Federation. Under section 12, sub- section (2) of the Act Federation shall be at liberty to recover such amount or any part thereof by deducting it from the security deposit or from any sum due by Federation to the contractor whether under this contract or otherwise.

Federation shall not be bound to contest any claim made against it under section 12, sub- section (1) of the said Act-except on the written request of the contractor and upon his giving to Federation full security for all costs for which Federation might become liable in consequence of contesting such claim.

Clause 21: The contract shall not be assigned or sublet without the written approval of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak. And if the Contractor shall assign or sublet his contract or attempt to do so or become insolvent or commence any in-solvency proceedings or make any composition with his creditors or attempt to do so or give any bribe, gratuity, gift, loan, requisite reward of advantage, pecuniary or otherwise shall either directly or indirectly be given, promised or offered by the Contractor or any of his servants or agents to any public officer or person in the employ of Federation in any way relating to his office or employment or if any such officer or person shall become in any way directly or indirectly interested in the Contract, the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak may thereupon by notice in writing rescind the Contract and the security deposit of the Contractor shall thereupon stand forfeited and be absolutely at the disposal of the Federation and the same consequences shall ensure as if the Contract had been rescinded under Clause 2 hereof and in addition the Contractor shall not be entitled to recover or be paid for any work there-for actually performed under theContract.

Clause 22: All sums payable by way of compensation under any of these conditions shall be considered as reasonable compensation to be applied to the use of Federation without reference to the actual loss or damage sustained, and whether or not any damages shall have beensustained.

Clause 22(a): Any excess payment made to the contractor inadvertently or otherwise under this contract or any account whatever and any other sum bound to be due to Federation contractor in respect of this contract or any other contract or work order or on any account whatever may be deducted from sum whatever payable

by Federation to the contractor either in respect of this contract or any work order or contract or any other account by any other department of the Government.

Clause 23: In the case of tender by partners any change in the constitution of the firm shall be forthwith notified by the Contractor to the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak for his information.

Clause 24: All works to be executed under the contract shall be executed under the direction and subject to the approval in all respects of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak who shall be entitled to direct at what point or points and in what manner they are to be commenced and from time to time carriedon.

Clause 25 : No claims for payment of an extra ordinary nature such as claims for a bonus for extra employed in completing the work before the expiry of the contractual period at the request of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak or claims for compensation where work has been temporarily brought to a standstill though no fault of the Contractor shall be allowed unless and to the extent that the same shall have been expressly sanctioned debit for payment and extradition any nature to be referred to Federation for decision of the M.D,HAFED.

ARBITRATION CLAUSE

Clause 25 (a) (i): If any dispute or difference of any kind whatsoever shall arise between the Federation/ his authorized agents and the contractor in connection with or arising out of the contract or the execution of the work that is **(i)** Whether before its commencement or during the progress of the work or after its completion, (iii) and whether before or after the termination abandonment or breach of the contract, it shall in the first instance be referred to for being settled by the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtakin charge of the work at the time and he shall within a period of sixty days after being requested in writing by the contractor to do so, convey his decision to the contractor, and subject to arbitration as hereinafter provided, such decision in respect of every matter so referred, shall be final and binding upon the contractor. In case the work is already, in progress, the contractor will, proceed with the execution of the work on receipt of the decision by the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak, in charge as aforesaid with all due diligence whether he or the Federation is authorized agent requires arbitration as hereinafter provided or not. If the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak, in charge of the work has conveyed his decision to the contractor and no claim to arbitration has been filed with him by the contractor within a period of sixty days from the receipt of letter communicating the decision, the said decision shall be final and binding upon the contractor and will not be subject matter of arbitration at all. If the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak in charge of the work fails to convey his decision within a period of sixty days from the date on which request has been made to the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak request to Divisional Headthat the matters in dispute be referred to arbitration as hereinafterprovided.

1. All disputes of differences in respect of which the decision is not final and conclusive shall at the request in writing of either party, made in a communication sent through Registered A.D. Post be referred to the sole arbitration of any serving GM HAFED, CFP, Rohtak/Executive Engineer, HAFED,Rohtak /Divisional Head to be nominated by designation by the M.D.HAFED at the relevant time, there will be

   no objection to any such appointment that the arbitrator so appointed is a Federation servant or that he had to deal with the matters to which the contract relates and that in the course of his duties as a Federation servant he had expressed his views on all or any of the matters in dispute. The arbitrator to whom the matter is originally referred being transferred or vacating his office, his successor-in-office as such shall be entitled to proceed with the reference from the stage at which it was left by his predecessor.

   In case the arbitrator nominated by the M.D.HAFED is unable or HAFED unwilling to act as such for any reason, whatsoever the M.D. shall be competent to appoint and nominate any other Superintending Engineer as the case may be, as arbitrator in his place and the Arbitrator so appointed shall be entitled to proceed with the reference.

2. It is also a term of this arbitration agreement that no person other than a person appointed by the M.D.HAFED shall act as arbitrator and if for any reason that is not possible, the matter shall not be referred to arbitration at all. In all cases where the aggregate amount awarded exceeds Rs. 25,000/- (Rupees Twenty five thousand only) the arbitrator must invariably give reasons for his award in respect of each claim and counter-claimseparately.

3. The arbitrator shall award separately giving his award against each claim and dispute raised by either party including any counterclaim individually and that any lump sum award shall not be legally enforceable.

4. The following matters shall not lie within the purview ofArbitration:-
   a) Any dispute relating to the levy of compensation as liquidated damages which has already been referred to the Divisional Head and its being heard or/ and has been finally decided by the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak, In charge of thework.
   b) Any dispute in respect of substituted, altered, additional work/Committed work/ defective work referred by the Contractor for the decision of the Divisional Head, In charge of the work, if it is being heard or has already been decided by the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED,Rohtak.
   c) Any dispute regarding the scope of the work or its execution or suspension or abandonment that has been referred by the contractor for the decision of the Federation and has been so decided finally by theHAFED.

5. The independent claims of the party other than the one getting the arbitrator appointed, as also counter-claims of any party will be entertained by the arbitrator not withstanding that the arbitrator had been appointed at the instance of the otherparty.
6. It is also a term of this arbitration agreement that where the party involving arbitration is the contractor, no reference for arbitration shall be maintainable unless the contractor, furnishes to the satisfaction of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak, In charge of the work, a security deposit of a sum determined according to details given below and the sum so deposited shall, on the termination of the arbitration proceedings, be adjusted against the cost, if any, awarded by the arbitrator against the claimant party and the balance remaining after such adjustment in the absence of any such cost being awarded, the whole of the sum will be refunded to him within one month from the date of the award:-

AMOUNTSOFCLAIMS	**RATE OF SECURITYDEPOSIT**
(i) For claims belowRs.10,000	2% of amountclaimed.
(ii) For claims of Rs.10,000and below Rs.1,00,000.	5% of amount claimed. Above and
(iii) For claims of Rs. 1,00,000andabove	10%of amountclaimed.

The stamp fee due on the award shall be payable by the Party as desired by the arbitrator and in the event of such party's default the stamp fee shall be recoverable from any other sum due to such Party under this or any othercontract.

7. The venue of arbitration shall be such place or places as may be fixed by the arbitrator in his sole discretion. The work under the contract shall continue during the arbitrationproceeding.

8. Neither party shall be entitled to bring a claim for arbitration if the appointment of such arbitrator has not been applied within 6 months:-

    a) Of the date of completion of the work as certified by GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak, Engineer-in-charge,or
    b) Of the date of abandonment of the work,or
    c) Of its non- commencement within 6 months from the date of abandonment, or written orders to commence the work as applicable ,or
    d) Of the completion of the work through any alternative agency or means 'after withdrawal of the work from the contractor in whole or in part and /or its rescission,or
    e) Of receiving an intimation from the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak, In charge of the work that final payment due to or recovery from the contractor had been determined which he may acknowledge and /or receive.

    Whichever of (a) to (e) above is the latest.
    If the matter is not referred to arbitration within the period prescribed above, all the rights and claim of any party under the contract shall be deemed to have been forfeited and absolutely barred by time even for civil litigation notwithstanding.

9. It is also a term of this arbitration agreement that no question relating to this contract shall be brought before any Civil Court without first involving and completing the arbitration proceedings as above. If the scope of the arbitration specifies herein covers issues that can be brought before the arbitrator i.e. any matter that can be referred to arbitration shall not be brought before a Civil Court. The pending of arbitration shall not restraint Federation to terminate the contract and make alternative arrangements for the completion of thework.

10. The arbitrator shall be deemed to have entered on the reference on the day he issues notices to the parties fixing the first date of hearing. The arbitrator may, from time to time, with the consent of parties enlarge the initial time for making and publishing theaward.

11. It is also a term of this arbitration agreement that subject to the stipulation herein mentioned, the arbitration proceeding shall be conducted in accordance with the provision of the arbitration Act. 1940 or any other law in force for the timebeing.

Clause 26: Work shall be carried out in accordance with the Technical Specifications mentioned in this DNIT & as per relevant IS Codes. In the event of there being no specifications, then in such case the work shall be carried out in all respects in accordance with the instructions and requirements of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak.

Clause 27: In the case of any clause of work for which there is no such specification as is mentioned in rule 1, such work shall be carried out in accordance with the district specifications, and in the event of there being no district specification, than in such case the work shall be carried out in all respects in accordance with the instructions and requirements of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak.

Clause 28 : The expression "works" or where used in these conditions shall unless there be something either in the subject or context repugnant to such worksbe construed and taken to mean the work by or by virtue of the Contract contracted to be executed whether temporary or permanent and whether original, altered, substituted or additional.

Clause 29: The terms and conditions of the agreement have been explained to me/ us and I/ we clearly understand them.

ADDITIONAL CLAUSES

Clause 30: The contractor states that he is not related to any of the officers employed by the HAFED.

Clause 31: No pit shall be dug by the contractor near the site of the work for taking out earth for use on the work. In case of default the pit so dug will be filled in by the Federation at the cost of the contractor.

Clause 32: Fair wage clauses are attached.

*Clause 33****: The contractor shall have to pay GST and other applicable taxes, in accordance with the rules in force from time to time.***

Clause 34: All payments for work done under this contract shall be made by cheque or RTGS (as applicable) to the contractor. The work covered by this contract as shown on plan which have been signed by the contractor are annexed herewith.

Clause 35: Should the tenderer withdraw or modify his tender within three months from the date of opening of tender, he is liable to be black listed and earnest money forfeited.

Clause 36: When a final bill is likely to be for a minus amount, the security deposit will be with-held till the bill is passed and the recoverable amount is first made good.

Clause 37 : All taxes should be included in the rates to be quoted and is payable by the contractor.

Clause 38: The rates given are for the work inclusive of GST and other applicable taxes etc.

Clause 39: It will be the responsibility of the contractor to ensure that the trees at the site of work and in the vicinity or their fruit etc. are not damaged by his labour or agent. The assessed cost of such damage if any will be at the discretion of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak and shall be deducted from the bill of the contractor.

Clause 40: The contractor shall provide at his own cost separate latrine, bathing enclosures and platform for use of the men and women labour and keep them clean to the satisfaction of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak. He should also arrange at his own expenses for clean drinking water, housing, medical facilities necessary for the welfare of the labour employed at his work. In case of his failure, the same shall be provided by Federation at contractor's cost. Any dispute regarding this will be settled by the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak whose decision will be binding.

Clause 41: Any material left on the site of work after one month from the date of completion of the work shall become the property of the Federation and no payment shall be made for it.

Clause 42: The amount of the work can be increased or decreased according to the requirement of the Federation and no claim whatsoever on this account will be entertained.

Clause 43: The Federation Reserves option to take away any items of the work or part thereof any time during the currency of the contract and re-allot it to another agency with due notice to the contractor without liability or compensation

Clause 44: It is not obligatory on the contractor to employ labour through employment exchange but he may avail of the facilities offered by the employment exchange in case he wishes to do so.

Clause 45: No claim on account of fluctuation in prices due to war or any other cause will be entertained.

Clause 46: The contractor shall be liable to make good all damages caused by breakage from the moment the stores, pipes and fittings etc. are handed over to hischarge.

Clause 47: No compensation whatsoever will be payable on account of any delay or default in the supply of material mentioned in the List of material to be issued to the contractor by the Federation and consequence delay in the execution of work.

Clause 48: GST/Taxes as applicable will be deducted from gross payment as per govt. instructions.

Clause 49: The contractor shall be liable to pay the ESI/CPF/EPF/ contribution, workers welfare cess etc. as applicable or as applied during the pendency of the contract under the provision of Provident Fund Act/ Labour Act to the persons engaged and shall have the registration with Regional Provident Fund Commissioner/ and Labour Officer etc.under Provident Fund Act/ Labour Act as applicable from time to time. The Federation shall not be responsible for any default committed under these Acts.

FAIR WAGES CLAUSES

a) The contractor shall pay not less than fair wage to labour engaged by him on thework.
Explanation : 'Fair Wage' means wage whether for time or piece-work notified at the time of inviting tenders of the work and where such wages have not been so notified the wages prescribed by the Public Works Department, Building and Roads Branch, Labour Deptt. Haryana for the district in which the work is done

b) The contractor shall, notwithstanding the provisions of any agreement to the contrary, caused to be paid fair wages to labourers, and indirectly engaged on the work including any labour engaged by his sub-contractors in connection with the said work, as if the labourers had been directly employed by him.

c) In respect of labour directly employed on the works for the performances of the contractor's part of this agreement the contract shall comply with or cause to be complied with the Haryana Public Works Department Contractor's Labour's Regulations made by Government from time to time in regard to payment or wages period deductions from wages recovery of wages not paid and deduction unauthorisedly made maintenance of wage work, wage slip, publication of wages and other terms of employment inspection and submission of periodical returns and all other matters of alikenature.

d) The GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak, concerned shall have the right to deduct. from the money due to the contractor, any sum required or estimated to be required for making good the loss suffered by a worker or workers by reason of non-fulfilment of the conditions of the contract for benefit of the workers, non-payment of wages or deduction made from his or their wages, which are not justified by the terms of the contract for non-observance of the regulations referred to in clause (c)above.

e) Vis-à-vis the Federation, the contractor, shall be primarily liable for all payments to be made under and for the observance of the regulations aforesaid without prejudice to his right to claim indemnity from hissub-contractors.

f) The regulations aforesaid shall be deemed to be part of thiscontract.

g) Attendance card should invariably be issued by the contractors to their workers, which should be returned to the contactors concerned at the time of receiving payment of theirwages.

h) Before making payment to the contractors the authorities concerned should obtain a certificate from the contractors that he has made payment to all the workers connected with the execution of thework for which the payment is beingmade.

i) Contractors employing 50 or more workers on the site of a particular work should provide facilities of housing, latrines, water and light to their workers at their ownexpense.

j) The normal working hours of workers employed by contractors for the execution of work allotted to them should be 8 hours per day with a break of 2 hours during summer, one hour during winter after continuous work of 4 hours at the latest. The spread over should in no case exceed 10 hours. Workers working beyond these hours should be paid overtime wages at the double the ordinary rate of their wages calculated by thehour.Contractor may work on his plan. However, prior information on the work schedule should be submitted to the Engineer-In-Charge/HAFED for coordination and supervision of works. In addiiton the working hours shall be as per Government norms and following the Fair Wages standards.

HARYANA STATE COOPERATIVE SUPPLY AND MARKETING FEDERATION LIMITED (CONTRACTOR'S LABOUR REGULATION)

A. Short title

These regulations may be called HAFED Contractor's Labour Regulations.

B. Definition

In these regulations, unless otherwise expressed, or indicated the following words and expression shall have the meaning hereby assigned to them respectively, that is to say.

(i) Labour means workers employed by HAFED contractor's directly or indirectly, a sub-contractor or other persons or by an agent on hisbehalf.

(ii) Fair wages means, whether for item or piece work, notified at the time of inviting tenders for the work and where such wages have not been so notified the wages prescribed by the Labour Deptt. Haryana for the district in which the work isdone.

(iii) Contractor shall include every person whether a sub-contractor or headman or agent employing labour on the work, taken oncontract.

(iv) "Wages" shall have the same meaning as defined in the payment of Wages Act and includes time and piece ratewages.

1. Display of notice regarded wagesetc.

The contractor shall before he commences his work on contract, display and correctly maintain and continue to display and correctly in a clean and legible condition in conspicuous places of the work, notice in English and in the Local Language spoken by the majority of the workers, giving the rate of wages which have been certified by the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak, or Regional Labour Commissioner as fair wages and the hours of work for which such wages are earned and a copy of such notices to the District Labour WelfareOfficer.

2. Payment ofWages

(i) Wages due to every worker be paid to himdirectly.

(ii) All wages shall be paid in current coin or currency or inboth.

3. Fixation of WagePeriods

(i) The contractor shall fix the wage periods in respect of which the wages shallpayable.

(ii) No wage period shall exceed onemonth.

(iii) Wages of every workman employed on the contract shall be paid before the expiry of ten days after the last of the wage period in respect of which the wages arepayable.

(iv) When the employment of any worker is terminated by or on behalf of the Contractor, the wages earned by him shall be paid before the expiry of succeeding the one on which his employment is terminated.

(v) All payment of wages shall be made on a working day except the work is completed before the expiry of the wages period in which case final payment shall be made within 48 hours of the last workingday.

Notes: -The terms working day means a day, on which the work on which the labour is employed is in progress.

4. Wages book and Wages Slipetc.

(i) The contractor shall maintain a wage book of each worker in such a form as may be convenient but the same shall include the followingparticulars:-

a) Rate of daily or monthlywages.
b) Nature of work for whichemployed.
c) Total number of days worked during each wageperiod.
d) Total amount payable for the work during each wageperiod.
e) All deduction made from the wages within an indication in each case of the ground for which the deduction is made from thewage.
f) Wages actually paid for each wageperiod.

(ii) The contractor shall also maintain a wage slip for each worker employed on the work. The wage slip shall contain all the particulars given in the wagebook.

(iii) The GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtakmay grant exemption from the maintenance of Wage Book and Wage Slips to a contractor who in his opinion may not directly or indirectly employ more than 50 persons on thework.

5. Fine and deductions which may be made fromwages

(i) The wages of workers shall be paid to him without any deduction of any kind except thefollowing:

a) Fines
b) Deductions for absence from duty viz, from the place or places Where by the terms of his employment is required towork.
c) The amount of deduction shall be in proportion to the period for which he wasabsent.
d) Deductions for damage to or loss of goods expressly entrusted to the employed person for custody, or for loss of money for which he is required to account, where such damage or loss is directly attributable to his neglect ordefault.
e) Any other deduction which the Government may from time to timeallow.

(ii) No fine shall be imposed on a worker and no deduction for damage or loss be made until the worker has been given an opportunity of showing cause against such fines ordeductions.

(iii) The total amount of fine which may be imposed in any one wage period on a worker shall not exceed an amount equal to Five paise in a rupee of the wage payable to him in respect of that wageperiod.

(iv) No fine imposed on any worker shall be recovered from him by instalments, or after the expiry of 90 days from the date in which it wasimposed.

6. Register of Fineetc.

(i) The contractor shall maintain a Register of fine and of all deduction for damage or loss Such Register shall maintain the reason for which fine was imposed or deduction for damage or lossmade.

(ii) The contractor shall maintain, both in English and local Indian Language, a list approved by the Chief Labour Commissioner clearly stating the acts and commissions for which penalty or fine may be imposed on workmen and display it in a good condition in a conspicuous place on thework

7. Preservation ofRegisters

The wage book, the wage slips and the Register of fines, deductions required to be maintained under these regulations shall be preserved for 12 months after the date of last entry made in them.

8. Power of Labour Welfare Officer to make Investigation /Enquiry

The Labour Welfare Officer or a person authorized by the Government on their behalf shall have power to make enquiries with a view to ascertaining and enforcing due and proper observance of the fair wage clause and provisions of these regulations. He shall be investigating into any complaint regarding the default made by the contractor or sub-contractor in regard to such provision.

9. Report of Labour WelfareOfficer

The Labour Welfare Officer or any other person authorized as aforesaid shall submit a report of the result of his investigation or enquiry to the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak, concerned, indicating the extent if any to which the default has been committed and the amount of fine recoverable in respect of the acts of omission and commission of the labourer with a note that necessary deduction from the contractor's bill be made and the wages and other dues be paid to the labourersconcerned.

10. Appeal against the decision of Labour WelfareOfficer

Any person aggrieved to the decision and recommendation of the Labour Welfare Officer or other person so authorized may appeal against such decision, to the Regional Labour Commissioner within 30 days from the date of decision forwarding simultaneously a copy of his appeal to GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak, concerned, but subject to such appeal, the decision of the Labour Welfare Officer shall be final and binding upon the contractor.

11. Representation ofParties

(i) A workman shall be entitled to be represented in any investigation or enquiry under these regulations by:
   a) An officer of a registered trade union to which he is amember.
   b) An officer of Federation of trade unions to which the trade union referred it in clause (a) is affiliated.
   c) Where the worker is not a member of any registered union, an officer of registered trade union connected with, or by any other workman employed in the industry in which the worker is employed.

(ii) An employer shall be entitled to be represented in anyinvestigationor enquiry under these regulationsby:
   a) An employer of an association of employers of which he is amember.
   b) An officer of an association of employers to which the association referred to in clause (a) is affiliated.
   c) Where the employer is not a member of any association of employers by an officer of an association of employers connected with or by any other employer isengaged.

12. Inspection ofBooks

The contractor shall allow inspection of Wage Book, the Wage Slips and Register of Fines and deduction to any of this worker or his agent at a convenient time and place after notice is received or to the Labour Welfare Officer or any other person authorised by the Government on his behalf.

13. Submission of Returns

The contractor will be regulated by (Regulation and Abolition Act 1970) and the contract labour (Regulations and Abolition Central Rule 1971) enforced by Haryana Labour and employment Department Memo No. 12 (26-78-4- Labour dated 10-6-79).

The contractor shall submit periodical returns specified from time to time.

14. Licensing ofContractor

Every contractor who employs or who employed on any day of the preceding 12 calendar months, 20 or more workmen, is covered by the act and is required to obtain a license. The contractor should obtain the necessary license as required under section 12 of contract labour (regulation and abolition Act 1970 before commencing thework).

15. Amendments

The Haryana Government may from time to time and or amend these regulations on any question as to application, interpretation or effect of these regulations the decision of the Labour Commissioner to Haryana Government in that behalf shall be final.

1. In case of duplicity/variation/contradiction of term & condition in the printed Tender Document and in special terms & conditions, terms and conditions mentioned in the Special terms & conditions will prevail.

2. The rate will be firm and biding on the contractor during the currency of contractor including extended time period. No escalation shall be paid for any increase in cost of material &labour.

16. The Bidder is advised to visit and examine the site conditions, approach road, traffic, location, surroundings, climate, availability of power, water and other utilities for installation & commissioning, access to site, handling and storage of materials, weather data, applicable laws and regulations, and obtain for itself on its own responsibility all information, as per their understanding, may be necessary for preparing the Bid and entering into the Contract Agreement. All the expenses of visiting the Site and its associated costs shall be borne by the Bidder. The bidder is advised to go through the documents with all details and understand the exact quantum of works. The scope of the works is in turnkey nature and no exclusions at the time of execution will be accepted.

SECTION-4 (II)

SPECIAL TERMS & CONDITIONS OF CONTRACT

In addition to the terms & conditions as stipulated in contract agreement, following special conditions shall also be applicable in this contract:

1. 5% security will be deducted from running bills and the 50 % of same will be refunded after 3 months from the satisfactory completion of work. Balance 50% after completion of defect liability period of two years or after submission of performance bank guarantee of equivalent amount valid upto Defect Liabilityperiod.

2. All applicable taxes (GST & others) are to be deducted from all the running bills as per standard norms of GoI.

3. Cess @ 1% of the total cost of this package of project from the payment of contractor under section-3 of the "Building & Other Construction Workers Welfare Cess Act-1996" & registration of establishment under section-7 of the "Building & Other Construction Workers" (regulation of employment and condition of service tax act 1996) shall be deducted from all running & finalbills.

4. Theratetobequotedbythecontractor shallbeinclusiveofapplicableGSTandother taxes.
5. **Valuations ofVariations:-**
   Since this is a turnkey contract, no extra items / claims will be accepted by HAFED under any circumstances.

6. **Extent ofvariations:-**
   Quoted rates for all items shall be firm and binding on the contractor irrespective of any variation No extra payment will be made beyond the total quoted amount.

7. **Measurements:-**
   Measurement of work executed:-
   The contractor shall, without extra charges, provide all assistance with every appliance, labour and other things necessary for measurement and recording levels.

   Except where any general or detailed description of the work expressly shows to the contrary, measurement shall be taken in accordance with the procedure set forth in the specification notwithstanding any provisions in the relevant Indian Standard Method of Measurement or any general or local custom. In the case of items which are not covered by specification, measurement shall be taken in accordance with relevant standard method of measurement issued by the bureau of Indian Standard and if for any item no such standard is available then a mutually agreed method shall befollowed.

   GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak or his authorized representative may cause either themselves or through another officer of the HAFED to check the measurements recorded jointly or otherwise as aforesaid and all provision stipulated herein above shall be applicable to such checking of measurement or levels.

It is also a term of his contract that recording of measurement of any item of work in the measurement book and/ or its payment of the interim on account or final bill shall not be considered as conclusive evidence as to the sufficiency of any work or material to which it relates nor shall it relieve the contractor from liabilities from any over measurement or defects noticed till completion of the Defects Liabilities Period.

8. **MonthlyPayments:-**
The said statement shall be approved or amended by the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak in such a way that in his opinion, it reflects the amount due to the contractor in accordance with the contract, after deduction, of any sums which may have become due and payable by the contractor to the Employer. In case where there is difference of opinion as to the value of any item the GM's HAFED, CFP, Rohtak/Executive Engineer's, HAFED, Rohtak view shall prevail. Within the 7th day of the month following the receipt of the monthly statement, the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak shall determine the outstanding amounts due to the contractor and shall issue to the contractor a certificate called "interim payment certificate" certifying the amount due to the contractor. However, the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak may recommend advance payment against on account bills when there is likely to be delay in authorizing payments for some special reasons which should berecorded.

9. The work shall be carried out as per the latest Respective Indian Standard Codes, Haryana PWD& Technical specifications mentioned in Tender Documents. In absence of specifications from Haryana PWD specifications, specifications from standard Engineering practice, IS codes and as per direction of the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak shall befollowed.

10. The time period for completion of work shall be **Six Months** from the date of handing over of site to the agency.

11. The work shall be inspected and frequency of tests required shall be as per relevant ISCode.

12. The defect liability period shall be 24 (Twenty Four)-calendar months after commissioning of the works. Any defect in material or workmanship observed in the work during execution of work or within Defect liability period shall be rectified by agency at his own cost. In the case the contractor fails to rectify the defects within 15 days, the department shall get the work executed at his risks and costs and recovered from theContractor.

13. Dispute arising out of this contract shall be limited to the jurisdictions of Panchkula court / Punjab & Haryana High Court, Chandigarh (as applicable)only.

14. All material to be arranged by contractor himself, shall be confirming to relevant ISI specification, duly ISI marked and as per list of approved manufactures/ makes by HAFED attached in the DNIT. Wherever referred ISI codes shall be with its latestamendments.

15. Contractor will have to supply manufacturer's certificate certifying that materials have been manufactured as per ISI specification, duly supported by necessarydocumentation.

16. Necessary certificate from the manufacturer for all the material brought at site shall be supplied to the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak, certifying that this lot of material have been manufactured as per Standard of BIS and confirms to relevant ISI Code.

17. HAFED reserves its right to get any material tested from M/s Shri Ram Institute for Industrial research or other equivalent reputed test house to ensure for quality of material/work. Testing charges shall be borne by the Contractor, but in Case of failure of any lot of material, all the work executed with that lot of the material shall berejected.

18. Sampling of work in progress shall be carried out by representative of GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak, Contractor and shall be got tested as per approved Quality Assurance Plan from M/s Shri Ram Institute for Industrial research Delhi / M/s Delhi Test House, New Delhi and NIT Kurukshetra or any other lab as suggested by HAFED. Fee of testing shall be borne by the Contractor. But in case, if any sample fails, rectification of defective work, to be done upto the entire satisfaction of GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak, as defined in the Technical Specifications in Tender Documents, Relevant IS Codes & Haryana P.W.D. specifications as applicable..

19. All types of works to be carried out by maintaining industrial safety acts., Tools for maintaining thesame at site to be arranged by the contractor at his own expenses. In case of any accidents occurred at site, Contractor is fully responsible for thesame.

20. The contractor shall submit the CAR (Contractor's All Risks) Policy for the awarded value of the work and valid of the work and valid for the entire duration of the work including the extended period of work, it any. The contractor shall provide to the Federation copy of the insurance policies and document taken out by him pursuance of the contract immediately after such insurance coverage. If the contractor fails to effect and keep in force insurance, as per the terms of contract, the Federation may effect and keep in fore any such insurance and pay such premium or premiums as may be necessary for that purpose and from time to time deduct the amount so paid by the Federation as aforesaid from any money due or which may become due to the contractor, or recover the same as debit due from thecontractor.

21. The contractor shall be responsible for preparing all claims and make good for all damage or loss by way of repairs and or replacement of portion of any works damaged or lost. The transfer of title shall not in any way relieve the contractor of his responsibilities during the period of the contract including the Defects LiabilityPeriod.
22. The contractor shall abide by the local laws and regulations governing labour applicable from time to time. During continuance of the contract, the contractor shall abide at all times by all existing labour enactments and rules made there under, regulations, notification and by laws (including rules), regulation, bye-laws that may be passed or notification that may be issued under any labour law in future either by the state or the Central Government or the localauthority.

23. The rate to be quoted shall include GST and other applicable taxes and noting extra shall be payable to the agency on thisaccount.

24. Nothing shall be paid for any loss and damages done to rain, floods or any other act of God and payment shall be made only for material acceptable to thedepartment.

25. Material purchased in excess shall not be measured and paid for and if not removed within one month after completion of the work, the material shall become the property of the HAFED and no claim on this account shall beentertained.

26. The contractor shall provide suitable measuring arrangement at site for checking of various material supplied byhim.

27. In case of duplicity/variation/contradiction of term & condition in the printed Tender Document and in special terms & conditions, terms and conditions mentioned in the Special terms & conditions will prevail.

28. The rate will be firm and biding on the contractor during the currency of contractor including extended time period. No escalation shall be paid for any increase in cost of material &labour.

29. Electricity &Water Electricity

The contractor will bear all electricity & diesel charges during installation, testing, commissioning & trial run of 3 months period, at its owncost.

Water

Contractor is required to make his own arrangement for the water required for the installation, testing & commissioning, trial run of 3 months period, as well as for drinking and other uses of his workers at its own cost. In either case water being provided should be fit for the respective usage and the contractor shall provide the test report of water being used. In case the water is provided by HAFED the same shall be charged at the prevailing rates of HAFED water policy/norms.

30. Taxes

It is being specifically intimated that the bidders should include GST and other applicable taxes.

31. Complete designs of P&M design proposal and Civil, Steel structure, MEP, fire fighting works i.e all applicable works to be executed should be duly vetted by IIT Delhi/ Roorkee /NIT/ or any other technical body by the Contractor with the confirmation from HAFED at Contractor's own cost within 30days of issuing the Letter ofAcceptance.

32. PerformanceSecurity:

A. Performance Security for SITC (Supply, Installation, Testing, Commissioning & Trial Run) of Work which shall valid upto Defect Liability Period plus 60days

The successful Bidder, i.e. the Bidder whose Bid is acceptable to the Employer, shall have to deposit Performance Security equal to 10% of the total contract value after deduction of the AMC value quoted by the bidder within 30 days of receipt of notification of award of the Contract. The performance security may be furnished in the form of Bank Guarantee from any Scheduled/ Nationalised bank in the formatgiveninBidDocuments.TheBankguaranteeforperformancesecurityshallremaininforceas given in the Bid Document shall be valid up to 60 days beyond the expiry of the Defects Liability Period of two years. The extension of the Bank Guarantee will be extended and submitted by the bidder accordingly if there is any delay on the decision of HAFED.

The proceeds of the performance security shall be payable to the HAFED as compensation for any loss resulting from the Contractor's failure to complete its obligations under the Contract.

B. Performance Security for AMC which shall valid upto AMC Period plus 60days

The successful Bidder, i.e. the Bidder whose Bid is acceptable to the Employer, shall have to deposit Performance Security equal to 50% of the AMC contract value quoted by the bidder before 30 days of completion of Defect Liability Period. The performance security may be furnished in the form of Bank Guarantee from any Scheduled/ Nationalised bank in the format given in Bid Documents. The Bank guarantee for performance security shall remain valid up to 60 days beyond the expiry of the AMC Period of three years. The extension of the Bank Guarantee will be extended and submitted by the bidder accordingly if there is any delay on the decision of HAFED.
The proceeds of the performance security shall be payable to the HAFED as compensation for any delay /loss resulting from the Contractor's failure to complete its obligations under the Contract.

1. Payment(Clause16)

I. Mobilization advance(Mandatory)

a) The contractor can avail 20% mobilization advance for Supply, Installation, Testing, Commissioning works and Civil, MEP fire-fighting works of the contract value @ 9% of simple interest for capital works to expedite the deployment of technical staff, establishment of office for own & employees staff, material, movement of equipment and machinery etc. at site. This advance shall be paid against bank guarantee from any nationalised bank of India to be given by the contractor. The Employer is rightly entitled to check that mobilisation advance is utilised for the work for which it is given. Mobilization advance shall be recovered @ 20% of gross value of work done from each running account bill, however, in any case full mobilisation advance shall be recovered before 80% of total work completed. The bank guarantee shall be released after 100% of the recovery of Mobilisationadvance.

b) Bonus @ 0.5% of contract value per fortnightly shall be paid to contractor for early completion. The bonus incentive for period less than fortnight shall not be paidfor.

NOTE:

(i) The interest rate applicable for advance will be 9% per annum (simple interest) on the outstanding advance amount. The advance shall be adjusted by recovery on pro rata basis along with interest from the 1st Supply/RA Bill onwards. The interest shall be calculated on the basis of advance adjusted from the date of cheque towards advance payment to the date of receipt of material at site, on actual number ofdays.

(ii) All bank guarantees should be issued by Nationalised Banks approved by RBI to be at parwith Nationalised Banks for the limited purpose of acceptance of guarantee or foreign banks having branches in India.

(iii) The successful bidder may raise running bills for supply as soon as supply is completed as per the schedule and bills for Installation & Commissioning job shall be raised asapplicable.

II. Terms of Payment

A. Terms of Payment for Supply Installation, Testing, Commissioning & Trial Run:

(a) 80% of contract price (against detailed item wise cost breakup be furnished by the Contractor in advance and accepted/ approved by SPV) on safe receipt of the goods at site and after inspection and approval of the SPV. 20% of mobilization advance will be recovered from each running bills on pro rata basis.

(b) 10% of contract price shall be paid on actual completion of installation/erection and after due inspection and approval by the SPV (against detailed break up cost to be furnished by the Contractor in advance and accepted by the SPV).

(c) The balance 10% shall be paid after successful commissioning and 3 months trial run of plant (on continuous satisfactory running of the complete plant for three month), and acceptance by the SPV's representative, within the scope of this contract.

B. Terms of Payment for Civil, MEP, Fire-fighting Works: As per RA Bills. 20% of mobilization advance (upon submission of Bank Guarantee of equivalent amount) will be recovered from each running bills on pro ratabasis.

C. Terms of Payment for AMC Period: The payment for AMC shall be made on quarterly basis and the above terms and conditions of payment and clause for mobilization advance is applicable only for Supply, Installation, Erection and Commissioning of equipments & machinery up-to defect liability period. No mobilization advance is to be given for AMC.

SECTION 4 (III) SCOPE OF WORK

SCOPE OF WORK

Design, detailed engineering, manufacturing, vetting from technical body, inspection at manufacturer's works, packing, forwarding, unloading, erection, testing, commissioning, achieving rated equipment and capacities including Civil, MEP, Firefighting works related to Silos, trail run, and handing over to HAFED's satisfaction of the following as given section wise in the list below and not limitedto:

A) Design and supplyof

- Raw material bulk storage silo system of 2500 MT Capacity (1 No Flat bottom Silo- 1500 MT, 1 No Silo- ***1000 MT) and associated structures at project site complete with silos, conveying system, cleaning system, equipment, steel supporting system and related electrical system including all Electrical Panels, Cables, Transformer, Diesel Generator (Power Backup)etc.
  *** Type of silo-flat bottom/hopper bottom is to be as per bidder's design, however stability certificate must be provided by the successful bidder
- Hoppers, Product pipelines, aspiration systems and ducting, flaps, sight glass if any etc., as is required for the Bulk storage Silo System defined above Piping distribution system for utilities such as compressed air including pipelines, valves, fumigation system and accessories required for the Bulk storage Silo System definedabove.
- HotdipgalvanisedsteelstructurefortheBulkstorageSiloSystemincludingtheboxtype(in Rectangular hollow Section) steel columns & beams, channels, angles, flats etc. for silos, platforms, ladders, catwalks/walkways, staircase and railings including Galvanized chequered plates for complete silo system.
- Weighbridge, Pit less type, 100 MT Capacity

B) Erection, testing and commissioningof:

- Bulk storage silo system equipment. The scope includes positioning, placement of equipment on foundation, bolting, grouting etc. Complete as perrequirement.
- Laying and testing of the pipelines before and after cleaning, storage and discharge piping/arrangement from the silos. Piping for compressed air etc. including making necessary tapping with valves and accessories with necessary supports for the various utilities and services isincluded.
- Weighbridge, Pit less type, 100 MT Capacity
- Erection of structure complete with platform, chequered plates, ladders,catwalks /walkways, railings, windows etc. asrequired.
- Erection and commissioning of complete Electrical including laying of LT cables from LT panel, MCC, PLC panel, Starters, Remote I/O panels, electric motors, geared motors, power and control cables, field instruments, field sensors, isolators, junction boxes, cable trays, PB Stations, Transformer, Diesel Generator (Power Backup) etc. including testing of thesame.
- Commissioning of the bulk storage silo system including SCADA software and related communicationsoftware.
- Installation of the Earthing network consisting of Earth pits, Earth conductors etc. complete for the entire Electrical installation and all the electricalequipment.

Bidders may add additional items section wise if these are required as per their detail engineering. These additional / optional / alternatives items offered by the bidder will be considered during technical evaluation of the bids and would be subjected to acceptance by the HAFED only through addendum of the tender document

The section wise list of equipment is as follows:

- The equipment and accessories shall be covered under the warranty/guarantee clausesspecified in biddingdocument.
- Suitable structure for roofing of all elevator towers to be provided along with roof sheeting.

C) Civil, MEP, Firefighting Works for SiloSystem

- All Civil, MEP works, Fire-fighting works including design, Drawings of P&M and vetting of design and GFC Drawings from Reputed Institute (IIT/NIT/Government Institute/Department) is in the successful Bidder'sScope.
- The Civil works shall coverall
    - RCC foundations required for Silos, Process Tower, Material Handling System and Office cum LT Panel room space of approx. 50 Sqmetc
    - Steel Structure for Loading/UnloadingArea,
    - External Development for Truck Movement andloading/Unloading
    - Boundary Wall and Gates are not included in the scope of works (Please see the attached drawings for detailedreference)
- All steel structure of silo system above plinth, supports of silos, elevators, Pipe Bridge in steel structure etc. are in the successful bidder'sscope.
- All GI structures of elevators and overhead conveyor bridge/walk way including columns, beams, purlins cross bracing etc. on RCC foundation above FFL, GI chequered plates for walk way/ maintenance platform/ staircase etc., toe guards on maintenance platform etc., are in the bidder's scope of works.
- All frames, foundation bolts for GI steel structure and equipment, including ladder and safety railing, supports for steel structure / equipment / piping/isolators, cables etc., maintenance platform with safety railing of equipment including grouting etc. to be provided by bidder. In addition, nosing angles around cut out of intake conveyor in dumping area shall be provided by thebidder.
- Suitable structure for roofing of all elevator towers to be provided along with roofsheeting.
- Bidder's scope also includes providing stability certificate of storage silos and its supporting structure, structural housing for elevators and overhead conveyors by reputed structural consultant, arranging inspection and obtaining approval for this steel structure of silo system from Local Factory Inspector or asapplicable.

D) Trial Run andTraining

- Trail Run of the facility (Plant and machinery in the scope of the tender), starts from the date of commissioning for three months period. The scope under the trial run covers successful running and operation of Silos Systems and other associated components in the scope; supply of required raw material (for material handling) for successful trial run, etc. All staff and materials required (for material handling) for trial run are to be deployed by the SuccessfulContractor.
- A minimum of one week training or more if required is to be arranged by the Successful Contractor for the running and operation staff proposed by HAFED during the trial run period. Prior Communication and Approval is to be done with HAFED regarding the training. The training should cover all details on running, monitoring, data recording and safety measures, etc. of all theequipment.

SrNo	Subject	Details	Remarks
1	Date of start of trial run	From the date of Commissioning	
2	Period of trial run	3 calendar months	
3	Brief Scope	Running and operation of all the equipment: Successful running and operation Silos and other associated components in the scope And A minimum of one-week training or more if required is to be arranged by theSuccessful Contractor for the running, and operation staff proposed byHAFED	Successful trial run shall be monitored for Silos Systems etc. Minimum of one week training or more as required is to be organised by the Contractor.

Trial run shall be for 15 days within 3 months periodwhere consistent capacity proof is achieved for every component. Consistent capacity means running the plant at a rated capacity. Raw material (for material handling section) will be arranged by the Client and all other requirements of consumables, electricity, water, diesel etc. and staff required for successful trial run are to be arranged by the Contractor.

E) Defect Liability period and Warranty, Annual Maintenance of the Plant and Machinery in the scope of thetender:

The defect liability period shall be 24 (Twenty Four)-calendar months after commissioning of the Equipment, Plant and Machinery and all the works in the scope of thetender.

Any defect in material or workmanship observed in the work during execution of work or within Defect liability period shall be rectified by agency at his own cost (the contractor's Cost). In the case the contractor fails to rectify the defects within 15 days, HAFED shall get the work executed at his risks and costs and recovered from the Contractor.

The warranty and guarantee certificates of all the components and machinery in the scope of the tender shall be submitted to HAFED at the time of Supply and Installation and the same shall hold true if it is more than the defect liability period. Otherwise, defect liability of two years holds true for all the equipment.

The Bidder shall quote for 3 years (36 calendar months) of Annual Maintenance Services post completion of Defect Liability Period. The same shall also include warranty / guarantee / spare parts / maintenance of the all the equipment& machinery. (If warranty of equipment/machinery is more than the defect liability period of 24 months).

The services during the annual maintenance period of three years shall be the same as mentioned in the defect liability period. However, the cost of spares or machinery/equipment shall be paid by HAFED (if warranty given by original equipment manufacturer has expired) after ascertaining the same. The successful contractor shall prepare a list of the equipment for requirements of spare parts or for the equipment for which replacement may be required and submit the same with its quoted rates to HAFED during the financial bid submission. The quoted rates for the spare parts shall be in limits and shall correspond to the rates quoted for the Supply and installation of equipment in the scope of the tender If any equipment is to be repaired/ replacedwhichisnotinthelistofsparepartssubmittedthentheContractorshallsubmitthreequotationsto HAFED of that equipment / spare parts etc and take prior approval from HAFED for any kind of rework or replacement during the three years of maintenance period. HAFED deserves the right to verify the same by competitive third party agency.

Table for Defect Liability Period & Warranty:

Sr No	Subject	Details	Remarks
1	Date of start of defect liability and warranty	From the date of Commissioning	
2	Period of defect liability and warranty	Minimum of 24 calendar months (2 years) and beyond for all the equipment whose Warranty is for more than 24 months as perOriginalEquipment Manufacturer.	
3	Brief Scope	Rectification and Replacement ofthe equipment if defects or error in functioning are found.	Reporting and Approval from HAFED

Table for Annual Maintenance Period:

Sr No	Subject	Details	Remarks
1	Date of start of Annual Maintenance	From the date of Completion of defect liability Period	
2	PeriodofAnnual Maintenance	Minimum of 36 calendar months (3 years) and beyond for all the equipment whose Warranty is for more than 24 months as perOriginalEquipment Manufacturer.	
3	Brief Scope	The successful contractor shall prepare a list of the equipment for requirements of spare parts or for the equipment for which replacement may be required and submit the same with its quoted rates to HAFED during the financial bid submission. The quoted rates for the spare parts shall be in limits and shall correspond to the rates quoted for the Supply and installation of equipment in the scope of the tender If any equipment is to be repaired/ replaced which is not in the list of spare parts submitted then the Contractor shall submit three quotations to HAFED of that equipment / spare parts etc and take prior approval from HAFED for any kind of rework or replacement during the threeyears of maintenance period. HAFED deservesthe right to verify the same by competitive third party agency	Reporting and Approval from HAFED

****** It may be noted that if warranty/guarantee is more than 60 months (24 months of Defect Liability and 36 months of Annual Maintenance) then the Contractor has to replace/rectify the same. If warranty exists beyond 36months it is the sole responsibility of the Contractor to maintain the same in case of any damage as stated by Original Manufactureragency**.

Note:

- **The completion date of commissioning of all equipment (i.e. the entire Silo Systems which includes Cleaning, Bagging & other associated components in the scope, etc.) will be marked as the final date of commissioning for further reference of Trial Run, Defect Liability Period and subsequently for Annual MaintenancePeriod.**
- **In case, any equipment is replaced or repaired during Defect Liability period or annual maintenance period (falling in the warranty period given by Original Equipment Manufacturer), all tests are to be performed by the contractor for the new equipment as per the Quality Assurance Plan. Schedule of spares inventory should be presented to HAFED at the time ofcommissioning.**

SECTION 5(I)

GENERAL CONDITIONS OF CONTRACT

1. Definitions

In this Contract, the following terms shall be interpreted as indicated.

a) The Contract" means the agreement entered into between the HAFED and the Contractor, as recorded in the Contract Form signed by the parties, including all attachments and appendices thereto and all documents incorporated by referencetherein;

b) "The Contract Price" means the price payable to the Contractor under the Contract for the full and proper performance of its contractualobligations;

c) "The Goods" means all of the equipment, machinery, and/or other materials, which the ContractorisrequiredtosupplytotheHAFEDundertheContract;

d) "Services" means services ancillary to the supply of the Goods, such as transportation and insurance, and any other incidental services, such as installation, commissioning, provision of technical assistance, training and other such obligations of the Contractor covered under the Contract;

e) "The Contractor" means the individual or firm supplying the Goods and services under this Contract.

f) "Office-in-charge"meanstheGMHAFED,CFP,Rohtak/ExecutiveEngineer,HAFED,Rohtak designated as such or other Officer appointed from time to time by the HAFED and notified in writing totheContractortoactasOfficer-in-chargeforthepurposesofcontract.

g) "Works" means all goods to be provided and work (Services) to be done by the Contractor under thecontract.

2. Application

These General Conditions shall apply to the extent that they are not superseded by provisions in other parts of the Contract.

3. Country ofOrigin

3.1 For purpose of this Clause "origin" means the place where the Goods were mined, grown or produced, or from which the Services are supplied. Goods are produced when, through manufacturing, processing or substantial and major assembling of components, a commercially recognized new product results that is substantially different in basic characteristics or in purpose or utility from itscomponents.

3.2 TheoriginofGoodsandServicesisdistinctfromthenationalityoftheContractor.

4. Standards

The Goods supplied under this Contract shall conform to the standards mentioned in the Technical Specifications, and, when no applicable standard is mentioned, to the authoritative standard appropriate to the Goods' country of origin and such standards shall be the latest issued by the concerned institution.

5. Use of Contract Documents andInformation

5. 1. The Contractor shall not, without the HAFED's prior written consent, disclose the Contract, or any provision thereof, or any specification, plan, drawing, pattern, sample or information furnished by or on behalf of the HAFED in connection therewith, to any person other than a person employed by the Contractor in the performance of the Contract. Disclosure to any such employed person shall be made in confidence and shall extend only as far as may be necessary for purposes of suchperformance.

5. 2. The Contractor shall not, without the HAFED's prior written consent, make use of any document or information enumerated in para. 5.1 Except for purposes of performing theContract.

5. 3. Any document, other than the Contract itself, enumerated in Para. 5.1 shall remain the property of the HAFED and shall be returned (in all copies) to the HAFED on completion of the Contractor's performance under the Contract if so required by theHAFED.

6. PatentRights

The Contractor shall indemnify the HAFED against all third-party claims of infringement of patent, trademark or industrial design rights arising from use of the Goods or any part thereof in India.

7. Inspection and Tests

8.1 The HAFED or its representative shall have the right to inspect and/or test the Goods to confirm their conformity to the Contract. The Special Conditions of Contract and/or the Technical Specifications shall specify what inspections and tests and QAP attached in the document the HAFED requires and where they are to be conducted. The HAFED shall notify the Contractor in writing of the identity of any representatives, if retained for these purposes. The contractor has to inform HAFED prior to despatch of any major equipment of the contract document. The contractor can only supply material if the inspection is foundsatisfactory.

8.2 The inspections and tests may be conducted on the premises of the Contractor or its subcontractor(s), at point of delivery and/or at the Good's final destination. Where conducted on the premises of the Contractor or it's sub- contractor(s), all reasonable facilities and assistance including access to drawings and production data-shall be furnished to the inspectors at no charge to the HAFED . In case of any defects or deficiency notified by the HAFED's inspection authority, the Contractor will rectify and make good the same without delay and not proceed with further processing of such item(s) of Goods without obtaining approval from the inspectionauthority.

8.3 Should any inspected or tested Goods fail to conform to the Specifications, the HAFED may reject them and the Contractor shall either replace the rejected Goods or make all alterations necessary to meet specification requirements free of cost to theHAFED.

8.4 The HAFED's right to inspect, test and, where necessary, reject the Goods after the Goods' arrival at the destination shall in no way be limited or waived by reason of the Goods having previously been inspected, tested and passed by the HAFED or its representative prior to the Goods shipment from the country oforigin.

8.5 Tests uponcompletion

8.5.1 The Contractor shall give to the HAFED 21 days notice of the date after which he will be ready to make the tests of completion (the Test). Unless otherwise agreed, the Tests shall take place within 14daysafterthesaiddateonsuchdayordays,astheHAFEDshallnotifytheContractor.

8.5.2 IftheHAFEDfailstoappointatimeafterhavingbeenaskedtodoso,ordoesnotattendat thetime and place appointed, the Contractor shall be entitled to proceed with the Tests in his absence. The tests shall then be deemed to have been made in the presence of the HAFED and the results of the Tests shall be accepted asaccurate.

8.5.3 If the Tests are being unreasonably delayed by the Contractor the HAFED may give notice requiring the Contractor to make the tests within 21 days after the receipt of such notice. The Contractor shall make the Tests on such days within that period as the Contractor may fix and of which he shall give notice to theHAFED.

8.5.4 If the Contractor fails to make the Tests within 21 days the HAFED may himself proceed with the Tests. All tests so made by the HAFED shall be at the risk and cost of the Contractor and the cost thereof shall be deducted from the Contractor's price. The test shall then be deemed to have been madeinthepresenceoftheContractorandresultsofthetestsshallbeacceptedasaccurate.

8.5.5 If the Goods/services or any section fails to pass the Tests, the Contractor may require such tests to be repeated on the same terms and conditions. All costs to which the HAFED may be put to by the repetition of the tests under this sub- clause or under sub clause 8.5.14 shall be deducted from the ContractPrice.

8.5.6 If the HAFED and the Contractor disagree on the interpretation of the test results each shall give a statement of his views to the other within 14 days after such disagreement arises. The statement shall be accompanied by all relevant evidence. The HAFED will review both the statements and render a final decision within a further period of fourteen (14) days, which shall be binding on the Contractor.

8.5.7 If the Goods/Services or any Section fails to pass the Tests on the repetition thereof under sub-clause 8.5.4 the HAFED after due consultation with the Contractor, shall be entitledto:

a) Order one further repetition of the Tests under the conditions of sub-clause 8.5.4or

b) Reject the Goods or a section thereof in which event the HAFED shall have the same remedies againsttheContractorasareprovidedundersub-clause8.5.12.

c) Issue a taking over certificate, if the HAFED so wishes, notwithstanding that the Goods are not complete. The Contractor's price shall then be reduced by such amount as may be agreed to bythe HAFED and the Contractor or failing an agreement, as may be determined through arbitration.

8.5.8 In considering the results of tests carried out under sub-clause 8.5.11 and 8.5.14 and the HAFED shall make allowances for the effect of any use of the Goods by him on the performance or other characteristics of theGoods.

8.5.9 As soon as the Goods/Services or any section thereof has passed the tests, the HAFED shall issue acertificatetotheContractortothateffect.

8.5.10 The Goods and Services shall be accepted by the HAFED when they have been completed in accordance with the contract, except in minor respects that do not affect the use of the Goods for their intended purposes and having passed the tests on completion and a taking over certificate has been issued or deemed to have been issued in accordance with sub-clause8.5.10

8.5.11 The Contractor may apply by notice to the HAFED for a taking over certificate not earlier than 14 days before the goods will in the Contractor's opinion be complete and ready for taking over under sub-clause8.5.9.

The HAFED shall within 28 days after the receipt of the Contractor's application either:

a) Issue the taking over certificate to the Contractor stating the date on which the works were complete and ready for taking over,or

b) Reject the application giving his reasons and specifying the work required to be done by the Contractortoenablethetakingovercertificatetobeissued.

If the HAFED fails either to issue the taking over certificate or to reject the Contractor's application within the period of 28 days he shall be deemed to have issued the taking over certificate on the last day of that period.

If the services are divided by the Contract into sections the Contractor shall be entitled to apply for separate taking over certificate for each such section.

8.5.12 The HAFED shall not use any part of the Goods unless taking over certificate has been issued in respectthereof.

If nevertheless the HAFED uses any part of the Goods that part which is used shall be deemed to have been taken over at the date of such use. The HAFED shall on request of the Contractor issue a taking over certificate accordingly. If the HAFED uses any part of the Goods before taking over, the Contractor shall be given the earliest opportunity of taking such steps as may be necessary to carry out the tests oncompletion.

8.5.13 If the Contractor fails to remedy a defect or damage pointed out by the HAFED within a reasonable time, the HAFED may fix a final time for remedying the defect ordamage.

If the Contractor fails to do so, the HAFED may:

a) Carry out the work himself or by others at the Contractor's risk and cost, provided that he does so in a reasonable manner. The costs properly incurred by the HAFED in remedying the defect or damage shall be deducted from the Contract Price, but the Contractor shall have no responsibility for such work,or

b) Require the Contractor to grant the HAFED a reasonable reduction in the Contract Price to be agreed or fixed by arbitrationor

c) If the defect or damage is such that the HAFED has been deprived of substantially the whole of the benefits of the Goods or a part thereof, he may terminate the Contract, in respect of such parts of the Goods as cannot be put to the intended use. The HAFED shall, to the exclusion of any remedy be entitled to recover all sums paid in respect of such parts of the Goods together with the cost of dismantling the same, clearing the site and returning plant to the Contractor or otherwise disposingofitinaccordancewiththeContractor'sinstructions.

8.5.14 If the defect or damage is such that repairs cannot be expeditiously carried out on the site, the Contractor may with the consent of the HAFED remove from the site for the purpose of repair any part of the works which is defective or damaged, after furnishing a suitable guarantee as may be prescribed by the HAFED.

8.5.15 If the replacement or renewals are such that they may affect the performance of the services, the HAFED may request that the tests on completion be repeated to the extent necessary. The request shall be made by notice within 28 days after the replacement or renewal. The tests shall be carried out in accordance with clauses 8.5.1 to8.5.3.

8.5.16 Until the final certificate of commissioning has been issued, the Contractor shall have the right of access to all parts of the Goods and to the records of the working and performance of the Goods andServices.

Such right of access shall be during the HAFED 's normal working hours at the Contractor's risk and cost. Access shall also be granted to any duly authorized representative of the Contractor whose name has been communicated in writing to the Contractor.

Subject to the HAFED's approval, the Contractor may also at his own risk and cost Make any tests, which he considers desirable.

8.6 Nothing in the clause 8 shall in any way relieve the Contractor from any warranty or other obligations under thisContract.

9. Packing andMarking

9. 1. The Contractor shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination as indicated in the Contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to temperature, salt and precipitation during transit and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the Goods' final destination and the absence of heavy handling facilities at all points in transit.

9. 2. The packing, marking and documents within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the Contract and, subject to Clause 18 and any subsequent instructions given by the HAFED.

9. 3. Each package shall be marked toindicate:

a) Name oftheContractor
b) Details ofitemsin
c) Name oftheConsignee
d) Purchase Ordernumber
e) Gross, net and tare the package weights of theitem
f)Destination

10 Delivery andDocuments

Delivery of the Goods shall be made by the Contractor in accordance with the terms specified by the HAFED in its Schedule of Requirements and the Special Conditions of Contract.

11. Insurance

11.1 The Goods supplied under the Contract shall be fully insured in Indian Rupees or a freely convertible currency against loss or damage incidental to manufacture or acquisition, transportation, storage at site, delivery and up to to handing over of the plant and equipment in the manner specified in the Special Conditions ofContract.

11.2 Where delivery of the Goods is required by the HAFED on a CIF basis, the Contractor shall arrange and pay for marine insurance naming the HAFED as thebeneficiary.

11.3 The Contractor shall provide a copy of the insurance policy along with invoice to the HAFED who will make arrangements to extend the validity of the policy, ifnecessary.

11.4 Should any loss or damage occur, the Contractor should-

a. Initiate and pursue claim tillsettlement, and

b. Promptly make arrangements for repair and/or replacement of any damaged item/s irrespective of settlement of claim by theunderwriters.

12. Transportation

12.1 Where the Contractor is required under the Contract to deliver the Goods FOR DESTINATION, as specified in the schedule of requirements. Transportation shall be arranged and paid for by the Contractor, and the cost thereof shall be included in the ContractPrice.

12.3 Where the Contractor is required to effect delivery under any other terms, for example, by post or to another address in the source country, the Contractor shall be required to meet all transport and storage expenses untildelivery.

12.4 In all the cases, transportation of the Goods up to the project site shall be the responsibility of the Bidder and the cost thereof shall be included/ indicated in the contractprice.

12.5 Where the Contractor is required under the Contract to deliver the Goods CIF, no further restrictionshall beplacedonthechoiceoftheoceancarrier.

13. IncidentalServices

13.1 As specified in the General Conditions of Contract, the Contractor may be required to provide any or all of thefollowing services:

a. Performance or supervision of on-site assembly and/or start-up of the suppliedGoods;

b. Furnishing of tools required for assembly and/or maintenance of the suppliedgoods;

c. Furnishing of a detailed operations and maintenance manual for each appropriate unit of the supplied Goods; and manuals covering the operation and maintenance of automation software and controlsystems.

d. Performance or supervision or maintenance and/or repair of the supplied Goods, for a period of timeagreedbytheparties,providedthatthisserviceshallnotrelievetheContractorofanywarranty obligations under this Contract;and

e. Conduct of training of the HAFED's personnel, at the Contractor's plant and/or on- site, in assembly, start-up operation, maintenance and/or repair of the suppliedGoods.

13.2 Prices charged by the Contractor for the preceding incidental services, if not included in the price for the Goods, shall be agreed upon in advance by the parties and shall not exceed the prevailing rates charged from other parties by the Contractor for similarservices.

14. Spare Parts requirement after defect liabilityperiod:

14.1 As specified in the Special Conditions of Contract, the Contractor may be required to provide the materials andnotificationspertainingtospare partsmanufacturedordistributedbytheContractor:

a. Such spare parts as the HAFED may elect to purchase from the Contractor, provided that this election shall not relieve the Contractor of any warranty obligations under the Contract;and

b. Intheevent ofterminationofproductionofthespareparts:

i. Advance notification to the HAFED of the pending termination, in sufficient time to permit the HAFED to procure its needed requirements;and

ii. FollowingsuchtermInation,furnishingatnocosttotheHAFED,theblueprints,drawingsand specificationsofthespareparts,ifandwhenrequested.

15. A. Defectsliability:

The defect liability period for the work is 24 months after successful commissioning of plants. During the defect liability period contractor shall be responsible for any damage, defects to equipments machinery/plants, services of machinery equipments as per their manual, replacement of any parts/machinery as required for proper functioning of plants.

15.1 Completion of Outstanding Work and RemedyingDefects

In order that the Contract Documents and the Works shall be in the condition required by the Contract (fair wear and tear expected) at, or as soon as practicable after, the expiry of the Contact Period, the Contractor shall

a) complete any work which is outstanding on the date stated in a Taking-Over Certificate, as soon as practicable after such date,and

b) execute all work of amendment, rework, and remedying defects or damage, as may be instructed by the Employer or the Employer's Representative during the ContractPeriod.

If any such defect appears or damage occurs, the Employer or the Employer's Representative shall promptly notify the Contractor in writing.

15.2 Cost of RemedyingDefects

All work referred to in Sub-Clause 15.1 (b) shall be executed by the Contractor at his own cost, if the necessity for such work is due to

(a) The design of theWorks,.

(b) Plant, Materials or workmanship not being in accordance with the Contract,or

(c) Failure by the Contractor to comply with any of his otherobligations.

15.3 Failure to RemedyDefects

If the Contractor fails to remedy any defect or damage within a reasonable time, the Employer or the Employer's Representative may fix a date on or by which to remedy the defect or damage, and give the Contractor reasonable notice of suchdate.

If the Contractor fails to remedy the defect or damage by such date and the necessity for such work is due to a cause stated in Sub-Clause 15.2(a), (b), or (c), the Employer may (at his sole discretion):

(i) Carry out the work himself or by others, in a reasonable manner and at the Contractors risk and cost, but the Contractor shall have no responsibility for such work: the costs properly incurred by the Employer in remedying the defect or damage shall be recoverable from the Contractor by the Employer;

(ii) Require the Employer's Representative to determine and certify a reasonable reduction in the Contract Price;or

(iii) If the defect or damage is such that the Employer has been deprived of substantially the whole of the benefit of the Works or parts of the Works, terminate the Contract in respect of such parts of the Works as cannot be put to the intended use: the Employer shall then be entitled to recover all sums paid for such parts of the Works together with the cost of dismantling the same, clearing the Site and returning Plant and Materials to the Contractor, and Sub-Clause 15.1 shall notapply.

15.4 Removal of DefectiveWork

If the defect or damage is such that it cannot be remedied expeditiously on the Site, the Contractor may, with the consent of the Employer's Representative or the Employer, remove from the Site for the purposes of repair any part of the Works which is defective or damaged.

15. Warranty/Guarantee

15.1 Contractor warrants that the Goods and equipment, supplied, installed and commissioned under the Contract are new, unused, of the most recent or current models and incorporate all recent improvements in design and materials unless provided otherwise in the Contract. The Contractor further warrants that the Goods supplied under this Contract shall have no defect arising from design, materials or workmanship (except insofar as the design or material is required by the HAFED's Specifications) or from any act or omission of the Contractor, that may develop under normal use of the supplied Goods in the conditions obtaining in the country of final destination. The Contractor also guarantees that the Goods supplied shall perform satisfactorily as per the signed/rated/-installed capacity as provided for in theContract.

15.2 Thiswarranty/guaranteeshallremainvalidfor24monthsand aspertheoriginal manufacturer(if it is more than 24 months) after the Goods have been commissioned/ installed at site, installed and the plant successfully tested, commissioned and accepted by the HAFED. The HAFED shall promptly notify the Contractor in writing of any claims arising under thiswarranty.

15.3 Upon receipt of such notice, the Contractor shall, repair or replace the defective Goods or parts thereof within fifteen days without costs to the HAFED other than, where applicable, the cost of inland delivery of the repaired or replaced Goods or parts from the port of entry to the final destination.

15.4 If the Contractor, having been notified, fails to remedy the defect(s) within a reasonable period, the HAFED may proceed to take such remedial action as may be necessary, at the Contractor's risk and expense and without prejudice to any other rights which the HAFED may have against the Contractor under theContract.

16. Payment

16.1 The method and conditions of payment to be made to the Contractor under the Contract shall be specified in the Special Conditions ofContract.

16.2 The Contractor's request(s) for payment shall be made to the HAFED in writing, accompanied by an invoice describing, as appropriate, the Goods delivered and Services performed, and by shipping documents, submitted pursuant to Clause 10, and fulfilment of other obligations stipulated in theContract.

16.3 Payments shall be made promptly by the HAFED within thirty (30) days of submission of an invoice/claim by theContractor.

16.4 AllpaymentsunderthiscontractshallbemadeinIndianRupeesonly.

17. Prices

1. Prices charged by the Contractor for Goods delivered and Services performed under the Contract shall not vary from the prices quoted by the Contractor in itsbid.

2. Price variation on account of change in rates of taxes and duties namely GST etc on the invoices items/services shall not be payable byHAFED.

18. ChangeOrders

18.1 The HAFED may, at any time, by a written order given to the Contractor pursuant to Clause 31, make changes within the general scope of the Contract in any one or more of thefollowing:

a. Drawings, designs or specifications, where Goods to be furnished under the Contract are to be specifically manufactured for theHAFED :
b. The method of shipment orpacking;
c. The place of delivery;or
d. TheServicestobeprovidedbytheContractor.

18.2 If any such change causes an increase or decrease in the cost of, or the time required for, the Contractor's performance of any part of the work under the Contract, whether changed or not changed by the order, an equitable adjustment shall be made in the Contract Price or delivery schedule, or both, and the Contract shall accordingly be amended. Any claims by the Contractor for adjustment under this clause must be asserted within thirty (30) days from the date of the Contractor's receipt of the HAFED 's changeorder.

19. ContractAmendment

19.1 Subject to Clause 18, no variation in or modification of the terms of the Contract shall be made except by written amendment signed by theparties.

20. Assignment

20.1 The Contractor shall not assign, in whole or in part, its obligations to perform under the Contract, except with the HAFED 'sprior written consent.

21. Subcontracts

21.1 The Contractor shall notify the HAFED in writing of all subcontracts awarded underthe Contract if not already specified in his bid. Such notification, in his original bid or later, shall not relieve the ContractorfromanyliabilityorobligationundertheContract.

21.2 Subcontractsmustcomplywiththeprovisionsofclause3

22. Delays in the Contractor'sPerformance

22.1 Delivery of the Goods and performance of Services shall be made by the Contractor in accordance with the time schedule specified by the HAFED in its Schedule ofRequirements.

22.2 Anun-excuseddelaybytheContractorintheperformanceofitsdeliveryobligationsshallrenderthe Contractorliabletoanyorallofthefollowingsanctions:
Forfeiture of its performance security, imposition of liquidated damages, and/or termination of the Contract for default.

22.3 If at any time during performance of the Contract, the Contractor or its subcontractor(s)should encounter conditions impeding timely delivery of the Goods and performance of Services, the Contractor shall promptly notify the HAFED in writing of the fact of the delay, its likely duration and its cause(s). As soon as practicable after receipt of the Contractor's notice, the HAFED shall evaluate the situation and may at its discretion extend the Contractor's time for performance, in which case the extension shall be ratified by the parties by amendment of the Contract.

23. LiquidatedDamages

23.1 Subject to Clause 25, if the Contractor fails to deliver any or all the goods or perform the services within the times period (s) specified in the Contract, the HAFED shall, without prejudice to its other remedies under the Contract, deduct from the contract prices, as liquidated damages, a sum equivalentto:

(1) 0.5% of the full contract value for every completed week (week comprising of 7 days including holidays and any incomplete week shall be ignored for the calculations of liquidated damages) of delay in thesupplies/commissioning.

(2) The total amount so deducted shall not exceed 10% of the Contract value. Once the maximum is reached, the HAFED may consider termination of thecontract.

23.1.2 The total amount so deducted shall not exceed 10% of the Contract value. Once the maximum is reached, the HAFED may consider termination of the Contract pursuant to Clause 24.

23.2 Any incremental taxes and levies on account of delay in performance of the Contract by the Contractor shall be to the Contractor'saccount.

24. Termination forDefault

24.1 Contractorsdefault:

24.1.1 If the Contractor shall assign the Contract, without the consent in writing of the HAFED first obtained, orifintheopinionoftheHAFED,theContractor:

a.Has abandoned the Contract, or

b.Without reasonable excuse has failed to commence the Works or has suspended the progress of the works for twenty eight days after receiving from the HAFED written notice to proceed, or

c. Despite previous warnings by the HAFED , in writing, is not executing the works in accordance with the Contract, or neglecting to carry out his obligations under the contract so as seriously to affect the carrying out of the Works.

Then the HAFED may, after giving fourteen days notice in writing to the Contractor, enter upon the Site and expel the Contractor there from without thereby voiding the contract, or releasing the Contractor from any of his obligations or liabilities under the contract, or affecting the rights and powers conferred by the Contract on the HAFED and may himself complete the works or may employ any other Contractor to complete the Works without prejudice to any other remedy of theHAFED . The HAFED or such other Contractor shall have free use for such completion of so much of the Contractor's Equipment as may be on the Site in connection with the works without being responsible to the Contractor for fair wear and tear thereof and to the inclusion of any right of the Contractor over the same.

24.1.2 The HAFED shall, as soon as may be practicable after any such entry and expulsion by the HAFED fix and determine by or after reference to the parties, or after such investigation or enquiries as he may think fit to make or institute, and shall certify what amount, if any, had at the time of such entry and expulsion been reasonably earned by or would reasonably accrue to the Contractor in respect of work then actually done by him under the Contract and the value of any unused or partially used materials on theSite.

24.1.3 If the HAFED shall enter and expel the Contractor under this Clause, he shall not be liable to pay to the Contractor any money on account of the Contract until the costs of execution and all other expenses incurred by the HAFED have been ascertained and the amount thereof certified. The Contractor shall then be entitled to receive only such sum or sums, if any, as the HAFED may certify would have been payable to him upon due completion by him after deducting the said amount. If such amount shall exceed the sum which would have been payable to the Contractor on due completion by him, then the Contractor shall, upon demand, pay to the HAFED the amount of such excess and it shall be deemed a debt due by the Contractor to the HAFED and shall be recoverableaccordingly.

24.1.4 If the HAFED pursuant to this Clause takes the Works or part thereof out of the Contractor's hands the Contractor's Liability under Clause for delay in completion shall immediately cease, without prejudice to any such liability that may at that time already be recoverable from the Contractor by the HAFED.

24.1.5 Consequent to such termination of Contract, the HAFED shall also be entitled to recover the advance paid, if any, to the Contractor along with interest @ 18% per annum compounded quarterly onthelastdayofMarch,June,SeptemberandDecemberontheadvancepaidfortheentireperiodfor which the advance was retained by theContractor.

24.2 Default of theHAFED

24.2.1 In the event of the HAFED:

a. Failing to pay to the Contractor the amount due within 60 days after the same shall have become due under the terms of the Contract subject to any deduction that the HAFED is entitled to make under the Contract,or
b. Becoming bankrupt or (being a company) going into liquidation other than for the purpose of a scheme of reconstruction or amalgamation,or
c. Being unable to continue to meet his contractual obligations for unforeseen reasons due to economicdislocation

The Contractor shall be entitled without prejudice to any other rights or remedies (and in respect of paragraph (a) above as an alternative to the provisions of Clause 16 for Payment to terminate his employment under the Contract by giving 30 days prior notice in writing to the HAFED .

24.2.2 Upon the giving of such notice the Contractor shall with all reasonable dispatch remove from the Site all Contractors' equipment brought byhim thereon.

24.2.3 In the event of such termination the HAFED shall be under the same obligations to the Contractor inregardtopaymentasiftheContracthadbeenterminatedundertheprovisionsofSub-Clause 25.4.2 hereof but in additions payment specified therein, the HAFED shall pay to the Contractor the amount of any reasonable loss or damage to the Contractor arising out of or in connection with or by consequence of suchtermination.

24.2.4 Nothing in this clause contained shall prejudice the right of the Contractor to exercise, either in lieu of or in addition to the rights and remedies in this Clause specified any other rights or remedies to which the Contractor may beentitled.

25. ForceMajeure

25.1 Notwithstanding the provisions of Clauses 22, 23, 24, the Contractor shall not be liable for forfeiture of its performance security, liquidated damages or termination for default, if and to the extent that, its delay in performance or other failure to perform its obligations under the Contract is the result of an event of ForceMajeure.

25.2 For purposes of this clause, "Force Majeure" means an event beyond the control of the Contractor and not involving the Contractor's fault or negligence and not foreseeable. Such events may include, but are not restricted to, acts of the HAFED either in its sovereign or contractual capacity, wars orrevolutions, fires,floods,epidemics,quarantinerestrictionsandfreightembargoes.

25.3 If a Force Majeure situation arises, the Contractor shall promptly notify the HAFED in writing of such condition and the cause thereof. Unless otherwise directed by the HAFED in writing, the Contractor shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeureevent.

25.4 TerminationinConsequenceofForceMajeure

25.4.1 If circumstances of Force Majeure have occurred and shall continue for a period of 182 days then, notwithstanding that the Contractor may by reason thereof have been granted an extension of Time forCompletionoftheWorks,eitherpartyshallbeentitledtoserveupontheother28days'noticeto terminate the Contract. If at the expiry of the period of 28 days Force Majeure shall still continue the Contract shallterminate.

25.4.2 If the Contract shall be terminated as aforesaid the Contractor shall be paid by the HAFED (in so far as such amounts or items hall not have already been overed by payments on account made to the Contractor) for all work executed prior to the date of termination at the rates and prices provided in the Contract and inaddition:

a) The amounts payable in respect of any preliminary items, so far as the work or service comprised therein has been carried out or performed, and a proper proportion as certified by the HAFED of any such items the work or service comprised in which has been partially carried outor performed.
b) The cost of materials or goods reasonably ordered for the Works or for use in connection with the Works which shall have been delivered to the Contractor or of which the Contractor is legally liable to accept delivery (such materials or goods becoming the property of the HAFED upon such payment being made byhim).
c) A sum, to be certified by the HAFED , being the amount of any expenditure, which in the circumstances was reasonably incurred by the Contractor in the expectation of completing the whole of the Works, in so far as such expenditure shall not have been covered by the payments in this Sub-Clause beforementioned.
d) The reasonable cost of removal under Sub-Clause 2 of this Clause and (if enquired by the Contractor) return thereof to the Contractor's works in his country or to any other destination at no greatercost.

e) The reasonable cost of repatriation of all the Contractor's staff and workmen employed on or in connectionwiththeWorksatthetimeofsuchtermination.
Provided always that, against any payments due from the HAFED under this Sub-Clause, the HAFED shall be entitled to be credited with any outstanding balances due from the Contractor for advances in respect of Plant and materials, and any sum previously paid by the HAFED to the Contractor in respect of the execution of theWorks.

26. Termination forInsolvency

26.1 The HAFED may at any time terminate the Contract by giving written notice to the Contractor, without compensation to the Contractor,if:

a) TheContractorbecomesbankruptorotherwiseinsolvent,

b) The Contractor being a Company is wound up voluntarily by the order of a Court receiver, liquidator or Manager appointed on behalf of the debenture holders or circumstances shall have arisen which entitle the court or debenture holders to appoint a receiver, liquidator or a Manager, provided that such termination will not prejudice or affect any right of action or remedy which has accrued or will accrue thereafter to the HAFED.

27. Termination forConvenience

27.1 The HAFED, may by written sent to the `Contractor, terminate the Contract, in whole or in part, at any time for its convenience. The notice of termination shall specify that termination is for the HAFED's convenience, the extent to which performance of work under the Contract is terminated, and the date upon which such termination becomeseffective.

27.2 TheGoodsthatarecompleteandreadyforshipmentwithin30daysaftertheContractor'sreceiptof notice of termination shall be purchased by the HAFED at the Contract terms and prices. For the remaining Goods, the HAFED mayelect:

a. To have any portion completed and delivered at the Contract terms and prices; and/or
b. To cancel the remainder and pay to the Contractor an agreed amount for partially completedGoodsand for materials and parts previously procured by the Contractor.

28. Resolution ofDisputes

28.1 The HAFED and the Contractor shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the Contract.

28.2 If, after thirty (30) days from the commencement of such informal negotiations, the HAFED and the Contractor have been unable to resolve amicably a Contract dispute, either party may require that the dispute be referred for resolution to the formal mechanisms specified in the Special Conditions of Contract. These mechanisms may include, but are not restricted to, conciliation mediated by a third party, adjudication in an agreed national or international forum, and/or international arbitration.ThemechanismshallbespecifiedintheSpecialConditionsofContract.

29. GoverningLanguage

29.1 The Contract shall be written in the language of the bid, as specified by the HAFED in the Instructions to Bidders. Subject to Clause 30, that language version of the Contract shall govern its interpretation. All correspondence and other documents pertaining to the Contract, which are exchanged by the parties, shall be written in that samelanguage.

30. ApplicableLaw

30.1 TheContractshallbeinterpretedinaccordancewiththelawsoftheUnionofIndia.

31. Notices

31.1 Any notice given by one party to the other pursuant to the Contract shall be sent in writing or by telegram or telex/fax and confirmed in writing to the address specified for that purpose in the Special Conditions ofContract.

31.2 A notice shall be effective when delivered or on the notice's effective date, whichever islater.

32. Taxes andDuties

32.1 A Contractor shall be entirely responsible for payment of all taxes, duties, license fees, entry tax etc. until taking over of the works by the 'HAFED'.

33. Right to use defectiveGoods

If after delivery, acceptance and installation and within the guarantee and warranty period, the operation or use of the Goods proves to be unsatisfactory, the HAFED shall have the right to continue to operate or use such Goods until rectifications of defects, errors or omissions by repair or by partial or complete replacement is made without interfering with the HAFED s'operation.

33. Standard terms & conditions of GST

1.0 The price bid by the contractor shall be inclusive of all taxes including GST upto the closing date for submission of bid in the employer's country on the contractor's equipment, plant, material & supplies (payment, temporary and consumable) acquired for the purpose of the contract and on the services performed under the contract.

2.0 The contractor shall raise taxable invoice provision of GST to HAFED.

3.0 The transaction on which GST will be claimed from HAFED shall be included in the return to be furnished under GST law & the amount claimed from HAFED shall be amounted for in the GST returns and will we deposited with GST authorities within the time prescribed by law in this regard.

4.0 The contractor shall indemnify HAFED for all losses caused to HAFED on account of excess charges of GST, In case it is found at a later stage that that wrong or incorrect payment has been recovered by it from HAFED on account of GST, the same will be refunded forthwith.

5.0 Subsequent Legislation – If, after the date of submission of tenders for the contract there occur changes to any national of state statute, Ordinance, Decree law which causes additional or reduced cost to the contractor, in the execution of the contract, such additional or reduced cost shall, be determined by GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak and shall be added to or deducted from the contract price and the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak shall notify the contractor accordingly.

6.0 Income tax, labour cess and other deductions as applicable/as may be notified by union Government/State Government from time to time will be deducted from gross payment as per Govt. Instructions.

7.0 Nothing in the contract shall relive the contractor from his responsibility to pay taxes/duties/cess etc. that may be levied in the employers country on profits made by him in respect of the contract.

8.0 HAFED will not facilitate towards issuance of any certificate for availing exemption of any taxes through local administration/Deputy Commissioner or otherwise.

9.0 Tax will be deducted at source by HAFED from the payment or credit to be made to the contractor as per provisions of GST law when the provisions of section 51 of CGST Act will be made applicable of HAFED.

10.0 An undertaking in this regard be given by agency at **Annexure-I**.

Annexure-I

Undertaking

1. Certified that the transaction on which GST will be claimed shall be included in the return to be furnished under GST Act and the amount claimed from HAFED shall be accounted for in the returns and will be deposited with GST authorities asrequired.

2. Certified that GST will not be charged on the exempt supplies made toHAFED.

3. Certified that we shall indemnify the HAFED in case is found at a later stage that wrong or incorrect payment has been received on account of GST, the same will berefunded.

(Signature)

CompleteName.....

Address.....

.....

GSTIN.....

SECTION 5(II)

GENERAL CONDITIONS OF CONTRACT FOR SUPPLY

a. Scope:

The following General Conditions of Contract shall supplement the General Conditions of Contract. Whenever there is a conflict, the provisions herein shall prevail over those in the General Conditions of Contract. The corresponding clause number of the General Conditions is indicated in parentheses.

b. Definitions

1. The HAFED is Haryana State Cooperative Supply and Marketing Federation Limited and would include the term"Owner".

2. The Contractor is (Name ofContractor).

c. Country ofOrigin

The place where the goods were mined, grown or produced from which the services are supplied

d. Equivalency of Standards and Codes

Wherever reference is made in the contract to the respective standards and codes in accordance with which goods and materials are to be furnished, and work is to be performed or tested, the provisions of the latest current edition or revision of the relevant standards and codes in effect shall apply, unless otherwise expressly set forth in the Contract. Where such standards and codes are national in character, or relate to a particular country or region, other authoritative standards which ensure an equal or higher quality than the standards and codes specified will be accepted subject to the HAFED 's prior review and written approval. Differences between the standards specified and the proposed alternative standards must be fully described in writing by the Contractor and submitted to the HAFED at least 30 days prior to the date when the Contractor desires the HAFED 's approval. In the event the HAFED determines that such proposed deviations do not ensure equal or higher quality, the Contractor shall comply with the standards set forth in the documents.

e. NA

f. Inspection andTests

6.1 HAFED may depute any third Party inspection of all Mechanical equipment, electrical motors, pipes before dispatch to site. The inspection expenses (Travelling & arrangement- Travel expenses for 2 persons) to be borne by the contractor. The HAFED (Employer) shall inform to the contractor, the name(s) of third party at appropriatetime.

6.2 TheinspectionoftheGoodsshallbecarriedouttocheckwhetherthe Goodsareinconformitywiththe technical specifications attached to the purchase order form and shall be in line with the inspection/test procedures laid down in the Schedule of Specifications and the Contract conditions.

6.3 Manufacturer must have suitable facilities at their works for carrying out various performance tests on the equipment. The bidder should clearly confirm that all the facilities exist for inspection and shall be made available to the inspectingAuthority.

6.4 A load and functional tests as indicated in the specifications must be carried out at the manufacturer's works. Reliability of the equipment shall be demonstrated to the satisfaction of the appointed inspector or inspectingAgency.

6.5 Approved Contractor's drawings shall not be departed from except as provided in the Bidding Document.

6.6 The HAFED shall have the right at all reasonable times to inspect, at the Contractor's premises all Contractor's drawings of any part thework.

6.7 The Contractor shall provide, within the time stated in the contract or in the programme, drawings showing how the plant is to be designed and any other information required for-

a. Preparing suitable foundations or other means of support.

b.Providing suitable access on the site for the plant and any necessary equipment to the place where the plant is to be erected and

c. Making necessary electrical connections from the panel board provided in the individual sections to the machines.

6.8 Before the goods and equipment are taken over by the HAFED, the Contractor shall supply operation and maintenance manuals together with drawings of the goods and equipment as built. These shall be in such details as will enable the HAFED to operate, maintain, adjust and repair all parts of the works as stated in thespecifications.

The manuals and drawings shall be in the ruling language (English) and in such form and numbers as stated in the contract.

Unless and otherwise agreed, the goods and equipment shall not be considered to be completed for the purposes of taking over until such manuals and drawings have been supplied to the HAFED.

6.9 The goods will be accepted after inspection by the HAFED, his representative or any inspection agency appointed byHAFED.

g. Delivery and Documents (Clause10)

Upon shipment/dispatch, the Contractor shall notify to the HAFED by cable or email or fax the full details of dispatch including HAFED order no., description of the goods, quantity, mode of transport,

place of loading, date of dispatch etc. The Contractor will mail the following documents to the HAFED with a copy to the Insurance Company**:**

Original and three copies of**:**

(i) The Contractor's invoice showing purchase order no. Goods description, quantity, unit price, totalamount;
(ii) Delivery note/case-wise detailed packing list identifying contents of each package/ lorry receipt;
(iii) Manufacturer's/Contractor's guaranteecertificate;
(iv) Inspection Certificate issued by the nominated inspection agency, and the Contractor's factory inspectionreport;
(v) Certificate oforigin;
(vi) Insurancepolicy;
(vii) Any other document evidencing payment of statutorylevies.
(viii) The Contractor's certificate certifying that the defects pointed out during inspection have been rectified.
(ix)

Note: The nomenclature used for the item description in the invoice/s, packing list/s and delivery note/s etc. Should be identical to that used in the purchase order. The despatch particulars including name of transporter, LR no. And date should also be mentioned in the invoice/s.

h. Insurance

1. The **"marine / transit"** insurance to be taken by the contractor / Contractor shall be in an amount equal to 110% of the FOR Destination value of the goods from "warehouse to warehouse" on "All Risks" basis including Strike, Natural calamities but exclusive of War Risks valid for a period not less than 3 months after the date of arrival of Goods at finaldestination.

2. **"Storage-cum-erection ALL Risks**" insurance for an amount equal to 110% of the contract value valid for a period not less than 3 months after installation, including one month for testing and commissioning, shall be taken by the contractor /Contractor.

OR

As an alternative to (a) & (b) above, "Marine-cum-erection ALL Risks" insurance policy, covering storage of equipment and other erection materials at site, for an amount equal to 110% of the contract value of supply, installation & commissioning and valid for a period not less than 3 months after installation, including one month for testing and commissioning, shall be taken by the contractor / Contractor.

3. **Third Party Insurance :** Before commencing the erection work the contractor / Contractor without limiting his obligations and responsibilities, shall insure against his liability for any material or physical damage, loss or injury which may occur to any property including that of the Owner / HAFED, or to any person including any employee of the Owner / HAFED. Such insurancesshallbeforanamountnotlessthanRs.10.00lakhsperoccurrencewiththenumber of occurrence unlimited.

i. Incidentalservices

9.1 The incidental services for supply, installation and commissioning contract, as follows shall be provided by theContractor:

(a) Furnishing of tools required for assembly and maintenance of the suppliedgoods for 2 years;
(b) Furnishing of a detailed operations and maintenance manual for each appropriate unit of the suppliedGoods;
(c) On-site assembly and start-up of the suppliedGoods;
(d) Conduct of training of the HAFED 's personnel (approx. for 4 man-weeks); at the Contractor's plant and/or on-site, in assembly, start-up operation, maintenance and/or repair of the supplied Goods.
(e) Furnishing of layout drawing etc. as specified in clause 3 of Special Conditions of Contract Part II.

j. SpareParts

Contractor shall carry sufficient inventories to assure ex-stock supply of consumable spares such as gaskets, plugs, washers, belts, etc. Other spare parts and components shall be supplied as promptly as possible but in any case within 15 days of placement of order after defect liability period and free of cost during the defect liability period.

k. Warranty/Guarantee (Clause15)

The warranty and guarantee certificates of all the components and machinery in the scope of the tender shall be submitted to HAFED at the time of Supply and Installation and the same shall hold true even if it is more than the defect liability period. Otherwise, defect liability holds true for all theequipments.

ECTION 5(III)
GENERAL CONDITIONS OF CONTRACT FOR INSTALLATION

1.0 SUFFICIENCY OFTENDER

The Contractor by bidding shall be deemed to have satisfied himself as to all the conditions and circumstances affecting the Contract Price, as to the possibility of executing the works as shown and described in the Contract, as to the general circumstances at the site of the works, as to the general labour position at site and to have determined the prices accordingly.

2.0 PROGRAMME OF INSTALLATION ANDCOMMISSIONING

As soon as practicable after the acceptance of the bid, the Contractor shall submit to the HAFED for his approval a comprehensive programme in the form of PERT network/ bar chart and any other form as may be required by the HAFED showing the sequence of order in which the Contractor proposes to carry-out the works including the design, manufacture, delivery to site, erection and commissioning thereof. After submission to and approval by the HAFED of such programme, the Contractor shall adhere to the sequence of order and method stated therein. The submission to and approval by the HAFED of such programme shall not relieve the Contractor of any of his duties or responsibilities under the Contract. The programme approved by the HAFED shall form the basis of evaluating the pace of all works to be performed by the Contractor.TheContractorshallupdatethePERTNetworkeverymonth,submitittotheHAFED and shall inform the HAFED the progress on all the activities falling on schedule for the next reportingdate.

3.0 PREPARATION OF DRAWINGS FORAPPROVAL

The Contractor shall prepare and submit all Drawings to the HAFED forapproval:

a. Withinthetimegiveninthespecificationorintheprogramme,suchdrawings,samples,patterns andmodelsasmaybecalledfortherein,andinnumbersthereinrequired.

b. During the progress of works and within such reasonable times as the HAFED may require suchdrawings ofthegeneral arrangement anddetailsoftheworksastheHAFEDmayrequire.

Wherever necessary, the Contractor would be provided with a set of architectural drawings for the buildings where the erection works would be carried out and also the equipment details/ drawings for various equipment to be handed over to the Contractor by the HAFED . The specifications/ conditions concerning the submission of drawings by the Contractor are detailed asunder:

3.1 Within four weeks from the date of receipt of the Notification of Award, Contractor shall furnish a list of all necessary drawings as briefly described below which the Contractor shall submit for approval, identifying each drawings by a serial number and descriptive title and expected date of submission. This list shall be revised and extended if necessary, during the progress of work depending on the nature of the contractalso.

The HAFED/IL&FS shall signify his approval or disapproval of all drawings or such drawings that would affect progress of the contract as per the agreed programme.

If,byreasonofanyfailureorinabilityof theHAFEDtoissuewithinfourweeksoftimeinallthe circumstancesanydrawingororderrequestedbytheContractorinaccordancewithsubclause i.of this clause, the Contractor suffers delay and/or incurs costs then the HAFED shall take

such delay into account in determining any extension of time to which the Contractor is entitled underClause15hereofandtheContractorshallbepaidtheamountofsuchcostasshall bereasonableBrief list ofdrawings:

ii. Equipmentdrawingsforfabricateditems.
iii. Equipmentlayoutforproduction,packingandserviceblocks.
iv. FlowdiagramsforCIPandvariousservices.
v. Servicepipinglayoutsinproduction,packingandserviceblocks.
vi. SSpipinglayoutinproductionandpackingblocks.
vii. Electricalcable,conduit/cabletray/cabletrenchlayout.
viii. Othermiscellaneousdrawingsasrequiredforerectionwork.
ix. Electrical single line diagram, PCC and MCC general arrangement drawing and wiring diagrams.
x. Automation system scheme, controls and networkdiagrams.

3.2 Drawings showing fabrication details, dimensions, layouts and bill of materials submitted for approval shall be signed by responsible representative of Contractor and shall be to any one of the following sizes in accordance with Indian Standards: A0, A1, A2, A3 andA4.

3.3 All drawings shall show the following particulars in the lower right hand corner in addition to Contractor'sname:

i. Name of theHAFED. ii. ProjectTitle.
iii. Titleofdrawing. iv.Scale.
v. Dateofdrawing. vi. Drawingnumber.
vii. Space for HAFED reference or drawing number.

3.4 In addition to the information provided on drawings, each drawing shall carry a revision number, date of revision and brief description of revision carried out. Whenever any revision is carried out, correspondingly revision number must beup-dated.

3.5 Alldimensionsondrawingsshallbeinmetricunits.

3.6 Drawings (three sets) submitted by the Contractor for approval will be checked, reviewed by the HAFED , and comments, if any, on the same will be conveyed to the Contractor. It is the responsibility of the Contractor to incorporate correctly all the comments conveyed by the HAFED on the Contractor's drawings. The drawings, which are approved with comments, are to be re-submitted to the HAFED for purpose of records. Such drawings will not be checked/reviewed by the HAFED to verify whether all the comments have been incorporated by theContractor.

If the Contractor is unable to incorporate any comments in the revised drawings, Contractor shall clearly state in his forwarding letter such non-compliance along with the valid reasons.

3.7 DrawingspreparedbytheContractorandapprovedbytheHAFEDshallbeconsideredasapartof the specifications. However, the examination of the drawings by the HAFED shall not relieve the Contractor of his responsibility for engineering design, workmanship, quality of materials, warranty obligationsand satisfactoryperformanceoninstallationcoveredunderthecontract.

3.8 If at any time before completion of the work, changes are made necessitating revision of approved drawings, the Contractor shall make such revisions and proceed in the same routine as for the originalapproval.

3.9 Date ofsubmission

In the event, the drawings submitted for approval require many revisions amounting to re-drawing ofthe same thenthedateofsubmissionoftherevisedrawingswouldbeconsideredasthedateof submission forapproval.

3.10 The Contractor shall furnish to the HAFED before the works are taken over, Operating and Maintenance instructions together with Drawings of the works as completed, in sufficient detail to enable the HAFED to maintain, dismantle, reassemble and adjust all parts of the works. Unless otherwise agreed, the works shall not be considered to be completed for the purposes of taking over until such instructions and drawings have been supplied to the HAFED.

4.0 CONTRACTOR'S SUPERINTENDENCE (AND) DEPLOYMENT OF ERECTION TEAM AND CONDUCT OFPERSONNEL

The Contractor shall employ one or more competent representatives, whose name or names shall have previously been communicated in writing to the HAFED by the Contractor, to superintend the carrying out of the works on the site. The said representative or if more than one shall be employed, then one of such representatives shall be present on the site during all times, and any orders or instructions which the HAFED may give to the said representative of the Contractor shall be deemed to have given to the Contractor. The said representative shall have full technical capabilities and complete administrative and financial powers to expeditiously and efficiently execute the work under thecontract.

4.1 The Contractor shall, execute the works with due care and diligence within the time for completion and employ Contractor's team comprising qualified and experienced engineers together with adequate skilled. Semi-skilled and unskilled workmen in the site for carrying out the works. The Contractor shall ensure adequate workforce to keep the required pace at all times as per the schedule of completion. Contractor shall also ensure availability of competent engineers during commissioning/start up, trial runs, Operation of the plant/equipment till handing over of theplant.

4.2 The Contractor shall furnish the details of qualifications and experience of their senior supervisors and engineers assigned to the work site, including their experience in supervising erection and commissioning of plant and equipment of comparablecapacity.

4.3 When the Contractor or Contractor's representative is not present on any part of the work where it may be desired to give directions in the event of emergencies, orders may be given by the HAFED and shall be received and observed by the supervisors or foremen who may have charge of the particular part of the work in reference to which orders are given. Any such instructions, directions ornoticesgiven bytheHAFEDshallbedeemedtohavebeengiventotheContractor.

4.4 The Contractor shall furnish to the HAFED a fortnightly labour force report showing by classifications the number of employees engaged in the work. The Contractor's employment records shall include any reasonable information as may be required by the HAFED . The Contractorshouldalsodisplaynecessary informationasmayberequiredbystatutoryregulations.

4.5 None of the Contractor's supervisors, engineers, or laborers may be withdrawn from the work without notice to the HAFED and further no such withdrawals shall be made if in the opinion of the HAFED , it will adversely affect the required pace of progress and/or the successful completion of thework.

4.6 The HAFED shall be at liberty to object to any representative or person, skilled, semi-skilled or unskilled worker employed by the Contractor in the execution of or otherwise about the works whoshall,intheopinionoftheHAFED,misconducthimselforbeincompetent,ornegligentor unsuitable, and the Contractor shall remove the person so objected to, upon receipt of notice in writing from theHAFED and shall provide in that place a competent representative at Contractor's own expense within a reasonabletime.

4.7 In the execution of the works no persons other than the Contractor, sub-Contractor and their employees shall be allowed on the site except by the written permission of the HAFED.

5.0 HAFED 'SINSTRUCTIONS

The HAFED may in his absolute discretion, issue from time to time drawings and/or instructions, directions and clarifications which are collectively referred to as HAFED 's instructions in regard to:

5.1 Anyadditionaldrawingandclarificationstoexhibitorillustratedetails.

5.2 Variations or modifications of the design, quality or quantity of work or the additions or omissions or substitution of anywork.

5.3 Any discrepancy in the drawings or between the schedule of quantities and/orspecifications.

5.4 Removal from the site of any material brought there by the Contractor, which are unacceptable to theHAFEDandthesubstitutionofanyothermaterialthereof.

5.5 Removal and/or re-execution of any work erected by the Contractor, which are unacceptable to the HAFED.

5.6 Dismissal from the work of any persons employed there upon who shall in the opinion of the HAFED , misconduct himself, or be incompetent ornegligent.

5.7 Opening up for inspection of any work coveredup.

5.8 Amending and making good of anydefects.

6.0 RIGHT OF THEHAFED

6.1 Right to directworks:

6.1.1 The HAFED shall have the right to direct the manner in which all works under this Contract shall be conducted, in so far as it may be necessary to secure the safe and proper progress and specified quality of the works. All work shall be done and all materials shall be furnished to the satisfaction and approval of the HAFED.

6.1.2 Whenever in the opinion of the HAFED , the Contractor has made marked departures from the schedule of completion or when circumstances or requirement force such a departure from the said schedule, the HAFED , in order to ensure compliance with the schedule, shall direct the order,paceandmethodof conductingthework,whichshallbeadheredtobytheContractor.

6.1.3 If in the judgment of the HAFED , it becomes necessary at any time to accelerate the overall pace of the plant erection work, the Contractor, when directed by HAFED , shall cease work at any particular point and transfer Contractor's men to such other point or points and execute such works, as may be directed by the HAFED and at the discretion of the HAFED.

6.2 Righttoordermodificationsofmethodsandequipment

If at any time the Contractor's methods, materials or equipment appear to the HAFED to be unsafe, inefficient or inadequate for securing the safety of workmen or the public, the quality of work or the rate of progress required, the HAFED may direct the Contractor to ensure safety, and increase their efficiency and adequacy and the Contractor shall promptly comply with such directives. If at any time the Contractor's working force and equipment are inadequate in the opinion of the HAFED , for securing the necessary progress as stipulated, the Contractor shall if so directed, increase the working force and equipment to such an extent as to give reasonable assurance of compliance with the schedule of completion. The absence of such demands from the HAFED shall not relieve the Contractor of Contractor's obligations to secure the quality, the safe conducting of the work and the rate of progress required by the contract. The Contractor alone shall be and remain liable and responsible for the safety, efficiency and adequacy of Contractor's methods, materials, working force and equipment, irrespective of whether or not the Contractor makes any changes as a result of any order or orders received from the HAFED.

6.3 Right to inspectthework

6.3.1 The HAFED 's representative shall be given full assistance in the form of the necessary tools, instruments, equipment and qualified operators to facilitateinspection.

6.3.2 The HAFED reserves the right to call for the original test certificates for all the materials used in the erectionwork.

6.3.3 In the event the HAFED 's inspection reveals poor quality of work/materials, the HAFED shall be at liberty to specify additional inspection procedures if required, to ascertain Contractor's compliancewiththespecificationsoferectionwork.

6.3.4 Even though inspection is carried out by the HAFED or HAFED 's representatives, such inspection shall not, however, relieve the Contractor of any or all responsibilities as per the contract, nor prejudice any claim, right or privilege which the HAFED may have because of the useofdefectiveorunsatisfactorymaterialsorbadworkmanship.

7.0 CONTRACTOR'SFUNCTIONS

7.1 The Contractor shall provide everything necessary for proper execution of the works, according to the drawings, schedule of quantities and specifications taken together whether the same may or may not be particularly shown or described therein, provided that the same can reasonably be inferred there from and if the Contractor finds any discrepancy therein, Contractor shall immediately refer the same to the HAFED whose decision shall be final and binding on the Contractor.

7.2 The Contractor shall proceed with the work to be performed under this Contract in the best and workman like manner by engaging qualified and efficient workers and finish the work in strict conformance with the drawings and specifications and any changes/modifications thereof made by the HAFED.

7.3 VARIATIONS

7.3.1.1 The HAFED shall make any variation of the form, quality or quantity of the Works or any part thereof that may, in his opinion, be necessary and for that purpose, or if for any other reason it shall, in his opinion be desirable, he shall have power to order the Contractor to do and the Contractor shall do any of thefollowing:

a. Increaseordecreasethequantityofanyworkincludedinthecontract,
b. Omit any suchwork,
c. Change the character or quality or kind of any suchwork,
d. Changethelevels,lines,positionanddimensionsofanypartoftheworks,and
e. Execute additional work of any kind necessary for the completion of the works and no such variation shall in any way vitiate or invalidate the contract, but the value, if any, of all such variations shall be taken into account in ascertaining the amount of the Contractprice.

7.3.1.2 No such variations shall be made by the Contractor without an order in writing of the HAFED, Provided that no order in writing shall be required for increase or decrease in the quantity of any work where such increase or decrease is not the result of an order given under this clause, but is the result of the quantities exceeding or being less than those stated in the Contract/Bill of Quantities.

7.3.1.3 All extra or additional work done or work omitted by order of the HAFED shall be valued at the rates and prices set out in the contract if in the opinion of the HAFED, the same shall be applicable. If the contract does not contain any rates or prices applicable to the extra or additional work, then suitable rates or prices shall be agreed upon between the HAFED and the Contractor. In the event of disagreement, the HAFED shall fix such rates or prices as shall, in his opinion, be reasonable andproper.

7.3.1.4 Provided that if the nature or amount of any omission or addition relative to the nature or amount of the whole of the works or to any part thereof shall be such that, in the opinion of the HAFED , the rate or price contained in the Contract for any item of the works is, by reason of such omission or addition, rendered unreasonable or inapplicable, then a suitable rate or price shall be agreed upon between the HAFED and the Contractor. In the event of disagreement the HAFED shall fix such other rate or price as shall, in his opinion, be reasonable and proper having regard to thecircumstances.

Provided also that no increase or decrease under sub-clause 7.3.2.1 of this clause or variation of rate or price under sub-clause 7.3.2.2 of this clause shall be made unless, as soon after the date of the order as is practicable and, in the case of extra or additional work, before the commencement of the work or as soon thereafter as is practicable, notice shall have been given in writing:

a. By the Contractor to the HAFED of his intention to claim extra payment or a varied rate or price,

Or

b. BytheHAFEDtotheContractor ofhisintentiontovaryarateorprice.

7.3.1.5 If, on certified completion of the whole of the works, it shall be found that a reduction or increase greater than 15 per cent of the sum named in the Letter of Acceptance results from the aggregate effect of all Variation Orders but not from any other cause, the amount of the

Contract Price shall be adjusted by such sum as may be agreed between the Contractor and the HAFED or, failing agreement, fixed by the HAFED having regard to all material and relevant factors, including the Contractor's site and general overhead costs of thecontract.

7.3.1.6 The Contractor shall send to the HAFED 's representative once in every month an account giving particulars, as full and detailed as possible, of all claims for any additional payment to which the Contractor may consider himself entitled and of all extra or additional work ordered by the HAFED which he has executed during the precedingmonth.

No final or interim claim for payment for any such work or expense will be considered which has not been included in such particulars. Provided always that the HAFED shall be entitled to

authorize payment to be made for any such work or expense, notwithstanding the Contractor's failure to comply with this condition, if the Contractor has, at the earliest practicable opportunity, notified the HAFED in writing that he intends to make a claim for such work.

7.4 The work shall be carried out as approved by the HAFED or his authorized representative/s from time to time, keeping in view the overall schedule of completion of the project. The Contractor's job schedule must not disturb or interfere with HAFED 's or other Contractors' or Contractors' schedules of day-to-day work. The HAFED will provide all reasonable assistance for carrying out thejobs.

7.5 Night work will be permitted only with prior approval of the HAFED. The HAFED may also direct the Contractor to operate extra shifts over and above normal day shift to ensure completion of contract as per schedule. Adequate lighting wherever required should be provided by the Contractor at no extra cost. The Contractor should\ employ qualified electricians and wiremen for these facilities. In case of Contractor's failure to provide these facilities and personnel, the HAFED has the right to arrange such facilities and personnel and to charge the cost thereof to the Contractor.

7.6 The Contractor shall, in the joint names of the Contractor and the HAFED , insure the received goods and equipment and so far as reasonably practicable the Works and keep each part thereof insured for the Contract Sum or such other value as may be mutually agreed between the HAFED and the Contractor against all loss or damage from whatever cause arising, other than the excepted risks, from the date of shipment or the date on which it becomes the property of the HAFED , whichever is the earlier, until it is taken over by the HAFED . The Contractor shall insure against the Contractor's liability in respect of any loss or damage occurring whilst the Contractor is on Site for the purpose of making good a defect or carrying out the Tests on Completion.

7.7 The HAFED shall not be liable for or in respect of any damages or compensation payable at law in respect or in consequence of any accident or injury to any workman or other person in the employment of the Contractor or any sub-Contractor, save and except an accident or injury resulting from any act or default of the HAFED , his agents, or servants. The Contractor shall indemnify and keep indemnified the HAFED against all such damages and compensation, save and except as aforesaid and against all claims, proceedings, costs, charges and expenses whatsoever in respect thereof or in relationthereto.

7.8 The Contractor shall insure against such liability with an insurer approved by the HAFED , which approval shall not be unreasonably withheld, and shall continue such insurance during the whole of the time that any persons are employed by him on the works shall, when required,

produce to the HAFED or HAFED 's representative such policy of insurance and the receipt for payment of the currentpremium.

Provided always that, in respect of any persons employed by any sub-Contractor, the Contractor's obligations to ensure as aforesaid under this sub-clause shall be satisfied if the sub-Contractor shall have insured against the liability in respect of such persons in such manner that the HAFED is indemnified under the policy, but the Contractor shall require such sub-Contractor to produce to the HAFED or HAFED 's representative, when required, such policy of insurance and the receipt for the payment of the currentpremium.

7.9 Whenever proper execution of the work under the Contract depends on the jobs carried out by some other Contractor, in such cases the Contractor should inspect all such erection and installation jobs and report to the HAFED regarding any defects or discrepancies.The Contractor's failure to do so shall constitute as acceptance of the other Contractor's installation/jobs as fit and proper for reception of Contractor's works except those defects which may develop after execution. Contractor should also report any discrepancy between the executed work and thedrawings.

TheContractorshallextendallnecessaryhelp/co-operationtootherContractorsworkingatthesite in the interest of thework.

7.10 The Contractor shall keep a check on deliveries of the Goods covered in the scope of erection work and shall advise the HAFED well in advance regarding possible hold- up in Contractor's work due to the likely delay in delivery of such Goods to enable him to take remedialactions.

7.11 The Contractor shall be permitted to substitute equipment of equal on better performance subject to approval by the HAFED ; which approval shall not be unreasonably withheld, provided however that the Contractor establishes to the HAFED 's satisfaction that the performance of the substituted equipment is equal or better than the performance of the equipment specified in the contract and without any increase in the Contractprice.

8.0 ROLE OF THE HAFED VIS-A-VIS THECONTRACTOR:

8.1 The Goods, if any, to be supplied by the HAFED for erection, testing and commissioning by the Contractor, shall be as listed inthe Contract.

8.2 Besides the utilities/services as specified in battery limits the following assistance/ facilities shall also be provided to the Contractor by the HAFED for carrying out the installationwork.

8.2.1 Plant building for reception, processing, and packaging and for services including internallighting will be made available by the HAFED.

8.2.2 Necessary temporary water for carrying out the installation shall beofcontractors responsibility. All necessary distribution tappings onwards shall also be the Contractor's responsibility.

8.2.3 Necessary temporary power for carrying out the installation shall be arranged by the Contractor at Contractor's own cost. The necessary authorisation letter will be issued by the HAFED on written request by theContractor.

The temporary power may not be reliable at the site and this could affect the welding operations and other installation works. Contractor shall provide stabilizer and Diesel

Generators "as necessary", to ensure adequate quality of welds and to ensure no delay in installation due to temporary power instability. No extra cost shall be paid by the HAFED on this account.

8.2.4 If the power is provided by the HAFED, the recovery shall be made from the total purchase order value (supply, installation and commissioning). The charges will be deducted from the labour charges of installation and commissioning and testing bills of the Contractor. However, the Contractor shall supply all the items such as switchgear, cabling etc. required for getting temporarypower.

8.3 If the Contractor suffers delay and/or incurs costs from failure on the part of the HAFEDin accordance with the mutually agreed schedule, the HAFED shalldetermine:

a. Any extension of time to which the Contractor is entitled under Clause 22 of GCC and;

9.0 SUPPLYOFTOOLS,TACKLESANDMATERIALS

The Contractor shall, at his own expense, provide all the necessary equipment, tools and tackles, haulage power, consumables necessary for effective execution and completion of the works during erection and commissioning.

10.0 PROTECTION OFPLANT

10.1 The HAFED shall not be responsible or held liable for any damage to person or property consequent upon the use, misuse or failure of any erection tools and equipment used by the Contractor or any of Contractor's sub- Contractors even though such tools and equipment may be furnished, rented or loaned to the Contractor or any of Contractor's sub-Contractors. The acceptance and/or use of any such tools and equipment by the Contractor or Contractor's sub-Contractor shall be construed to mean that the Contractor accepts all responsibility for andagrees to indemnify and save the HAFED from any and all claims for said damages resulting from the said use, misuse or failure of such tools andequipment.

10.2 The Contractor and Contractor's sub-Contractor shall be responsible, during the works, for protection of work, which has been completed by other Contractors. Necessary care must be taken to see that the Contractor's men cause no damage to the same during the course of execution of thework.

10.3 All other works completed or in progress as well as machinery and equipment that are liable to be damaged by the Contractor's work shall be protected by the Contractor and protection shall remainandbemaintaineduntilitsremovalisdirectedbytheHAFED.

10.4 The Contractor shall effectively protect from the effects of weather and from damages or defacement and shall cover appropriately, wherever required, all the works for their complete protection.

10.5 The work shall be carried out by the Contractor without damage to any work and property adjacent to the area of Contractor's work to whomsoever it may belong and without interference withtheoperationofexistingmachinesorequipment.

10.6 Adequate lighting, guarding and watching at and near all the storage handling, fabrication, pre-assembly and erection sites for properly carrying out the work and for safety and security shall

be provided by the Contractor at Contractor's cost. The Contractor should adequately light the work area during night time also. The Contractor should also engage adequate electricians/wiremen. Helper etc. to carry out and maintain these lighting facilities. If the Contractor fails in this regard, the HAFED may provide lighting facilities as he may deem necessary and charge the cost thereof to theContractor.

10.7 The Contractor shall take full responsibility for the care of the works or any section or portions thereof until the date stated in the taking over certificate issued in respect thereof and in case any damage or loss shall happen to any portion of the works not taken over as aforesaid, from any cause whatsoever, the same shall be made good by and at the sole cost of the Contractor and to the satisfaction of the HAFED. The Contractor shall also be liable for any loss of or damage to the works occasioned by the Contractor or the Contractor's Sub-Contractor in the course of any operations carried out by the Contractor or by the Contractor's Sub-Contractors for the purpose of completing any outstanding work or complying with the Contractor'sobligations.

11.0 UNLOADING,TRANSPORTATION AND INSPECTION

11.1 The Contractor shall be required to unload all the Goods from the carriers, received at site after Contractor's team arrives at site. The Contractor shall plan in advance, based the information received from the HAFED, Contractor's requirement of various tools, tackles, jacks, cranes, sleepers etc. required to unload the material/equipment promptly and efficiently. The Contractor shall ensure that adequate and all measures necessary to avoid any damage whatsoever to the equipment at the time of unloading are taken. Any demurrage/detention charges incurred due to the delay in unloading the material/equipment and releasing the carriers shall be charged to the Contractor's account. The Contractor shall be responsible for receipt at site of all Goods and Contractor's equipment delivered for the purposes of theContract.

11.2 The Contractor shall safely transport/shift the unloaded Goods and equipment to the storagearea.

11.3 All the Goods received by the HAFED prior to arrival of the Contractor at site shall be handed over to the Contractor and there upon the Contractor shall inspect the same and furnish a receipt to the HAFED. The manner in which the inspection shall be carried out is enumeratedbelow:

11.3.1 The materials/equipment would be carefully unpacked by opening the wooden cases/other modes of packing's as the case maybe.

11.3.2 Detailed inventory of various items would be prepared clearly listing out the shortages, breakages/damages after checking the contents with respect to the Contractor's packing list, the HAFED's Contract and approved equipment drawings. The Contractor shall also check every equipment for any shortage/shortcoming that may eventually create difficulty at the time of installation orcommissioning.

11.3.3 All the information and observations by the Contractor shall be furnished in the form of INSPECTION REPORT' to the HAFED with specific mention / suggestions which in the opinion of the Contractor should be given due consideration and immediate necessary actions, to enable the HAFED to arrange repair or replacement well in time and avoid delays due to non- availability o f equipment and parts at the time of their actualneed.

11.3.4 The inspection for all the Goods handed over to the Contractor shall be completed within three week'speriod.

11.4 The protection, safety and security of the Goods so taken over from the HAFED shall be the responsibility of the Contractor, until they are handed over to the HAFED after erection, commissioningandtestingasperthetermsoftheContract.

12.0 STORAGE OFGOODS

The Contractor shall be responsible for the proper storage and maintenance of all Goods under Contractor's custody. Contractor shall take all required steps to carry out frequent inspection of equipment/materials stored as well as erected equipment until the same are taken over by the HAFED . The following procedure shall apply for the same.

12.1 The Contractor's inspector shall check stored and installed Goods to observe signs of corrosion, damage to protective coating to parts, open ends in pipes, vessels and equipment, insulation resistance of electrical equipment etc. The Contractor shall immediately arrange a coat of protective painting whenever required. A record of all observations made on Goods, defects noticed shall be promptly communicated to the HAFED and HAFED's advice taken regarding the repairs/rectifications. The Contractor shall thereupon carry out such repairs/ rectifications at Contractor's own cost. In case the Contractor is not competent to carry outsuch repairs/

rectifications, the HAFED reserves the right to have this done by other competent agencies at the Contractor's responsibility and risk and the entire cost for the same shall be recovered from the Contractor's bills.

12.2 The Contractor's inspector shall also inspect and provide lubrication to the assembled Goods. The shafts of such equipment shall be periodically rotated to prevent rusting as well as to check freeness of thesame.

12.3 TheInspectorshallcheckforanysignsofmoistureorrustinginanyGoods.

12.4 If the commissioning of Goods is delayed after installation of the Goods, the Contractor shall carryoutallprotectivemeasuressuggestedbytheHAFEDduringsuchperiod.

12.5 Adequate security measures shall be taken by the Contractor to prevent theft and loss of Goods handed over to the Contractor by the HAFED. The Contractor shall carry out periodical inventory checks of the Goods received, stored and installed by the Contractor and any loss noticed shall be immediately reported to the HAFED. A proper record of these inventories shall be maintained by the Contractor. The Contractor should not sell, assign, mortgage, hypothecate or remove Goods which have been installed or which may be necessary for completion of the work without the written consent of theHAFED.

12.6 Asuitablegreaserecommendedforprotectionofsurfacesagainstrusting(refinedfrompetroleum oil with lanclin minimum (70 deg C) and water in traces) shall be applied over all Goods as required once in every sixmonths.

12.7 All Goods shall be stored inside a closed shed or in the open depending upon whether they are of indoor or outdoor design. The space heaters where provided into the electrical equipment shall be kept connected with power supply irrespective of their type of storage. Where space heaters are notprovidedadequateheatingwithbulbisrecommended.Fortransformersheatingofoilshallbe

donebygiving440Vsupplyandshort-circuitingtheLTterminals.Frequentchecksoninsulation resistance are essential for all electrical equipment and record of the inspection reports and megger readings shall be maintained equipment wise. Such records shall be presented to the HAFED wheneverdemanded.

12.8 All the necessary Goods required for protection as described above shall be arranged by the Contractor and such cost shall be included in theContract Price.

13.0 APPROVALS

13.1 The Contractor shall obtain the necessary statutory approvals and any other state and local authorities as may be required and the cost of obtaining such approvals shall be included in the Contract Price. All the necessary details, drawings, submission of application and proforma will be furnished by the Contractor to the HAFED for verification/ signature. The necessary application duly filled-in, together with the prescribed fees shall be submitted to the appropriate authorities by the Contractor on behalf of the HAFED . However all the actual statutory prescribed fees paid by the Contractor shall be reimbursed by the HAFED upon production of thereceipt/vouchers.

13.2 Wherever necessary or required, the Contractor shall furnish the necessary test and/or inspection certificates etc. from the appropriate authorities as per IER (Indian Electricity Rules) and other statutory regulations and the cost for obtaining these certificates shall be included in the ContractPrice.

14.0 REVIEW AND CO-ORDINATION OF ERECTIONWORK

The Contractor shall depute senior and competent personnel to attend the site co- ordination meetings that would generally be held at the site every month. The Contractor shall take necessary action to implement the decisions arrived at such meetings and shall also update the erection schedule.

15.0 EXTENSION OF TIME FORCOMPLETION

Time limit -6 months Extension may be provided against valid reasons, detailed work schedule and approval of Client.

Should the amount of extra or additional work of any kind or any cause of delay referred to in these conditions, or exceptional or adverse climatic conditions, or other special circumstances of any kind whatsoever which may occur, as described in the General Conditions of Contract, other than through a default of the Contractor, be such as fairly to entitle the Contractor to an extension of time for the completion of the works, the HAFED shall determine the amount of such extension and shall notify the Contractor accordingly. Provided that the HAFED is not bound to take into account any extra or additional work or other special circumstances unless the Contractor has within twenty-eight days after such work has been commenced, or such circumstances have arisen, or as soon thereafter as is practicable, submitted to the HAFED full and detailed particulars of any extension of time to which he may consider himself entitled in order that such submission may be investigated at thetime.

SECTION – 6

TECHNICAL SPECIFICATIONS

INTRODUCTION

This section of the bidding documents outlines the technical specifications for the Design, Manufacture, Supply, Erection, Testing and Commissioning of grain storage silos complete with cleaning system, weighing facility collection systems and bagging units with associated accessories, etc required for the HAFED Mega Food Park.

These technical specifications are for the guidance of the bidders only and not intended to bring out allthe details of design and fabrication of the equipment or equipment components. The successful Bidder shall befullyresponsibletoundertakealltheworksinvolvedinthedesign,engineering,manufacture,supplying equipment at site including the erection, testing and commissioning of all the equipment of bulk storage silosystemforgrains.BiddersaretonotethatthisgrainStorageSiloSystembeingofferedinthisbidshall be part of the overall project and together with the required accessories. They shall be fully responsible in the overall timely implementation of the project on Turnkey basis, within the battery limits defined in this tender. The work being carried out shall confirm to high standards of engineering design & workmanship. The equipment offered shall be capable of performing in continuous commercial operation to meet agreed performance standards and acceptable to the HAFED. No exclusions of any nature are acceptable, other than those specifically detailed in this biddingdocument.

The bidders are required to provide all technical data/information wherever asked for. Any bid not following the bid format structure or provided with insufficient technical data/information/documents is liable to be considered as non-responsive.

The HAFED/Construction Manager will interpret the meaning of various equipment specification and drawings submitted by the bidder and shall have the right to reject any material/equipment, which in their opinion is not in full accordance to tender specifications.

The silo system shall be designed, supplied and executed in accordance with the prevailing standards as applicable to the job.

- Bureau of IndianStandards
- FCI (Food Corporation of India)Norms
- Indian ElectricityRules
- StateElectricityBoard(SEB)regulationswheretheSilosSystemislocated
- ChiefElectricalInspectorateregulationsofStatewheretheSilosSystemislocated
- Indian ExplosivesAct
- Indian FactoryAct
- IndianWeights&MeasuresAct
- AnyotherapplicableIndianAct.

WhereverIndianStandardsarenotavailable/applicable,thebiddershallfollowInternational Standards

(DIN/British/American). FCI
standards are acceptable.

The bidder shall be responsible for arranging approval from various applicable Indian Statutory Authorities (on behalf of the employer). The fees shall be reimbursed by the employer after satisfactory approval as per the requirement of the project. The bidder has to intimate the HAFED before taking any approval.

The Mechanical and Electrical design, performance and function of the main equipment/parts and their accessories, including control and instrumentation panels, shall comply with the latest relevant Indian standards. Safety and other statutory regulations/ requirements shall comply with that being followed in the country.

The Electrical works shall comply with the latest Indian Electricity Rules and other statutory regulations/ requirements of power supply authorities and Chief Electrical Inspectorate.

The electrical installation done by the bidder shall be got approved by them from the above statutory authorities and any modifications or changes if suggested by the authorities, the same shall be carried out by the bidder without any additional cost. Approval certificate shall have to be handed over to the HAFED

Bidder's scope includes arranging (a) inspection and stamping of various weighing equipment provided in System from local Weights & Measures Authority and obtain approval for the same and (b) inspection and obtaining approval for the System building steel structure from Local Factory Inspector.

- The job shall be executed on single responsibility basis and this contract shall be covering design, supply, erection, testing & commissioning of the entire equipment required for 2500 MT storage silo system.

- Asstatedearliertheentirejobwillhavetobeexecutedonasingleresponsibilitybasisandthebidder should consider the complete work as mentioned in this tender in its totality. It should be understood that all minor work which may be necessary to achieve the rated capacity of the System is included in the scope of work, though not specificallymentioned.

- The bidder may visit the site before submitting thebid.

- **Project Time Scale:** The design, supply, fabrication, erection, testing and commissioning of grain storage silos complete with cleaning system, weighing system, Collection System, Bagging Unit etc withassociatedaccessorieslikeconveyors,elevatorsandbinsshallbecompletedwithin6monthsafte r placement of order. The Bar-chart or PERT network or MS Project or Equivalent showing the time scheduleofthevariousactivitiesfromStarttoCompletionistobeprovidedbythebidderandshallbea part of the contractagreement.

Major Requirements for Raw Material Storage and Associated Equipment Structures

- **Two Number Flat Bottom Silos i.e- One Number Flat bottom 1500 MT Silo, One Number Flat bottom/hopper bottom 1000 MTSilo**
  ***Type of silo-flat bottom/hopper bottom is to be as per bidder's design, however stability certificate must be provided by the successful bidder

- **MinimumofThreeNumbersReceivingHoppersfor40TPHloadingandunloadingcapacity**
- **Drum Sieve and Pre Cleaner of minimum 40 TPHCapacity**
- **1 No Bin Silo –Minimum 50 MT Capacity (One bin for bagging and bulk loading both) with Bagging machine of 15 TPH for Bagging operation purpose and also for the purpose for bulk loading on trucks** Electronic load cell based semi-automatic bagging machine (net weigher type) –having weighers with chute suitable for both Jute & HDPE bags complete with heavy duty stitching machine and slat conveyor for transporting filled bags for bagging machine to dispatch vehicle for truck loadingthroughstitchingmachineandslatconveyor.Thesystemshallbedesignedsuchthatdirectloadin g offilledbagsintrucksasfaraspossibleto minimizemanualhandlingofbagsbetweenthepointoffilling in bags and loading intrucks.
- **1 No Weighbridge-100 MT (Pit-less type)**

- **ImportantNoteonDesignProcessFlow:**
- The raw material shall be received through hoppers and then cleaned. Weight of the grains is to be recorded on manual basis(weigh-bridge)
- Cleaning Process and wasteseparation.
- Flow meter provision to monitor the inputmaterial
- Provision of storage in the respective Silos and then after storage for further dumping to bagging or bin silo is to be made.
- In addition, after cleaning of material, provision for direct dumping to the bagging silo or bin silo is to be provided.
- Thebiddersareadvisedtodesignthelayoutaccordinglyandsubmittheindicativelayoutandprocessflo w in the technicalbid.

INSTRUCTIONS TO BIDDERS:

All machines are to be provided with motor/geared motor/motor-gear box and drive parts.
The term, drive parts" indicated in the technical specifications of equipment covers the supply of item as below:

i. Chain drive: - Driving and driven sprockets of MS and flame hardened, required length of simplex/duplex chains with closing link and key in the drivenshaft.

ii. V- belt drive :-Driving and driven pulleys, required numbers, type and length of „V" belts of polyesterreinforcedtype,keyinthedrivenshaftandsliderailsformotor.

iii. DirectcoupledDrive:-Suitablecouplingwithaccessoriesandkeyindrivenshaft. It shall be of chain type, unless otherwisespecified.

Apart from above, the supply of base frame for motor/geared motor and drive guard of 2 mm thick MS sheet is also included under drive parts.

Accessibility: All the machines should have suitable provisions (platform with safety railing) for inspection, lubrication and maintenance.

Lubricant: All the machines should be supplied with first charge of lubricant (grease/gear oil) etc, supplied loose in drums and to be filled before testing andcommissioning.

Welding: All Stainless Steel to Stainless Steel and Stainless Steel to Mild Steel welding should be carried out by TIG/ MIG method. MS to MS welding shall be carried out by electric arc welding. Allweld joints for fabricated equipment/hoppers/bins/piping etc. should be ground smooth from inside to facilitate easy and free flow of material.

Name Plate: Every machine/equipment should have a name plate with name of the manufacturer, year of manufacture, capacity of the machine/equipment, number and other relevant information if any, writtenon it. Name plate shall be fixed on equipment with suitablebracket.

Shrouds: Drive and drive parts including coupling for motors in the storage silo system shall be covered with safety grills/shrouds, easily removable type. All motors installed outside the building shall have shrouds, made from 14G Al. sheet having louvers for air circulation and a lifting handle.

Inspection: CLIENT has the right to carry out the stage-wise inspection for all items and the Contractor has to intimate the CLIENT for factory inspection prior to supply of all equipments/machineries.

LOT items: Wherever "lot" items has been specified by the bidder, like piping, cables and steel structures
etc.,thedetailedlistshallbeprovidedbythebidderwithunitrate.However**thebidsshallbeevaluatedon LOT/SETbasisonlyandalsosuccessfulbiddershallhavetoexecutetheseitemsonLOT/SETbasis only.** Any materials under lot / set items required for the project execution shall be supplied & erected by successfulbidderwithoutanyextrarate.Allsurplusmaterialsincludingscrapmaterialsunderlot/unitrate itemsaftersatisfactorilycompletionofworksshallbetakenbackbythesuccessfulbidder.

The length of conveyors and elevators is to be considered as “centre to centre” distance between head and tail end bearings, unless otherwise specified.
In detail specification of equipment/hoppers and accessories etc., the thicknesses of constructionmaterialhavebeen specifiedwhereeverrequired.Itistobenotedthat thesearetheminimum but the supplier may provide thicknesses more than these if required by their design/detailing of the equipment.

Suitable Discharging angle of raw material in pipes/transition pieces/hopper bottoms etc should be given for smooth flow of grain.

All the equipment in general should be dust proof in arrangement.

Three hard copies of installation, operation/SLD and maintenance manual of all machines should be supplied. One set should be packed with machine while 2 sets should be sent along with dispatch

documents to consignee. A DRIVE (USB) should also be provided with all drawings, datasheets, installation, operation and maintenance manuals.

All the equipment in general should be dust proof in arrangement.

Painting: If galvanization is present, paint is not required. It is recommended that all the major materials are hot dip galvanized. Only in applicable cases, on approval of CLIENT/Construction Manager, the painting procedure for all the fabricated equipment at the supplier‟s work should be as given below.

(i) Removalofrustfromthesurfacebyusingsandblasting/emerypaper/Chemicalrustsolventetc.
(ii) Applying one coat of suitableprimer.
(iii) Puttyshouldnotbeusedtohidedentedsurfacesandinsteaddentsifappearedshouldberemovedcarefully.
(iv) Applying two coats approved shade of synthetic enamel/black bituminouspaint.
(v) Supportingsteelstructure,transitionpieces&pipingetc.beingfabricatedatsitetobeappliedwithtwo coats of corrosion resistant zinc oxide primer and one coat of synthetic enamel paint before erection/installationandthenfinalsecondcoatofsyntheticenamelpaintaftererection/installationbut beforecommissioning.If the supporting steel structure is fabricated at factory, same are to be inspected by HAFED/Engineer in charge prior to fabrication. ColorsshouldbeasperStandardPracticeandshouldbeofgoodqualityandcan sustain hazardousatmosphere.

TECHNICALSPECIFICATIONSOFSILOSYSTEM,ACCESSORIESANDSUPPORTING STRUCTURE FOR ELEVATORS ANDMACHINERIES.

The silos shall be of galvanized iron corrugated sheet of thickness as per design requirement.Thedesignofthesiloshouldbebased onSingaporeStandardSSEN1993-4- 1:2011whichisanadaptionofthe EuropeanStandardcodeEN1993-4-1:2007,IDT.Thisstandardhasallthe referencesoftheindividual componentsof silo.Theconcrete foundationsareasperEN1992andEN1997.Asthesteel structureandcivil foundationswithretainingwallsare basedonprevailingseismiczoneand windvelocityaspernormsof the site conditions.SeismicdesignRC columnsandwallsectionIS:5503(Part–I &Part–II)-1969andIS:9178(Part –II) - 1979couldalsobereferred The silo height and diameter are to be designed according to ANSI-ASAE/FCI/ASTM/DIN/IS/EURO/BIS Codes based on the raw material grains (like wheat, maize, paddy, bajra etc.) that are proposed to be stored in these silos.

- Bulk Storage Silo-1 No Silo 1500 MT Silos-Flat BottomSilo
- Bulk Storage Silo-1 No Silo 1000 MT Silo-Flat Bottom/Hopper BottomSilo
- Conveying Capacity- 40 TPH
- Type of silo-flat bottom/hopper bottom is to be as per bidder's design, however stability certificate must be provided by the successfulbidder
- Both the silos are to be designed on Wheat based (Density -750 Kg/m3) and can be also used for Paddy, Maize &Bajra.
- Provision of cleaning all these grains is to bemade.
- All material handling equipment for unloading, conveying, loading etc should be designed and provisions should be made in such a way that future expansion of 1000-1500 MT can be done by HAFED in future as perdemand.

Perforated sheet for aeration to be designed considering minimum thickness of material out of the grains considered. Minimum galvanization thickness has to be minimum 450 GSM. The silos shall be designed for wind load (highest as per historical records) and for seismic stability as per seismic zone of Rohtak.Reference Wind Load-180 Km/Hr as per IS 875: Part 3

The Silos shall be constructed from bolted corrugated galvanised sheet metal and shall have a flat bottom with sweep augur. The galvanisation thickness, which is from hot dip process, should not be less than 450 grams/meter square, capable of lasting for 30 (thirty) years. The Silos shall be water tight and shall be constructedinamannerthatprotectstheSilos,conveyorsandallotherequipmentfromaccumulationof ground water. The support slab of Silos shall be elevated so that all equipment is situated at a level above the once-in- 50-years flood level at the Site. The Silos shall be capable of withstanding seismic activity in accordance with the guidelines issued by the National Disaster ManagementAuthority.

FLAT BOTTOM SILOS: Shall be provided with galvanized corrugated steel sheets, outside galvanized stiffeners,bolts,adequateno.ofgalvanizedsupportinglegs,roof,roofladder,handrailforroofladder,ladders fromgroundtoroofeavewithsafetycageandonerestplatformundercylinderdoor,insideladderfromaccess door to ground floor without safety cage. Suitable eaves close between silo cylinders on roof to prevent water entry to be provided. Silo has to have membrane type/fork type high, middle and low level switch, inspection openingonroofandcylinderdoor.Siloshallalsohaveaerationsystem,automatictemperaturemonitorsystem withweatherstation,additionalsoftwareforautomationofthefansandforcentralizedSCADA.

The detailed silo specification for sheets, roof and other accessories shall be as per details given

below: ROOF: The roof loading capacity should be minimum 10000 KG for providing optimum strength and providing low peak heights for overhead equipment like conveyors and related equipment. Roof ribs are to be full lapped- double or triple-rib formed for added strength. One pieced roof panel preferred depending on diameter.SteelqualityshallconformtoS280GDaccordingtonormUNE-EN-10346:2009andhavingtensile strength not less than 450 N/mm2 and lower yield point not less than 380 N/mm2. Galvanization shall be 450 gm/sq. m according to norm UNE-EN- 10346:2009. In case of large diameter silos or wherever required structuralroofwithbeamsandpurlinshotdippedgalvanizedanddesignedtosupportoverheadequipmentlike catwalks and conveyors to beprovided.

CORRUGATED STEEL BODY SHEET: The vertical body sheets shall be corrugated galvanized sheet of thickness varying from 0.8 mm to 4 mm as per design calculations. The vertical joints shall utilize automatic punchingsystemtoassureperfectconnectionbetweenthem.Qualitycontrolledsteelcoilsshallbeusedforthe same of tensile strength not less than 450N/mm2 and lower yield point not less than 380 N/mm2. Galvanization shall be minimum 450 gm/sq.m according to norm UNE-EN-10346:2009. Corrugation pitch of 76mmx14mmdeeppreferredwithusefullengthofsheet1140mmx2400mmoraspersizing.Steelquality shall conform to S 350 GD according to norm UNE-EN-10346:2009.
In relation to corrugation pitch the preferable parameters are stated in the tender document. If any changes in the same are proposed or designed, same should be submitted in the Technical Bid.

STIFFENERS:Minimum3stiffenersperwallsheetstobegiven. Outsidepositionedstiffenerstocarrythe verticalloadofthesilotothefoundation,manufacturedfromhightensilesteel(Recommended500 N/mm2 or atleast 450 N/mm2) of thickness varying from 1.5 mm to 4mm as per design requirements and galvanization450gm/sqmaccordingtonormUNE-EN-10346:2009.Designshallensurestrongjointsandbest stability.StiffenersmaybeCchannels/omegashapedofminimum75mmandlengthsabout1140mmor2280 mm.SteelqualityshallconformtoS350GDaccordingtonormUNE-EN-10346:2009.
SEALANT: These shall be made from butyl rubber compound supplied in strips of 6 mm dia. and shall be used to fillvertical jointsofbodysheets andhoppersheetjoints.Thesealingofholesfor boltedjointsshallbe made with special sealing washer EPDM or similar unbeatable weatherseal.

BOLTING: Each bolt shall have a special sealing washer to act as unbeatable weather seal and shallconform to EN-ISO4017:2011 with steel quality 8.8 or 10.9 (and norm EN-ISO 898- 1:2010). Nuts shall conform to EN-ISO 4032:2011with steel quality 8. The bolting shall be coated by a hot dip galvanization process following the norm EN-ISO10684:2006.

CAT WALKS: These shall be formed in two different sections each of 700 mm width including double hand rail (pipe of 32 NB GI "B" class) of 1.1 M high. One section shall be used as walkway and the other for installing the conveyor. The structure of the catwalk to be made with profiled beams made from hot dipped galvanized steel of min. 3 mm thickness and bolted construction. Flooring of walkway shall be made of galvanized steel perforated sheets of 3mm thick. Steel quality shall conform to S 280 GD according to norm UNE-EN-10346:2009 and galvanization 450 gm/sq.m according to norm UNE-EN- 10346:2009. Tensile strength of galvanized perforated sheet shall not less than 500 N/mm2 and lower yield point not less than 380 N/mm2.

SUPPORTSTRUCTURE: Thesearerequiredtosupporttheelevatorsandotherequipmentofthesilosyste m being proposed and shall be designed as per the load requirements. The supports shall be single or double columns made form hot dipped galvanized steel. For heavy loads additional overhangs are to be installed on thesupportstohavebetterdistributionofweight. Allsupportsaretobejoinedtostiffenersto

transfertheload directly to the ground. Steel quality shall conform to S 280 GD according to norm UNE- EN-10346:2009 and galvanization 450 gm/sq. m according to normUNE-EN-10346:2009.

AERATION SYSTEM: Double F or Double H or 100% aeration floor, aeration fans having capacity between 4.5 to 6 meter cube per hour per ton..Theair blowershallbeactivated/ run automatically when the temperature of raw materials reaches a set temperature above ambient. Dust insidethe silos is to be controlled to prevent any dust explosion. Recommended air requirement per silo should be as applicableaspertheSiloCapacityconfirmingFCInorms/otherapplicableindustrialnorms.

SWEEPAUGERS:Theseshallbewithtractordrive/suitabledrivenusedforthegrainsilosandshallinclude one central steel support, electrically operated with suitable KW rating motor, screw flight of suitable size
includingallsupportingstructureandplanetaryadvancingsystem.Motorshallbeplacedsuitablyforeasier maintenance. If Placed inside (geared motor)ease of maintenance provisions are to be provided. Operation and maintenance manual of motor is to be submitted by the successful bidder. It shall be outside the silo for easy maintenance. Sweep auger shall be industrial type gear driven by a single motoror
tractordrivenanditscapacityshallbesameascapacityofdischargeconveyor.Thecapacityofsweepaugeras applicable synchronized with loading unloading and pre-cleanercapacity

TEMPERATURE CONTROL SYSTEM: This shall consist of a temperature control centre made up of a computer,colorscreenwithprovisionforindicatingthetemperatureofeachprobe,activationanddeactivatio n of the probes, activation and deactivation manually the sensors which are in the raw material depending on height of silo fill, graphical representation of temperature charts, RS 232 interface between PC and temp control system. The temperature control system shall activate the aeration system when set temperature is reached. Supply shall be at 220V with intrinsic safety barrier to **feed** circuits placed in explosion risk zones (Zone20ATEX).Sufficientnumberofprobeswith4or5sensorsperprobe/orasperBidder"sdesignshallbe providedforeachsilo.Thesystemshallincludemultiplicationboxfortheprobes,connectingwires/cablesand supports on the silo roof for thecables.

WEIGHBRIDGE-

Weighbridge of 100 MT capacity of pit less type including all accessories, standard weights (1000 Kg), with minimum 8 load cells, Computer, Printer, UPS, installation, commissioning, stamping for legal metrology etc. means complete in all means. All Civil foundation works, and Weighbridge Room/Porta Cabin included in the Scope.

Indian standard IS-1436(1991):weigh bridges specifications and IS-9281 Part 1 of 4 (1979) for electronic weighing system including load cells. Weighbridges shall conform to Standard of Weight and Measures Act, 1976 and the Standards of Weights and Measures (Packaged Commodities) Rules, 1977 of India

The position of the Weighbridge at the site will be decided by HAFED during implementation stages.

Important Notes:

- The foundation location, foundation bolts of silos, layout of elevators, trenches, pits including load details on the foundations are in the scope of thebidder.
- The steel supports shall be designed for box type sections or other economical sections, so as to reduce the overall steel requirement, keeping the required safety standards asindicated.
- Thesteelstructureforthesilosystemandassociatedequipment(includingthesilos)shallbeasperthe

designofthebidder.Thesilosandthesupportingframeworkshallbedesignedforwindload(highestasper historical records) and for seismic stability as per seismic zone. Stability certificate for the silos and structure shall be submitted by the successful bidder. Design calculations for the structure shall be shared with the CLIENT and who shall suggest the bidder, for alteration, wherever found required. Design calculations for the silosto be shared with CLIENT without any extra cost

- Purpose of staircase is for maintenance and inspection purpose or a separate Staircase shall be suitably locatedsothatquickapproachtoworkingplatformsandshallbeminimum0.8mwidewith32mmpipe(GI "B" class) hand railing (doublebraced).
- Platforms, railing shall be extended to all working equipment to facilitate inspection, operation and maintenance.
- Elevation (all sides) drawings for the silo system showing heights of all silos including elevatorsandconveyorsshallbefurnishedtotheCLIENTincludingtheconveyorentrydirecttodistributio nconveyorin pre-weighing section of thesystem.

TECHNICAL SPECIFICATIONS OF INDIVIDUAL EQUIPMENT CONVEYING & OTHER FABRICATED EQUIPMENT

Process Tower The reference codes for the structure designs are IS: 800-1984 Code for practice for general construction in steel, SP6 (1) Handbook for structural steel sections, IS: 875-1987 (2nd rev) part 1 to 5 Code of practice for design loads for buildings and structures.

Wheat shifting system Material handling system are to be designed enabling shifting of wheat from one silo to another incase it is required to cool the wheat to atmospheric temperature

A.CHAIN CONVEYORS

Chain conveyors are required to carry grains and meals like materials horizontally or at an inclination.

These shall be Pre galvanized minimum 275 GSM, bolted construction with AR steel wear liner, dust & water proof and bolted design, having steel plate thickness as follow:

Casingbottom -- minimum 5 mm GIplate
Casingside -- minimum 4 mm GIplate
Casingpartition -- minimum3mmCasing(Asapplicable)
Topcover--minimum 3 mm GIplate

Screw type chain tensioning device at inlet end with limit switch for protection of chain (tensioning device to extended to sense excessive slack or increased tension in conveyor chain), conveying chain & sprocket of hardened special steel, shaft supported on both sides in pillow block self-aligned ball bearings, exchangeable wear rail of TISCRAL/UHMWPE or equivalent material wear rail minimum 8 mm thick to be provided at trough top & bottom for chain guide, conveying chain to be Drag Bush Chain type of sufficient breaking load with special steel & case hardened parts along with special nylon wear pads at 500 mm interval. Cleaning strips of UHMW/equivalent to be provided after every few links. Suitable size rectangular inlets & outlets both flange type, bolted type sight glass cum inspection doors of 5 mm thick acrylic sheet at inlet & outlet sides, cleaning brushforchainlinkateachoutlet,overflowflapwithlimitswitchatlastdischargeendtobeprovided.Suitable adjustableguideplateatinlettoregulatetransfer/flowofmaterialsandtoavoidchockingtobeprovided.Top cover to have slope on both sides and overlap in joints for easy removal of rain water from top and also to avoid entry of rain water inside the conveyor. Conveyor to be run by horizontal foot mounted geared motor withchain/directcoupleddriveparts&itsMS guardetc.asperrequirement.

B. SCREW / PADDLECONVEYORS

Screw Conveyors are required to convey/distribute grains & meal like materials horizontally or at suitable inclination. These shall be Pre galvanized minimum 275 GSM, bolted construction with AR steel wear liner with constant pitch and dust-proof design, having steel construction, flanged bearing with stuffing boxes, intermediate hanger bearings with maintenance free, self-lubricated special nylon bushes, screw or paddle flights of steel of uniform pitch welded on screw shaft, necessary rectangular type inlet & outlet. Overflow flap at discharge end with limit switch, sight glass of 5 mm thick acrylic sheet to top cover near hangerbearing,boltedtypebaffleplateofmin.3mmthickGIsheetofapprox..

400mmlong(tocontrolthedischargeofmaterial)atjustafterinlettobeprovided.Conveyortoberunbyfoot mounted horizontal geared motor and chain type direct coupling. Construction detail of various major items shall be asfollows.

Trough – minimum 3 mm thick GI sheet
Flight -- minimum 3 mm thick GI plate
Saddles -- minimum5mmthickGIsheet.
Endplate -- minimum 8 mm thick GI sheet
Mainshaft – heavy duty Cclass
MSERW pipe Top cover– minimum 3 mm thick GI sheet

C. SCREW / PADDLEDISCHARGERS

Screw / paddle dischargers are required to take out grains & meal like materials from hoppers/bins etc. horizontally or at suitable inclination.

Theseshallbeof**variablepitch**anddust-proofdesign,havingsteelconstruction,flangedbearingwithstuffing boxes,intermediatehangerbearingswithmaintenancefree,self-lubricatedspecialnylonbushes(onlyifscrew length is more than 5 Meter.) screw or paddle flights of steel welded on screw shaft, necessary inlet & outlet bothflangedtype,overflowflapwithlimitswitch&its bracket, sightglassof5mmthickacrylicsheetontop cover,boltedtypecleaningdooronbottomofscrewtroughatinlet,boltedtypebaffleplateofmin.3mmthick GIsheetofapprox.400mmlong(tocontrolthedischargeofmaterial)atjustafterinlet.Conveyortoberunby foot mounted horizontal geared motor and chain type direct coupling. Construction detail of various major items shall be asfollows.

Trough – minimum 3 mm thick GI sheet
Flight - minimum 3 mm thick GI plate
Saddles - minimum 5 mm thick GI sheet.
Endplate- minimum 8 mm thick GI sheet
Main shaft – heavy duty C class
MSERW pipe Top cover 8– minimum 3 mm thick GI sheet

D. BELTCONVEYORS

Belt conveyors are required to convey grains and meals like materials horizontally or inclined (the inclination not to exceed the angle of repose of the material itself) over short, medium and long distances. Application of theseconveyorsinSilosystemtobelimitedforashortdistanceandwithenclosedtroughstoavoidspillageof materials.

These belt conveyors shall be of sliding belt design, with the belt sliding on rollers along the

conveying distance. Main body of conveyor to be of min. 3 mm thick GI sheet. All supporting frame / structure to be of GI. Conveyor to be run by a foot mounted horizontal geared motor with direct coupled drive parts etc.

E. BUCKETELEVATORS

Bucket Elevators are required to convey powder /grains and meal like materials vertically. Materials shall be carried out in buckets mounted on belt.

These shall be Pre galvanized minimum 275 GSM, bolted construction with AR steel wear liner, dust-proof design, having steel construction, two leg bolted trough type, food and oil resistant antistatic belting ofPVC-linedfabric,pressedsteelbuckets,Elevatorsbootwith**twoinletswithpermanentmagnet**(magneticstrength 11000gauss) housed inSS304,GIscrewtype(min.32mmdia.rod)belttighteningdevice forminimum300mmbeltadjustmentwithGIchecknutandcagetypepulley.Elevatorheadwithrubber lagged crown pulley and wear resistant guide plate. Elevator to be provided with necessary slidedoors at bottom for cleaning and maintenance, bolted type inspection windows with 5 mm thick acrylic sight glass on either trough, pawl type/in built gear box (Bidder should fulfill the purpose of elevator ofminimum 40 TPH capacity) nylon back stop with guard, special bolts for fixing buckets on belt, inter connectingrectangularGIductingbetweentwotroughsforairbalancing,airbreatheronGIductingatsuitable location, casing retention frame and leg spacers or built gear box. For belt and bucket fixing and maintenance purpose, one trough with open able flanged bolted side with sight glass should be provided. Elevator to berun byafootmountedhorizontalgearedmotorand chaintypedirectcouplingdrive parts.

Sensor for belt alignment is required. GI supporting structure to be provided for installation of elevators approx. 150 mm above finished floor level.

Construction details of materials shall be as follows:
Troughs - minimum 2 mmthick GI plate
Buckets - minimum 2 mmthick
PP plate Top head - minimum 4 mm thick GIPlate
Cover of top head - minimum 2 mm thick GI Plate
Bottomhead -minimum4mmthickGIplate

F. CASCADE TYPE DIAMOND SHAPED MAGNETICSEPARATOR

These are used in the system to arrest the ferrous impurities from raw materials feed flow.

The unit is fabricated from GI steel plates of minimum 3 mm thick in diamond shaped chute. On each sectionofchute,apermanentmagnet(magneticstrengthminimum11000gauss)ishousedinstainlesssteel 304 enclosure with heavy duty hinges and magnet to be swing away from the body of chute by pneumatic air cylinder after a pre-determined time through signal from a PLC. Cleaning cycle of magnet to be fully automatic and shall be operated from SCADA in control room. Ferrous impurities to be collected in a separate steel hopper at ground floor through GI gravity pipe and GI pneumatic 2 way flap. Regular materialhastobeguidedtoadifferentchute.LocationofmagnetstobeshowntheFlowdiagram.

G. DRUM SIEVES &PRECLEANER

These are required as pre-cleaning machines to separate impurities, such as straw particles,

strings, pieces of wood, stones, etc. from granular and floury bulk materials.
The machine to consist of a horizontal, overhung sieve drums rotating in an enclosed casing. The drum to bemadeofperforatedsheetmetalandperforationstobekeptopenbyabrushscraper.Separateoutlettobe providedforfineandcoarsematerials.Theguideoutlethastobeprovidedtoassistdischargeofthecoarse impurities and prevention of inclusion of fines. The machine to be complete with aspiration connection, foot mounted horizontal geared motor and driving parts etc. Construction detail of drum sieves shall be as follows:
Main body - 3 mm thick GI powder coated Perforated drum - 2 mm thick MSsheet

H. DUMPINGHOPPERS

Thesearerequiredingo-down/ inrawmaterialunloadingstation fordumpingof ingredientsfrombagsto conveyor runningbelow.

These shall be fabricated from GI steel plates for sufficient holding capacity, with removable MS grill. Nosing angle frame for installation of these hoppers in RCC opening shall be provided by CLIENT. ISMC 75 x 40 mm cross members for seating grill on angle cleats and for seating aspiration unit shall be provided. The grill shall be welded on the cleats and shall be about 10mm below the FFL. A removable type magnetic grill made from SS 304 4thk tubes inserted with rare earth permanent magnets rods (min 11000G) shall be placed on the grill whenever needed for filtering out magnetic impurities/floor sweepings. Suitable size bolted type inspection window cum sight glass of 5 mm thick acrylic sheet to be provided at just above outlet. Suitable aspiration to be provided in the dumping hopper.
Construction detail of dumping hoppers shall be as follows:

Mainbody-		minimum 3 mm thick MSsheet
Grill	-	40mmx6mmMSflats(verticalposition)
Frame	-	65 x 65 x 6 mm MSangle

I. HOPPERS AND STORAGE BINS &REJECTS

These are required for storing materials as per the requirement of process flow. These shall be fabricated from mild steel plates /profile ribbed steel sheets with welded/bolted joints wherever required for required holding capacity with stiffening arrangements. Main body shall be fabricated from minimum 3 mm thick MS sheets. Suitable channel type stiffeners shall be provided to avoid bulging. It should preferably have sight glass cum inspection window near outlet, top manhole (size 500 mm x 500 mm approx) with removablegrill&hingedtypecover.Airbreathersshallbe600mmdiaorasperdesign.Bracketwithropela dder shall be provided for bins and high /low level sensors with visual alarm (wherever required as indicated elsewhere), sight glasses on shell & bottom cone. Bins shall preferably be rectangular in shape. If two or more rectangular bins are required at a particular location, these are preferably to be installed adjacent to each other having common partition walls with an opening of size 300 x 300 mm (approx.) at top side ofwall.

J. SILO FUMIGATIONSYSTEM

A portable air recirculation power unit shall be installed. Silo shall be provided with, fixed plastic pipes to inject fumigants into the Silo aeration system ducting at the bottom of the Silo; and fixed plastic pipes for collecting exhausted fumigant from the top of the Silo and should be a closed loop.
The phosphine formulation should beas per BIS 1980. Irrespective of formulation used, be it aluminum phosphide or phosphine granules, a system needs to be designed for 1.5 g/meter cube

phosphine gas.
The storage needs to be insect free but still two fumigationcycles are expected once as a preventive fumigation andother as a curative fumigation. Beyond two fumigation a careneeds to be taken for phosphine residue as per Prevention ofFood Adulteration Act or similar regulations.

K. AERATIONFANS

To remove the hotspots developed inside the silos and to bring the inside grain atmosphere to uniform temperature, air will be circulated through the grain.
Aeration system includes fans with aeration frames which are fixed in trenches on the floor of the SILO foundation. Aeration frames are covered by perforated sheets having holes for the air passage. For aeration system designing, aeration area should be considered 20 % of total area and suitable to run on auto mode.

It is further clarified that the above parameters are recommended for Conveying and other fabricated equipment. In case of any deviation, bidders are advised to submit the design calculations in the technical bid

General Requirements

All bolted type drag chain conveyors shall be with AR steel wear liner at inlet and outlet have following: Maximum linear speed – As per the required capacity and should meet the project's requirement and better life
Minimum cover plate thickness - 3 mm Minimum side plate thickness - 4 mm Minimum bottom plate thickness - 5 mm Minimum intermediate plate thickness - 4 mm
Material should be pre galvanized minimum 275 GSM

All belt bucket elevator with flanged double trough shall have following:

Maximum liner belt speed - As per the required capacity and should meet the project's requirement and better life
Minimum trough plate thickness - 2 mm Minimumheadandbottomplate-4mmthickness
Material should be pre galvanized minimum 275 GSM with wear liner at inlet and outlet

All screw conveyers shall have the following:
Minimum trough plate thickness - 3 mm Minimum flight screw plate - 3 mm thickness Minimum top cover plate thickness - 3mm

AllproductpipingshallbeofODstandardGI"B"classpipe(Sizeshouldbeasperttheprojectrequirement andindustrial standards).Accordinglyslightglasses,pneumaticflaps/gatesbeingprovided.

The diamond shaped cascade magnets provided in the System to be of rare earth magnets with minimum
strengthof11000gauss.TheMagnetsinelevatorswhereferrousparticlesshallberemovedmanuallyfrom magnets shall be Ferrite Magnets of minimum 11000 gauss. No magnet to be provided in dumping hoppers. Magnets should be duly marked in the P&ID.

Spare parts: For two years operation of the entire Silo System after capacity trial, spare parts to be indicated and quoted item wise separately for individual equipment. Cost of spares will be considered for price comparison purpose. Spares if any required till the capacity trial is completed shall be provided by successful bidder without any additional cost.

Training: For all the imported equipment like sweep auger for grain silo, temp.

Monitoring system etc., training of the operators would be undertaken by the supplier directly.

The silo system would also have the following additional facilities:

- Elevators supporting tower to have proper roof shed for easy operation and maintenance during rainyseason.
- Allsupportingstructuralplatforms,elevatortowers,staircase,walkway,chequeredplatesfor platform/staircase/walk way, gravity pipes to be of hot dip galvanized and of pre-fabricated bolted design.
- Lighting for storage silo area, loading & unloading area of the silo system (Considering lighting after every 5 meterdistance).

MACHINES

A. ASPIRATION FILTER UNIT

This is used for cleaning of dust laden air or the separation of solids from gas/ solids mixes, in order to recover materials and clean the exhaust air or the gas.

Dust laden air enters in aspiration filter and then clean air escapes by blower mounted on the unit through filter bags and dust is deposited on the outside of filter bags. For removing the dust retained on theoutside of filter bags, high pressure reverse air shocks are provided at regular intervals to the inside of the filter bags through an automatic electronic/pneumatic control system. Compressed air for reversed air shocks will be available near the unit. Dust after reversed thrust to be fallen directly on the equipment on which aspiration unit is installed/ collected in a bottom hopper /cone clamped with body of unit. The blower to have suitable silencer /noise absorbed arrangement on discharge end to reduce noise as per industrial norms.

Aspirationfiltertoconsistofsheetsteelbaghousingfabricatedfromminimum3mmthickmildsteelsheet withinletspoutanddustcollectinghopper/cone,blowerwithmotor&silenceforescapingcleanairatnear zerosoundlevel.Blowerofaspirationunittoberunbysuitableverticalfootmountedelectricmotor.Filter to be provided with sheet steel hinged cover with integral filter-row purges system in IP-65 protection class. Filter bags of cartridge type, non-oven made from polyester plated membrane laminated, to be providedwithsuitableGIcageifneededandfasteningsystem.Itshouldbeensuredthatbagsandcagescan be easily removed for cleaning in position by special annular brush. One cleaning brushes for filter bag to be provided along with the unit. The unit to be complete with electronic/ pneumatic control apparatus having provision for adjustable bag cleaning cycle and the length of the cleaning pulses, air filter cum regulator unit for moisture removal and to control system pressure, steel supporting legs, manometer to measure pressure drop across the filter bags etc. as perrequirement.

ASPIRATION SYSTEM FOR DUMPING HOPPERS shall also be similar to the above and required to minimize generation & spread of dust while dumping ingredients in dumping hoppers.

MISCELLANEOUS

A. ASPIRATIONDUCTS

These are used in storage silo system for inter-connecting dust producing centers such as hoppers/bins/machines etc. With Aspiration filters, blowers etc.

Minimum Size of Any Pipe to Be 150 MM. (Nominal Dia.)

B. GRAVITYSPOUTING

These are used in Silos, Pre cleaning systems for connecting different machines, hoppers, etc. for conveying various ingredients and finished feed.
These can be in the form of circular pipe or rectangular/square shape with flanges only, no cufflink is allowed.
MINIMUM SIZE OF ANY CIRCULAR PIPE TO BE 320 MM. (NOMINAL DIA.) STANDARD GI "B" CLASS OR 400 SQ CM FOR SQUARE GIPIPES.

All spouting & accessories such as bends spout branches, segments, elbows, transition pieces, flaps etc. to be manufactured from minimum 3.15 mm thick MS steel sheets. Pipes & accessories to have non- porous & no projection on internal surfaces and having excellent protection against rust.

C. TWO/THREE WAYFLAPS

These are required in storage silo system for diverting the flow of material.
FlapstobefabricatedfromGI/SSsheetsteelwithwearlinerwithinlet&outlethavingflanges.Theseshall bepneumatictypeorasapplicable.Flapstobecompletewithinspectionwindows,limitswitches,solenoid valves, pneumatic cylinders & operating handles etc. The main body of flaps should be made from 3.15 mm MS sheet and solenoid valves suitable for 230 V, 4ports.

D. SLIDEGATES

These gates are required for discharging/accumulating solid ingredients in the hopper/bin/mixer. Minimum one manually operated. These shall be either manually or pneumatically operated or as applicable, & shall be complete with reed switch (for pneumatic operation)/ scale (for manual operation) to indicate the position of the gate to RCP/ centrally located PLC in control room as detailed. For pneumatic gates suitable size, air cylinder (double acting) & rating solenoid valve shall be provided. The design of the gates shall be approved by the CLIENT before supply. Wherever required, pneumatic gate shall be provided with slots/stoppers and control mechanism to control the flow rate of material rather than only open and close. The body is to be made of minimum 3 mm thick GI/ MS steel sheet.

E. AUTOMATION EQUIPMENT&ACCESSORIES

Function: Programmed operation through PLC logic, for level monitoring, temperature monitoring, auto operation of aeration blowers, equipment interlocks, gates and flaps safety interlocks, operation of aspirations units, magnetic separator operations, recording of data, report generation etc. The system shall include but not limited to the following

AutomationsystemwithDCS/latestversionofPLC,SCADAforsilosystem,forrealtimemonitoringand control of silo system level, temperature, aspiration etc complete with Remote I/O panels, sensors, limit switches Ethernet cables, signal cables, System safeties, protectionsetc
OnenumberOperator'spanel(HMI)forprogrammedprocessoperationforoptimalpowerutilizationwit h WINDOWS compatible software. Laser printer, UPS & its rack/ standetc.
ModulartypeFurnitureforcomputersandoperator(Tables,chairs)

F. WEIGHING AND BAGGING SYSTEM

Electronic load cell based semi-automatic bagging machine (net weigher type) –having weighers with chute suitable for both Jute & HDPE bags complete with heavy duty stitching machine and

slat conveyor for transporting filled bags for bagging machine to dispatch vehicle for truck loadingthroughstitchingmachineandslatconveyor.Thesystemshallbedesignedsuchthatdirectloading offilledbagsintrucksasfaraspossibleto minimizemanualhandlingofbagsbetweenthepointoffilling in bags and loading intrucks.
Capacity of minimum 15TPHandreasonablemechanical systemtostack& loadbaggedwheat forloadingintothetrucksorrailway wagons. The accuracy of the weighershould be minimum 0.01%. Theelectronicweighingsystemshall conformtoIS-1436(1991).

NOTE:GENERALNOTEONAUTOMATIONPROVISIONS

- Continuous Level sensors for indication and control for all silos shall preferably be provided.
- High and low level sensors for indication and control for extra safety for all above silos are to beprovided.
- Proximitysensors,limitswitchesetc.,forfullopen/fullclosefeedbackofvalves,gates,flaps, slowspeedindication,man&machinesafetiesandforoverflowsensingofelevators/conveyors, and critical equipment are to beprovided.

TECHNICAL SPECIFICATIONS FOR UTILITIES/SERVICES GENERAL REQUIREMENTS

Thesupplyofpipes,valves,fittingsandaccessoriesforutilitiesinthiscaseCompressedairisincludedinthe supply

The following may specially be noted.

- Forpipesizingtheflowratesshouldbeasperttheprojectrequirementandsuitability.
- Allvalvesforaboveservices aretobeflangedtypeexceptthosebelow25mm.
- The supply of above service pipes should be inclusive of same quality bends, tees, flanges and with necessary gaskets, bolts, nutsetc
- Flanges/Counter flanges shall be as per BSTables:
- Painting of pipelines (As applicable) with anti-corrosive primer and paint of approved shade including, lettering, marking, flow directions etc., shall be as per the industrial norms and painting procedure.

A. COMPRESSED AIR EQUIPMENT ANDDISTRIBUTION

i. AIRCOMPRESSOR

This is required for producing compressed air required for operation of pneumatic flaps/ gatesand aspiration filters of Silo system,etc.

Thisshallbelubricatedscrewtypeaircompressorwithoilfiltertofilteroilupto0.01microns,forgeneration of oil & moisture free dry air at suitable pressure and required free air delivery. Compressor shall be advanced control system for capacity control and for performance monitoring with high efficiency **IE3** motor. It shall be complete with intake filters and all standard accessories such as service valve, safety valve,autodrainvalve,pressuregaugeandsuitabledrivemotor&drivepartsetc.
Compressor shall be provided with a pressure switch for auto operation. The capacity of receiver shall be sufficient to meet sudden large requirement of compressed air and to avoid frequent ON/OFF of compressor.Forremovalofmoisturefromreceivers,automaticdrainvalvewithsolenoidetc.tobeprovided.
The starter panel shall be supplied with thecompressor.
Capacityofthecompressoranditsdrier,receiver shallbesuitabletotakecaretheloadofcompressedairfor completestoragesilosystem.Dischargepressureofcompressorshallbe7Kg/cm2anditshallhavethenoise level preferably be 68 +/-3dB.

ii. REFRIGERATED AIRDRIER

FUNCTIONAL REQUIREMENTS
Air drier would be required to provide moisture free compressed air for use in various equipment, controls & instruments.

DESIGN REQUIREMENT
The Air Drier shall be refrigerated type, air cooled and suitable capable of handling requirement of air for complete system at a Maximum Pressure of 16 kg/sq cm. It shall be fitted with a suitable CFC free reciprocating refrigerant compressor, using R134A Gas having a minimum pressure drop (0.35 bar) fitted with efficient compact copper tube in tube heat exchanger, with counter flow pattern, heat exchangers fully encapsulatedwithPUFinsulationallhousedunderinsulatedbox.Thecompressorshalldeliverairqualityof +30 C PDP all housed in a sound reducing enclosure needing no foundation.

Capacity of the compressor drier shall be suitable to take care the load of compressed air and supplied with the Electrical panel associated with the drier complete with incomer switch.

SCOPE OF SUPPLY

The Air drier should be provided with the following:

- Air inletconnection
- Air outletconnection
- Air inletstrainer
- Cyclone condensateseparator
- Pressure dew pointmeter

  Air-drying unit insulating block housing Air-to-Air heat exchanger, air to refrigerant heat exchanger/evaporator,cyclonecondensateseparator,liquidseparator,refrigerantdistributor,andrefrigeration injectionrestrictor.
- Condensate trap with automaticdischarge
- Manual drain valve for condensate & auto drain valve (timerbased)
- Water cooledcondenser
- Safety switch, High & Lowpressure
- Liquid refrigerantdryer
- Liquid shut offvalve
- Liquid refrigerantreceiver
- Liquidseparator
- Sight glass with moistureindicator
- Refrigerant expansionvalve
- Refrigerant circuit accessconnection
- Hose, automatic condensatedischarge

iii. AIR RECEIVER:Function:

Air receiver shall store compressed air, help equalize pressure variation in pipes, & prevent short cycle loading and unloading of compressor.

Design Requirement:

Receiver shall be vertical type with dished ends and shall meet the statutory requirement of pressurevessels. Receiver shall be designed conforming to IS 7983 and the material of construction shall conform to the relevant IS in mild steel. Capacity of the receiver shall be suitable to take care the load of compressed airfor complete system. The receiver shall be complete with safety valve, service valves, pressure gauge, fusible plug, hand holes, automatic moisture separator and auto drain valve (Timer based) to remove moisture. The airreceivershallbedesignedforDesignpressureof12Kg/sq.cm&shouldbeHydro-testedat18Kg/sq.cm.

COMPRESSED AIR PIPING AND VALVES

Heavy duty, GI ERW piping (class C), only welded or flanged installation, complete with ball valves with

SS working parts, flexible metal braided hoses & brass nipples, 4 port, 3 way Solenoid valves etc as per requirement. Necessary controls and instrument including flow meter, Pr. / temperature sensors etc. shall

beinthescopeofsupply.Allpipingshallbeinternallycleanedandflushedbythecontractoraftererection in a manner suited to the service and as directed by theCLIENT.

ELECTRICALS Electrical &Automation

Powers supply 415 volts, 50 HZ, 3 phases, with **suitable UPS** for supply to controls, PLC, DCS, Computers etc.

Allelectricmotorstobesquirrelcage,3phaseEnergyEfficienttypeIE2andtohavedirecton-linestarterup to **7.5 KW**, star delta starter **above 7.5 KW and up to 11 KW**, electronic soft start starter **above 11 KW motors**. For all motor feeders below 40 HP use Motor Protection Circuit Breaker with overload /SC protection, contactors in Motor control centre shall be provided. However for large sized motors suitable capacitors shall be directly connected across the MCC bus bar of main system when respective motor is switched ON.

For power, from MCC to motor, armoured cables with copper conductor with suitable rating shall be provided. For controls, armoured cables with copper conductor (minimum 1.5 Sq MM). For signals copper conductor un- armoured cables can be used.

Electric geared motors either directly mounted on equipment shaft or with direct coupling preferred over motor with gear box combination. Minimum safety factor for gear motor/box to be1.4.
Auto operation of System with latest version PC and display monitor. Including conveying shall ensure equipment safety.

Hard mimic required on operating control desk which also serves for manual operations, lighting of production block's steel structure to be dust proof industrial type, having minimum IP 54protection.

All bidders shall submit a consolidated list of motors equipment-wise, (with drive mechanism up to shaft of machine wherever applicable), and any other electrical utility units consuming electrical power indicating KW (installed and operating), RPM of motor, RPM of gear motor/box and type of drive parts.

All bidders shall submit a consolidated single line power diagram of electrical installation being providedby them, including wherever applicable the details of motor control centers, control panels, remote panels and electricmotorsetc.ThisalsoincludessuggestedCapacitorbanksinKVARconsideredfortheequipment.

Biddersshallprovidedetailsofautomationconsideredbythemfor theirstoragesilosystem.Thesilosystem shall preferably be completelyautomated.

Note: It may be noted that design data & drawings, automation which are to be submitted with the bid, are binding and mandatory in order to evaluate the bid. Bids without the complete set of required details may be treated as incomplete bid.
Further the successful bidder after acceptance of contract shall have to submit the final set of required
drawingssuitablymodified/correctedifnecessaryasperfinaldesignrequirements/siteconditionsandgetthe same approved from CLIENT beforeexecution

Necessary LT Electrical system complete for the Silo System starting from LT cabling of LT panel through Motor Control Centre of the Silo System, Control desk housing I/O modules and hard mimic along with necessary controller PLC. Other electrical include downstream motors and gear motors/gear boxes, power and control cables, instrumentation and field wiring, field devices, isolators, push button stations/remote I/O panels, cable trays, earthing, capacitor bank, etc. with necessary process and equipment interlocks as per requirement. CLIENT will carry their HT line at a single point at site. Regarding cable from LT Panel to MCC Panel, it is expected that bidder shall visit the site & understand the site condition or consider 200m lengthofsupplyingandlayingofcableandincludethesameinthepricebid.Howeverpaymentwillbemade as per actual execution andmeasurement.

Electrical Battery Limit:

After Silo system MCC panel, HT line (including supply to MCC from PCC)Power and control of all supplied equipments and earthing. With Lighting arrester and Lighting Provision near Inline motors. (i.e. Elevators, Conveyors, Cleaners, Bag Filters). All applicable transformers and Diesel Generator(100 % Power Backup for Plant operations- for smooth plant functioning) are to be included accordingly.

Haryana State Electricity Board will provide electrical connection till Transformer.
The transformer along with further connections for electrical including Power backup remains in the scope of the successful bidder.

AUTOMATION: Objective:
AutomationforrawmaterialstoragesilosysteminMegaFoodParkshallbeintendedtoensureuninterrupted operation of equipment and reduce manual involvement to the extent possible. PLC with SCADA shall be usedforautomation&operationofthesystemwithredundancy,asperthefollowinglogic:

Other safeties and interlocks: Aeration system is to be provided to control the temperate of material inside the silo within the permissible limit to ensure safety of silos

Fire Fighting System
A suitably designed firefightingsystem is required as per the norms of the local Fire Fighting department which has hydrants, portable fire extinguishers like CO2, dry powder type etc. The Fire fighting should conform to NBC norms as per the site area.

General Requirement:

1. The system shall be used to automate and co-ordinate, monitor the operations of silo system for storage / intake, to ensure smooth and continuousoperations.
2. All idle machinery shall be put off when not inuse.
3. Systematicandregularreportgenerationforshift,day,month,yeartobemadeavailableforallmain and critical equipment which are to beoperated.
4. Temperatureofmaterialsinsidethesilosfromtimetotimeandreportsaregeneratedtimetotimeby Quality ControlOfficer.
5. Health/load of all motors shall be tracked and recorded on weeklybasis.
6. All hardware for dynamic and static panel, PLC panels shall besupplied.

TECHNICAL SPECIFICATIONS FOR ERECTION, TESTING & COMMISSIONING

Erection, testing and commissioning is inclusive but not limited to the following:

- Positioningofallthesilosystemequipmentintheapprovedlocations,includinggrouting,anchoring etc as perrequirement.
- Laying of product, aspiration and Service pipelines inclusive of the necessary valves, fittings etc. including the necessary accessories ifany.
- AnchoringofthepipelinesonnecessarysupportsforallproductaspirationandServicepipelines.
- Erection/Welding/Grouting into place necessary structural platforms, walkways, hand rails etc., as perrequirement.
- Nameofallimportantmachinestobewrittenonthemafterfinalinstallationbutbefore commissioningbyapainter.Necessaryaeromarksandotheridentificationbypaintingtobeprovided on piping asrequired.
- Laying of LT Power cables in conduit pipes, cable trays, underground (including excavation etc) as per specifications or in trenches provided by the CLIENT, including supporting of cable trays/conduits, isolators, junction boxes, remote push button stations etc. Termination of Power cablesonMCCandonMotorstarters,Capacitors,isolatorsetc.withsuitablecableglands,lugsetc.
- Termination of control cables/sensor wires on RCPs, control panels, limit switches, indicators, controllersetc
- Earth pit installation complete including excavation, installation, refillingetc.
- Earthing of all electrical equipment with two runs of earth electrode of appropriate size from earth pits, Panel board trenchesetc.
- Testing and commissioning procedure have been detailed separately intender

TECHNICALDATA&INFORMATIONTOBEPROVIDEDBYBIDDER(Biddersshouldprovideth e details of equipment and other details for which they intend toquote.)

FLOW DIAGRAM

Bidders shall submit the flow diagram based on requirements of CLIENT, starting from unloading of materials to dumping hopper, cleaning and receipt of materials in silos, conveying of material from silos to bagging/processing or dispatch.

EQUIPMENT LAYOUT

Biddersshallsubmitthescaledequipmentlayoutsofthesilosystemincludingun-loadingstationintheform of plans along with sections and elevation views. This shall also have the dimensions of the equipment as well as the suggested dimensions of the silo system as recommended by the bidder. **The layout should be made in such a way that it should be easy for operation and maintenance of various equipments and machineries, materials should be easily transported from silos to final destination (either bagging or production or truck loading) as per the sitelayout.**

MODULAR LAYOUT OF STORAGE SILO AREA

Bidders shall provide the scaled drawing (similar to one prepared by CLIENT and attached with bidding document) showing proposed area of the Project (Silo Site) with the relative location of the various blocks. Biddersshouldconsidertheminimumareaofstoragesilosystemincludingstaircaseforelevatortower.Top walk way over silos should be at samelevel.

CATALOGUES/LEAFLETS/DRAWINGS OFEQUIPMENT

The complete technical details of the various individual equipment proposed by the bidder in the form of catalogues/leaflets/ drawings, data sheets etc., are to be submitted along with the bid.

DEVIATIONS FROM TECHNICAL REQUIREMENT

Itemswhichdeviatefromthebiddingproposalshallbeasperdesignspecificationsofthebidderandshallbe treated as a deviation from the text of this bidding document. Deviated items should fulfill the minimum performance parameters as specified in thistender.

Thisbiddingdocumentdoesnotallowbidderstomakeexclusionsfromanypartofthebidandanincomplete list of equipment or an incomplete schedule of service utilities to be provided would be considered as a non- responsivebid.

OPTIONAL ITEMS / BREAK UP PRICE Break Up Price
For all items including LOT or SET items which are detailed in the bidding document, break-up price of the lot/setitems,unititemrateswhetherinNos.,RMorSq.meters.,KilogramsorMTshallbeprovided.**Thisis meant for only payment releases during supply & execution and not for the commercial evaluation of the bid. The bidding document will be evaluated on a total lump-sum basis as per LOT or SET as specifiedbyCLIENT.**Allsurplusmaterialsincludingscrapmaterialsunderunitrate /lot items shall be taken back by the successful bidder after satisfactory completion of works defined under this tender

PROJECT MANAGEMENT:
The project execution shall be time-bound as per the mutually agreed time schedule. Supplier shall nominate an experienced project engineer who shall be responsible for activities of project in office andsite.
Acompetentexecutionteamshallbedeputedatsitebysupplierwhoshallbestationedatsiteandadequately experienced in Project Management of such magnitude andtype.

- TheCLIENTshallalsonominateanofficialwithwhomthesuppliershallcommunicate/coordinate.

- TheCLIENTshallalsopostaSiteEngineeratproject siteforsupervisionandcoordinationwithSite Engineer of the supplier. Approval on technical documentation (with or without specified amendments)shallbegivenbyCLIENTwithintenworkingdaysaftersubmission.

- Supplier shall obtain approval for purchase of specific makes of equipment whose makes arenot mentioned in his offer. If two or more makes of the same equipment are mentioned in the form of alternatives,thesuppliershallseekapprovalforchoosingonemakeoveranother.

- Thesupplier'sProjectEngineerwillprovidetotheCLIENT"sProjectIn-chargewith**fortnightly** progress reports which clearly indicate the actual vs.planned progress and the new likely completion date of supply, erection and commissioning of the SilosSystem.

- For indigenous items, the supplier shall invite CLIENT/Construction Manager for inspection and preliminary testing. The inspection may be required at various stages of manufacture/assembly for some items. For imported items, the CLIENT has right to inspect the equipment at manufacturer's works prior to dispatch. However, supplier shall do the inspection and submit the necessary test certificate.

- Details of documentation to be submitted shall be according to the overall project programme.

- The Project / Site Engineer of supplier shall be fully authorized to take on the spot decision with regardto:
  - Modification in layout and execution programme to suit localconditions.
  - To purchase essential materials from local market to avoiddelays.

- After satisfactory erection and testing, competent commissioning team shall be deputed to establish the performance parameters for a specificperiod.

TESTING AND COMMISSIONING

After installation of all equipment and completion of product piping and connection of all utilities including electrical, each major equipment shall be tested at no load after checking all alignments. On completion of satisfactory no load test, section-wise testing at no load shall be carried out. Any defect noticed during no load shall be attended to. After testing of all sections on no load, the System as a whole shall be tested with raw material for trial run and ultimately commissioning the complete System to the satisfaction of CLIENT project authority.

ESTABLISHING PERFORMANCE GUARANTEES

OncompletionofsupplyerectiontestingandcommissioningoftheSystem/ equipmentthesamehasto be operated at full capacity continuously in **3 shifts of 8 hours basis for 3 days** to the satisfaction of the CLIENT/Project Authority, to establish performance guarantees provided by the bidder. However, the operating staff for three shifts shall be in bidder scope, number of days can be increased according to the CLIENT's requirement and siteconditions.

TRAINING

Training in the operation and maintenance of the various equipment of the System shall form an important componentofProjectManagement.Trainingshallbeundertakenbythebidder**foraperiodofthreemonths** during which the contractor should guide and train the staff of the CLIENT in operation and maintenance of the all the equipments to achieve the optimum efficiency and product quality. Training should commence during the testing/ commissioning period and shallinclude:

1. Familiarization with all major equipment of the storage silo system and its utilities etc. including the operation of the DCS/PLC panels and othersystems.

2. Procedureforattainingtheratedoutputandoptimumproductquality.Familiarizationwiththe basic principle of Electronic/Electrical control systems, including faultfinding.

3. Familiarization with start-up procedures, regular maintenance and operational procedures including dismantling of machine parts, replacement of spares/components, preventive maintenance etc. Condition monitoring ofequipment.
4. Generating production and maintenance log sheets of important equipment and systems. The CLIENT will nominate a qualified team for training purpose. Training shall be given to all the personnelrequiredtooperatetheequipmentandtheirimmediateSupervisors/Engineers.

The training schedule should be proposed by the bidder together with the content of training programmes, their duration etc.

STAND-BY SERVICES AFTER COMMISSIONING

Once the commissioning and warranty runs are over and the System is taken over by CLIENT/ProjectAuthority,thesuppliershallprovidetotheSystemstandbytechnicalsupervisorysupportas follows:

- For **one month** after warranty runs in which further training of the CLIENT/Project Authority‟s operating staff shall be done and equipment/system still needing finer

adjustment/changes shall be carriedout.

- For**aweekeachafter4months,8monthsand1year**fromwarrantyruns,tohavediscussionswith System staff and assistance to review the correctness of operations / maintenance procedures and necessarycorrections.

BATTERY LIMITS Equipment
All raw materials bulk storage silo system equipment and machinery to be supplied & erected by the bidder but not limited to the list in the scope of works of the bidder and starts from the dumping hoppers of silo intake section up to final processing section.

All frames, foundation bolts for equipment with accessories and their civil grouting ensuring proper alignment, maintain verticality/plumb, levels etc are also to be provided by the bidder.

Bidder shall provide equipment details including cut out drawing as per requirement

Compressed Air:
Bidder‟sscopesincludecompressedairatrequiredpressure,istobeproduced,storedanddistributedittoall consumptionpointsintherawmaterialstoragesilosystemandcleaningsystemforallpneumatic(orelectric operated) flaps / gates operation etc. Drain from the air compressor, receiver shall be taken outside the room by the bidder through auto drainarrangement.

Lighting
Electric power, 415 V, 3 phase & neutral shall be made available in lighting switch board located in LTroom.Cables,distributionboardforstoragesiloarealighting(includingonrawmaterialunloadingarea)sha ll be provided by the bidder. Distribution of lighting in walk way on top of silos & overhead conveyors, on maintenance platforms for elevators & its pit, raw material un- loading area etc. including supply & installation of light fittings as details below, aviation light with wiring, lightening arrester, CU lightening conductorandnecessaryearthpits&CUearthingelectrodesareinthebidder'sscopeofworks.

Supply of Metal Halide 150W MH flood light fixture IP 65 with powder coated pressure dies cast aluminumhousingandtoughenedglasscover.Thefittingandthegearcompartmentshouldbecompletewith thenecessarylamp,igniter,ballast,capacitorandmountingaccessories.ModelGEGEMF1X150CAI.

MATERIALSANDOTHERRESOURCES:Allconsumableslikegearoils,lubricants,packingfor flanged joints etc. and commissioning spares required if any, for installation, testing & commissioning till takingovertheSystembytheCLIENTshallbeprovidedbysuccessfulbidder.

OTHER STATUTORY REQUIREMENT
The Mechanical and Electrical design, performance and function of the main equipment/parts and their accessories, including control and instrumentation panels of storage silo system shall comply with the latest relevant Indian standards. Safety and other statutory regulations/ requirements shall comply with that being followed in the country.

- A well thought system for operational management systemconforming all the requirements in a transparent way needs to be planned and written and shared. A PLC/SCADA system is a good enabler for the purpose which serves well for safe operations as well.
- Preandpostcommissioningstagesthe facilitymanagementshouldconformtothe StateEnvironment&Pollutionnorms. Anydeviationwouldlead tostrictaction
- A well laidoutsafetyplanshouldbeadhered toavoidanykindofminorormajoraccidents. HighstructureslikeProcess tower,the catwalksof theSilos etc.shouldbeprovidedwith the lighteningarrestersystem. A well-documented Safety Plan in both soft and hard copy shall be furnished by the bidder at the completion of the project.

Civil, MEP, Firefighting Works:

All civil, MEP, Fire fighting works for Silos Area ,external development works-roads/pavements, steel shed structure for loading/ unloading are to be executed by the civil contractor.

TECHNICAL DETAILS AND DRAWINGS TO BE FURNISHED ALONG WITH THE BID

A) DRAWINGS

- **Equipment drawing:** The general arrangement (GA) drawing of silo and each associated equipmentlikehoppers,conveyors,elevatorsetc.,indicatingdimensions,tolerancesetc.,aspropose d by thebidder.
- **Layout drawing:** The machinery and equipment layout drawing of the silo systemshowing
- layout of the silos and other equipment with all accessories including panels and service/utility units complete.
- **Service piping Schematic** Wherever applicable the drawing showing the service/utility schematic piping for compressed air (including branch lines, valves, insulation thickness, controls, instruments, traps, sight glasses, strainers, safety valves, automation (if any) and all accessories etc., to be submitted withbid.
- **Electricals** The single line diagram showing electrical power distribution from the panel, details of motor HPs of all the motors, cable sizes of feeders to various equipment etc., to be furnished. Control wiring and automation scheme diagrams of the relevant panel drawings to understand the control scheme/logic is to be submitted bysupplier.
- **Catalogues** The relevant catalogues, technical data sheets, drawings, photographs etc., ofeach equipment/accessory being offered to be submitted by bidder

B) EQUIPMENT

List of equipment (Section-wise) with adequate brief specification of each item including construction material, critical thicknesses, and length/height/capacity, drive details, make/model etc.

Chain Conveyor:
General arrangement drawing of a typical chain conveyor showing thickness of various plates, detail of wear plates, detail of chain, designed breaking load, chain speed, type of bearing, drive arrangement, etc.

Bucket Elevator
General arrangement drawing of a typical belt bucket elevator showing thickness of various plates, size, type and thickness of buckets, size and type of belt, type of bearings, belt speed, drive arrangements, head and tail pulley etc.

Screw Conveyors
General arrangement drawing of a typical screw conveyor showing thickness of various plates, size and type of main shaft, pitch of screw, type of bearing, screw speed, drive arrangement, drive parts etc.

Proportionate bins/ hoppers
General arrangement drawing of a typical proportionate bin and a big hoppers, molasses tanks, showing thickness of various plates, height and diameter, flange joints, slops and construction material etc.

Flat bottom silos for raw material
General arrangement drawing of flat bottom silos (for grains as well as paddy storage) showing diameter,

height,coneangleatbottomandtop,stiffenersandsupportingstructure,andthicknessoftheplateatvarious places along with detail of aeration blower and temperaturesensors.

Silo accessories support Structure
General arrangement drawing of elevation and section showing columns, cross bracing, platforms etc.

Cleaning System
General arrangement drawing of elevation and section.

Technical Data for Silos and Cleaning System: Automation and PLC Panel

Details of the automation scheme, network diagram, type & model of PLC offered.

Technical detail of computer system with a write-up indicating equipment details, process, controls, type of reportswhichcanbeprinted.Detailofinput/outputportsandothertechnicaldetailsofthePLCpanel&hard ware of computersystems.

TECHNICAL DETAILS AND DRAWINGS TO BE SUBMITTED AFTER AWARD OF CONTRACT
The following shall be provided after award of contract:

- ThefinalequipmentGAdrawing(inbothhard-3setsandsoftform:AutoCAD)beingmanufactured as per design and product specifications ofCLIENT
- Final services /utilities schematic with sizes of pipe lines, valves, insulation thickness, controls, showing all instruments andaccessories
- Final foundationfootprint
- Final electrical load details inHP/KW
- Final control schematic of the controlpanel/automation

LIST OF APPROVED MAKES:

Thelistsofapprovedmakesofitemsaregivenbelow.Thebiddershallnoteandconfirmthemake proposed by them. Deviations in makes are to be clearlymentioned.

Description	Makes
Corrugated GIC Silo storage systems	SYMAGA / BEHLEN/ BROCK/ OBIAL/FOWLER WESTRUP/ SHIRKE/ GI AGRO SYSTEMS/ROSTFREI STEELS/ SIOUX/GSI/MY SILO
Electrically Operated Sweep Auger	MORILLON /AGI Frame/Shirke/Guttridge/ makes of tractor driven
Aspiration Unit	TECH FLOW / Reico/Rajdeep
Electronic Bagging Machine.	CRONOS RICHARDSON / BOSCH / TECHNO-WEIGH / C J INDUSTRIES / IIM /GABAR/Switch Well
Galvanized steel Pre-coated Profile sheets for side & roof cladding	INTERARCH/ POLYSTEEL (DENDRO) UNIMETAL / METACOLOUR / ISPAT/ TIGER / KIRBY/TATA BLUESCOPE/JSW/ESSAR
Centrifugal fans	ABB / FLAKT WOODS / AEROTECH /NADI/ Engicon/ NDSR/ AEROTEK
Process Control Valve	SAMSON / ROSEMOUNT / KROHNEMARSHALL/ FESTO

Structural Steel	SAIL / TISCO /RINL/IISCO/JSW/ESSAR/Makes to be As per IS 2062
Temperature, Pressure Level Transmitter & Indicator	E&H / ROSEMOUNT / SIEMENS/SUPERTECH/Fintech/I Grain
RTD	PYROELETRIC / ALTOP / TOSHNIWAL / RADIX
Level Switch/Sensor (for silos, bins and hoppers)	IFM /SAPCON, INDORE/ BAUMER /ALLEN BRADLEY / E&H//FESTO
Vortex / Magnetic Flow meter	E&H / ROSEMOUNT / YOKOGAWA / FORBES MARSHALL / MANAS MICROSYSTEMS / EMERSON.
Pressure switch / temp switch / Pressure transmitter /temperature transmitter /Thermostat	DANFOSS / SWITZER / PYROTECH /ALTOP / WIKA / AMERICAN SPECIALITIES, USA
Pressure & Temperature Gauge	FIEBIG / H GURU / WAREE / PRICOL
Temperature sensors / digital indicator / controller / recorder	YOKOGAWA / TATA HONEYWELL /RADIX / PYROTECH / E&H /EMERSON/Gescaser
Intelligent Motor Protection relay	ABB/ SCHNEIDER / ROCKWELL /SIEMENS.
VFD	SIEMENS / ALLEN BRADLEY / DANFOSS / ABB/SIEMENS/L&T/FUJI
Electronic Soft Starter	SIEMENS / ALLEN BRADLEY / ABB /SCHNEIDER /DANFOSS/L&T.
Load manager / Power / Energy Monitor	ALLEN BRADLEY / SIEMENS / ABB /ENERCON
Voltage / Current / Energy /Power factor Transducer	RISHABH / ENERCON/ SCHNEIDER /SIEMENS.
PC (Personal Computer)	COMPAQ/HEWLETT- PACKARD/IBMLENEVO/ DELL
PLC / DCS System	SIEMENS / ALLEN BRADLEY/ SCHINEIDER/ YOKOGAWA/ ABB
Automation System	SIEMENS / ROCKWELL /TECHNOWEIGH/ IIM / SCHINEIDER
TEFC Electric Motors & Motor for geared Motors	BHARAT BIJLEE / SIEMENS / ABB /CROMPTON / KIRLOSKAR
Geared Motor / Gear Box	PBL/POWER MASTER / RADICON/ SHANTHIGEAR / BONFIGOLI / EURODRIVES / ROTOMOTIVE/NORD
Air Circuit Breaker	L&T / SIEMENS / ABB / SCHNEIDER
MCCB, MPCB	L&T / SIEMENS / ABB / SCHNEIDER
Contactors	L&T / SIEMENS / ABB / SCHNEIDER
Starter Overload Relays	L&T / SIEMENS / ABB / SCHNEIDER
Timers Electronic	L&T / SIEMENS / ABB / SCHNEIDER

Switch disconnector Fuse	L&T / SIEMENS / ABB / SCHNEIDER
MCBs	SIEMENS/ L&T-HAGER / MDS LEGRAND / GE
Push Buttons	ESBEE / SIEMENS / GE / VAISHNO / TEKNIC/Schenider/Risabh
Indicating Lamps	ESBEE / SIEMENS / GE / VAISHNO / TEKNIC/Schenider/Risabh
Digital Ammeter & Voltmeter	ENERCON / IMP / MECO/Risabh/Schneider/Siemens
Analog Ammeter & Voltmeter	RISHABH / IMP / MECO / AE
Digital Energy Meter	ENERCON / L&T / CADEL / AE/Schenier/Siemens
Analog Energy Meter	UNIVERSAL / HAVELS / JAIPUR
Power Factor Meter	RISHABH / IMP / MECO / AE
LT Power Cables	CCI / FORT GLOSTER / HAVELS/FINOLEX / RRKABEL
LT Copper Control Cables	CCI / RPG ASIAN / FINOLEX / FORTGLOSTER / RRKABEL/HAVELS
Signal & Instrument cable	LAPP KABEL / RR KABEL / THERMOPAD
PVC Insulated Copper wire (for panel)	FINLOEX / RRKABEL
Power Capacitors	MALDE / MEHER / SIEMENS /EPCOS/ MOMAYA/Schneider/Siemens/L&T/Shreem/Sycon
APFC Relay	L&T / BELUK / MECO/Schneider/Siemens/L&T/Shreem/Sycon/Selec
Cable Tray	INDIANA / MEK / SUNRISE / SUPER / PILCO
Isolating Switches	SIEMENS / L&T/Eton
HRC fuses	L&T / SIEMENS
IP 55 boxes for motor isolators, push buttons, junction boxes etc.	HENSEL / HANSU
Terminal Blocks	WAGO / LAPP INDIA / CONNECTWELL / ELMEX
Pipe-in-pipe earthing	FAST EARTH/L&T
Electronic Load Manager	ENERCON / KRYKARD / L&T
Selector Switch	KAYCEE / SALZER

Cable Glands/Lugs	COMET / EX-PROTECTA / DOWELS / LAPP KABEL / BRACKO/Connect Well/Mechtric
Servo Voltage Stabilizer	SUVIK / APLAB / NEEL / KRYCARD/SERVOMAX/MAKVOLT/PUREVOLT/
UPS	EMERSION / APC / HI-REL / DBELECTRONICS / APLAB/Eton/
SMF Battery	AMCO / YUASA / EXIDE/Amaron
GI "C" Pipes for air.	TATA / JINDAL / KALYANI / MST
NRV for Air Line	INTERVALVE / AUDCO /L&T
Ball valves for Air line	AUDCO / L&T
Air Compressor	INGERSOLL RAND/ ATLAS COPCO/ELGI
Refrigerated Air Dryer	GEM EQUIPMENTS/ SABROE /CHICAGO PNEUMATIC / HIRAS/INGERSOLL RAND/ ATLAS COPCO/PURIFAIR/ELGI/KIRLOSKAR
Air lines accessories	SHAVO NORGEN / FESTO /AIRMATIC / LEGRIS / NUCON/AIRMAX/JANATICS/ELGI/KIRLOSKAR
Auto Drain Valve	ULTRA FILTER / ZANDER/JORC/ELGI/KIRLOSKAR
Weighbridge	LEOTRONIC SCALES/STAT WEIGH/MICROTECH/ESSAE /STAR WEIGH

Note: - In case the bidder proposes any other makes to sufficiency to the technical specifications and the scopeofthetender,theyshouldsubmitacomplyingstatementonallparametersandcomparisonstatement atthetimeofprebidmeetingonly.HoweverHAFED'sdecisionisfinal.
P.S.- in case of equivalent/competitive makes, bidders have to submit the name of the make list in the pre bid meeting considering their own design based on which they are bidding ensuring all technical specifications and parameters are achieved and met. As well as they should take approval of HAFED prior to placing the order.

This list of approved makes shall be considered for reference. **The Bidders has to submit the capacity,**
MOC/input/outputparameters/andmakesinthetechnicalBid.Priortosupplyandinstallationofall equipments and machinery, the successful bidder has to take written approval from the SPV/HAFED/ConstructionManager.

TECHNICAL SPECIFICATIONS OF CIVIL, MEP WORKS

Details of Civil Works

External Development for Truck Movement and Parking -The construction shall be basedon standards like IS:15658:2006 on"Precast Concrete Blocks for Paving– Specification," Bureau of Indian Standards.IRC SP: 63-2004 "Guidelines for Use of Interlocking Concrete Block Pavement" Indian Roads Congress. The bidder may also propose their own design complying to the relevant IS Codes.

(Please refer the drawings for details of external development and roads)

AdministrationOffice- Suitably designed office block to accommodate the requisite staff for ease of working cum LT Panel room space of approx. 50 Sqmetc.

Silos Civil Foundations- The Civil foundations are to be designed, vetted by the successful bidder and executed as per the loads with all safety factors applicable.

Sheds for Loading/Unloading- Structural Steel Sheds at loading unloading area are included in the scope

General Conditions for Civil Works

- The work shall be carried out as per the latest Haryana PWD specifications only. In absence of specifications from Haryana PWD specifications, specifications from standard Engineering practice,IScodesandasperdirectionoftheEngineer-in-chargeshallbefollowed.

- All material to be arranged by contractor himself, shall be confirming to relevant ISI specification, duly ISI marked and as per list of approved manufactures/ makes by HAFED attachedintheDNIT. Wherever referredISIcodes shallbewithitslatest amendments.

- Contractor will have to supply manufacturer's certificate certifying that materials have been manufacturedasperISIspecification, dulysupportedbynecessarydocumentation.

- Necessary certificate from the manufacturer for all the material brought at site shall besupplied to the Engineer-in-charge, certifying that this lot of material have been manufactured as per Standard of BIS and confirms to relevant ISICode.

- HAFED reserves its right to get any material tested from M/s Shri Ram Institute for Industrial research or other equivalent reputed test house to ensure for quality of material/work. Testing charges shall be borne by HAFED, but in Case of failure of any lot of material, all the work executed with that lot of the material shall berejected.

- Sampling of work in progress shall be carried out by representative of Engineer-in- Charge, Contractor and shall be got tested from M/s Shri Ram Institute for Industrial research Delhi / M/s Delhi Test House, New Delhi and NIT Kurukshetra. Fee of testing shall be borne by the H.S.I.I.D.C. But in case, if any sample fails, cost (testing charges) shall be recovered from agency with a fine of Rs. 10,000.00 per sample, in addition to rectification of defective work, to the entire satisfaction of Engineer in Charge, as defined in theHaryana
  P.W.D. specifications.

- All types of concreting is to be done with use of mechanical mixer and vibrator, which are tobe arranged by the contractor at his ownexpenses.

- The contractor shall submit the CAR (Contractor's All Risks) Policy for the awarded value of the work and valid of the work and valid for the entire duration of the work including the extended period of work, it any. The contractor shall provide to the Federation copy of the insurance policies and document taken out by him pursuance of the contract immediately after such insurance coverage. If the contractor fails to effect and keep in force insurance, as per the terms of contract, the Federation may effect and keep in fore any such insurance and pay such premium or premiums as may be necessary for that purpose and from time to time deduct the amount so paid by the Federation as aforesaid from any money due or which maybecomeduetothecontractor,orrecoverthesameasdebitduefromthecontractor.

- The contractor shall be responsible for preparing all claims and make good for all damage or loss by way of repairs and or replacement of portion of any works damaged or lost. The transfer of title shall not in any way relieve the contractor of his responsibilities during the period of the contract including

the Defects LiabilityPeriod.

- The contractor shall abide by the local laws and regulations governing labour applicable from time to time. During continuance of the contract, the contractor shall abide at all times by all existing labour enactments and rules made there under, regulations, notification and by laws (including rules), regulation, bye-laws that may be passed or notification that may be issued under any labour law in future either by the state or the Central Government or the local authority.

- The rate to be quoted shall include all allowances for hardness, wetness, sales tax, royalty(compensation) due to octroi and all such other charges and taxes leviable if any andnotingextrashallbepayabletotheagencyonthis account.

- Nothing shall be paid for any loss and damages done to rain, floods or any other act of God and payment shall be made only for material acceptable to thedepartment.

- Material purchased in excess shall not be measured and paid for and if not removed within one month after completion of the work, the material shall become the property of the HAFED and no claim on this account shall beentertained.

- The contractor shall provide suitable measuring arrangement at site for checking of various material supplied byhim.

- In case of duplicity/variation/contradiction of term& condition in the printed Tender Document and in special terms & conditions, terms and conditions mentioned in the Special terms & conditions willprevail.

- The rate will be firm and biding on the contractor during the currency of contractor including extendedtimeperiod.Noescalationshallbepaidforanyincreaseincost ofmaterial&labour.

- The contractor shall use Cement of OPC 43 grade as per IS-269-1976 (with latest amendments) of approved makes or equivalent as approved by competent authority / Engineer - In charge as per details givenbelow:-
    - Ambuja,JK, Ultratech.

- The contractor shall use Fe-415 / Fe-500 steel as per relevant IS standards of approved make as per details given below:-
    - SAIL, TISCO, RINL.
- The BoQ mentioned in this tender is indicative only. The quantities may vary invariably upto any limit. The contractor is required to execute the job with the rates of each items quoted at the time oftendering.
- Civil contractor need proper Coordination & Clearance with / from the Silo Work's contractor at the time of Anchor Bolts, Base Plates or as applicable casting / pedestal casting / Executing thejob.

Other Special Conditions

1.1 SITE OFFICE FOR THEENGINEER

1.1.1 Provision of SiteOffice

The successful Tenderer is to provide and maintain a site office at a location approved by the Engineer / Construction Manager in consultation with the Employer, within 15 days from the date of issue of Notice to Proceed.

1.1.2 Furnishing of the Site Office for theEngineer

A separate Engineers office as specified in the contract data shall be provided. This Engineers office shall be of standard quality and furnished. The maintenance of this Engineers office is also the responsibility of contractor.

1.1.3 Surveying Equipment

1.1.3.1 TheContractorshallprovideatthesite,athisownexpense,setofsurveyingand measuringequipmentsasspecifiedinthecontractdata.Thesetshallbeusedby the Contractor for requirement at site and also shall be made available from the commencementofcontractfortheuseoftheEngineer'sRepresentative.Theset shall consist of the followinginstruments:

1.1.3.2 All equipment shall be supplied with their tripods, staff and such other equipment/itemastheEngineer'sRepresentativemayrequireforthemeasuring, or setting -out of thework.

1.1.3.3 The Contractor shall be solely responsible for the maintenance of all such instruments and equipment and shall ensure they are, at all times, in good repair and adjustment. All equipment other than expendable items shall revert to the Contractor upon completion of theworks.

1.1.3.4 TheContractorshallprovidetheEngineer,throughouttheContractperiod,with all necessary assistants and chainmen to assist with surveying work. The assistant shall keep the survey equipment in goodorder.

1.2 LABORATORY AND LABORATORYTESTING

1.2.1 Description

1.2.1.1 Testingof materialsandcompletedworkshallbecarriedoutbyasitelaboratory establishedandallocatedexclusivelyforthatpurpose,alltestingshallbecarried outunderthedirectionandsupervisionoftheEngineer'sstaff.Alltestsshallbe performed in strict accordance with the appropriate Indian Standards or other standards as approved by theEngineer.

1.2.1.2 Any testing relating to the Works as required by the Engineer which cannot be carriedoutinthesitelaboratoryshallbecarriedoutattheContractor'sexpense, at an independent laboratory approved by theEngineer.

1.2.1.3 Theprovisionoflaboratoryfacilitiesonsite,asspecified,shallinnowayrelieve Contractor of the responsibility for providing additional laboratory space and testingequipmentasnecessaryinordertocontrolmaterialsatmixingplantsand elsewhereand enablehimtofulfilhisobligationsundertheContract.

1.2.1.4 Iffor anyversonalaboratorycannotbesetupatsite,allthetestsshallbegot done in a laboratory approved by theEngineer.

1.2.2 LaboratoryBuilding

1.2.2.1 TheContractorshallprovide,furnish,equip,keepcleanandmaintaintothe satisfactionoftheEngineeralaboratorybuildingofafloorareanotlessthan 30sq.m.Thebuildingshallbeprovidedwithelectricalpower,potablewater, drainage, and shall have adequate daylight and artificiallighting.

1.2.2.2 The Laboratory shall be adequately staffed by the contractor with materials technicians and assistants in the numbers deemed necessary by the Engineer so that no interruption of unnecessary delay shall occur to construction activitiesdue to delays in sampling or testing, in-site or in the laboratory, as required by the Contract. The testing equipment provided in the laboratory shall be sufficient but not limited to carry out the followingtests;

(a) modified Proctor compactiontests
(b) Field Density tests using core cutter and sand replacementmethods

(c) Crushing strength of 150mm size concretecubes.
(d) Sieveanalysis
(e) Slumptests

The Contractor shall, at the Commencement of the Contract, submit a detailed list of the equipment he is proposing to provide showing for each item its type and model, serial number, manufacturer's name and year of manufacture for the Engineer's approval.

The testing of the works by the Engineer, in no way, absolves the Contractor from his responsibilities to carry out his own testing of the quality of his works and the materials used.

1.2.2.3 The laboratory building and equipment shall be used exclusively for the purposesforwhichtheyareintendedandshall,togetherwithallequipment,all samplesandrecords,beopentoinspectionbytheEngineerduringallworking hours.

1.2.2.4 The laboratory shall be fully operational within 15 days of commencement of Contractandremainsountilallworkintheopinionoftheengineeriscomplete. AsumofRs.5000/daywillbedeductedfromthemoneyduetotheContractor for each day over the 15 day limit, for failure on the part of the Contractor to providethelaboratorytotheEngineer'ssatisfaction.AttheendofConstruction the laboratory building with furniture and equipment shall revert to the Contractor.Thelaboratoryshallnot,however,beremovedfromsitewithoutthe prior consent of theEngineer.

1.2.2.5 Ifincasethetestsaretobedoneinanapprovedlaboratory,suchanapproval shall be obtained from the Engineer within 15 days of commencement of Contract; in such cases the Clause 1.2.2.4 will notapply.

1.2.2.6 2VernierCallipersand2ScrewGaugeshaving0.01mmleastcountshallbe made always available at site by theContractor

1.2.2.7 After removal of the laboratory the Contractor shall clean and level the site removingallfoundations,drainwaterpipesandotherservicesinstalledforthe laboratory and return the ground toits original condition.

1.2.3 Contractor's Senior MaterialsTechnician

1.2.3.1 The Contractor shall provide a full-time senior materials technician to be responsibleforthe day-to-dayactivitiesofthelaboratoryandforsitetesting.He shall be directly and solely responsible to the Engineer or designated members of his staff. The senior materials technician shall have not less than ten years experience of the testing of earthworks and pavement materials and their construction,includingasphaltconcrete,andofconcreteforstructures,andshall be fully converse with the testing of materials as per latest Indian Standards. The experience and qualifications of the senior materials technician shall be to the approval of theEngineer.

1.2.4 Sample

1.2.4.1 TheContractorshallsubmitsamplesofallmaterialsandgoodsforinclusionin theworkstotheEngineerandonlythoseapprovedbytheEngineerandtothe standards specified elsewhere in the Contract may be ordered for supply. Samplesshallbesubmittedpromptlyinordernottodelaytheworks.

All work executed shall be of equal standard in all respects to the approved samplesandtheEngineer mayrejectanyworkwhich,inhisopinion,doesnot comply with the approvedsamples.

1.3 SITE SURVEYS, SETTING OUT AND DESIGNDETAILING

1.3.1 Description

The Contractor shall be responsible for the true and proper setting-out of the worksinrelationtothelinesandlevelsofreferencegivenbytheEngineeror shown on the Drawings and for the correctness of the position, levels, dimensionsandalignmentofallpartsoftheworksandfortheprovisionofall necessaryinstruments,appliancesandlabourusedinconnectiontherewith.

Heshallcarryout adetailedsurveyofthesiteinadvanceofhiscommencement ofConstructionwork,andshallsupplyfulldetailstotheEngineerasspecifiedinthefollowingsubclauses.

Allsettingoutandlevellingshallbebasedonpermanent Benchmarksobtained from the LocalAuthority.

1.3.2 Existing levels andLayouts

1.3.2.1 Beforecommencingoperationsofanysectionoftheworks,theContractorshall survey all existing detail in that section, in plan and in level and shall plot the results in such detail and to such scales as shall be to the satisfaction of the Engineer. These survey plots shall be supplied to the Engineer at least two weeksinadvanceofthesearchforservicesspecifiedinthespecificationand,in any event, at least four weeks before the intended commencement of construction on the section. Unless otherwise instructed by the Engineer the detailedsurveyplotswillbesuppliedin1:200scaleandprintedonhighquality transparent draughting medium as approved by theEngineer.

1.3.2.2 InadditiontotherequirementsofSub-clause1.3.2.1above,horizontalcontrol linesshallbemarkedoutbypegsatintervalsofnotmorethan20mandthelines traversedwiththeodolitebysteelbandorbyanyother methodacceptabletothe Engineer. The alignments established shall be referenced by pegs offset at suitable distance on each side of the horizontal control lines. These offset pegs shall be painted in a conspicuouscolour.

1.3.2.3 Cross sections of the existing ground and of the ground after completion of earthworksshallbetakenatintervalsnotexceeding20malongthehorizontal control lines in an approved and acceptablemanner.

1.3.3 Bench Marks and Survey Points

1.3.3.1 As the work proceeds, the contractor shall establish, at suitable location, substantial permanent benchmarks, clear of the works, from which, all subsequentsettingoutandlevellingshallbecarriedout.Thelocationofthe benchmarksshallbeagreedwiththeEngineerbeforetheyareestablished.

1.3.3.2 Benchmarks shall be constructed in class 20/20 concrete, with minimum dimensionsof0.3mx0.3m,theuppersurfacebeingapproximately50mmabove ground level. A 20mm diameter mild steel rod, not less than 300mm in length, shallbecastintotheconcretesothatitprojectsabout10mmabovethecentreof the surface of the concrete. The concrete surface shall be clearly engraved with the reference number of the benchmark. The co-ordinates and level of each benchmarkshallbedeterminedinmetresto3decimalplaces.

1.3.3.3 TheContractorshallcheckco-ordinatesandlevelsofbenchmarksatmonthly intervals and immediately notify the Engineer of anydiscrepancies.

1.3.4 Survey, Design, Working and Shop Drawings

1.3.4.1 TheContractorshouldnotethattheDrawingsandQuantitiesintheTender Documents,whilstdetailed,havetobeconsideredaspreliminary,andonly provide and indication of the locations, layouts and scope of works.The locations, layout and scope of works may be altered and in such cases the Contractorshallnotbeentitledtoanyclaimwhatsoeverforsuchalterationsover and above the measured works or measured variations at the tendered rates except in accordance with the provisions of relevant Clauses of the Conditions ofContract.

1.3.4.2 Subjecttotheabovelimitation,designdetailwillbeprovidedbytheEngineerin advance of the Contractor's intended commencement of construction as indicated in his approved construction programme or as otherwise agreed with theEngineer.

1.3.4.3 ShouldanyContractor'sproposalsfortheanyspecialiseditemsdifferinentirely or substantially from that of the Engineer's or should it affect another componentoftheelementoritemofworkbeyondpermissiblevariationsfromit, thentheContractorshall,athisowncost,beresponsibleforredesigntoprovide a complete acceptable system before approval of any part thereof. For such works,theContractorshallfurnish,athisownexpense,theEngineerwithcopies ofalldesigncalculation,sketches,workingdrawingsandsimilarinformationin as much detail as the Engineer may reasonable require for his full information and subsequentapproval.

SuchapprovaloftheContractor'sdesignshallnotrelievetheContractorfrom any of his duties, responsibilities or obligations under theContract.

The above design work to be undertaken by the Contractor or his approved subcontractor shall be in accordance with f current practice generally using accepted design techniques in accordance to international standards or as specifiedintherelevantTenderDocumentalltotheapprovaloftheEngineer.

1.3.4.4 Contractorshallpreparetheworkingdrawings/shopdrawingsanddocuments, including diagrams and schedules shall show the details of proposals for the execution of the works and shall include everything necessary for the following purposes:

Toillustrateindetailthearrangementofthevarioussectionof theworksandto identify the variouscomponents.

To integrate the various sections of the works.

The shop drawings required shall include but not be limited to the following

Generallayoutdrawingsforequipmentandlikeitemsasdeemednecessaryby theEngineer.

a) Detailed layout drawings all lift stations and pumping stations, showing the connection of mechanical and electrical services, ducting, paper work, conduit, cable tray and trunking together with earthingsystem

b) Detailedlayoutdrawingsshowingsectionssuchasthroughceilingvoids and verticalshafts.

c) System diagrams, circuit diagrams and wiring diagrams for all installations andequipment.

d) The drawings, specifications and technical information for materials and equipment of building components such as doors, windowsetc.

1.3.4.5 Working drawings and documents shall be made available in sufficient time in order to maintain the Programme of Work onsite.

The Contractor shall liase with the Engineer for the period required for any approval, which shall be a maximum of two weeks.

The Contractor shall ensure that all items to be ordered by him can be accommodated in the positions shown on the drawings and for taking all necessary dimensions on site together with any supporting information which may be necessary for preparing working drawings.

Materialsor equipmentshallbeordered norconstruction oftheassociatedworks becommenceduntilsuchapprovalhasbeenobtainedfromtheEngineer.

TheContractorshallbedeemedtohaveobtainedafullandproperunderstanding of the Engineer's design and design intents and to have satisfied himself with their accuracy and suitability. In this respect, the Engineer will meet all reasonablerequestsmadebytheContractorinfurnishingdesigninformationand the like to he Contractor. No claim in respect of lack of knowledge will be admissible.

1.3.5 ConstructionLevels

Before commencement of construction, the Contractor shall conduct a detailed topographic survey of each road in the project and submit to the Engineer, for approval, the following:

(a) Tabulated control levels to which the works are to be referred to. Co-ordinates of each salient point shall be determined in metres to 3 decimal places.

(b) Plan of the proposed road showing the location of the asphalt carriageway The existing services, as determined by site excavation, should also be marked up on theseplans.

(c) Profile of the existing road as directed by theEngineer

(d) Inthedualcarriageway,profileshallbedrawnforbothcarriageways.

1.4 SOIL INVESTIGATION ANDREPORT

1.4.1 A soil investigation has been undertaken during the Design phase. However in case additional investigations are required during the course of construction the Contractor shall be advised of such requirement and the Contractor shall promptlycarryout suchinvestigationsasadvisedbytheEngineer.

1.5 PROGRESSPHOTOGRAPHS

1.5.1 The Contractor shall submit to the Engineer each month, throughout the period of the Contract, progress photographs as mentioned in the General conditions of the contract, taken at the direction of the Engineer. The camera used for this purposeshallbesuchthatthedateisprintedout.

1.5.2 In addition copies of previously selected progress photographs and mounted in three separate and suitable albums shall also be delivered to the Engineer on the Preliminary Handing-over of the works. The arrangements for the progress photographsaresubjecttotheapprovaloftheEngineerandshallbediscussedat as earlyadateaspossiblesothatcompletecoveragecanbeassured.

1.6 NOTICEBOARDS

The Contractor shall provide, erect and maintain for the duration of the contract, two steel framed timber notice boards for the works, in location approved by SPV and the Engineer's Representative.

Notice Boards shall have a block board panel size of around 3m as detailed on the Drawings or equally approved. Prior to sign writing, the board shall be painted with two coats of white oil based paint back and front. The board shall be supported above the ground on steel struts painted matt black and fixed into concrete foundations, all to the approval of the Engineer. The sign shall be paintedbyaskilledsignwritertoshowthedetailsdescribedintheContract.The Contractorisresponsibleforobtainingallnecessaryapprovalsfortheerectionof these noticeboards.

Under no circumstances, shall sub-contractor's or supplier's name boards be fixed on hoarding or elsewhere on site.

1.7 ADVERTISING

1.7.1 Neither the Contractor nor any of those in his employment shall give information concerning the works for publication in any form without the written approval of theEngineer.

1.7.2 Neither the Contractor nor any of his sub-contractors shall erect placards or advertisements within the site other than the notice boards permitted under the relevantClauses.

1.8 SITESAFETY

1.8.1 SiteSafety

In order to improve the general vehicular traffic condition and to guarantee public safety from and around the work the Contractor shall provide all labour, and materials, and construct and maintain temporary traffic diversions through out the construction activities, to the directive and approval of the Engineer. It is therefore recognised that there is a particular responsibility placed upon the Contractor totakespecialprecautionsfor publicsafetyandtominimisethescale and extent of disruption. Plans for diversion shall always be submitted to the Engineer for priorapproval.

1.8.2 Safety onSite

1.8.2.1 The Contractor shall ensure that the works are carried out in a safe manner. According to internationally accepted guidelines on safe working procedures and to the satisfaction of theEngineer.

1.8.2.2 Thefollowingrequirements shallbecomplied withbytheContractor:

a) Excavation - All excavations shall be adequately supported to avoid collapses and effective safety barriers shall be erected with warning signs and devises around all open excavations to the satisfaction of the Engineer.

Struts and walling shall not be used as ladders and for the purpose of access to the base of excavation the Contractor shall provide proper ladders which shall be suitablysecured.

Reflective wearing shall be worn by all workmen on or close to a highway and, where necessary, temporary road signs and cones shall be provided to ensure a safe workingarea.

b) Protective Clothing - The Contractor shall ensure that all personnel on site are supplied with the necessary protective clothing such as safety helmets, goggles, face masks, ear muffs, gloves, boots, etc. which are required for the operations beingperformed.

c) Scaffolding - Suitable and sufficient scaffolds shall be provided and properly maintained for all work that cannot safely be carried out from the ground or from part of the structure or froma ladder.

Every scaffold shall be of good construction, of suitable and sound material and of adequate strength for the purpose for which it is used. Unless designed as an independent structure, every scaffold shall be rigidly connected to a part of the structure which is of sufficientstrength toaffordsafesupport.Protectiveheadgear shallalwaysbeworn.

d) Lifting Device - Every rope, chain, pulley, bloc, hook, winch, crane or other lifting gear used for raising or lowering loads of as a means of suspendingthemshallbeof goodconstruction,soundmaterial,adequate strength and free from defects. They shall be properly maintained and tested at regular intervals by a competent person, who shall be to the approval of theEngineer.

e) Working in existing manholes etc. , - Checks shall be carried out before entry to ensure that the atmosphere is fir for respiration and nosmoking

naked lights or flames are to be permitted in any sewer, manhole of chambers or adjacent to them when these are open

The equipment which shall be made available shall include but not limited to:

a) Gas detector lamps with lead acetatepapers.
b) Lifting harness with ropes
c) Handlamps with sparebatteries
d) First aidkit.
e) Protective headgear.
f) RubberGloves.
g) Breathingapparatus.

1.8.2.3 Throughout the period of the Contract, the Contractor shall provide safety helmets and high reflectivity jackets to all Consultant's staff and visitors. Barriers must be provided to all excavations for the safety of the public and flagmen must be used for all items of plant for the safety of the operatives, supervision staff and members of thepublic.

1.8.3 VehicularMovement

1.8.3.1 BeforecommencingtheworksthetheContractorshallconsultwithandobtainfrom the Employer and the Engineer their requirements for temporary safety signs, road markings, lighting and other measures necessary to ensure the safety of the public, and shall comply with these requirements will not relieve the Contractor of his obligations under the Contract. The Contractor shall also take a No Objection Certificate from Consultants supervising other Contracts in the area, get details of newly installed and temporary services and obtain access requirements for othercontractors.

1.8.3.2 The Contractor shall deploy, as a full time member of his site staff for the duration of the contract, whose duties shall include the production and implementation of safety management schemes. Qualification and experience of thesafetymanagementstaffshallbesubjecttotheapprovaloftheEngineer.

1.8.3.3 Throughout the Contract, the Contractor shall maintain vehicular and personnel access to all parts within the site at alltime.

Adequate warming and direction signs are to be erected wherever necessary and diversions are to be maintained in good condition to the satisfaction of the Engineer.

1.8.3.4 Temporary diversions shall be constructed and maintained to the standards approved by the Engineer. Upon completion of the Permanent works, the temporary diversions shall be removed and the site restored to the satisfaction of theEngineer.

1.8.3.5 All diversions and safet sign boards must be constructed and maintained to the highest standards with regular washing of cones and daily maintenance of flashing lights. The signs and cones should be self-stabilising, and if extra stability is required only small sandbags should beused.

1.8.3.6 All stockpiles of material to be used in the works must be fenced off and all unsuitable material must be removed from site on a daily basis and not stockpiled onsite.

1.8.3.7 Payment for safety management shall be considered as included in the various pay items of B.O.Q. deductions to be made, from moneys due to the Contractor, for failure on the part of the Contractor to provide adequately for safety and for the accommodation of safety managementplan.

1.9 SERVICES

1.9.1 Contractor to establish location ofServices

Before the Contractor may proceed with the Works in any given area he is requiredtoestablishtheprecisel ocationofallservicesinthatareaasexecuted by othercontractors.

1.10 AS BUILTRECORDS

1.10.1 On or before the completion of the works, at the direction of the Engineer, the Contractor shall prepare detailed drawings and other records, as required, of the works executed. The Contractor is required to submit the soft copy as well as twohardcopiesoftheasbuilt recordstothescaleadvisedbytheEngineer.

1.11 PROGRAMME OFWORKS

1.11.1 In respect of the programme of works required under Clause 17 of the General ConditionsofContractthefollowingspecificrequirementsshallapply:-

- The works shall be programmed in such a way as to minimise disruption to otherworks
- Works shall not be carried out simultaneously over large areas of the site but shall be sequenced so that all operations likely to cause disruption to other works shall be undertaken and completed in discrete area before commencement of operations in otherareas.
- Works, which, by their nature, will create disruption and / orobstructions to other works, shall be programmed to be undertaken in a continuous sequence of events from the initial disruption until the restorationofaccesswithoutandsignificantdelaybetweenoperations.

1.11.2 TheContractor'sProgrammeof Works,submittedinaccordancewithClause17 of the Conditions of Contract, shall be subject to the approval of the Engineer and of Employer, the Contractor has not properly achieved the objectives of the programme, then they may require the Contractor to revise his Programme and theContractorshall dosoforth,forthisreasontheContractorisadvisedtoliaise closelywiththeEngineerduringtheproductionofhisProgramme.

1.11.3 The Contractor should note that when a phase or phases of the works is/are programmed to be completed before commencement of another phase, the Contractor may not commence work on the later phase until the former phase is completed, even if the former phase overruns its allocated construction time, withoutthespecificpermissionoftheEngineer'sRepresentative.

1.11.4 In addition to the Works Programme required under Clause 17 of the Conditions of Contract, the Contractor shall produce individual programmes for each element of the works likely to cause significant disruption to other works,for the approval of the Engineer and prior to commencement of the element of the works, clearly showing the sequencing of construction operations is such a manner as to minimise the duration of thedisruption.

1.11.5 The Contractor shall note that different work in various parts of site by other contractors may be in progress or may commence during the Contract Period. It will be the Contractor's responsibility to liase with contractors on adjacent sites in order to ensure the detail progress. The Contractor's Programme will be phased and will make full allowance for the need for a co-operative timing with adjacentcontractors.

1.12 CONTRACTOR'S OFFICES, YARD, STORES AND PLANTAREA

1.12.1 The Contractor's main office shall be located in the general vicinity of the Engineer's office, on land to be provided, by the Contractor, for the duration of the project. The Contractor's main office shall be used for the purposes of administering the Project but may not be used for the storage of construction materials nor for storage or maintenance of plant and shall not be allowed to becomeunsightly.

1.12.2 The Contractor's other offices, yard, stores and plant area shall be provided, by the Contractor, at location(s) to the approval of the Employer. The Contractor shall be responsible for all associated expenses including rents, assessments or temporary occupation license fees, establishment, running and maintenance costs, the supply of all services, as well as the obtaining of any appropriate No ObjectionCertificates.

1.12.3 Within 7 days of the Commencement date of the Contract, the Contractor shall submit, for the approval of the Engineer, a drawing showing detailed plans for his offices, yard, stores and plant area, together with al sanitary arrangements, and for the supply of waterandelectricity. Until the En

1.12.4 The Contractor shall not be permitted to erect temporary building or structures elsewhere without the specific permission in writing of the Engineer, including approvalofthedimensionsandspecificationsofsuchbuildingsor structuresand theirlocation.

1.12.5 The Contractor shall take all steps necessary as directed by the Engineer to minimise or eliminate dust, noise or any other nuisance, which may occur. Plant emitting dust, smoke, excessive noise or other nuisance shall not be permitted to be sited at any location which shall cause nuisance to any building or other installation, whether complete or under construction, site offices, camps, or other similar buildings.

1.12.6 Under no circumstances shall overnight accommodation be permitted on site except for Site watchman in carrying out theirduties.

1.12.7 Throughout the period of the Contract, the Contractor shall maintain the area of his operation within the limits of the site in a clean, tidy and safe condition by arranging materials and the like in an orderly manner. All rubbish, debris, waste materials and the like shall be systematically cleared from the site as it accumulates.

1.12.8 The Contractor shall satisfy himself as to the means of access to the site and other relative items affecting him, his sub-contractors andsuppliers.

1.12.9 Upon completion of the Contract, or, in the case of facilities required by the Contractor during the Period of Maintenance, on completion of the period of maintenance the Contractor shall remove all buildings and other facilities from the site including all foundations and services, clean and level the site and restore the ground to its originalcondition.

2.1 SITEPREPARATION

2.1.1 General

The Contractor shall maintain close liaison with the Engineer and the Employer and shall obtain their approval prior to removal of any service installation. Where external Service Authority installations are to be removed, they shall be removed after the existing facilities have been relocated and commissioned or after they have been redundant and after any electrical supply has been made safe by the Authority or the Contractor whichever is appropriate.

"Site clearance" shall include the demolition/removal of all plants, bushes, underground structure, foundations, manholes, chambers, drains, septic tanks, cesspits, soak away, pipelines, undergrowth, trees (of any girth), tree stumps, buildings, services, rubbish and debris which are required to be cleared to construct the Works. Site clearance as directed by the Engineer shall include clearing and grubbing for the road corridor. The rate shall include for backfilling with suitable material all voids created by the removal of above mentioneditems.

It is deemed that except for the items mentioned in this bill, costs of all other works in connection with site clearance are included in various pay items of other bills.

2.1.2 Removal ofTrees

a) General

1. This item consists of the removal of trees of any girth, their disposal as instructed by the Employer and Engineer and the backfilling of the hole left after uprooting thetree.

2. If any tree is conflicting with the road works then Contractor shall inform the Cons

Removal of trees shall be performed only after written approval from the Employer.

b) Measurement andPayment

Payment under this item shall be made per unit of trees removed.

The unit price shall constitute full compensation for the removal, hauling, disposing off of the tree of any girth as described herein and as directedbytheEngineerandforallmaterial,labour equipment,supplies and incidentals necessary to complete theWork.

No payment shall be made for the removal of bushes, stumps, roots etc., whose cost is considered as included in other pay items of the bill.

2.1.3 Removal ofFence

a) General

The Contractor shall take down existing fencing and gates within the Contract Right-of-Way as shown on the Drawings or as directed by the Engineer and shall ensure the provision of suitable terminal posts, tensions, tie wires, lengths of fencing or whatever is necessary to ensure the integrity of the remaining lengths of fencing and stop the entry of animals should the remaining fenced area be under cultivation or a plantation.

Prior to removal, the fencing is to be inspected by the Engineer toassess its suitability forre-use.

Sections of fencing designated by the Engineer as suitable for re-use shall be dismantled, removed and stored in a manner approved by the Engineer to leave all parts of the fencing system suitable for re-use and late re-erection as directed by the Engineer.

b) Measurement andPayment

Payment under this Item shall be made per linear metre of fence removed.

The unit price shall constitute full compensation for the worksdescribed herein and as directed by the Engineer and for all material, labour, equipment,suppliesandincidentalsnecessarytocompletetheWorks.

2.1.4 Removal of ConcreteStructures

a) General

The Contractor shall remove wholly or in part and satisfactorily dispose of all structures (manhole, slabs, walls, building or any other concrete structure) as indicated on the Drawings or directed by the Engineer, and which are not specifically described under a separate Clause of this Specifications.

All material removed and all structures demolished shall be removed from the Work Site, hauled away and disposed off in approved disposal area and as approved by the Engineer.

The voids or depression which are the result of the demolition of structures shall be backfilled with borrow material as approved by the Engineer. Backfilling material shall be placed in horizontal layers of over 15 cm in depth and compacted to not less than 98%.

b) Measurement andPayment

Payment for the removal and disposal of all structures and related obstructions as described above will be at the cubic metre rate included in the Bill of Quantities which shall include all labour and equipment to demolish, remove the obstructions as building materials, concrete, debris etc., loading, hauling irrespective of haulage distance, disposing off all materials removed, and backfilling with borrow material and depression of voids, as indicated on the Drawing, specified herein andas directed by theEngineer.

3.0 CONSTRUCTION OF STORM WATERDRAINS

3.1 General

All rates inserted shall include for working in close proximity to the proposed service utilities, the provision of temporary supports to services, any special protective measures required by the Engineer, dewatering, excavation in any materials, backfilling, levelling and compaction of excavations. It also includes for supply and placing of bedding and surround materials (except concrete for pipelines which shall be measured separately or as otherwise stated in the Bill Item description), disposal of debris to tip and disposal of unsuitable material and/or surplus suitable material.

3.2 Excavation fordrains

3.2.1 General Specifications in Section -2 - Earthworks are applicable for excavation for Drainsalso.

3..2.2 Stacking of excavatedmaterial

The excavated material shall be stacked near the drains, but away from the compound walls such that the stability of the walls are not endangered. The suitable material shall be used in leveling the area between the compound wall and the footpath.

While planning trench excavation for drains, the contractor should take precautions, against caving in of sides of trench, and dewatering of trench with appropriate measures.

The excavation shall conform to the lines grades and bottom slopes shown or specified in the drawings/ schedules. Any excess depth in cutting shall be made good with approved soil.

The sides of excavation shall be trimmed to receive the drains.

3.3 Dewatering

If ground water is met with, it shall be removed by suitable means including pumping and bailing out and the excavation shall be kept dry at all times. Care shall be taken to discharge the drained water into suitable outlets, without causing damage to either the works or adjoining property. The contractor shall rectify any damage caused either due to improper dewatering or improper discharge of the drained water, at his own cost

3.4 Backfilling

All space between the drain walls and the side of excavation shall be backfilled to the original surface level making due allowance to settlement, in layers not exceeding 150mm thickness. The backfilling shall be compacted to 95 percent MDD.

3.5 Construction ofDrains

The drains shall be constructed with the specified material, which could be, rubble masonry, brick masonry or Concrete. The construction shall follow the relevant general specification depending on the material used.

3.6 Matters of special attention

3.6.1 The bottom of the trench shall correspond to the invert of the drain plus the thickness of the bedding. The slope of the trench bottom shall be adjusted in the earthexcavation.

3.6.2 Before laying concrete base slab, the surface of the bedding layer shall be sprinkledwithwater inordertoreducethelossof waterfromtheconcretebed.

3.6.3 Theconcreteshallbevibratedandcompacted.

3.6.4 There shall be an interval of at least 24 hours before the sidewalls of the drain are cast on the baseslab

3.6.5 The sides of the excavation shall be moistened with water to reduce the loss of water from the concrete walls to beplaced.

3.6.6 Expansionjointsshallbeprovidedat20mintervalintheconcretewalls.

3.6.7 Expansionjointsshallalsobeprovidedwhereverthereisachangeinalignment.

3.7 Concrete Coverslabs

3.7.1 Insitu coverslabs

The insitu cover slabs shall be cast as per the general specification for concrete.

3.7.2 Precast coverslabs

The precast slabs shall be cast to the dimensions given in the drawings. There shall be flushdown hooks and drain holes in the slabs, irrespective of whether these are shown in the drawings or not.

3.8 Drainage through Drain walls/Kerbs

In locations as shown on the drawings or instructed by the Engineer simple drainage openings through drain walls shall be made. These openings shall be made by placing 110mm diameter uPVC pipes in the drain walls at a maximum spacing of 4m. The road surface at the pipe openings shall be depressed by 20mm below level of the road surface at the opening. This depression shall be gradual in an area of 300mmx300mm in front of the pipe, enabling the storm water to pond in front of the pipe and flow into the drain. The proposal for the detail of opening shall be approved by the Engineer before installing the pipes.

TECHNICAL SPECIFICATIONS

A' CivilWorks

CONTENTS

INTRODUCTION.

INTRODUCTION

1. These Specifications contain guidelines and directions to be followed jointly and severallyintheimplementationofthesubjectprojecttodeliver aqualityproduct.
2. These specifications have been prepared with regard being given to the Central PWD and the various states P.W.D. Specifications and, in the absence of specificrequirements herein, the relevant provisions in the above documents shallapply.
3. This document comprise of two parts – (i) General Specifications and (ii) Special Specifications. The former deals with various works that is commonly relevant to constructionprojectswhilethelatter dealswiththeitemsofparticularapplication.
4. The Special Specifications are intended to supplement the General Specifications. In case of any non-coherence, differences, deviations or discrepancies between the two the special Specifications will takeprecedence.
5. Rates provided in the bid document or the rates quoted by the Contractor for all items of works while submitting the tender will be deemed to include cost of all materials, taxes, duties, levies, octroi etc., cost of all labour, all protection works to the site as well as portions and premises of works in progress, arrangements and related works to ensure safety to the site, personnel and materials and all other inputs involved in the execution of theitems.
6. The Engineer will be the authority to interpret or clarify the provisions of these specifications and the outcome shall be made known to the Contractor, in writing. Interpretations/ clarifications once issued will be final as far as the particular contractual works areconcerned.
7. Any Indian Standard/ International Standard/ manual referred to in the Specifications shall mean the latest revision/edition of the standard/Manual with all additions and amendments issuedthereto.
8. Definitions

   Unlessspecifiedotherwiseinrelatedclausesorsections,definitionoftermsandexpressions in the Specifications, will be those given against the termsbelow.

a. Best: The most superior material/article and workmanship obtainable in the context of thework.

b. IS: The standards, specifications and code of Practices issued by the Bureau of Indian Standards. Any IS designated by a number means its lat est revision and edition including all additions and amendmentsthereto.

c. Site: The land or other places on, in, into or through which the work is to be executed under the contract or any adjacent land, path or street which may be allotted or used for the purpose of carrying out theContract.

d. Floor level: For ground floor, top level of finished floor and for other floors above ground level, top level of the structuralslab.

e. Measurements: In booking dimensions, the order shall be in the sequence of length, width, height/depth/thickness if measured in linear terms. In certain cases, booking of quantity executed may be in terms of numbers, weight, volumeetc.

f. Rounding off: Significant places rounded off as specified. Where not specified, in accordance with IS:2.

g. Materials: Any article for the work as per samples duly approved by the Engineer. The approved samples duly authenticated and stamped shall be kept in the custody of the Engineer till the completion of the work. All materials to be provided by the contractor shall be brand new and as per the samples approved by theEngineer.

1. EARTHWORK, EXCAVATION AND SUBBASE

1.1. ApplicableCodes

The following Indian Standard Codes, unless otherwise specified herein, shall be applicable.Inallcases,thelatesteditionsincludingallapplicableofficialamendments and revisions shall be referredto.

a) IS:783 - Code of practice for laying of concretepipes.

b) IS:3764 - Excavation work - Code of Safety.

c) IS:2720 - Methods of test forsoils:

d) (Part-1) - Preparation of dry soil samples for varioustests.

e) (Part-2) - DeterminationofWaterContent.

f) (Part-4) - Grainsizeanalysis.

g) (Part-5) - Determination of liquid and plasticlimit.

h) (Part-7) - Determination of water content - dry densityrelation using light compaction.

h) (Part-8) - Determinationofwatercontent-drydensityrelation using heavycompaction.

i) (Part-9) - Determination of dry density – moisture contentbyconstant weight of soilmethod.

l) (Part-14) - Determinationofdensityindex(relativedensity)of cohesionlesssoils.

m) (Part-22) - Determination of organicmatter.

n) (Part-26) - Determination of pH Value.

o) (Part-27) - Determination of total solublesulphates.

p) (Part-28) - Determination of dry density of soils in place, bythe sand replacement method.

q) (Part-33) - Determinationofthedensityinplacebytheringand water replacement method.

r) (Part-34) - Determinationofdensityofsoilinplacebyrubber balloonmethod.

s) (Part-38) - Compaction control tests (HilfMethod).

1.2. Excavation

1.2.1 General

Excavation for trenches over areas and for pits, etc. shall be done to widths, lines and levels as shown in drawings or to such lesser or greater widths, lines and levels as directed. The bottom and sides of excavation shall be trimmed to require levels, profile, etc. watered and thoroughly rammed. Should any excavation be taken below the specified levels, the contractor shall at his own cost fill up such excavation with cement concrete (M-10) to required levels. Filling in such excavation with excavated material is prohibited.

Allexcavationworkshallbecarriedoutbymechanicalequipmentunless,intheopinion of Engineer-in-charge, the work involved requires it to be carried out by manual methods.

1.2.2 Grubbing andClearing

Beforeexcavationisstarted,theareacomingundercutting/excavationshallbethoroughly grubbedandclearedoffshrubs,rankvegetation,grass,bushwood,debris, trees/saplingof girth upto 300 mm. The roots shall be removed upto depth of 600 mm below ground. The rubbishshallberemovedoutsidethesiteasdirectedbytheEngineer-in-charge.

1.2.3 Dewatering

The Contractor shall ensure that the excavation and the structures are free from water during construction and shall take all necessary precautions and measures to exclude ground/rain water so as to enable the works to be carried out in reasonably dry conditionsinaccordancewiththeconstructionprogramme.Sumpsmadefordewatering mustbekeptclearoftheexcavations/trenchesrequiredforfurtherwork.Themethodof pumping shall be approved by Engineer-in-charge, but in any case, the pumping arrangementshallbesuchthatthereshallbenomovementofsubsoilorblowingindue to differential head of water during pumping. Pumping arrangements shall be adequate to ensure no delays in construction. The dewatering shall be continued for at least (7) sevendaysafterthelastpouroftheconcrete.TheContractorshall,however,ensurethat no damage to the structure results on stoppingof dewatering.

TheContractorshallstudythesub-soilconditionscarefullyandshallconductanytests necessaryatthesitewiththeapprovaloftheEngineer-in-chargetotestthepermeability and drainage conditions of the sub-soil for excavation, concreting etc., below ground level.

TheschemefordewateringanddisposalofwatershallbeapprovedbytheEngineer-in- charge. The Contractor shall suitably divert the water obtained from dewatering from such areas of site where a build up of water in the opinion of the Engineer-in-charge obstructstheprogressofthework,leadstounsanitaryconditionsbystagnation,retards the speed of construction and is detrimental to the safety of men, materials, structures andequipment.

When there is a continuous inflow of water and the quantum of water to be handled is considered in the opinion of Engineer-in-charge, to be large, a well point system- single stage or multistage, shall be adopted. The Contractor shall submit to the Engineer -in- charge, details of his well point system including the stages, the spacing, number and

diameterofwellpoints,headersetc.,andthenumber,capacityandlocationofpumpsfor approval.

Unless separately provided for in the Schedule of quantities, cost of dewatering is deemed to have been included in the unit rates quoted for excavation. If separately providedfor,theunitofmeasurementshallbeasindicatedintheScheduleofQuantities.

1.2.4 Timbering to excavation(shoring)

Wherethesoilissoftandsidesofexcavationneedssupporting,suitably designed planking and strutting shall beprovided.

Closetimberingshallbedonebycompletelycoveringthesidesofthetrenchesandpits generally with short, upright members called 'polling boards'. These shall be of minimum25cmx4cmsectionsorasapprovedbytheEngineer-in-charge.Theboards shallgenerallybeplacedinpositionverticallysidebysidewithoutanygaponeachsideof the excavation and shall be secured by horizontal walings of strong wood at maximum 12 meter spacings, strutted with ballies or as approved by the Engineer-in-charge. The lengthoftheballiestrutsshalldependonthewidthofthetrenchorpit.Ifthesoilisvery softandloose,theboardsshallbeplacedhorizontallyagainsteachsideoftheexcavation and supported by vertical wallings, which in turn shall be suitably strutted. The lowest boards supporting the sides shall be taken into the ground and no portion of the vertical sideofthetrenchorpitshallremainexposed,soastorender theearthliabletoslipout.

Timber shoringshallbe'close'or'open'type,dependingonthenatureofsoilandthe depthofpitortrench.Thetypeoftimberingshallbeasapproved bytheEngineer-in- charge. It shall be the responsibility of the Contractor to take all necessary steps to prevent the sides of excavations, trenches, pits, etc. fromcollapsing.

Timbershoringmayalsoberequiredtokeepthesidesofexcavationsverticaltoensure safety of adjoining structures or to limit the slope of excavations, or due to space restrictions or for other reasons. Such shoring shall be carried out, except in an emergency, only after approval from theEngineer-in-charge-in-charge.

Thewithdrawalof thetimbershallbedonecarefullytopreventthecollapse of thepit or trench.Itshallbestartedatoneendandproceededwith, systematicallytotheotherend. Concreteormasonryshallnotbedamagedduringtheremovalofthetimber.
In the case of open timbering, the entire surface of the side of trench or pit is not requiredtobecovered.Theverticalboardsofminimum25cmx4cmsectionsshallbe spacedsufficientlyaparttoleaveunsupportedstripsofmaximum50cmaveragewidth. The detailed arrangement, sizes of the timber and the spacing shall be subject to the approval of the Engineer-in-charge. In all other respects, the Specifications for close timbering shall apply to opentimbering.

Incaseoflargepitsandopenexcavations,whereshoringisrequiredforsecuringsafety of adjoining structures or for any other reasons and where the planking across sides of excavations/pits cannot be strutted against, suitable inclined struts supported on the excavatedbedshallbeprovided.Theloadfromsuchstrutsshallbesuitablydistributed onthebedtoensurenoyieldingofthestrut.Ifhowever,Engineer-in-chargedirectsany timbering to be

left-in, keeping in mind the type of construction or any other factor, Contractorshall bepaidfor atthescheduleditemrateforsuchleft-intimbering.

Unless otherwiseseparatelyprovidedforinScheduleofQuantities,thetimbershoring is deemed to have been included in the unit rates quoted for excavation. If separately provided for, then the actual effective area of shored faces as approved by Engineer -in- charge shall be measured in sq.mtrs. The area of planking embedded in the bed/sides of excavation will not be considered, nor the area supporting inclined struts in case oflarge pits/open excavation. All planks, boards, wallings, verticals, struts, props and all other materials required for shoring and subsequent safe dismantling and removal shall be included in the quoted unitrates.

1.2.5 Soil / Rock Classification

1.2.5.1 General

All materials to be excavated shall be classified by Engineer-in-charge, into one of the following classes and shall be paid for at the rate contracted for that particular class of material. No distinction shall be made whether the material is dry, moist or wet. The decision of Engineer-in-charge regarding classification of the material shall be final and binding on contractor and not be a subject matter of any appeal or arbitration. Excavation shall be classified under one of the following categories by the Engineer-in- charge.

a) Ordinary and HardSoils

These shall include all kinds of soils containing kankar, sand, silt, murrum and/or shingle, gravel, clay, loam, peat, ash, shale etc. which can generally be excavated by spade, pick-axes and shovel and which is not classified under "soft and decomposed rock" and "hard rock" defined below. This shall also include embedded rock boulders not longer than 1 metre in any direction and not more than 200 mm in any one of the other two directions.

b) HardRock

This shall include all rock occurring in large continuous masses, which cannot be removed except by blasting for losening it. Hard varieties of rock with or without veins and secondary minerals, which, in the opinion of Engineer-in-charge require blasting, shall be considered as hard rock. Concrete work both reinforced and unreinforced to be dismantled will be measured under this item unless a separate provision is made in the Schedule of Quantities.

c) Soft and DecomposedRock

This shall include rock, boulders, slag, chalk, slate, hard mica schist, laterite, sand stone and all other materials which in the opinion of Engineer-in-charge is rock but does not need blasting and could be removed with picks, hammer, crow bars, wedges and pneumatic breaking equipment. The mere fact that contractor resorts to blasting for reasons of his own, shall not qualify for classification under "hard rock".

1.2.5.2 Stripping LooseRock

Allloseboulders,detachedrockspartiallyandotherloosematerialwhichmightmove therewithnotdirectlyintheexcavationbutsoclosetotheareatobeexcavatedastobe liable,intheopinionofEngineer-in-charge,tofallorotherwiseendangertheworkmen, equipment, or the work shall be stripped off and removed from the area of the excavation. The method used shall be such as not to render unstable or unsafe the portion, which was originally sound andsafe.

Any material not requiring removal in order to complete the permanent works, but which,intheopinionofEngineer-in-charge,islikelytobecomelooseorunstablelater,

shall also be promptly and satisfactorily removed. The cost of such stripping will be paid for at the unit rates accepted for the class of materials in question.

1.2.6 Blasting

Whereblastinghastoberesortedtoforrockcuttingitshallbetheresponsibility ofthecontractortoarrangeforthefollowingathisentirerisk, costandresponsibility.

a) Permission from all the connected Public Authorities such as Municipal Corporation, Inspector of Explosives, Police, Highway Authorities, etc. shall be obtained.

b) Fees, royalties and any other levies, attendant on such blasting work shall be entirely borne by thecontractor.

c) All precautionary measures such as notices to adjoining property and other agencies working in and around the plot, signaling and watch etc. shall strictly adheretoaccordingtothevariousregulationsinforce.

d) All risk Insurance in respect of the blasting hazards to men and materials within and in the vicinity of the plot. This insurance shall be apart from the Contractors all Risk Insurance Policy stipulated under General Conditions unless the Contractor incorporates blasting hazards and its coverage in the said general policy.

e) StoringofblastingmaterialsshallbestrictlyasperExplosiveRegulations. Thetenderedmustacquainthim-selfwiththesiteconditionsinregardtoblasting,nature of rock likely to be met with, timing and other restrictions to blasting etc. No. Claims whatsoever in these regards shall beentertained.

1.2.7 Disposal of Surplus excavatedmaterials

All materials considered surplus shall be removed to destinations and disposed offas approvedbyEngineerincharge.Thedisposalofthematerialcanbeinanyofthe following ways as directed by theEngineer-in-charge.

1. Filling in low lyingareas
2. Filling in at places of filling such as under floors, in roads,etc.
3. Stacking of material in pre-designated stackingyard.
4. Removal of material outside the plot fordisposal.

1.2.8 Measurements

Measurementsforallexcavation,filling,cartingawayandearthworkshallbein solid measure. The rates quoted by the tenderers are thus for solid measure units. The following factors shall be applied to obtain quantities of solidmeasure.

- Excavation : Volume shall be determined bylevels taken before commencement of excavation and after completion up to the requiredlevel.
- Filling watered and consolidated in layers: Volume shall be determined by levels taken before and after compacted filling and by measuring the length and breadth as required.

Stackmeasureasinrubble,etc. : Volume of stack less40%

Themodeofmeasurementforvarioustypesofexcavations&disposalshallbe as under:-

a) In case of trenches, pits and areas, measurements shall be on the basis of the width of foundation and the depth to bottom of foundation (bottom of bed concrete if provided) formation. Excavation for trenches and pipes & cables shall be measuredseparately.

b) Excavation in rock shall be measured up to levels indicated or required. No undulations as physically appearing after excavation shall be taken into consideration while arriving at thequantities.

c) Where such measurement is not possible as in the case of strata intermixed with soil, excavated rock shall be properly stacked as directed by the Engineer-in- charge and the volume of rock calculated on the basis of stack measurements after making appropriate allowance forvoids.

d) Excavation beyond the widths or depths required will not be paid for, any additional concrete or bedding material required as a result of over-excavation shall be at the Contractor'sexpense.

1.2.9 Rates

Theratesshallbeinclusiveofalltheoperationsdescribedaboveincludingclearingand grubbing,dewatering,shoringanddisposalatsiteasdirectedbytheEngineer-in-charge.

13. Earth Filling, Backfilling and SiteGrading

13.1. General

All fill material shall be subject to the Engineer-in-charge's approval. If any material is rejected by Engineer-in-charge, the Contractor shall remove the same forthwith from the site. Surplus fill material shall be deposited /disposed off as directed by Engineer-in-charge after the fill work is completed.

No earth fill shall commence until surface water discharges and streams have been properlyinterceptedorotherwisedealtwithtotheapprovaloftheEngineer-in-charge.

TheContractorshallnotcommencetheplacementofanyfillorbackfillatanylocation without the approval of theEngineer-in-charge.

13.2. Material

Totheextentavailable,selectedsurplussoilsfromexcavationsshallbeusedasbackfill. Backfillmaterialshallbefreefromlumps,organicorotherforeignmaterial. Alllumps of earth shall be broken or removed. Where excavated material is mostly rock, the boulders shall be broken into pieces not larger than 150 mm size, mixed with properly gradedfinematerialconsistingofmurumor earthtofillthevoidsandthemixtureused forfilling.

If fill material is required to be imported, the Contractor shall make arrangements to bringsuchmaterialfromoutsideborrowpits.Thematerialandsourceshallbesubjectto the prior approval of the Engineer-in-charge. The pH value of soil shall be between 5.5 to9andthesoil shallhavethefollowinggradinganalysis.

Sand : 20% to75%
Silt : 10% to60%
Clay : 05% to30%

The approved borrow pit areas shall be cleared of all bushes, roots of trees, plants, rubbish, etc. Topsoil containing foreign material shall be removed. The materials so removedshallbedisposedoffasdirectedbyEngineer-in-charge.TheContractorshall providethenecessaryaccessroadstoborrowareasandmaintainthesameifsuchroads do not exist, at hiscost.

13.3. Filling in pits and trenches around foundations of structures, walls,etc.

As soon as the work in foundations has been accepted and measured, the spaces around the foundations, structures, pits, trenches, etc., shall be cleared of all debris, and filled with earth in layers not exceeding 15 cm, each layer being watered, rammed and properlyconsolidated,beforethesucceedingoneislaid.Eachlayershallbeconsolidated to the satisfaction of Engineer-in-charge. Earth shall be rammed with approved mechanical compaction machines. Usually no manual compaction shall be allowed unless the Engineer-in-charge is satisfied that in some cases manual compaction by tampers cannot be avoided. The final backfill surface shall be trimmed and leveled to a proper profile to the approval of theEngineer-in-charge.

13.4. Sand Filling in Plinth and OtherPlaces

Atplaceswherebackfillingisrequiredtobecarriedoutwithlocalsanditshallbeclean, mediumgrainedandfreefromimpurities.Thefilled-in-sandshallbekeptfloodedwith water for 24 hours and drained to ensure maximum hydraulic compaction. Any temporary work required to contain sand under flooded condition shall be on Contractor'saccount.Thesurfaceoftheconsolidatedsandshallbedressedtorequiredlevel or slope. Construction of floors or other structures on sand fill shall not be started until the Engineer-in-charge has inspected and approved the fill.

13.5. MurrumFilling

Theliquidlimit&plasticityindexofsuch materials shallbebelow20and6respectively and the fraction passing 75-micron sieve does not exceed 10 %. It shall be laid in layers notexceeding15cm&compactedasper thedirectionsofEngineer-in-charge.

13.6. Filling inTrenches

Fillingintrenchesforpipesanddrainsshallbecommencedassoonasthejointsofpipes and drains have been tested and passed. The backfilling material shall be properly consolidatedbywateringandramming,takingduecarethatnodamageiscausedtothe pipes.

Wherethetrenchesareexcavatedinsoil,thefillingfromthebottomofthetrenchtothe level of the center line of the pipe shall be done by hand compaction with selected approved earth in layers not exceeding 8 cm; backfilling above the level of the center lineofthepipesshallbedonewithselectedearthbyhandcompaction, orotherapproved means in layers not exceeding 15cm.

Incaseofexcavationoftrenchesinrock,thefillinguptoalevel30cmabovethetopof the pipe shall be done with approved excavated soil. The filling up to the level of the center line of the pipe shall be done by hand compaction in layers not exceeding 8 cm whereasthefillingabovethecenterlineofthepipeshallbedonebyhandcompactionor approvedmeansinlayersnot exceeding15cm.Thefillingfromalevel30cmabovethe top of the pipe to the top of the trench shall be done by hand or other approved mechanical methods with broken rock filling of size not exceeding 15 cm mixed with fine material as available to fill up thevoids.

Fillingofthetrenchesshallbecarriedoutsimultaneouslyonbothsidesofthepipeto avoid unequal pressure on thepipe.

13.6.1.1. Measurement

Excavation for trenches for pipes, cables etc. shall be paid as under.

a. Upto 1 meter depth, the width of the trench for the purpose of measurement of excavation shall be arrived at by adding 40 cm to the external diameter of the pipe (not the sockets), cable, conduits etc. When a pipe is laid on concretebed/cushioning layer the authorized width shall be cable external diameter of the pipe/cable plus 40 cm for the width of concrete bed/cushioning layer, whichever ismore.

b. For depths exceeding 1 meter as allowance of 5 cm per meter ofdepth for each side of the trench shall be added to the authorized width (i.e. External diameter of the pipe plus 40 cm) except where battering or benching has been ordered. This allowance shall be the entire depth of the trench. The authorized width in such case shall, here fore, be equal to (depth of trench) /10 plus external diameter of pipe plus 40 cm or the width of concrete Bed/cushioning, whichever ismore

c. When morethanonepipe,cable,conduitetc.arelaid,thediametershallbereckoned as the horizontal distance from outside to outside of the outermost pipes, cables, conduits etc.

13.7. General SiteGrading

Site grading shall be carried out as indicated in the drawings and as approved by the

Engineer-in-charge.Excavationshallbecarriedoutasspecifiedin theSpecifications. Fillingandcompactionshallbecarriedoutasspecifiedandelsewhereunlessspecified otherwise shall be carried out as indicatedbelow.

Thefillshallbeplacedinlayersnotexceeding200mmandleveleduniformlyand mechanically compacted before the next layer isdeposited.

Toensurethatthefillhasbeencompactedasspecified,fieldandlaboratorytestsshallbe carried out by the Contractor at his owncost.

Field compaction tests shall be carried out in each layer of filling until the fill to the entire height has been completed. This shall hold good for embankments as well. The fill will be considered as incomplete if the desired compaction has not been obtained.

TheContractor shallprotecttheearthfillfrombeingwashedawaybyrainordamagedin any other way. Should any slip occur the Contractor should remove the affectedmaterial and make good the slip at hiscost.

Ifsospecified,therockasobtainedfromexcavationmaybeusedforfillingandleveling to indicate grades without further breaking. In such an event, filling shall be done in layers not exceeding 50cms approximately. After rock filling to the approximate level, indicated above has been carried out, the voids in the rock filling shall be filled with finer materials such as earth, broken stone, etc. and the area flooded so that the finer materials fill up the voids. Care shall be taken to ensure that the finer fill material does not get washed out. Over the layer so filled, a 100 mm thick mixed layer of broken material and earth shall be laid and consolidation carried out by a 8 -10 ton roller. No less than twelve passes of the roller shall be accepted before subsequent similar operations are takenup.

13.8. FillDensity

Thecompaction,wheresocalledfor,shallcomplywithminimum95%ofmaximumdry density as per IS 2720 (Part 8) at moisture content differing not more than 4% from the optimum moisture content. The Contractor shall demonstrate adequately by field and laboratory tests that the specified density has beenobtained.

13.9. Lead

Leadfordeposition/disposalofexcavatedmaterial,shallbethecrowflightdistanceas specified in the respective item of work. No extra compensation is admissible on the grounds that the lead including that for borrowed material had to be transported over marshy or ‘katcha’land/route.

13.10. Measurements

Backfillingasperspecificationthesidesoffoundationsofcolumns,footings,structures, walls, tanks, rafts, trenches etc. with excavated material will be paid for separately. It shall be clearly understood that the rate quoted for excavation shall include stacking of excavated material as directed, excavation/packing of selected stackedmaterial, conveying it to the place specified etc. as specified. As a rule, material to be backfilled shall be stacked temporarily as directed by the Engineer-in-charge.

Backfilling, plinth filling etc. with borrowed earth will be paid for at rates quoted. The quoted rate shall include all operations such as clearing, excavation, lead and transport, fill, compaction etc, as specified. Quantity of consolidated filling based on payment line for excavation shall be measured and paid for in cubic meters. The lead, lift etc. shall be as

indicated in the schedule of quantities.

Actualquantityofconsolidatedsandfillingandmurrumfillingshallbemeasuredand paid for in cubicmeters.

13.11. Rates

The rates shall be inclusive of clearing and grubbing, spreading, watering and compaction etc. as per specification above.

14. Anti TermiteTreatment

14.1. Type ofTreatment

AntiTermiteTreatmentisforpreventionoftermitesinfectingthebuilding.Thetreatment shall be done during the time of construction with application of chemical / insecticide emulsions.

14.2. Chemical / Emulsion

Chloropyrifos Emulsifiable concentrate of 1% conforming to IS:8944 shall be used. The chemical concentrate of above shall be procured by the contractor in sealed containers. Emulsion shall be prepared at site by diluting the concentrate with required amount of clean potablewatertoobtainspecifiedemulsionconcentration.Forexampleonepartofchemicalof 30% concentration when mixed with 59 parts of water shall give 0.5% emulsion concentration.

14.3. Applicator

Thetreatmentworkatsiteshallbegotdoneonlyfromqualifiedandcompetent applicatoragenciesusingchemicalsprocuredfromreputedmanufacturers

1.4.4 Treatment

Thetreatmentshallbeappliedformasonryfoundationsandbasements,RCCfoundationand basements, top surface of filling for floor, junction of walls and floor, external perimeter of building, soil under plinth protection, on the basement wall surfaces and around pipes traversing from below ground to thebuilding.

1.4.1.1. Chemical treatment of soils for the protection of buildings from attack of subterranean termites shall be done as per IS: 6313 (Part II). Treatment shall be got done only from the approved specialized agencies using the chemical procured directly from reputed and authorized dealers. Graduated containers shall be used for dilution and spraying of the chemical shall be done using hand operated pressure pumps. Proper stock account should be kept to ensure that the specified quantityofchemicalisusedfortherequiredareaduringtheoperation.

1.4.4.3 Time of Application

Soil treatment should start when foundation trenches and pits are ready to take bed concrete/levelingcourseinfoundations.Layingofbedconcrete/levelingcourseshould start when the chemical emulsion has been absorbed by the soil and the surface is quite dry.Treatmentshouldnotbecarriedoutwhenitisrainingorsoiliswetwithrainorsub

soilwater.Treatmenttothesurfaceofearthfillingwithintheplinthshallalsobedonein the same manner before laying the sub-gradefor flooring.

1.4.4.3 Disturbance

Thetreatedsoilbarriersshallnot bedisturbed.Ifforsomereasonsthetreatedsoil barriersaredisturbed,immediatestepsshallbetakentorestorethecontinuityand completeness of the barriersystem.

1.4.4.4 Treatment for Masonry Foundations andBasements

a. The bottom surface and the sides (up to a height of 300 mm) of the excavations made for masonry foundations and basements shall be treated with the chemical at the rate of 5 litters per square metre surfacearea.

b. After the masonry foundations and the retaining wall of the basements come up, the backfill intheimmediatecontactwiththefoundationstructureshallbetreatedattherate of 7.5 litters per sq.m of the vertical surface of the substructure for each side. If water is used for ramming the earth fill, the chemical treatment shall be carried out after the ramming operation is done by rodding the earth at 150 mm centers close to the wall surface and spraying the chemical with the above dosage. The earth is usually returned in layers and the treatment shall be carried out in similar stages. The chemical emulsion shall be directed towards the concrete or masonry surfaces of the columns and walls so thattheearthincontactwiththesesurfacesiswelltreatedwiththechemical.

1.4.4.5 Treatment for RCC Foundation andBasements

In the case of RCC foundations, the concrete mix is dense (being 1:2:4 or richer). It is, therefore,unnecessarytostartthetreatmentfromthebottomofexcavations.Thetreatment

shall start at the depth of 500 mm below ground level except when such ground level is raised or lowered by filling or cutting after the foundations have been cast. In such cases, the depth of 500 mm shall be determined from the new soil level resulting from the filling or cutting mentioned above, and soil in immediate contact with the vertical surfaces of RCCfoundationsshallbetreatedattherateof7.5litrespersquaremetre.Theotherdetails of treatment shall be as laid down in1.4.4.4.

1.4.4.6 Treatment of Top Surface of PlinthFilling

The top surface of the filled earth within the plinth walls shall be treated with chemical emulsion at the rate of 5 litres per sqm of the surface before the sand/sub-grade is laid. Holesupto50to75mmdeepat150mmcentersbothways shallbemadewithcrowbars onthesurfacetofacilitatesaturationofthesoilwithchemicalemulsion.

1.4.4.7 Treatment at Junction of the Walls and theFloor

To achieve continuity of the vertical chemical barrier on inner wall surfaces from the

ground level, a small channel 30 x 30 mm shall be made at all the junctions of walls and columns with the floor (before laying the sub-grade) and rod holes made in the channel upto ground level 150 mm apart and the chemical emulsion poured along the channel @ 7.5 litres per sqm of the vertical wall or column surface so as to soak the soil right to bottom. The soil shall be tamped back into place after this operation.

1.4.4.8 Treatment of soil along External Perimeter of Building

After the building is complete, 300 mm deep holes shall be provided in the soil with iron rods along the external perimeter of the building at intervals of about 150 mm and these holes shall be filled with chemical emulsion at the rate of 7.5 litres per sqm of vertical surfaces of external walls. If the depth of filling is more than 300 mm, the external perimeter treatment shall extend to the full depth of filling up to the ground level so as to ensure continuity of the chemical barrier. In case the earth outside the building is graded on completion of building, this treatment shall be carried out on completion of such grading.

1.4.4.9 Treatment of Soil under Apron (Plinth Protection) along External Perimeter ofBuildings

Top surface of the consolidated earth over which the apron is to be laid shall be treated with chemical emulsion at the rate of 5 litres per square metre of the surface before the apron is laid. If consolidated earth does not allow emulsion to seep through, holes upto 50 to75mmdeepat150mmcentersboth waysmaybemadewith12 mmdiametermildsteel rodonthesurfacetofacilitatesaturationofthesoilwiththechemicalemulsion.

1.4.4.10 Treatment for expansionjoints

Anti-termite treatment shall be supplemented by treating with chemical emulsion through the expansion joint after the sub-grade has been laid @ 2 litres per linear metre of expansion joint.

1.4.4.11 Treatment of Walls Retaining Soil above FloorLevel

Retaining walls like the basement walls or outer walls above the floor level retaining soil need to be protected by providing chemical barrier by treatment of retained soil in the immediate vicinity of the walls, so as to prevent entry of termites through the voids in masonry, cracks and crevices, etc. above the floor level. The soil retained by the walls shall be treated at the rate of 7.5 litres per square metre of the vertical surface so as to effectacontinuousouterchemicalbarrier,incontinuationoftheoneformedunder1.4.4.4.

1.4.4.12 Treatment of Soil Surrounding Pipes, Wastes andConduits

When pipes, wastes and conduits enter the soil inside the area of the foundations, the soil surrounding the points of entry shall be loosened around each such pipe water or conduit for a distance of 150 mm and to a depth of 75 mm before treatment is commenced. When they enter thesoilexternaltothefoundations,theyshallbesimilarlytreatedforadistance ofover300 mmunlesstheystandclearofthewallsofthebuildingsbyabout75mm.

1.4.4.13 Measurements

Alldimensionsshallbemeasuredcorrect toacm.Themeasurementsforalltheoperations described above shall be the plinth area of the building in square-meters at floor 1 level (Ground floor). Nothing extra shall be measured forpayment.

1.4.4.14 Rate

The rate for the anti-termite treatment shall include the cost of labour, concentrated chemical and all other inputs involved in all the operations described above.

1.5. Sub BaseFormation

1.5.1. Types of SubBase

The sub base is laid on the dressed sub grade prepared as per specification in 1.2 & 1.3.

- RubbleSoling
- WBM
- WMM

It will be done by any one method as directed by the Engineer-in-charge.

Where plinth area is small and covered by foundations, columns, beams and walls, invariably rubble soling shall be provided.

When large areas are available, WBM shall be resorted to.

1.5.2. RubbleSoling

Rubble for soling shall be locally available stone of approved variety. It shall behard,durableandfreefromdefectssuchasfissures,etc.Aftergradeispreparedtothe required levels, rubble shall be hand set as closely as possible and packed well. Stones shall be laid to have their largest area resting on the sub-grade. Rubble packing shall be in one layer of 20/25 cms. thick. After the stones are packed in position, the interstices betweenthemshallbecarefullypackedwithstonechipsofappropriatesizes.Theseshall behammeredintoobtainafinishedhardandcompactandlevelsurface.Merespreading of loose spalls or stone chips isprohibited.

Thesurfaceshallthenbeexaminedforanyprotrusionandiffoundthesame shallbeknockedofftoobtainasevena surfaceaspossible.

Under no circumstances, filling in voids with murrum, sand or such other material will be permitted for building. The soling so laid shall be compacted with suitable mechanical rammers. Dry Rolling is continued till the movement of the stones under roller load stops. Dry screenings consisting of gravel of stone aggregates upto 12 mm sizeisthenspreadverygraduallytofilluptheintersticesanddryrollingiscontinuedtill the voids are filled. At this stage the surface is copiously sprinkled with water and ramming continued simultaneously pushing the screenings in voids if any. Surface shall beallowedtodryandloose excessscreeningif anyshallberemoved.

1.5.3. WBM Subbase

This shall be laid in one or two layers as directed by the Engineer-in-charge, compacted thickness of each layer being 75 mm thick.

1.5.3.1. Stone aggregates of grading I 90 mm to 45 mm shall be spread uniformly on the prepared sub grade and rolled with 8-10 T wt power roller till the movement of aggregatestops.Furtherworki.e.fillingintersticeswithscreeningsiscarriedoutas specified in 1.5.2 to obtain a neat even surface without loose materials on the surface. Binding materials shall be added as directed by the Engineer-in-charge. For 100 mm compacted thickness of layer following quantities shall be consumed for area of 10 sq.meters.

Gradedaggregates	1.21 to 1.43 cubicmeters Screenings 0.27to0.44cubicmeters
Bindingmaterials	0.08 to 0.10 cubicmeters

1.5.4. Measurements

MeasurementsforrubblesolingandWBMshallbeonvolumetricbasistakingplanarea of actual work multiplied by compactedthickness.

1.5.5. Rates

Rates shall be inclusive of all work as per specification above.

2.0 PLAIN & REINFORCED CONCRETE

2.1. ApplicableCodes

ThefollowingIndianStandardCodes,unlessotherwisespecifiedherein,shallbeapplicable.In allcases,thelatesteditionsincludingallapplicableofficialamendments andrevisions shallbe referredto.

2.1.1. Materials

1)	IS.269	Specification for 33 grade ordinary Portlandcement.
2)	IS.455	Specification for Portland slagcement.
3)	IS.1489	Specification for Portland-pozzolana cement (Part 1 &2).
4)	IS:8112	Specificationfor43gradeordinaryPortlandcement.
5)	IS:12330	SpecificationforsulphateresistingPortlandcement.
6)	IS:383	Specificationforcoarseandfineaggregates fromnatural Source for concrete.
7)	IS:432	Specificationformildsteelandmedium(tensilesteelbarsand hard
8)	IS:786	drawnsteel)wiresforconcretereinforcement.(Part1 &2) concrete reinforcement.
9)	IS:1566	Specification for hard-drawn steel wire fabric forconcrete

reinforcement.

10)	IS:9103	Specification for admixtures forconcrete.
11)	IS:2645	Specification for integral cement water- proofingcompounds.
12)	IS:4990	Specification for plywood for concrete shutteringwork.

2.1.2. MaterialTesting

1)	IS.4031	Methods of physical tests for hydraulic cement (Parts 1 to15)
2)	IS:4032	Method for chemical analysis of hydrauliccement.
3)	IS:650	Specification for standard sand for testing ofcement.
4)	IS:2430	Methods for sampling of aggregates forconcrete.
5)	IS: 2386	Methods of test for aggregates for concrete (Parts 1 to8)
6)	IS:3025	Methods of sampling and test (physical and chemical) forwater used in industry.
7)	IS:6925	Methods of test for determination of water soluble chloridesin concrete admixtures.

Material Storage

1)	IS:4082	Recommendationsonstackingandstoringofconstruction materials atsite.

2.1.3. Concrete MixDesign

1)	IS:10262	Recommended guidelines for concrete mixdesign.
2)	SP:23(S&T)	Handbook on ConcreteMixes

2.1.4. ConcreteTesting

1)	IS.1199	Method of sampling and analysis ofconcrete.
2)	IS:516	Method of test for strength ofconcrete.
3)	IS:9013	Methodofmaking,curinganddeterminingcompressive strength of accelerated cured concrete testspecimens.
4)	IS:8142	Methodoftestfordeterminingsettingtimeofconcreteby penetrationresistance.
5)	IS:9284	Method of test for abrasion resistance ofconcrete.
6)	IS:2770	Methods of testing bond in reinforcedconcrete.

2.1.5. Equipments

1)	IS:1791	Specificationforbatchtypeconcretemixers.
2)	IS:2438	Specificationforrollerpanmixer.
3)	IS:4925	Specification for concrete batching and mixingplant.
4)	IS:5892	Specification for concrete transit mixer andagitator.
5)	IS:7242	Specification for concretespreaders.
6)	IS:2505	General Requirements for concrete vibrators: Immersiontype.
7)	IS:2506	General Requirements for screed board concretevibrators.
8)	IS:2514	Specificationforconcretevibratingtables.
9)	IS:3366	Specificationforpanvibrators.
10)	IS:4656	Specificationforformvibratorsforconcrete.

11) IS: 11993 Code of practice for use of screed board concretevibrators.
12) IS:7251 Specification for concretefinishers.
13) IS:2722 Specificationforportableswingweighbatchersforconcrete (single and double buckettype).
14) IS:2750 Specification for steelscaffoldings.

Codes of Practice

1) IS:456 Code of practice for plain and reinforcedconcrete.
2) IS:457 Codeofpracticeforgeneralconstructionofplainandreinforced concrete for dams and other massivestructures.
3) IS:3370 Codeofpracticeforconcretestructuresforstorageofliquids (Parts 1 to4)
4) IS:3935 Code of practice for compositeconstruction.
5) IS:2204 Codeofpracticeforconstructionofreinforcedconcreteshell roof.
6) IS:2210 Criteriaforthedesignofreinforcedconcreteshellstructuresand foldedplates.
7) IS:2502 Codeofpracticeforbendingandfixingofbarsforconcrete reinforcement.
8) IS:5525 Recommendationfordetailingofreinforcementinreinforced concreteworks.
9) IS:2751 Codeofpracticeforweldingof mildsteelplainanddeformed bars used for reinforced concreteconstruction.
10) IS:9417 Specificationforweldingcoldworkedbarsforreinforced concreteconstruction.
11) IS:3558 Codeofpracticefor useofimmersionvibratorsfor consolidatingconcrete.
12) IS:3414 Codeofpracticefordesignandinstallationofjointsin buildings.
13) IS:4326 Codeofpracticeforearthquakeresistantdesignand construction ofbuilding.
14) IS:4014 Code of practice for steel tubular scaffolding (Parts 1 &2)
15) IS:2571 Code of practice for laying in situ cement concreteflooring.
16) IS:7861 Codeofpracticeforextremeweatherconcreting:Part1 Recommended practice for hot weather concreting.
17) IS:1893 Criteriaforearthquakeresistantstructuressubjectedtoseismic forces.
18) IS: 13920Code of Practice for Ductile Detailing of Reinforced Concrete Structures subjected to Seismicforces.
19) IS: 13827Improving Earthquake Resistance of Earthen Buildings-Guidelines.
20) IS:13828ImprovingEarthquakeResistanceofLowStrengthMasonry Buildings-Guidelines

2.1.6. Construction Safety

1) IS.3696 Safety code for scaffolds and ladders. (Parts 1 & 2)
2) IS: 7969 Safetycodeforhandlingandstorageofbuildingmaterials.
3) IS: 8989 Safety code for erection of concrete framed structures.

2.1.7. Measurement

1) IS1200 MethodofmeasurementofbuildingandEngineer-in-chargeing Works
2) IS3385 CodeofpracticeformeasurementofCivilEngineer-in-chargeing Works

2.2. General

Concreteandreinforcedconcreteworkshallbecarriedoutgenerallyinconformitywith thelatestIndianStandardIS:456exceptforprovisionsindicatedhereinbelow.Allwork is to be carried out with utmost precision and up to date scientific know-how and the contractorshallemploythoroughlycompetentstafftoachievethehigheststandards.

2.3. Materials

2.3.1. Cement

CementfortheworkshallbeordinaryPortland/SlagCementconformingtothe latestIndianStandardsIS:8112-43gradeandofthebestnormalsettingqualityunlessa quicksettlingqualityisexpresslyinstructedinthespecificationsorotherwiseduringthe courseoftheworkbytheEngineer-in-charge.Onlyonetypeofcementshallbeusedin anyonemix.Thesourceofsupply,typeorbrandofcementwithinthesamestructureor portionthereofshallnotbechangedwithoutapprovalfromtheEngineer-in-charge.The contractorshallalwayspurchasePortlandcementasfreshaspossibleaftermanufacture andshallsupplythemanufacture'stestcertificate,correspondingtothebatchofcement intended for use in work. Where there is reason to believe the cement has been long stored,theEngineer-in-chargemaydemandaLaboratoryTestCertificateregardingthe character of cement and the contractor shall furnish the same at no extra cost. The Engineer-in-charge shall reject any cement, which in his opinion does not meet the requiredstandards.

All bags and containers in which cement is packed shall be stored in a dry, weather-tight,andproperlyventilatedstructurewithadequateprovisionforprevention andabsorptionofmoisture.Thecontractorshallatalltimesmaintainfortheinspection of the Engineer-in-charge a log book indicating the receipt of cement brand and agent from whom obtained and the age of cement. Cement, which has caked or perished by being wet or otherwise, shall on no account be used on thework.

Cement shall be consumed on the works in the same sequence as that of its receiptatsite.Cementreclaimedfromcleaningofbagsorfromspillagefromcontainers or otherwise shall on no account beused.

If cement is not stored properly and has deteriorated, the material shall be rejected. Cement bags shall be stored in dry weatherproof shed with a raised floor, well away from the outer walls and insulated from the floor to avoid moisture from ground. Not more than 15 bags shallbestackedinanytier.StoragearrangementshallbeapprovedbytheEngineer-in-charge. Storage under tarpaulins shall not bepermitted.

2.3.2. Sand(Refer Table No.I)

Sand(fineaggregated)shallgenerallyconformtoIS383.Sandshallbenatural sand,crushedgravelsandorcrushedstonesandatthediscretionoftheContractor.Use ofseasandisprohibited.Sandshallbecomposedofhardsiliceousmaterialandshallbe

cleanandofsharpangulargrittype.Sandshallbeproperlygradedminimizingvoids. Allowanceforbulkageofsandshallbemade.Thefinenessmodulusofsandshall neither be less than 2.2 nor more than3.2.

2.3.3. Coarse Aggregate(Refer Table No. II & III)

Coarse aggregate shall be approved hard aggregate generally conforming to IS 383.

Eachsizeofcoarseandfineaggregatesshallbestackedseparatelyandshallbeprotected fromleavesandcontaminationwithforeignmaterial.Thestacksshallbeonhard,clean, freedrainingbases, drainingawayfromtheconcretemixingarea.

2.3.4. Water

Water for all concrete work shall be clean, free from deleterious matter such as oils, acids, alkalies, sugar and vegetable matter. Every attempt shall be made to use water, which is fit for drinking purposes. Water storage facilities provided by the contractorshallbemaintainedproperlytoprecludecontaminationofwaterbyanyofthe harmful substances. The quantity of water to be added to concrete for mixing shall be such as to afford workability consistent withstrength.

TheContractorshallmakehisownarrangementsforstoringwateratsiteintanksto preventcontamination.

TABLE – I

Unless otherwise directed or approved, the grading of sand shall be within the limits indicated hereunder: -

Fine aggregate conforming to Grade Zone IV shall not be used for RCC works.

I.S. Sieve Designation	PERCENTAGE PASSING FOR			
	Grading Zone I	Grading ZoneII	Grading ZoneIII	Grading ZoneIV
10 mm	100	100	100	100
4.75 mm	90 – 100	90 – 100	90 – 100	95 – 100
2.36 mm	60 – 95	75 – 100	85 – 100	95 – 100
1.18 mm	30 – 70	55 – 90	75 – 100	90 – 100
600 micron	15 – 34	35 – 59	60 – 79	80 – 100
300 micron	5 – 20	8 – 30	12 – 40	15 – 50
150 micron	0 – 10	0 – 10	0 – 10	0 – 15

TABLE – II

GRADING OF COARSE AGGREGATE

I.S. Sieve Designation	Percentage passing for single sized aggregate of nominal size					Percentage passing for Grading aggregate of nominal size			
	40 mm	20 mm	16 mm	12.5 mm	10 mm	40 mm	20 mm	16 mm	12.5 mm
63 mm	100	-	-	-	-	100	-	-	-
40 mm	85 - 100	100	-	-	-	95– 100	100	-	-
20 mm	0 – 20	85 – 100	100	-	-	30 – 70	95 – 100	100	100
16 mm	-	-	85 – 100	100	-	-	-	90 – 100	-
12.5 mm	-	-	-	85 – 100	100	-	-	-	90 – 100
10 mm	0 – 5	0 – 20	0 – 30	0 – 45	85 – 100	10 – 35	25 – 55	30 – 70	40 – 85
4.75 mm	-	0 – 5	0 – 5	0 – 10	0 – 20	0 – 5	0 – 10	0 – 10	0 – 10
2.36 mm	-	-	-	-	0 – 5	-	-	-	-

TABLE – III

UPPER LIMIT FOR DELETERIOU MATERIALS IN COARSE & FINEAGGREGATES

The percentages of deleterious substances in the aggregate delivered to the mixer shall not exceed the following:-

		Percent by Weight	
		Uncrushed	**Crushed**
i)	Material finer than 75 micronI.Ssieve -FineAggregates (FA)	-Coarse Aggregates(CA)	
Ii)	Coalandlignite (CA) and(FA)	3.00 3.00	3.00 15.00
iii)	Claylumps (CA) and(FA)	1.00	1.00
iv)	Softfragments(CA) 3.00	0.00	
(FA)		0.00	0.00
v)	Total of all above substances(CA)	5.00	(FA)

.00

5
.
0
0
2
.
0
0

Reinforcement Steel

2.3.5.1 MaterialSpecification

Steelusedforreinforcementshallbeanyoffollowingtypesspecificallyapplicableasper Bill ofQuantities

- Mild steel and mediumtensilebarIS 432 Part I (FE 415)
- HYS deformedbars IS1786
- Structural steel section(GradeA) IS2062

2.3.5.2 Tolerance inMass

Refer to the following:-

TABLE

(ToleranceofNominalMass)

Sr. No.	Nominal Size in mm	Tolerance on the nominal mass percent		
		Batch	Individual Sample +	Individual sample for coil (-x-)
a)	upto and including 10	± 7	-8	± 8
b)	over 10, upto and including 16	± 5	- 6	± 6
c)	over 16	± 3	- 4	± 4

\+ For individual sample plus tolerance is notspecified

(x) For coil batch tolerance is notapplicable.

Tolerance shall be determined in accordance with method given in IS 1786.

2.3.5.3 a) HYS Deformed Bars

HighstrengthdeformedbarsandwiresshallconformtoIS:1786.Thephysical propertiesforallsizesofsteelbarsarementionedbelowin Tablebelow.

TABLE

Sr. No.	Property	Grade		
		Fe 415	Fe 500	Fe 550
1.	0.2% proof stress / yield stress, min	415	500	550

	N/mm^2			
2.	Elongation, percent min. on gauge length 5.65 □ A, Where A is the X-Sectional Area of the test piece.	14.5	12	8
3.	Tensile strength(min)	10% more than actual 0.2% proof stress but not less than 485 N/mm^2	8% morethan actual 0.2% proof stress but not less than 545 N/mm^2	6% more than actual 0.2% proof stressbut not less than 585 N/mm^2

Tests: Selection and preparation of Test sample. All the tests pieces shall be selected by the Engineer-in-charge or his authorized representative in accordance with provisions as laid in IS: 1786 either –

a) From cutting ofbars

Or

b) If he so desires, from any bar after it has been cut to the required or specified size and the test piece taken from any partof it.
In no case, the test pieces shall be detached from the bar or coil except in the presence of the Engineer-in-charge or his authorized representative.

The test pieces obtained in accordance with as above shall be full sections of the bars as rolled and subsequently cold worked and shall be subjected to physical/chemical tests without any further modifications. No deductions in size bymachiningor otherwiseshallbepermissible.Notestpieceshallbeenactedor otherwise subject to heat treatment. Any straightening, which a test piece may require shall be donecold.

2.3.5.4 Stacking andStorage

Steel for reinforcement shall be stacked on top of timber sleepers to avoid contact with ground/waterandshallbestoredinsuchawaytoprevent distortingandcorrosion.Barsof differentclassifications,sizesandlengthsshallbestoredseparatelytofacilitateissueinsuch sizes andlengthstocauseminimumwastageincuttingfromstandardlength.

2.3.5.5 Fabrication and Fixing ofReinforcement

a) GeneralRequirements

Steelforreinforcementshallbeclearandfreefromloosemiscalls,dust,looserust,coatsof paints,oilorothercoatings,whichmaydestroyorreducebond.Itshallbestoredinsucha wayastoavoiddistortionandtopreventdeteriorationandcorrosion.Priortoassemblyof reinforcementonnoaccountanyoilysubstanceshallbeusedforremovingtherust.

b) Assembly ofReinforcement

Bars shall be bent correctly and accurately to the size and shape as shown in the detailed drawingorasdirectedbytheEngineer-in-charge.Preferablybarsoffulllengthshallbeused. Necessary cutting and straightening is also included. Over lapping of bars, where necessary shall be done as directed by the Engineer-in-charge. The overlapping bars shall not touch each other and these shall be kept apart with concrete between them by 25 mm or 1 ¼ times themaximumsizeofthecoarseaggregatewhicheverisgreater.Butwherethisisnot possible,theoverlappingbarsshallbeboundtogetheratintervalsnotexceedingtwicethe dia. Of such bars with two strands annealed steel wire of 0.90 mm to 1.6 mm twisted tight. The overlaps / splices shall be staggered as per directions of the Engineer-in-charge. But in no case the over lapping shall be provided in more than 50% of cross sectional area at one section.

Bonds and Hooks Forming End Anchorages

ReinforcementshallbebentandfixedinaccordancewithprocedurespecifiedinIS2502, codeofpracticeforbendingandfixingofbarsforconcretereinforcement.

c) Anchoring Bars inTension

Deformed bars may be used without end anchorages provided, development length requirementissatisfied.HooksshouldnormallybeprovidedforplainbarsintensionDevelopment length of bars will be determined as per IS :456.

d) Anchoring Bars inCompression

The anchorage length of straight bar in compression shall be equal to the "Development Length"ofbarsincompressionasspecifiedinIS:456.Theprojectedlengthofhooks,bend s andstraightlengthsbeyondbend,ifprovidedforabarincompression,shallbeconsidered

for development length.

e) Binders, stirrups, links and thelike

Incaseofbinders,stirrups, linksetc.thestraightportionbeyondthecurveattheendshallbe not less than eight times nominal size ofbar.

f) Welding ofBars

Welded joints or mechanical connections in reinforcement may be used but in all cases of importantconnections,testsshallbemadetoprovethatthejointsareoffullstrengthofbars connected.

TheEngineer-in-chargeshallbeapprovedthelocationandtypeof welding.Weldingshallbe as per IS: 2751 for mild steel bars and for cold workedbars.

g) Placing inPosition

Fabricated reinforcement bars shall be placed in position as shown in the drawings or as directed by the Engineer-in-charge. The bars crossing one another shall be tied together at every intersection with two strands of annealed steel wire 0.9 to 1.6 mm thickness twisted tight to make the skeleton of the steel work rigid so that the reinforcement does not get displaced during deposition of concrete.

The bars shall be kept in correct position by the following methods:

i. In case of beam and slab construction pre-cast cover blocks in cement mortar 1:2 (1 cement: 2 coarse sand) about 4 x 4 cm section and of thickness equal to the specifiedcover shallbeplacedbetweenthebarsandshuttering,soastosecureand maintain the requisite cover of concrete overreinforcement.

ii. In case of cantilevered and doubly reinforced beams or slabs, the vertical distance between the horizontal bars shall be maintained by introducing chairs, spacers or supportbars ofsteelat1.0metreoratshorterspacingtoavoidsagging.

iii. In case of columns and walls, the vertical bars shall be kept in position by means of timber templates with slots accurately cut in them; or with block of cement mortar 1:2 (1 cement : 2 coarse sand) of required size suitably tied to the reinforcementtoensurethattheyareincorrectpositionduringconcreting.

iv. In case of other RCC structure a combination of cover blocks, spacers and templates shall be used as directed byEngineer-in-charge.

h) Tolerance on Placing ofReinforcement

UnlessotherwisespecifiedbytheEngineer-in-charge,reinforcementshallbeplacedwithin the followingtolerances:

Tolerance In spacing

a) For effective depth, 200 mmorless ± 10mm

b) For effective depth, more than 200 mm ± 15mm

The cover shall in no case be reduced by more than one third of specified cover or 5 mm whichever is less.

i) Bending at ConstructionJoints

Where reinforcement bars (up to 12 mm for HYSD bars and up to 16 mm for MS bars) are bent aside at construction joints and afterwards bent back into their original position care shouldbetakentoensurethatatnotimetheradiusofthebendislessthan4bardiametersfor plainmildsteelor6bardiametersfordeformedbars.Careshallalsobetakenwhenbending backbarstoensurethat theconcretearoundthebaris notdamaged.

j) Measurement

Reinforcement including authorized spacer bars, chairs and lap pages shall be measured in lengthofdifferentdiameters,asactually(notmorethanasspecifiedinthedrawings)usedi n the work nearest to a centimeter and their weight calculated on the basis of standard weight given in Table below. Wastage and unauthorized overlaps shall not be paid for. Annealed steelwirerequiredforbindingortackweldingshallnotbemeasured,itscostbeinginclude d in the rate ofreinforcement.

Chairsseparatorsetc.shallbeprovidedasdirectedbytheEngineer-in-chargeandmeasured separately and paidfor.

TABLE

Cross Section Area and Mass of Steel Bar

Nominal Size Mm	Cross Sectional Area Sq.mm	Mass per meter Run Kg.
6	28.3	0.222
7	38.5	0.302
8	50.3	0.395
10	78.6	0.617
12	113.1	0.888
16	201.2	1.58
18	254.6	2.00
20	314.3	2.47
22	380.3	2.98
25	491.1	3.85
28	616.0	4.83
32	804.6	6.31
36	1018.3	7.99

40	1257.2	9.85
45	1591.1	12.50
50	1964.3	15.42

a) Rate

The rate for reinforcement shall include the cost of labour and materials required for all operationsdescribedabovesuchascleaningofreinforcementbars,straightening,cutting , hooking,bending,binding,placinginpositionetc.asrequiredordirectedincludingtack welding on crossing of bars in lieu of binding withwires.

2.3.6 Testing of Materials:

(a) (I) Manufacturer'sTests

ForeachbatchofmaterialssuppliedManufacturer'sTestCertificateasperIS:1786 shall be submitted forapproval.

(ii) Field Tests – Following type of lab test shall be carriedout.

1) TensileTests
This shall be done as per IS 1608

2) BendTest
This shall be done as per IS 1599

3) Re-test
This shall be done as per IS 1786

4) RebendTest
This shall be done as per IS 1786

5) Chemical composition Test ThisshallbedoneasperIS228

6) Unit weightTest

This shall be done as per IS 1786

Should any one of the test pieces first selected fail to pass any of the tests specified above, two further samples shall be selected for testing in respect of each failure. Should the test piecesfromboththeseadditionalsamplespass,thematerialsrepresentedbythetestsamples shall be deemed to comply with the requirement of the particular test. Should the test piece fromeitheroftheseadditionalsamplesfail,thematerialrepresentedbythetestsamplesshall be considered as not having complied withstandard.

(b). AcceptanceCriteria

Basedontheresultsoftestscarriedoutasmentionedabove,theEngineer-in-chargewill decidetheacceptanceofthebatchundertestfor useinRCCstructures,andhisdecision shall be final and binding on theContractor.

Thechargesforallthetestsshallbebornebythe Contractorandaredeemedtohave been included in the price quoted for the relevant BOQ item. It shall be clearly understoodbytheContractorthattheconfirmatoryteststipulatedaboveismandatory andthetimerequiredforsuchtestingshallbecateredforinthedeliveryschedulefor materials.

Allreinforcementshallbeclean,freefrompitting,oil,grease,paint,loosemillscales, rust, dirt, dust, or any other substance that will destroy or reducebond.

2.4 Concrete

All structural concrete shall be Mix designed & weight batched.

2.4.1 DesignMix

Designmixconcreteisthatinwhichdesignofmix i.e.theproportionbyweight ofcement, aggregatesandwateris arrivedastohavemeantargetstrengthwithrequiredworkabilityin wet condition and the desired durability in hardenedstate.

2.4.2 Grade ofConcrete

Thecompressivestrengthofvariousgradesofdesignedconcreteshallbeasper Tablebelo w (TableIV)

TABLE IV

GRADEOFCONCRETE

Sr. No.	Type of Concrete	Min. Cement Content in Kg/Cumof Concrete	Compression Strength	
			7 day N/mm^2	28 days N/mm^2
1.	M 15 (PCC)	315	10.0	15
2.	M 20 (RCC)	405	13.5	20
3.	M 25 (RCC)	410	17.0	25

CompressiveStrengthindicatedabovepertainstopressuretestonworkstestcubes15cmx 15 cm x 15 cm after normal curing for 14 days as per IS:516.

The minimum cement content stipulated above should be adopted irrespective of whether the Contractor achieves the desired strength with less quantity of cement. The Contractor's quoted rates for concrete shall provide for the above eventuality

and
nothing extra shall become payable to the Contractor in this account. Even in the case where the quantity of cement required is higher than that specified above to achieve
desiredstrengthbasedonanapprovedmixdesign,nothingextrashallbecomepayableto theContractor.

TheContractorshallnotcommenceconcretinginthePermanentWorksuntildetailsof trial mixes and test results for each class of concrete have been submitted to and approved by theEngineer-in-charge.

TheContractor shallnotaltertheapproved mixproportionsnortheapprovedsourceof supplyofanyoftheingredientswithouthavingpreviouslyobtainedtheapprovalofthe Engineer-in-charge.

Duringproduction,theEngineer-in-chargemayrequiretrialmixestobemadebeforea substantialchangeismadeinthematerialsor intheproportionsofthematerialstobe used.

ItshallbetheContractor'ssoleresponsibilitytocarryoutthemixdesignsathisowncost

fromareputedinstituteasapprovedbyEngineer-in-charge-in-charge.Heshallfurnishto

the Engineer-in-charge at least 30 days before concreting operations, a statement of

proportions proposed to be used for the various concrete mixes and the strength

results obtained.

Arangeofslumps,whichshallgenerallybeusedforvarioustypesofconstructionunless otherwiseinstructedbytheEngineer-in-charge, isgivenbelow:

Structure/Member	**Slump in millimeters**	
	Maximum	**Minimum**
Reinforced foundation walls and footings	75	40
Plain footings, caissons and substructure Walls	75	40
Slabs, Beams and reinforced walls	100	40
Pump & miscellaneous Equipment Foundations	75	40
Building columns	100	40
Pavements	50	40
Heavy mass construction	75	25

Note: Allconcretingdoneforwaterretainingstructuresshallhaveaminimumslump value of 60 mm and maximum of 100mm

2.4.3 Design Procedure for Concrete Mix (refer IS10262)

2.4.3.1 Data to be stipulated /specified

1. Characteristics compressive strength of concrete at 28days
2. Degree ofworkability
3. Limitations on Water Cementratio
4. StandardDeviation
5. Minimum Cement Content as per IS:456
6. StandardDeviation(TableV)
7. DegreeofControl(TableVI)

2.4.3.2 TargetStrength

As per IS 456 and IS 1343 target average Compressive strength at 28 days is fck + 1.65s Where fck = characteristics compressive strength at 28 days
S = standard deviation.

2.4.3.3 Batching

In proportioning concrete, the quantity of cement and aggregates shall be determined by mass. Water shall be measured by volume in calibrated tanks. Uniform quality ofgraded aggregates and water cement ratio shall bemaintained.
Admixtures if required shall be mixed as per the relevant IS: 9103/456.

2.4.3.4 Mixing

Concrete shall be mixed in a mechanical mixer. The mixer should comply with IS 1791. It shall be fitted with hopper. The mixing shall be continuous until there is uniform distribution of the material and the mass is uniform in colour and consistency. If there is segregation after unloading from the mixer, the concrete should be remixed. The mixing time shall not be less than 2 minutes.

Each time the work stops, the mixer shall be cleaned out, and while recommencing; the first batch shall have 10% additional cement to allow for sticking in the drum.

2.4.5 Transporting, Placing andCompacting

2.4.5.1 Transportation

Concrete shall be transported from the mixer to the place of laying as rapidly as possible by methods,whichwillpreventthesegregationorlossofanyoftheingredients,andmaintaining the requiredworkability.

2.4.5.2 Placing

Theconcrete shallbedepositedasnearlyaspracticableinitsfinalpositiontoavoid rehandling.Itshallbelaidgently(notthrown)andshallbe thoroughlyvibratedand compactedbefore settingcommencesandshouldnotbe subsequentlydisturbed.Method of placing shall be such as to precludesegregation. Careshall be taken to avoid

displacementofreinforcementormovementofformworkanddamage due torains. Concreteshallnotbe dropped fromaheightofmorethan1m.

WhileplacingconcretetheContractorshallproceedasspecifiedbelowandalsoensurethe following:

(a) Continuouslybetweenconstructionjoints andpre-determinedabutments. (b) Withoutdisturbancetoformsorreinforcement.

(c) Withoutdisturbance topipes,ducts,fixingsandtheliketobecastin;ensurethat suchitemsaresecurelyfixed.Ensurethatconcretecannotenteropenendsof pipes andconduitsetc.

(d) Withoutdroppinginamannerthatcould causesegregationorshock.

(e) Indeeppoursonlywhentheconcreteandformworkdesignedforthispurpose andbyusingsuitablechutesorpipes.

(f) Donotplaceif the workabilityissuchthatfullcompaction cannotbeachieved.

(g) Withoutdisturbingtheunsupportedsidesofexcavations;preventcontamination of concretewithearth.Providesheetingifnecessary.In supportedexcavations, withdrawthe liningsprogressivelyasconcrete isplaced.

(h) Ifplaceddirectlyontohardcoreoranyotherporousmaterial,dampenthe surface toreducelossofwaterfromtheconcrete.

(i) Ensurethatthere isnodamage ordisplacementtosheetmembranes. (j) Recordthetimeandlocationofplacingstructuralconcrete.

(k) Maintain separate pour card for each pour as per the format approved by Engineer-in-charge-in-charge.

2.4.5.3 Compaction

Concreteshallbethoroughly compactedand fullyworkedaroundembeddedfixtures andinto cornersoftheform work.Mechanicalvibratorofappropriatetypeshalldocompactiontilla denseconcrete isobtained.The mechanicalvibratorsshallconformto IS2505,IS2506,IS2514,IS4656specificationsforconcretevibrators(immersiontype).Topreventseg regation,overvibrationshallbeavoided.TheuseofmechanicalvibratormayberelaxedbytheEngineer-in-chargeathisdiscretionforcertainitems andpermithand compaction.

Handcompactionshallbe done withthehelpof tampingrods.Compactionshallbe completedbeforethe initialsettingstarts. Forthe itemswhere mechanicalvibrators arenotto beused,thecontractorshalltakepermissionof theEngineer-in-chargeinwritingbeforethe startof the work.Aftercompactionthetopsurfaceshallbefinishedevenandsmoothwith woodentrowelbeforetheconcretebeginstoset.

2.4.5.4 ConstructionJoints

Concretingshallbecarriedout continuouslyuptoconstructionjoints. Thepositionand arrangementofconstructionjointsshallbeasshowninthestructuraldrawingsorasdirected bytheEngineer-in-charge.Numberofsuchjointsshallbe keptminimum.Jointsshallbekept asstraight aspossible.

Dowels forconcrete work,notlikelytobetakenupinthe nearfuture,shallbecoated withcementslurryandencasedinlean concreteasindicatedonthe drawingsoras approvedbytheEngineer-in-charge.

Assoonasthe exposed concrete hassufficientlyhardened,thesurfaceof thejointshall be waterjettedorbrushedwithastiffbrushtoexposethe largeraggregate withoutbeing disturbed.Alternatively,if thepreparationisnotsatisfactory,orproperjointpreparation isnotpossible duetoinclementweather,theContractorshallthoroughlyremovethe laitance ofhardenedconcretebymechanicalchippingaftersevendaysofconcrete work athisowncost. Beforeplacing freshconcreteagainstaconstructionjoint allloose materialshallberemovedandthesurfacesluicedwithwateruntilitisperfectlyclean, thereafterallpoundedwatershouldberemoved.

Whenconcretingistoberesumedonasurface,whichhasnotfullyhardened,alllaitance shallberemovedbywirebrushing,thesurfacewetted,free waterremovedandacoatof cementslurryapplied.Onthis,a layerofconcrete notexceeding150mmthicknessshall beplacedandwellrammedagainsttheoldwork.Thereafterworkshallproceedinthe normalway.

2.4.5.5 StandardofAcceptance

(a) Theaverage strengthofgroupofcubes foreachgradecastforeachdayshallnot belessthanthe specifiedworkcube strength.20percentofcubescastforeach daymayhavevalueslessthanthe specifiedstrengthprovidedthatthelowest value isnotlessthan85%of thespecifiedstrength.)

(b) Concretestrengthlessthanspecifiedmayasaspecialcasebeacceptedina memberwith the approvalofEngineer-in-charge-in-chargeprovidedthatthe maximumstressin thememberunderthemaximumdesign liveloaddoesnot exceed the permissible safe stressappropriate tothelowerstrengthofthe concrete.

(c) Concretewhichdoesnotmeetthe strengthrequirementsasspecifiedbuthasa strengthgreaterthanthatofthelowestvalue of85%may,atthe discretionofthe designer, beacceptedas beingstructurallyadequatewithout further testing. Howeverinsuchcasespro-ratareductionintherate ofconcrete shallbe incorporated forpayment.

(d) Concrete ofeachgradeshallbeassessedseparately.

(e) Concreteshallbeassesseddailyforcompliance.

2.4.5.6 Criteriaforacceptance ofwork

Partorelementofconcrete workshallbedeemedtobe acceptable,providedthethree cubestested for28daysstrengthconformtothefollowing:

a) Average of thethreecubesstrengthsshallnotbelessthanthespecifiedstrength. b)

Noindividualcubestrengthshallbelessthan90%of thespecifiedstrength.

c) If any individual cube strength exhibits more than 133% of the specified strength,suchcube shallbe classifiedasfreakandthe criteriain(a)and(b) above,shallbe appliedforthe remaining two cubesonly and the acceptability determined.

d) Quantumofcubes andtesting

Asetof6cubesshallbecastpereverysampleofconcrete.Theminimum frequencyofsamplingofconcrete ofeachgradeshallbeasunder:

Quantityof Concrete(inm3)	No.ofsamples
1–5	1
6–15	2
16–30	3
31–50	4
51andabove	4+1additionalsamplefor eachadditional50m3orpart thereof.

Atleastonesampleshallbetaken fromeachshift andasetof6

Cubesoneveryimportantelement asdecidedbytheEngineer-in-charge-in- charge.

The decisionofTheEngineer-in-chargeinthis regardshallbefinalandbinding.

TABLE5

Gradeofconcrete	StandardDeviationfordifferentdegree of controlinN/mm^2		
	VeryGood	Good	Fair
M15	2.5	3.5	4.5
M20	3.6	4.6	5.6
M25	4.3	5.3	6.3
M30	5.0	6.0	7.0
M35	5.3	6.3	7.3

(e) Degree ofquality controlexpectedunderdifferentsite conditionsisdescribedin table6.

TABLE6

Degree of Control	Condition of production of concrete
Very Good	Fresh cement from single source and regular tests, weigh batching of all materials, aggregates supplied in single size, control of aggregates grading and moisture content, control of water added, frequent supervision, regular workability and strength tests and field laboratory facilities.
Good	Carefully stored cement and periodic test, weigh batching of all materials, controlledwater, graded aggregate supplied, occasional grading and moisture tests, periodic check of workability & strength,intermittentsupervisionandexperienced workers.
Fair	Proper storage of cement, volume batching of all of the aggregates, allowing for bulking of sand, weigh batching of cement, water content controlled by inspection of mix & occasional supervision and tests.

2.4.5.7 Finishtoconcretesurfaces

Finishto concretesurfaces atvarioussituationsshallbe asperdirectionsofThe Engineer-in-charge.Whereformfinishisspecified,the finalsurfaceshallbesmoothand evenandnoundulations,ridges,spotsetc.shallbepermitted.Theyshallalsobe laidto patternasdirected.In casesurfacesintendedanddirectedforformfinish,exhibit anyof thedefects above mentioned,thesurfacesshallberubbedwith carborundumorplastered andfinishedasdirectedattheriskand costof thecontractor.Thedecisionastothe acceptabilityorotherwise ofasurfacewillbenotifiedbyTheEngineer-in-chargeand thecontractorwillimplementthe instructions accordingly.

2.4.5.8 Concretecoverforreinforcement

Wherenotspecificallyindicatedinthe drawings,concretecoverfor reinforcementshallbeasper the latestIS456orasperdirections atsitefromtimeto time.Properconcretecoverblockstosuitvariouscoversasrequiredshallbeprovidedin adequatenumberssufficientlyaheadof the work.

2.4.5.8a) Specificationforself levellingfloortopping

- SurfacePreparation

Thesubstratemustbecleanedthoroughlybywirebrushtomakeitfreefromloose particles,laitaince,oil,greaseetc.substratemustbefromanymoisture

PrimingwithSikafloor80Primer

Onthepreparedsurface,applicationofasolvent freeepoxyresinbasedprimer of densityapproximate1Kg/litre(A+B)at30^{o}C.Mixingratioofprimershouldbecomp.A :Comp.B=1:2.5byweight.

Application of normal setting epoxy modified cementitious self-levelling floor toppingSikafloor81Epocem.

Ontheprimedsurfaceapplicationof2mmthick, self leveling floortoppingfloortopping Sikafloor81Epocem@4.4Kg/M^2

.ApplicationofSikafloor80Primer

OnthetopofSikafloor81Epocemfurtherapplicationof Sikafloor80primer

FinallyapplicationofEpoxybasedself-smootheningfloortoppingSikafloor261Sof 1mmthickness.

2.4.5.9 Curing

Itisveryimportantthatallcementconcrete workshallbecuredproperly.All concrete workshallbecoveredwithalayerofsacking,canvas,Hessianorsimilar absorbentmaterialandkeptwet continuously fornotlessthana fortnightorasdirected. Waterusedforcuringshallalsobefreefromanydeleterioussubstances andshall generallybefitfordrinking.The workshallbeadequatelyprotected frompremature drying,winds,directedsunrays, rapid coolingduringthefirstfewdays afterplacing, vibrationandimpactwhichmaydisrupttheconcreteandinterferewithitsbondtothe reinforcement.Membranecuringshallbeallowedwithpriorpermissionof Engineer-in- charge-in-charge without anyextrapayment.

2.4.5.10a) Openings andinserts

Allopenings andinsertswhicharedesignatedinduetime oras required forservices,willbeexactlyprovidedbythecontractor includingsupplyofmaterials.TheContractorshouldalsotheanchorsorsuchitems, whichmaybesuppliedbytheEngineer-in-charge inexactpositionandinperfectlines andlevels.Inserts applytosuch items astimber,dowelsbolts,loop,brackets,suspensionirons,hooks, screwplates,pipeofvarioustypes anddiameteretc.etc.Openingsin concrete ormasonrymustbeprovidedinslightlybigger, ifdirectedso, asshownindrawingsorasinstructed.Itmustbeclearlyunderstoodthat theprovisionsof inserts andopenings ascontemplatedinthis contract aretobecarriedoutwith"utmostprecision"andanydeviationof the samefromthatasshownindrawingorinstructed,havetoberectified bythecontractorathisowncostandrisk.

b) LiquidRetainingStructures

TheContractorshalltakespecialcareforconcreteforliquidretaining structures,undergroundstructures andthose othersspecifically called fortoguaranteethefinishandwatertightness.Allsuchconcreteshallbe mixedwithwaterproofingcompoundandplacedwithleastnumberof joints.

Allsuchstructuresshallbe hydro-tested.

TheContractorshallmakeallarrangements forhydro-testingof structure,allarrangements fortestingsuchastemporarybulkheads, pressuregauges,pumps,pipe linesetc.

Anytemporaryarrangementsthatmayhavetobe made to ensure stabilityof thestructuresshallalsobeconsideredtohavebeentaken intoaccountwhile quotingtherates. Anyleakagethatmayoccurduringthe hydro-testorsubsequently duringthedefectsliabilityperiodortheperiodforwhichthestructure is guaranteedshallbe effectivelystoppedeitherbycement/epoxypressure grouting,gunitingorsuchothermethods asmaybeapprovedbythe Engineer-in-charge. Allsuchrectificationshallbedonebythe Contractortotheentiresatisfactionof theEngineer-in-chargeatnoextra costtotheHAL.

c) TestingConcreteStructuresforLeakage

Hydro-static testforwatertightnessshallbe doneatfullstoragelevelor soffitofcoverslab, asmaybedirectedbytheEngineer-in-charge,as describedbelow:

In caseofstructureswhose externalfaces areexposed,suchaselevated tanks,therequirementsof thetestshallbe deemedtobesatisfiedif the externalfacesshownosignof leakage orsweatingandremain completelydryduringtheperiodofobservationofsevendays after allowingasevendayperiodforabsorptionafterfillingwithwater.

Inthecaseofstructureswhose externalfaces areburiedandarenot accessibleforinspection,suchasundergroundtanks,thestructuresshall befilledwithwaterandafterthe expiryofsevendaysafterthefilling, thelevelof thesurface of the watershallberecorded.Thelevelofwater shallberecordedagainatsubsequentintervalsof24hrs.Overaperiod ofsevendays.Backfillingshallbe withheldtillthetanksaretested. The totaldropinsurfacelevelovera periodforsevendaysshallbetakenas anindicationof the watertightnessof thestructure. TheEngineer-in-chargeshalldecide ontheactualpermissible natureof thisdropinthe surfacelevel,takingintoaccountwhetherthestructuresareopenor closedandthecorrespondingeffectithasonevaporationlosses.Unless specifiedotherwise,astructurewhosetopiscoveredshallbedeemedto be watertightifthetotaldropinthesurface leveloveraperiodofseven daysdoesnotexceed40mm.

Each compartment/segmentof thestructureshallbetestedindividually.

Forstructuressuchaspipes,tunnelsetc.thehydrostatictestshallbe carriedoutby fillingwithwater, aftercuringasspecified,andsubjecting tothespecifiedtestpressureforspecifiedperiod.Ifduringthisperiod thelossofwaterdoesnotexceedthe equivalentof thespecifiedrate,the structureshallbeconsidered tohavesuccessfullypassedthetest.

2.4.5.11RepairandReplacementofUnsatisfactoryConcrete

Immediatelyaftertheshutteringis removed,allthedefectiveareassuchas honey-combedsurfaces,roughpatches,holesleftbyformboltsetc.shallbe inspectedbytheEngineer-in-chargewhomaypermitpatchingof thedefective areasorrejecttheconcrete work.

Allthroughholesforshutteringshallbefilledforfulldepthandneatlyplugged flushwithsurface.

Rejectedconcreteshallberemovedandreplacedbythe Contractoratno additionalcosttotheclient.

Forpatchingofdefectiveareasallloose materialsshallberemovedandthe surfaceshallbepreparedasapprovedbytheEngineer-in-charge.

Bondingbetweenhardenedand freshconcreteshallbe done eitherbyplacing cementmortarwithapprovedbondingagentorbyapplyingepoxy.Thedecision of theEngineer-in-chargeastothe methodofrepairstobeadoptedshallbefinal andbindingontheContractor. Thesurfaceshallbesaturatedwithwaterfor24 hoursbeforepatchingisdone with1:4cementsandmortar. Theuseofepoxyfor bonding freshconcreteshallbecarriedout asapprovedbytheEngineer-in- charge.

Alltheformbolt repairsanddelayedrepairsshallbecarriedoutusinga proportionofwhitecementinrepairmixtotheapprovalof theEngineer-in-charge,soastomatchthecolourof thesurroundingarea.

Tolerances forR.C.Buildings

a) Variation fromthePlumb

(I) Inthe lines andsurfacesofcolumns,piers, andwalls andinarrises5mmper2.5 mor25mm,whicheverisless?

(ii) Forexposedcornercolumns andotherconspicuouslines
Inanybayor5mmaximum - 5mm
In10mormore - 10mm

b) Variation fromthelevelorfromthe gradesindicatedonthe drawings

(I) Inslabsoffits,ceilings,beamsoffits, andinarrises
In2.5m - 5mm Inanybayor5mmaximum - 10mm
In10mormore - 15mm

(ii) Forexposedlintels,sills,parapets,horizontalgrooves andotherconspicuous lines:
Inanybayor5mmaximum - 5mm
In10mormore - 10mm

c) Variationofthelinearbuildinglinesfromestablishedpositioninplanandrelated positionofcolumns,walland partitions:

Inanybayor5mmaximum - 10mm
In10mormore - 20mm

d) Variationinthesizesandlocationsof sleeves,openingsinwallsandfloors–5mm except inthe caseofand for anchor bolts.

e) Variationincross-sectionaldimensionsofcolumnsandbeamsandinthethickness ofslabsand walls

Minus - 5mm
Plus - 10mm

f) Footings

(I) Variationindimensioninplan
Minus - 5mm
Plus - 50mm

(ii) Misplacementoreccentricity
2%offootingwidthinthedirectionofmisplacementbutnotmorethan50mm

(iii) Reductioninthickness
Minus - 5%ofspecifiedthicknesssubjecttoamaximumof50mm g)

VariationinSteps

(I) Inaflightofstairs
Rise - 3mm
Tread - 5mm

(ii) Inconsecutivesteps
Rise - 1.5mm
Tread - 3.0mm

2.4.5.12Measurement

Dimensions shallbemeasurednearest to acmexceptforthethicknessofslab, whichshallbe measuredcorrectto0.5cm.Theareasshallbe workedoutnearest to0.01sq.mt.The cubical contentsshallbeworkedouttonearest0.01cubic meters.

Reinforcedcementconcretewhethercast-in-situorprecastshallbeclassified andmeasuredseparatelyasperBillofQuantity.

Nodeductionshallbe madeforthefollowing:- a) Openingupto0.1sq.m

Note:Incalculatingareaofopeningsupto0.1sqmthesize ofopeningshall include the thicknessofanyseparate lintelsorsills.Noextralabourfor formingsuchopeningsorvoidsshallbepaidfor.

b) The volumeoccupiedbyreinforcement.

c) Thevolumeoccupied by waterpipesconduitsetc.notexceeding 25sq cm eachin crosssectionalarea.Nothingextrashallbepaid forleaving and finishingsuch cavities andholes.

The measurementof RCCworkofvariousunitsshallberegulatedasbelow;

a) Slabsshallbetakenasrunningcontinuously.

b) Beamsshallbemeasuredfromfacetofaceofcolumnsandshallinclude haunches,ifany,betweencolumnsandbeam.Thedepthofthebeamshall befromthebottomofslabtothebottomofbeam.

c) Thecolumnsmeasurementshallbetakenuptotheundersideofslab.

d) Chajjasalongwiththebearingonwallshallbemeasuredincubicmeter nearestto two placesofdecimal.Whenchajjasiscombinedwithlintel,slab or beam,the projectingportionshallbemeasuredas chajjas,builtinbearing shallbe measuredasperitemoflintel,slaborbeaminwhichchajjabears.

e) Wheretheband andlintelsareofthesameheightand theband servesas llintel,thelengthofthebandtobemeasuredaslintelshallbeforclear lengthofopeningplustwicethe overalldepthofband.

2.4.5.13Rate

Therateincludesthecostofmaterialsandlabourinvolvedinalltheoperations describedabove includingcostofcenteringandshutteringwork.

2.5 NominalMixConcrete

2.5.1 MixDesign&Testing

Mixdesignandpreliminarytestsarenotnecessary forNominalMixConcrete.However workstestsshallbecarriedout asperIS:456. ProportionsforNominalMixConcrete maybeadoptedasperTable9ofIS:456.HoweveritwillbetheContractor'ssole responsibilitytoadopt appropriatenominalmixproportionstoyieldthespecified strength.

2.5.2 Batching&Mixingof Concrete

Basedontheadoptednominalmixes,aggregatesshallbe measuredbyvolume.However cementshallbebyweightonly,usingwholebagsofcement.

2.6 OptionalTests

If theEngineer-in-charge isnotsatisfiedwiththeresultsof thetestsorotherwise considersthatthe materialsi.e.cement,sand,coarseaggregates,reinforcement andwater arenotinaccordancewiththeSpecificationsorifspecifiedconcretestrengths arenot obtained,he mayorderteststobecarriedoutonthese materialsinlaboratory,tobe approvedbytheEngineer-in-charge,asperrelevantIS Codes. Contractorshallhaveto pay forthesetests.

Inthe eventofanyworkbeingsuspectedoffaultymaterialorworkmanshiprequiringits removalorif theworkscubesdonotgivethestipulatedstrengths,theEngineer-in-chargereservestherighttoordertheContractor totake outcores and conducttestson themordoultrasonic testingorloadtestingofstructureasreferredtoin IS456,etc.The Engineer-in-chargealsoreservestherighttoasktheContractortodismantleandre-do suchunacceptablework,atno costtotheHAL.

If thestructure is certifiedasfailedbyEngineer-in-charge,thecostof thetestand subsequentdismantling/reconstructionshallbebornebytheContractor.

The quotedunit rates/pricesofconcreteshallbe deemedtoprovideforalltests mentionedabove.

2.7 Grouting

a) StandardGrout

Groutshallbeprovidedasspecifiedonthe drawings.TheproportionofStandardGrout shallbesuchastoproduceaflowable mixtureconsistentwithminimumwatercontent andshrinkage. Surfacestobegroutedshallbethoroughlyroughenedandcleaned. All Structuralsteelelementstobe groutedshallbecleanedofoil,grease,dirtetc. Theuseof hot,strong caustic solution forthispurposewillbepermitted. Priortogrouting,the hardenedconcreteshallbesaturatedwithwaterandjustbefore groutingwaterinall pocketsshallberemoved. Groutingoncestartedshallbe done quicklyandcontinuously. Variationingroutmixes andproceduresshallbepermittedifapprovedbyEngineer-in- charge. Thegroutproportionsshallbe limitedasfollows:

Use	Grout Thickness	MixProportions	W/CRatio
a)Fluidmix	Under25mm	OnepartPortlandCementto onepartsand	0.44
b)Generalmix	25mmandoverbut lessthan50mm	OnepartPortlandCementto 2partsofsand	0.53
c)Stiffmix	50mmandover	OnepartPortlandCementto 3partsofsand	0.53

b) Non-ShrinkGrout

Non–shrinkgroutwhererequiredshallbeprovidedinstrictaccordance withthe manufacturer'sinstructions/specificationsonthedrawings.

2.8 FormWork(CenteringandShuttering)

2.8.1 FormWork

Formworkshallinclude use ofalltemporaryor permanent formsormoulds requiredfor forming the concrete,whichiscast-in-situ,togetherwithalltemporaryconstruction required fortheirsupport.

2.8.2 DesignandToleranceinConstruction

Formworkshallbedesignedandconstructedtothe shapes,linesanddimensionsshown onthe drawingswiththetolerancesgiven below:

a) Deviation fromspecifieddimensionsofcrosssection
Ofcolumns andbeams +12mm
- 6mm

b) Deviation fromdimensionsoffootings

i) Eccentricityinplan0.02timesthe widthofthe footingsin the direction ofdeviationbutnotmorethan50mm.

ii) Thickness +0.05timesthespecifiedthickness.

(**Note**–Toleranceapplytoconcretedimensionsonly,andnottopositioningofvertical steelordowels).

2.8.3 GeneralRequirement

Itshallbe strongenoughtowithstandthe deadandliveloadsandforcescausedby rammingandvibrationsofconcreteandotherincidentalloads,imposeduponitduring andaftercastingofconcrete.It shallbemadesufficientlyrigidbyusingadequate numberoftiesandbraces,Screwjacksorhardboardwedgeswhere requiredshallbe providedtomakeupanysettlementinthe formworkeitherbeforeorduringthe placing ofconcrete.

Forms shallbesoconstructed asto be removableinsectionsinthedesired sequence, withoutdamagingthesurfaceofconcreteordisturbingothersections.Careshallbe takentoseethatnopiece iskeyedintotheconcrete.

2.8.3.1 Material forFormWork

a) Proppingandcentering

Allpropping and centering should beeitherofsteeltubeswithextension piecesor builtupsectionsofrolledsteel.

2.8.3.2 a) Centering/Staging

Contractorshalldesign thestaging asperdesign forslabs/beamsetc.and asper levelsasshownindrawings.Allthe stagingtobeeitherTubularsteelstructurewith adequate bracingsasapprovedormadeofbuilt-upstructuralsectionsmade from rolledstructuralsteelsections.

b) Incase ofstructureswithtwoormore floors,theweightofconcrete,centeringand shutteringof anyupperfloorbeingcastshallbesuitably supportedonone floor belowthetopmostflooralready cast.

c) Formworkandconcretingofupperfloorshallnotbedone until concreteoflower floorhasset atleastfor14days.

2.8.3.3 Shuttering

Shuttering used shallbeofsufficientstiffnessto avoidexcessivedeflection andjoints shallbe tightlybuttedtoavoidleakageof slurry.Newwaterproof ply/steelshuttering onlyshallbeused.

Ifsteelshutteringisusedforconcretingitshouldbesufficientlystiffened.The steel shutteringshouldalsobeproperlyrepairedbefore useandproperlycleanedtoavoid stains,honeycombing,seepageofslurrythroughjointsetc.

2.8.3.4 Formworkshallbeproperlydesignedforselfweight,weightofreinforcement,weight offresh concrete,and in addition,thevariousliveloadslikely to beimposedduring the constructionprocess(suchasworkmen,materialsandequipment).Incase theheightof centringexceeds3.50meters,thepropmaybeprovidedinmulti-stages.

2.8.3.5 Camber

Suitable cambershallbe providedinhorizontalmembersofstructure,especiallyin cantilever spans to counteract the effect of deflection. Theform work shall beso assembledastoprovideforcamber.The camberforbeamsandslabsshallbe4mmper meter(1to250)orasdirectedbythe Engineer-in-charge,so astooffsetthe subsequent deflection.Forcantileversthecamberatfreeendshallbe1/50thoftheprojectedlength orasdirectedbytheEngineer-in-charge.

2.8.3.6 RemovalofFormWork(Strippingtime)

Innormalcircumstancesandwhereordinary Portland cementisused,formsmay generally be removed after the expiry of the following periods or as specified by engineer-in-charge: