



**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, HARYANA STATE**

**Issued By:**

Haryana State Cooperative Supply and Marketing Federation Limited  
HAFED Building, Sector 5, Panchkula, Haryana 134108

<b>Name of work: -</b>	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
<b>Estimated cost:</b>	Rs.470.00 Lakhs
<b>Time Limit: -</b>	6 Months
<b>Earnest Money:</b>	Rs. 4.70 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	4.70	6000/- (5000+1000)	6 Months	17.08.2020 at 17:01 Hrs to 15.09.2020 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 on or before 15.09.2020 at 16:00 Hrs.
- The date of bid submission is from 17.08.2020 at 17:01 Hrs to 15.09.2020 at 16:00 Hrs through e-Tender portal as mentioned above
- Pre- Bid meeting will be held on 27.08.2020 at 11.00 Hrs. At HAFED Corporate Office, Sector-5, Panchkula, Haryana.
- The technical bids will be opened on 16.09.2020 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

**SECTION-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	4.70	6000/- (5000+1000)	6 Months	17.08.2020 at 17:01 Hrs to 15.09.2020 at 16:00 Hrs

- 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.
- 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. In case 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.
- Intending bidders will be mandatorily required to online sign-up (create use account) on the website <http://etenders.hry.nic.in> to be eligible to participate in the e-Tender. **The intended bidders fails to upload EMD during the bid submission shall not be allowed to submit his/her bids for the respective event/Tenders.**
- 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 before the 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 <https://haryanaeprocurement.gov.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	-	17.08.2020 17.01 Hrs	15.09.2020 16.00 Hrs
2	-	Downloading of Tender Document & Bid Preparation	17.08.2020 17.01 Hrs	15.09.2020 16.00 Hrs
3	Pre Bid Meeting		27.08.2020 11.00 Hrs	
4	Corrigendum Issue (if any)		07.09.2020 17.00 Hrs	
5.	-	Submission of Tender Document Fees, EMD, E-Service Fee and (Technical) Documents.	17.08.2020 17.01 Hrs	15.09.2020 16.00 Hrs
6.	Technical Bid Opening	-	16.09.2020 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) In case 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 will not be opened and no claim whatsoever on this account will be considered.
- 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. in Lakhs)			
			One work of magnitude of 80% i.e.	Or	Two works of magnitude 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 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	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 or Solvency:**

**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:

**Working Bid Capacity**> 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 Joint Venture (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 Joint Venture 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 criteria i.e criteria II-(a), (b) and (c) as stipulated above



**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-Procurement Portal:**

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 Digital Certificate:**

**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 of India.

**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 Certifying Authority 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 certificate from.

**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 carrying DSCs.

**2.5** Bid for a particular tender must be submitted online using the digital certificate (Encryption & Signing), which is used to encrypt and sign the data during the stage of bid preparation. In case, during the process of a particular tender, the user loses his digital certificate (due to virus attack, hardware problem, operating system or any other problem) he will not be able to submit the bid online. Hence, the users are advised **to keep a backup of the certificate** and also keep the copies at safe place under proper security (for its use in case of emergencies).

- 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 to a no-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 the firm.
- 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 new user.
- 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 the company.
3. **Pre-requisites for online bidding:**  
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 Inviting Tenders:**  
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 Tender Documents:**  
The tender documents can be downloaded free of cost from the e- Procurement portal <https://etenders.hry.nic.in>
6. **Key Dates:**  
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/ Price Bid):**
- 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 authorization networks.
- 7.2 **PREPARATION & SUBMISSION OF online APPLICATIONS/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 the screen.
  - (ii) Scan copy of Document to be submitted / uploaded for Technical bid under online Technical Envelope. The required documents (refer to DNIT) shall be prepared and scanned

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 mandatorily online under Commercial Envelope and original not to be submitted manually**

## **8. ASSISTANCE TO THE BIDDERS**

For queries on Tenders Haryana Portal, Kindly Contact

Note: Bidders are requested to kindly mention the URL of the portal 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 respective e-tendering event. Also, for queries related to e-payment of EMD kindly contact the helpdesk at least two days prior to closing date and time of the respective event.

Intended bidders mandatorily requiried to register their quires if there is any pertaining to the online bidding and the single e-Procurement 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. Debit Card
- B. Net Banking
- 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-Procurement portal.
- (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 the bidder.
- (iii) Bidder clicks on "Continue" button.

- (iv) The e-Procurement portal takes the bidder to Debit Card payment gateway screen.
- (v) Bidder enters card credentials and confirms payment
- (vi) The gateway verifies the credentials and confirms with “successful” or “failure” message, which is confirmed back to e-Procurement portal.
- (vii) The page is automatically routed back to e-Procurement portal
- (viii) The status of the payment is displayed as “successful” in e-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 and timestamp.
- (x) The e-Procurement portal allows Bidder to process another payment attempt in case payments are not successful for previous attempt.

#### **B) Net Banking**

The procedure for paying through Net Banking will be as follows:

- (i) Bidder selects Net Banking option in e-Procurement portal.
- (ii) The e-Procurement portal displays the amount to be paid by bidder.
- (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 / her Bank
- (vi) The Net Banking gateway redirects Bidder to the Net Banking page of the selected Bank
- (vii) Bidder enters his account credentials and confirms payment
- (viii) The Bank verifies the credentials and confirms with “successful” or “failure” message to the Net Banking gateway which is confirmed back to e- Procurement portal.
- (ix) The page is automatically routed back to e-Procurement portal
- (x) The status of the payment is displayed as “successful” in e-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 and timestamp.
- (xii) The e-Procurement portal allows Bidder to process another payment attempt in case payments are not successful for previous attempt.

#### **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 across India.

1. To choose the payment of EMD, the bidder clicks on RTGS/NEFT payment option.
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 code each.

#### **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 Deposit A/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-Procurement portal. (ii) The e-Procurement portal displays the amount to be paid. The bidder chooses the bank account number for refund of the amount. (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 OTC Challan.
- (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 the payment.
- (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 the bidder.
- (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 and Amount.
- (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 the receipt.
- (xi) The status of the payment will be displayed as “verification successful” in e- Procurement Portal, when the bidder clicks on the verification option in the portal.
- (xii) Bidder would be required to upload the scan copy of receipt as received from

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 mentioned below:-

- 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 the newspaper.
- 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 tender cost.
- 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 the country.
- 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 or deducted by instalments), the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak on behalf



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

- (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, Rohtak 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 the Contractor.
- (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 security deposit.

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 be final.

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 grounds of 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 or proper.

**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, unsounded and imperfect or unskilful work to be removed and taken away and reconstructed or re-

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 all parties.

**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 all respects.

**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 a sufficient portion thereof being in this case sold for the purpose. All materials supplied to the contractor,

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, Rohtak and 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 such materials.

**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, Rohtak and 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 as aforesaid.

**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 request forthwith.

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 be final.

**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 originally contemplated.

**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 Contractor himself.

**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 his subordinate - 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 thereof no payment of allowances shall be 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 or 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 portion thereof.

**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 portion thereof.

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 such person.

**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 contractor shall also be liable to indemnify 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 such claims.

**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 the Contract.

**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 been sustained.

**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 carried on.

**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, **(ii)** 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, Rohtak in 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 Head that the matters in dispute be referred to arbitration as hereinafter provided.

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-claim separately.
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 of Arbitration:-
  - 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 the work.
  - 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 the HAFED.
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 notwithstanding that the arbitrator had been appointed at the instance of the other party.
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:-

#### **AMOUNTS OF CLAIMS**

#### **RATE OF SECURITY DEPOSIT**

(i) For claims below Rs. 10,000	2% of amount claimed.
(ii) For claims of Rs. 10,000 and Above and below Rs. 1,00,000.	5% of amount claimed.
(iii) For claims of Rs. 1,00,000 and above	10% of amount claimed.

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 other contract.

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 arbitration proceeding.
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 the work.
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 the award.
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 time being.

**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, 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 28 :** The expression "works" or where used in these conditions shall unless there be something either in the subject or context repugnant to such works be 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 his charge.

**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 the work.  
**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 alike nature.
- 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 his sub-contractors.
- f) The regulations aforesaid shall be deemed to be part of this contract.
- g) Attendance card should invariably be issued by the contractors to their workers, which should be returned to the contractors concerned at the time of receiving payment of their wages.
- 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 the work for which the payment is being made.
- 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 own expense.
- 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 the hour.

## **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 his behalf.
- (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 is done.
- (iii) Contractor shall include every person whether a sub-contractor or headman or agent employing labour on the work, taken on contract.
- (iv) "Wages" shall have the same meaning as defined in the payment of Wages Act and includes time and piece rate wages.

#### **1. Display of notice regarded wages etc.**

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 Welfare Officer.

#### **2. Payment of Wages**

- (i) Wages due to every worker be paid to him directly.
- (ii) All wages shall be paid in current coin or currency or in both.

#### **3. Fixation of Wage Periods**

- (i) The contractor shall fix the wage periods in respect of which the wages shall payable.
- (ii) No wage period shall exceed one month.
- (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 are payable.
- (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 wage period in which case final payment shall be made within 48 hours of the last working day.

**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 Slip etc.**

- (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 following particulars:-
  - a) Rate of daily or monthly wages.
  - b) Nature of work for which employed.
  - c) Total number of days worked during each wage period.
  - d) Total amount payable for the work during each wage period.
  - e) All deduction made from the wages within an indication in each case of the ground for which the deduction is made from the wage.
  - f) Wages actually paid for each wage period.
- (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 wage book.
- (iii) The GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak may 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 the work.

#### **5. Fine and deductions which may be made from wages**

- (i) The wages of workers shall be paid to him without any deduction of any kind except the following:
  - a) Fines
  - b) Deductions for absence from duty viz, from the place or places Where by the terms of his employment is required to work.
  - c) The amount of deduction shall be in proportion to the period for which he was absent.
  - 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 or default.
  - e) Any other deduction which the Government may from time to time allow.
- (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 or deductions.
- (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 wage period.
- (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 was imposed.

#### **6. Register of Fine etc.**

- (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 loss made.
- (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 the work

## **7. Preservation of Registers**

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 Welfare Officer**

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 labourers concerned.

## **10. Appeal against the decision of Labour Welfare Officer**

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 of Parties**

- (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 a member.
  - b) An officer of Federation of trade unions to which the trade union referred to 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 any investigation or enquiry under these regulations by:
  - a) An employer of an association of employers of which he is a member.
  - 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 is engaged.

## **12. Inspection of Books**



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 of Contractor**

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 the work).

### **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 bidding 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 Liability period.
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 & final bills.
4. The rate to be quoted by the contractor shall be inclusive of applicable GST and other taxes.
5. **Valuations of Variations:-**  
Since this is a turnkey contract, no extra items / claims will be accepted by HAFED under any circumstances.
6. **Extent of variations:-**  
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 be followed.

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. Monthly Payments:-**

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 7<sup>th</sup> 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 be recorded.

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 be followed.
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 IS Code.
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 the Contractor.
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 latest amendments.
15. Contractor will have to supply manufacturer's certificate certifying that materials have been manufactured as per ISI specification, duly supported by necessary documentation.

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 be rejected.
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 the same 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 the same.
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 the contractor.
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 Liability Period.
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 local authority.
23. The rate to be quoted shall include GST and other applicable taxes and noting extra shall be payable to the agency on this account.
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 the department.

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 be entertained.
26. The contractor shall provide suitable measuring arrangement at site for checking of various material supplied by him.
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 bidding 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 own cost.

**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 of Acceptance.

32. **Performance Security:**

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

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 format given in Bid Documents. The Bank guarantee for performance security shall remain in force as

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 60 days**

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 Mobilisation advance.
- 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 paid for.

**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 1<sup>st</sup> 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 of days.
- (ii) All bank guarantees should be issued by Nationalised Banks approved by RBI to be at par with

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 as applicable.

## **II. Terms of Payment**

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

- (a) 70% 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) 20% 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 will be recovered from each running bills on pro rata basis.

**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 limited to:

#### **A) Design and supply of**

- 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 defined above.
- Hot dip galvanised steel structure for the Bulk storage Silo System including the box type (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.

#### **B) Erection, testing and commissioning of:**

- Bulk storage silo system equipment. The scope includes positioning, placement of equipment on foundation, bolting, grouting etc. Complete as per requirement.
- 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 is included.
- Erection of structure complete with platform, chequered plates, ladders, catwalks /walkways, railings, windows etc. as required.
- 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 the same.
- Commissioning of the bulk storage silo system including SCADA software and related communication software.
- Installation of the Earthing network consisting of Earth pits, Earth conductors etc. complete for the entire Electrical installation and all the electrical equipment.

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 clauses specified in bidding document.
- Suitable structure for roofing of all elevator towers to be provided. However roofing sheeting will be done by Contractor.

### **C) Civil, MEP, Firefighting Works for Silo System**

- 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) is in the successful Bidder's Scope.
- The Civil works shall cover all
  - RCC foundations required for Silos, Process Tower, Material Handling System and Office cum LT Panel room space of approx. 50 Sqm etc
  - Steel Structure for Loading/Unloading Area,
  - External Development for Truck Movement and loading/Unloading
  - Boundary Wall and Gates are not included in the scope of works  
(Please see the attached drawings for detailed reference)
- All steel structure of silo system above plinth, supports of silos, elevators, Pipe Bridge in steel structure etc. are in the successful bidder's scope.
- 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 the bidder.
- Suitable structure for roofing of all elevator towers to be provided along with roof sheeting.
- 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 as applicable.

### **D) Trial Run and Training**

- Trial 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 Successful Contractor.
- 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 the equipment.

HSr No	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	<p>Running and operation of all the equipment: Successful running and operation Silos and other associated components in the scope</p> <p style="text-align: center;">And</p> <p>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</p>	<p>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.</p>

Trial run shall be for the period where consistent capacity proof is achieved for every component. Consistent capacity means running the plant at a rated capacity. Raw material (for material handling section) and staff required for successful trial run are to be arranged by the Contractor. Raw material for trial run –Material handling section, cleaning section, bagging section etc and sample storage procedure in the Silo are in Contractor scope. However, raw material for entire 2500 MT storage is not required and not in scope of the Contractor. The time period of Trial Run is to be weekly / fortnightly on one shift basis within 3 months trial run period to ensure all parameters should be achieved.

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

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

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/ 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 three years of maintenance period. HAFED deserves the right to verify the same by competitive third party agency.

Table for Defect Liability Period & Warranty:

<b>Sr No</b>	<b>Subject</b>	<b>Details</b>	<b>Remarks</b>
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 per Original Equipment Manufacturer.	
3	Brief Scope	Rectification and Replacement of the equipment if defects or error in functioning are found.	Reporting and Approval from HAFED

Table for Annual Maintenance Period:

<b>Sr No</b>	<b>Subject</b>	<b>Details</b>	<b>Remarks</b>
1	Date of start of Annual Maintenance	From the date of Completion of defect liability period	
2	Period of Annual Maintenance	Minimum of 36 calendar months (3 years) and beyond for all the equipment whose Warranty is for more than 24 months as per Original Equipment 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 three years of maintenance period. HAFED deserves the	Reporting and Approval from HAFED

		right to verify the same by competitive third party agency	

**\*\*\*\* 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 Manufacturer agency.**

**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 Maintenance Period.
- 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 of commissioning.

## **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 reference therein;
- b) "The Contract Price" means the price payable to the Contractor under the Contract for the full and proper performance of its contractual obligations;
- c) "The Goods" means all of the equipment, machinery, and/or other materials, which the Contractor is required to supply to the HAFED under the Contract;
- 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" means the GM HAFED, CFP, Rohtak/Executive Engineer, HAFED, Rohtak designated as such or other Officer appointed from time to time by the HAFED and notified in writing to the Contractor to act as Officer -in-charge for the purposes of contract.
- g) "Works" means all goods to be provided and work (Services) to be done by the Contractor under the contract.

#### **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 of Origin**

**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 its components.

**3.2** The origin of Goods and Services is distinct from the nationality of the Contractor.

#### **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 and Information**

- 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 such performance.
- 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 the Contract.
- 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 the HAFED.

**6. Patent Rights**

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.

**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 found satisfactory.
- 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 its 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 inspection authority.
- 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 the HAFED.

- 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 of origin.
- 8.5** Tests upon completion
- 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 14 days after the said date on such day or days, as the HAFED shall notify the Contractor.
- 8.5.2** If the HAFED fails to appoint a time after having been asked to do so, or does not attend at the time 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 as accurate.
- 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 the HAFED.
- 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 made in the presence of the Contractor and results of the tests shall be accepted as accurate.
- 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 Contract Price.
- 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 entitled to:
- a) Order one further repetition of the Tests under the conditions of sub-clause 8.5.4 or
  - b) Reject the Goods or a section thereof in which event the HAFED shall have the same remedies against the Contractor as are provided under sub-clause 8.5.12.
  - 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 by the



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 the Goods.

**8.5.9** As soon as the Goods/Services or any section thereof has passed the tests, the HAFED shall issue a certificate to the Contractor to that effect.

**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-clause 8.5.10

**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-clause 8.5.9.

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 Contractor to enable the taking over certificate to be issued.

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 respect thereof.

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 on completion.

**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 or damage.

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 arbitration or
- 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 disposing of it in accordance with the Contractor's instructions.

**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 to 8.5.3.

**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 and Services.

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 this Contract.

## **7. Packing and Marking**

- 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 to indicate:

- |                           |  |
|---------------------------|--|
| a) Name of the Contractor | d) Purchase Order number                               |
| b) Details of items in    | e) Gross, net and tare the package weights of the item |
| c) Name of the Consignee  | f) Destination   |

## **10 Delivery and Documents**

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 handing over of the plant and equipment in the manner specified in the Special Conditions of Contract.

**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 the beneficiary.

**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, if necessary.

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

- a. Initiate and pursue claim till settlement, and
- b. Promptly make arrangements for repair and/or replacement of any damaged item/s irrespective of settlement of claim by the underwriters.

## **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 Contract Price.

**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 until delivery.

**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 contract price.

**12.5** Where the Contractor is required under the Contract to deliver the Goods CIF, no further restriction shall be placed on the choice of the ocean carrier.

**13. Incidental Services**

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

- a.** Performance or supervision of on-site assembly and/or start-up of the supplied Goods;
- b.** Furnishing of tools required for assembly and/or maintenance of the supplied goods;
- 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 control systems.
- d.** Performance or supervision or maintenance and/or repair of the supplied Goods, for a period of time agreed by the parties, provided that this service shall not relieve the Contractor of any warranty 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 supplied Goods.

**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 similar services.

**14. Spare Parts requirement after defect liability period:**

**14.1** As specified in the Special Conditions of Contract, the Contractor may be required to provide the materials and notifications pertaining to spare parts manufactured or distributed by the Contractor:

- 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.** In the event of termination of production of the spare parts:
  - i.** Advance notification to the HAFED of the pending termination, in sufficient time to permit the HAFED to procure its needed requirements; and
  - ii.** Following such termination, furnishing at no cost to the HAFED, the blueprints, drawings and specifications of the spare parts, if and when requested.

**15. A. Defects liability:**

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 Remedying Defects**

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 Contract 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 Contract Period.

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 Remedying Defects**

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 the Works,.
- (b) Plant, Materials or workmanship not being in accordance with the Contract, or
- (c) Failure by the Contractor to comply with any of his other obligations.

#### **15.3 Failure to Remedy Defects**

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 such date.

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 Contractor's 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 not apply.

#### **15.4 Removal of Defective Work**

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 the Contract.
- 15.2** This warranty/guarantee shall remain valid for 24 months and as per the original 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 this warranty.
- 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 the Contract.

## **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 of Contract.
- 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 the Contract.
- 16.3** Payments shall be made promptly by the HAFED within thirty (30) days of submission of an invoice/claim by the Contractor.
- 16.4** All payments under this contract shall be made in Indian Rupees only.

## **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 its bid.
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 by HAFED.

## **18.Change Orders**

**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 the following:

- a. Drawings, designs or specifications, where Goods to be furnished under the Contract are to be specifically manufactured for the HAFED ;
- b. The method of shipment or packing;
- c. The place of delivery; or
- d. The Services to be provided by the Contractor.

**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 change order.

## **19. Contract Amendment**

**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 the parties.

## **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 's prior written consent.

## **21. Subcontracts**

**21.1** The Contractor shall notify the HAFED in writing of all subcontracts awarded under the Contract if not already specified in his bid. Such notification, in his original bid or later, shall not relieve the Contractor from any liability or obligation under the Contract.

**21.2** Sub contracts must comply with the provisions of clause 3

## **22. Delays in the Contractor's Performance**

**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 of Requirements.

**22.2** An un-excused delay by the Contractor in the performance of its delivery obligations shall render the Contractor liable to any or all of the following sanctions:  
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. Liquidated Damages**

**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 equivalent to:

- (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 the supplies/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 the contract.

**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's account.

## **24. Termination for Default**

**24.1** Contractors default:

**24.1.1** If the Contractor shall assign the Contract, without the consent in writing of the HAFED first obtained, or if in the opinion of the HAFED, the Contractor:

- 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 the



HAFED . 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 the Site.

**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 recoverable accordingly.

**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 on the last day of March, June, September and December on the advance paid for the entire period for which the advance was retained by the Contractor.

## **24.2 Default of the HAFED**

**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 economic dislocation

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 Contractor's equipment brought by him thereon.

24.2.3 In the event of such termination the HAFED shall be under the same obligations to the Contractor in regard to payment as if the Contract had been terminated under the provisions of Sub-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 such termination.

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 be entitled.

## **25. Force Majeure**

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 Force Majeure.

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 or revolutions, fires, floods, epidemics, quarantine restrictions and freight embargoes.

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 Majeure event.

### **25.4 Termination in Consequence of Force Majeure**

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 for Completion of the Works, either party shall be entitled to serve upon the other 28 days' notice to terminate the Contract. If at the expiry of the period of 28 days Force Majeure shall still continue the Contract shall terminate.

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 shall 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 in addition:

- 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 out or

- 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 by him).
  - 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 before mentioned.
  - 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 greater cost.
  - e) The reasonable cost of repatriation of all the Contractor's staff and workmen employed on or in connection with the Works at the time of such termination.
- 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 the Works.

## **26. Termination for Insolvency**

**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) The Contractor becomes bankrupt or otherwise insolvent,
- 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 for Convenience**

**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 becomes effective.

**27.2** The Goods that are complete and ready for shipment within 30 days after the Contractor's receipt of notice of termination shall be purchased by the HAFED at the Contract terms and prices. For the remaining Goods, the HAFED may elect:

- 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 completed Goods

and for materials and parts previously procured by the Contractor.

## **28. Resolution of Disputes**

**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. The mechanism shall be specified in the Special Conditions of Contract.

## **29. Governing Language**

**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 same language.

## **30. Applicable Law**

**30.1** The Contract shall be interpreted in accordance with the laws of the Union of India.

## **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 of Contract.

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

## **32. Taxes and Duties**

**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 defective Goods**

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 amounting for in the GST returns and will be 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 or 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 relieve the contractor from his responsibility to pay taxes/duties/cess etc. that may be levied in the employer's 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 as required.
2. Certified that GST will not be charged on the exempt supplies made to HAFED.
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 be refunded.

(Signature)

Complete Name.....

Address.....

.....

GSTIN.....

## **SECTION 5(II)**

### **GENERAL CONDITIONS OF CONTRACT FOR SUPPLY**

#### **2. 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.

#### **3. Definitions**

- (a) The HAFED is Haryana State Cooperative Supply and Marketing Federation Limited and would include the term “Owner”.
- (b) The Contractor is (Name of Contractor).

#### **4. Country of Origin**

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

#### **5. 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.

#### **6. NA**

#### **7. Inspection and Tests**

- 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) to be borne by the contractor. The HAFED (Employer) shall inform to the contractor, the name(s) of third party at appropriate time.
- 6.2** The inspection of the Goods shall be carried out to check whether the Goods are in conformity with the

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 inspecting Authority.
- 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 inspecting Agency.
- 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 of the work.
- 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 the specifications.

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 by HAFED.

## **8. Delivery and Documents (Clause 10)**

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, total amount;
- (ii) Delivery note/case-wise detailed packing list identifying contents of each package/ lorry receipt;
- (iii) Manufacturer's/Contractor's guarantee certificate;
- (iv) Inspection Certificate issued by the nominated inspection agency, and the Contractor's factory inspection report;
- (v) Certificate of origin;
- (vi) Insurance policy;
- (vii) Any other document evidencing payment of statutory levies.
- (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.

## 9. Insurance

- (a) 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 final destination.
- (b) “**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.

- (c) **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 insurances shall be for an amount not less than Rs. 10.00 lakhs per occurrence with the number

of occurrence unlimited.

## **10. Incidental services**

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

- (a) Furnishing of tools required for assembly and maintenance of the supplied goods for 2 years;
- (b) Furnishing of a detailed operations and maintenance manual for each appropriate unit of the supplied Goods;
- (c) On-site assembly and start-up of the supplied Goods;
- (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.

## **11. Spare Parts**

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.

## **12. Warranty/Guarantee (Clause 15)**

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 the equipments.

**SECTION 5(III)**  
**GENERAL CONDITIONS OF CONTRACT FOR INSTALLATION**

**1.0 SUFFICIENCY OF TENDER**

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 AND COMMISSIONING**

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. The Contractor shall update the PERT Network every month, submit it to the HAFED and shall inform the HAFED the progress on all the activities falling on schedule for the next reporting date.

**3.0 PREPARATION OF DRAWINGS FOR APPROVAL**

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

- a. Within the time given in the specification or in the programme, such drawings, samples, patterns and models as may be called for therein, and in numbers therein required.
- b. During the progress of works and within such reasonable times as the HAFED may require such drawings of the general arrangement and details of the works as the HAFED may require.

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 as under:

- 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 contract also.

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, by reason of any failure or inability of the HAFED to issue within four weeks of time in all the circumstances any drawing or order requested by the Contractor in accordance with sub clause (3) 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 under Clause 15 hereof and the Contractor shall be paid the amount of such cost as shall be

reasonable.

- i. Brief list of drawings:
  - ii. Equipment drawings for fabricated items.
  - iii. Equipment layout for production, packing and service blocks.
  - iv. Flow diagrams for CIP and various services.
  - v. Service piping layouts in production, packing and service blocks.
  - vi. SS piping layout in production and packing blocks.
  - vii. Electrical cable, conduit/cable tray/cable trench layout.
  - viii. Other miscellaneous drawings as required for erection work.
  - ix. Electrical single line diagram, PCC and MCC general arrangement drawing and wiring diagrams.
  - x. Automation system scheme, controls and network diagrams.
- 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 and A4.
- 3.3** All drawings shall show the following particulars in the lower right hand corner in addition to Contractor's name:
  - i. Name of the HAFED .
  - ii. Project Title.
  - iii. Title of drawing.
  - iv. Scale.
  - v. Date of drawing.
  - vi. Drawing number.
  - 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 be up-dated.
- 3.5** All dimensions on drawings shall be in metric units.
- 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 the Contractor.

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** Drawings prepared by the Contractor and approved by the HAFED shall be considered as a part of 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 obligations and satisfactory performance on installation covered under the contract.
- 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 original approval.
- 3.9** Date of submission

In the event, the drawings submitted for approval require many revisions amounting to re-drawing of the same then the date of submission of the revised drawings would be considered as the date of submission for approval.

- 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 OF PERSONNEL**

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 the contract.

- 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 the plant.
- 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 comparable capacity.
- 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 or notices given by the HAFED shall be deemed to have been given to the Contractor.
- 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 Contractor should also display necessary information as may be required by statutory regulations.
- 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 the work.
- 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 who shall, in the opinion of the HAFED , misconduct himself or be incompetent, or negligent or

unsuitable, and the Contractor shall remove the person so objected to, upon receipt of notice in writing from the HAFED and shall provide in that place a competent representative at Contractor's own expense within a reasonable time.

- 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 'S INSTRUCTIONS**

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 Any additional drawing and clarifications to exhibit or illustrate details.
- 5.2 Variations or modifications of the design, quality or quantity of work or the additions or omissions or substitution of any work.
- 5.3 Any discrepancy in the drawings or between the schedule of quantities and/or specifications.
- 5.4 Removal from the site of any material brought there by the Contractor, which are unacceptable to the HAFED and the substitution of any other material thereof.
- 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 or negligent.
- 5.7 Opening up for inspection of any work covered up.
- 5.8 Amending and making good of any defects.

## **6.0 RIGHT OF THE HAFED**

### **6.1 Right to direct works:**

- 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, pace and method of conducting the work, which shall be adhered to by the Contractor.
- 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 Right to order modifications of methods and equipment**

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 inspect the work**

**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 facilitate inspection.

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

**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 compliance with the specifications of erection work.

**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 use of defective or unsatisfactory materials or bad workmanship.

**7.0 CONTRACTOR'S FUNCTIONS**

**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 the following:

- a. Increase or decrease the quantity of any work included in the contract,
- b. Omit any such work,

- c. Change the character or quality or kind of any such work,
- d. Change the levels, lines, position and dimensions of any part of the works, 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 Contract price.

**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 and proper.

**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 the circumstances.

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. By the HAFED to the Contractor of his intention to vary a rate or price.

**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 the contract.

**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 preceding month.

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 the jobs.
- 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 relation thereto.
- 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 current premium.

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 current premium.

- 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 the drawings.

The Contractor shall extend all necessary help/co-operation to other Contractors working at the site in the interest of the work.

- 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 remedial actions.
- 7.11 The Contractor shall be permitted to substitute equipment of equal or 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 Contract price.

## **8.0 ROLE OF THE HAFED VIS-A-VIS THE CONTRACTOR:**

- 8.1 The Goods, if any, to be supplied by the HAFED for erection, testing and commissioning by the Contractor, shall be as listed in the 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 installation work.
- 8.2.1 Plant building for reception, processing, and packaging and for services including internal lighting will be made available by the HAFED .
- 8.2.2 Necessary temporary water for carrying out the installation shall be of contractors 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 the Contractor.

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 temporary power.
- 8.3 If the Contractor suffers delay and/or incurs costs from failure on the part of the HAFED in accordance with the mutually agreed schedule, the HAFED shall determine:
- a. Any extension of time to which the Contractor is entitled under Clause 22 of GCC and;

## **7.0 SUPPLY OF TOOLS, TACKLES AND MATERIALS**

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 OF PLANT**

- 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 and agrees 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 and equipment.
- 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 the work.
- 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 remain and be maintained until its removal is directed by the HAFED.
- 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 with the operation of existing machines or equipment.
- 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 the Contractor.
- 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's obligations.

## **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 the Contract.
- 11.2** The Contractor shall safely transport/shift the unloaded Goods and equipment to the storage area.
- 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 enumerated below:
- 11.3.1** The materials/equipment would be carefully unpacked by opening the wooden cases/other modes of packing's as the case may be.
- 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 or commissioning.
- 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 of equipment and parts at the time of their actual need.
- 11.3.4** The inspection for all the Goods handed over to the Contractor shall be completed within three week's period.
- 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, commissioning and testing as per the terms of the Contract.

## **12.0 STORAGE OF GOODS**

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 out such 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 the same.
- 12.3 The Inspector shall check for any signs of moisture or rusting in any Goods.
- 12.4 If the commissioning of Goods is delayed after installation of the Goods, the Contractor shall carry out all protective measures suggested by the HAFED during such period.
- 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 the HAFED.
- 12.6 A suitable grease recommended for protection of surfaces against rusting (refined from petroleum oil with lanolin minimum (70 deg C) and water in traces) shall be applied over all Goods as required once in every six months.
- 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 not provided adequate heating with bulb is recommended. For transformers heating of oil shall be done by giving 440 V supply and short-circuiting the LT terminals. Frequent checks on insulation 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 whenever demanded.
- 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 the Contract 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 the receipt/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 Contract Price.

#### **14.0 REVIEW AND CO-ORDINATION OF ERECTION WORK**

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 FOR COMPLETION**

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 the time.

## **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 all the details of design and fabrication of the equipment or equipment components. The successful Bidder shall be fully responsible to undertake all the works involved in the design, engineering, manufacture, supplying equipment at site including the erection, testing and commissioning of all the equipment of bulk storage silo system for grains. Bidders are to note that this grain Storage Silo System being offered in this bid shall 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 bidding document.

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 Indian Standards
- FCI (Food Corporation of India) Norms
- Indian Electricity Rules
- State Electricity Board (SEB) regulations where the Silos System is located
- Chief Electrical Inspectorate requirements of State where the Silos System is located
- Indian Explosives Act
- Indian Factory Act
- Indian Weights & Measures Act
- Any other applicable Indian Act.

Wherever Indian Standards are not available/ applicable, the bidder shall follow International 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.
- As stated earlier the entire job will have to be executed on a single responsibility basis and the bidder 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 specifically mentioned.
- The bidder may visit the site before submitting the bid.
- **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 with associated accessories like conveyors, elevators and bins shall be completed within 6months after placement of order. The Bar-chart or PERT network or MS Project or Equivalent showing the time schedule of the various activities from Start to Completion is to be provided by the bidder and shall be a part of the contract agreement.



## 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 MT Silo**

\*\*\*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

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- **Minimum of Three Numbers Receiving Hoppers for 40 TPH loading and unloading capacity**
- **Drum Sieve and Pre Cleaner of minimum 40 TPH Capacity**
- **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 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 loading through stitching machine and slat conveyor. The system shall be designed such that direct loading of filled bags in trucks as far as possible to minimize manual handling of bags between the point of filling in bags and loading in trucks.
- **Important Note on Design Process Flow:**
- 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 waste separation.
- Flow meter provision to monitor the input material  
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.

- The bidders are advised to design the layout accordingly and submit the indicative layout and process flow in the technical bid.

## 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 driven shaft.
- ii. V- belt drive :-Driving and driven pulleys, required numbers, type and length of „V“ belts of polyester reinforced type, key in the driven shaft and slide rails for motor.
- iii. Direct coupled Drive:-Suitable coupling with accessories and key in driven shaft.  
It shall be of chain type, unless otherwise specified.

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 and commissioning.

**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. All

weld 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, written on it. Name plate shall be fixed on equipment with suitable bracket.

**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., the detailed list shall be provided by the bidder with unit rate. However **the bids shall be evaluated on LOT/SET basis only and also successful bidder shall have to execute these items on LOT / SET basis only.** Any materials under lot / set items required for the project execution shall be supplied & erected by successful bidder without any extra rate. All surplus materials including scrap materials under lot / unit rate items after satisfactorily completion of works shall be taken back by the successful bidder.

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 construction material have been specified where ever required. It is to be noted that these are the minimum 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) Removal of rust from the surface by using sand blasting / emery paper/ Chemical rust solvent etc.
- (ii) Applying one coat of suitable primer.
- (iii) Putty should not be used to hide dented surfaces and instead dents if appeared should be removed carefully.
- (iv) Applying two coats approved shade of synthetic enamel/black bituminous paint.
- (v) Supporting steel structure, transition pieces & piping etc. being fabricated at site to be applied with two coats of corrosion resistant zinc oxide primer and one coat of synthetic enamel paint before erection/installation and then final second coat of synthetic enamel paint after erection / installation but before commissioning. Colors should be as per Standard Practice and should be of good quality and can sustain hazardous atmosphere.

## TECHNICAL SPECIFICATIONS OF SILO SYSTEM, ACCESSORIES AND SUPPORTING STRUCTURE FOR ELEVATORS AND MACHINERIES.

The silos shall be of galvanized iron corrugated sheet of thickness as per design requirement. The silo height and diameter are to be designed according to ANSI-ASAE/FCI based on the raw material grains (like wheat, maize, paddy, bajra etc.) that are proposed to be stored in these silos.

- 1 No Silo 1500 MT Silos-Flat Bottom Silo
- 1 No Silo 1000 MT Silo-Flat Bottom/Hopper Bottom Silo
  - . 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
  - Both the silos are to be designed on Wheat based (Density -750 Kg/m<sup>3</sup>) and can be also used for Paddy, Maize & Bajra.
  - Provision of cleaning all these grains is to be made.
  - 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 per demand.

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.

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 constructed in a manner that protects the Silos, conveyors and all other equipment from accumulation of 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 Management Authority.

**FLAT BOTTOM SILOS:** Shall be provided with galvanized corrugated steel sheets, outside galvanized stiffeners, bolts, adequate no. of galvanized supporting legs, roof, roof ladder, hand rail for roof ladder, ladders from ground to roof eave with safety cage and one rest platform under cylinder door, inside ladder from access 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 opening on roof and cylinder door. Silo shall also have aeration system, automatic temperature monitor system with weather station, additional software for automation of the fans and for centralized SCADA.

**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. Steel quality shall conform to S 280 GD according to norm UNE-EN- 10346:2009 and having tensile strength not less than 450 N/mm<sup>2</sup> and lower yield point not less than 380 N/mm<sup>2</sup>. Galvanization shall be 450 gm/sq. m according to norm UNE-EN- 10346:2009. In case of large diameter silos or wherever required structural roof with beams and purlins hot dipped galvanized and designed to support overhead equipment like catwalks and conveyors to be provided.

**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 punching system to assure perfect connection between them. Quality controlled steel coils shall be used for the same of tensile strength not less than 450N/mm<sup>2</sup> and lower yield point not less than 380 N/mm<sup>2</sup>. Galvanization shall be minimum 450 gm/sq.m according to norm UNE-EN-10346:2009. Corrugation pitch of 76 mm x 14 mm deep preferred with useful length of sheet 1140 mm x 2400 mm or as per sizing. Steel quality 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:** Minimum 3 stiffeners per wall sheets to be given .Outside positioned stiffeners to carry the vertical load of the silo to the foundation, manufactured from high tensile steel (Recommended 500 N/mm<sup>2</sup> or atleast 450 N/mm<sup>2</sup>) of thickness varying from 1.5 mm to 4mm as per design requirements and galvanization 450 gm/sqm according to norm UNE-EN-10346:2009. Design shall ensure strong joints and best stability. Stiffeners may be C channels/omega shaped of minimum 75 mm and lengths about 1140 mm or 2280 mm. Steel quality shall conform to S 350 GD according to norm UNE-EN-10346:2009.

**SEALANT:** These shall be made from butyl rubber compound supplied in strips of 6 mm dia. and shall be used to fill vertical joints of body sheets and hopper sheet joints. The sealing of holes for bolted joints shall be made with special sealing washer EPDM or similar unbeatable weather seal.

**BOLTING:** Each bolt shall have a special sealing washer to act as unbeatable weather seal and shall conform 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-ISO 10684:2006.

**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/mm<sup>2</sup> and lower yield point not less than 380 N/mm<sup>2</sup>.

**SUPPORT STRUCTURE:** These are required to support the elevators and other equipment of the silo system 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 the supports to have better distribution of weight. All supports are to be joined to stiffeners to transfer the load 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 norm UNE-EN-10346:2009.

**AERATION SYSTEM:** For flat bottom silos the aeration system shall be Y type made of special galvanized corrugated and perforated steel sheets with min. 20% area covering the entire flat bottom silo. Centrifugal fan of adequate capacity cum and required WC head shall be fitted to bottom of Y. Special circular/square type aeration roof vents with protection against birds are also to be provided. The air blower shall be activated / run automatically when the temperature of raw materials reaches a set temperature above ambient. Dust inside the silos is to be controlled to prevent any dust explosion. Recommended air requirement per silo should be as applicable as per the Silo Capacity confirming FCI norms/other applicable industrial norms.

**SWEEP AUGERS:** These shall be with tractor drive /suitable driven used for the grain silos and shall include one central steel support, electrically operated with suitable KW rating motor, screw flight of suitable size including all supporting structure and planetary advancing system. Motor shall not be placed suitably for easier maintenance. 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 motor or tractor driven and its capacity shall be same as capacity of discharge conveyor. The capacity of sweep auger as applicable synchronized with loading unloading and pre-cleaner capacity

**TEMPERATURE CONTROL SYSTEM:** This shall consist of a temperature control centre made up of a computer, color screen with provision for indicating the temperature of each probe, activation and deactivation 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 (Zone 20 ATEX). Sufficient number of probes with 4 or 5 sensors per probe/ or as per Bidder’s design shall be provided for each silo. The system shall include multiplication box for the probes, connecting wires/ cables and supports on the silo roof for the cables.

**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 the bidder.
- 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 as indicated.
- The steel structure for the silo system and associated equipment (including the silos) shall be as per the design of the bidder. The silos and the supporting framework shall be designed for wind load (highest as per 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 silos to be shared with CLIENT without any extra cost
- Purpose of staircase is for maintenance and inspection purpose or a separate Staircase shall be suitably located so that quick approach to working platforms and shall be minimum 0.8 m wide with 32 mm pipe (GI “B” class) hand railing (double braced).
- 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 elevators and conveyors shall be furnished to the CLIENT including the conveyor entry direct to distribution conveyor in pre-weighing section of the system.

**TECHNICAL SPECIFICATIONS OF INDIVIDUAL EQUIPMENT CONVEYING & OTHER FABRICATED EQUIPMENT****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:

Casing bottom	--	minimum 5 mm GI plate
Casing side	--	minimum 4 mm GI plate
Casing partition	--	minimum 3 mm Casing (As applicable)
Top cover	--	minimum 3 mm GI plate

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 TISCRAAL 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 brush for chain link at each outlet, overflow flap with limit switch at last discharge end to be provided. Suitable adjustable guide plate at inlet to regulate transfer /flow of materials and to avoid chocking to be provided. 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 with chain/direct coupled drive parts & its MS guard etc. as per requirement.

**B. SCREW / PADDLE CONVEYORS**

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 hanger bearing, bolted type baffle plate of min. 3 mm thick GI sheet of approx..

400 mm long (to control the discharge of material) at just after inlet to be provided. Conveyor to be run by foot mounted horizontal geared motor and chain type direct coupling. Construction detail of various major items shall be as follows.

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– minimum 3 mm thick GI sheet		

### C. SCREW / PADDLE DISCHARGERS

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

These shall be of **variable pitch** and dust-proof design, having steel construction, flanged bearing with stuffing boxes, intermediate hanger bearings with maintenance free, self-lubricated special nylon bushes (only if screw length is more than 5 Meter.) screw or paddle flights of steel welded on screw shaft, necessary inlet & outlet both flanged type, over flow flap with limit switch & its bracket, sight glass of 5 mm thick acrylic sheet on top cover, bolted type cleaning door on bottom of screw trough at inlet, bolted type baffle plate of min. 3 mm thick GI sheet of approx. 400 mm long (to control the discharge of material) at just after inlet. Conveyor to be run by foot mounted horizontal geared motor and chain type direct coupling. Construction detail of various major items shall be as follows.

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. BELT CONVEYORS

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 these conveyors in Silo system to be limited for a short distance and with enclosed troughs to avoid spillage of 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. BUCKET ELEVATORS

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 of PVC - lined fabric, pressed steel buckets, Elevators boot with **two inlets with permanent magnet** (magnetic strength 11000 gauss) housed in SS304, GI screw type (min. 32 mm dia. rod) belt tightening device for minimum 300 mm belt adjustment with GI check nut and cage type pulley. Elevator head with rubber lagged crown pulley and wear resistant guide plate. Elevator to be provided with necessary slide doors 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 of minimum 80 TPH capacity) nylon back stop with guard, special bolts for fixing buckets on belt, inter connecting rectangular GI ducting between two troughs for air balancing, air breather on GI ducting at suitable 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 be run by a foot mounted horizontal geared motor and chain type direct coupling drive 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 mm thick
GI plate Buckets	- minimum 2 mm thick
PP plate Top head	- minimum 4 mm thick GI Plate
Cover of top head	- minimum 2 mm thick GI Plate
Bottom head	- minimum 4 mm thick GI plate

## **F. CASCADE TYPE DIAMOND SHAPED MAGNETIC SEPARATOR**

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 section of chute, a permanent magnet (magnetic strength minimum 11000 gauss) is housed in stainless steel 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 material has to be guided to a different chute. Location of magnets to be shown in the Flow diagram.

## **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 be made of perforated sheet metal and perforations to be kept open by a brush scraper. Separate outlet to be provided for fine and coarse materials. The guide outlet has to be provided to assist discharge of the coarse 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 MS sheet

## **H. DUMPING HOPPERS**

These are required in go-down / in raw material unloading station for dumping of ingredients from bags to conveyor running below.

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:

Main body-	minimum 3 mm thick MS sheet
Grill	- 40 mm x 6 mm MS flats (vertical position)
Frame	- 65 x 65 x 6 mm MS angle

## **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 removable grill & hinged type cover. Air breathers shall be 600 mm dia or as per design. Bracket with rope

ladder 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 of wall.

## **J. SILO FUMIGATION SYSTEM**

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.

## **K. AERATION FANS**

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

Minimum head and bottom plate - 4 mm thickness

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

All product piping shall be of OD standard GI "B" class pipe (Size should be as per the project requirement and industrial standards). Accordingly sight glasses, pneumatic flaps/gates being provided.

The diamond shaped cascade magnets provided in the System to be of rare earth magnets with minimum strength of 11000 gauss. The Magnets in elevators where ferrous particles shall be removed manually from 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 rainy season.
- All supporting structural platforms, elevator towers, stair case, walk way, chequered plates for 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 meter distance).

## **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 the outside 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.

Aspiration filter to consist of sheet steel bag housing fabricated from minimum 3 mm thick mild steel sheet with inlet spout and dust collecting hopper/cone, blower with motor & silence for escaping clean air at near zero sound level. Blower of aspiration unit to be run by suitable vertical foot mounted electric motor. 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 provided with suitable GI cage if needed and fastening system. It should be ensured that bags and cages can 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 per requirement.

**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. ASPIRATION DUCTS**

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. GRAVITY SPOUTING**

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 GI PIPES.**

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 WAY FLAPS**

These are required in storage silo system for diverting the flow of material.

Flaps to be fabricated from GI/SS sheet steel with wear liner with inlet & outlet having flanges. These shall be pneumatic type or as applicable. Flaps to be complete with inspection windows, limit switches, 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, 4 ports.

### **D. SLIDEGATES**

These gates are required for discharging/accumulating solid ingredients in the hopper/bin/mixer. 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

Automation system with DCS/ latest version of PLC, SCADA for silo system, for real time monitoring and control of silo system level, temperature, aspiration etc complete with Remote I/O panels, sensors, limit switches Ethernet cables, signal cables, System safeties, protections etc

One number Operator's panel (HMI) for programmed process operation for optimal power utilization with WINDOWS compatible software. Laser printer, UPS & its rack/ stand etc.

Modular type Furniture for computers and operator (Tables, chairs)

### **NOTE: GENERAL NOTE ON AUTOMATION PROVISIONS**

- 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 be provided.
- Proximity sensors, limit switches etc., for full open/full close feedback of valves, gates, flaps, slow speed indication, man & machine safeties and for over flow sensing of elevators/conveyors, and critical equipment are to be provided.

## **TECHNICAL SPECIFICATIONS FOR UTILITIES/SERVICES GENERAL REQUIREMENTS**

The supply of pipes, valves, fittings and accessories for utilities in this case Compressed air is included in the supply

The following may specially be noted.

- For pipe sizing the flow rates should be as per the project requirement and suitability.
- All valves for above services are to be flanged type except those below 25 mm.
- The supply of above service pipes should be inclusive of same quality bends, tees, flanges and with necessary gaskets, bolts, nuts etc
- Flanges/Counter flanges shall be as per BS Tables:
- 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 AND DISTRIBUTION**

#### **i. AIRCOMPRESSOR**

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

This shall be lubricated screw type air compressor with oil filter to filter oil up to 0.01 microns, for generation 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, auto drain valve, pressure gauge and suitable drive motor & drive parts etc.

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. For removal of moisture from receivers, automatic drain valve with solenoid etc. to be provided. The starter panel shall be supplied with the compressor.

Capacity of the compressor and its drier, receiver shall be suitable to take care the load of compressed air for complete storage silo system. Discharge pressure of compressor shall be 7 Kg/ cm<sup>2</sup> and it shall have the noise level preferably be 68 +/-3 dB.

#### **ii. REFRIGERATED AIR DRIER**

##### 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 encapsulated with PUF insulation all housed under insulated box. The compressor shall deliver air quality of +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 inlet connection

- Air outlet connection
- Air inlet strainer
- Cyclone condensate separator
- Pressure dew point meter

Air-drying unit insulating block housing Air-to-Air heat exchanger, air to refrigerant heat exchanger/evaporator, cyclone condensate separator, liquid separator, refrigerant distributor, and refrigeration injection restrictor.

- Condensate trap with automatic discharge
- Manual drain valve for condensate & auto drain valve (timer based)
- Water cooled condenser
- Safety switch, High & Low pressure
- Liquid refrigerant dryer
- Liquid shut off valve
- Liquid refrigerant receiver
- Liquid separator
- Sight glass with moisture indicator
- Refrigerant expansion valve
- Refrigerant circuit access connection
- Hose, automatic condensate discharge

### 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 pressure vessels. 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 air for 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 air receiver shall be designed for Design pressure of 12 Kg/sq.cm & should be Hydro-tested at 18Kg/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 be in the scope of supply. All piping shall be internally cleaned and flushed by the contractor after erection in a manner suited to the service and as directed by the CLIENT.

### **ELECTRICALS Electrical &Automation**

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

All electric motors to be squirrel cage, 3 phase Energy Efficient type IE2 and to have direct on- line starter up 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 be

1.4.

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 54 protection.

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 provided by them, including wherever applicable the details of motor control centers, control panels, remote panels and electric motors etc. This also includes suggested Capacitor banks in KVAR considered for the equipment.

Bidders shall provide details of automation considered by them for their storage silo system. The silo system shall preferably be completely automated.

**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 drawings suitably modified/corrected if necessary as per final design requirements/site conditions and get the same approved from CLIENT before execution

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 length of supplying and laying of cable and include the same in the price bid. However payment will be made as per actual execution and measurement.

#### **Electrical Battery Limit:**

After Silo system MCC panel, HT line (including supply to MCC from PCC). Power and control of all supplied equipment's and earthing. With Lighting arrester and Lighting Provision near Inline motors. (i.e. Elevators, Conveyors, Cleaners, Bag Filters). All applicable transformers and Diesel Generator (Power Backup) are to be included accordingly.

#### **AUTOMATION: Objective:**

Automation for raw material storage silo system in Mega Food Park shall be intended to ensure uninterrupted operation of equipment and reduce manual involvement to the extent possible. PLC with SCADA shall be used for automation & operation of the system with redundancy, as per the following logic:

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

**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 continuous operations.
2. All idle machinery shall be put off when not in use.
3. Systematic and regular report generation for shift, day, month, year to be made available for all main and critical equipment which are to be operated.
4. Temperature of materials inside the silos from time to time and reports are generated time to time by Quality Control Officer.
5. Health/load of all motors shall be tracked and recorded on weekly basis.
6. All hardware for dynamic and static panel, PLC panels shall be supplied.

**TECHNICAL SPECIFICATIONS FOR ERECTION, TESTING & COMMISSIONING**

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

- Positioning of all the silo system equipment in the approved locations, including grouting, anchoring etc as per requirement.
- Laying of product, aspiration and Service pipelines inclusive of the necessary valves, fittings etc. including the necessary accessories if any.
- Anchoring of the pipe lines on necessary supports- for all product, aspiration and Service pipe lines.
- Erection/Welding/Grouting into place necessary structural platforms, walkways, hand rails etc., as per requirement.
- Name of all important machines to be written on them after final installation but before commissioning by a painter. Necessary aero marks and other identification by painting to be provided on piping as required.
- 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 cables on MCC and on Motor starters, Capacitors, isolators etc. with suitable cable glands, lugs etc.
- Termination of control cables/sensor wires on RCPs, control panels, limit switches, indicators, controllers etc
- Earth pit installation complete including excavation, installation, refilling etc.
- Earthing of all electrical equipment with two runs of earth electrode of appropriate size from earth pits, Panel board trenches etc.
- Testing and commissioning procedure have been detailed separately in tender

**TECHNICAL DATA & INFORMATION TO BE PROVIDED BY BIDDER** (Bidders should provide the details of equipment and other details for which they intend to quote.)

**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**

Bidders shall submit the scaled equipment layouts of the silo system including un-loading station in the form 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 site layout.**

**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. Bidders should consider the minimum area of storage silo system including stair case for elevator tower. Top walk way over silos should be at same level.

## **CATALOGUES/LEAFLETS/DRAWINGS OF EQUIPMENT**

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**

Items which deviate from the bidding proposal shall be as per design specifications of the bidder and shall be treated as a deviation from the text of this bidding document. Deviated items should fulfill the minimum performance parameters as specified in this tender.

This bidding document does not allow bidders to make exclusions from any part of the bid and an incomplete list of equipment or an incomplete schedule of service utilities to be provided would be considered as a non-responsive bid.

## **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/set items, unit item rates whether in Nos., RM or Sq. meters., Kilograms or MT shall be provided. **This is 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 specified by CLIENT.** All surplus materials including scrap materials under unit rate /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 and site. A competent execution team shall be deputed at site by supplier who shall be stationed at site and adequately experienced in Project Management of such magnitude and type.

- The CLIENT shall also nominate an official with whom the supplier shall communicate/coordinate.
- The CLIENT shall also post a Site Engineer at project site for supervision and coordination with Site Engineer of the supplier. Approval on technical documentation (with or without specified amendments) shall be given by CLIENT within ten working days after submission.
- Supplier shall obtain approval for purchase of specific makes of equipment whose makes are not mentioned in his offer. If two or more makes of the same equipment are mentioned in the form of alternatives, the supplier shall seek approval for choosing one make over another.
- The supplier's Project Engineer will provide to the CLIENT's Project In- charge with **fortnightly** progress reports which clearly indicate the actual vs.planned progress and the new likely completion date of supply, erection and commissioning of the Silos System.
- 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 regard to:
  - Modification in layout and execution programme to suit local conditions.
  - To purchase essential materials from local market to avoid delays.
- After satisfactory erection and testing, competent commissioning team shall be deputed to establish the performance parameters for a specific period.

## 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

On completion of supply, erection, testing and commissioning of the System / equipment, the same has to 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 site conditions.

## TRAINING

Training in the operation and maintenance of the various equipment of the System shall form an important component of Project Management. Training shall be undertaken by the bidder **for a period of three months** 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 shall include:

1. Familiarization with all major equipment of the storage silo system and its utilities etc. including the operation of the DCS/PLC panels and other systems.
2. Procedure for attaining the rated output and optimum product quality. Familiarization with the basic principle of Electronic/Electrical control systems, including fault finding.
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 of equipment.
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 personnel required to operate the equipment and their immediate Supervisors/ 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/Project Authority, the supplier shall provide to the System standby technical supervisory support as 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 carried out.



- For a week each after 4 months, 8 months and 1 year from warranty runs, to have discussions with System staff and assistance to review the correctness of operations / maintenance procedures and necessary corrections.

### **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's scopes include compressed air at required pressure, is to be produced, stored and distributed it to all consumption points in the raw material storage silo system and cleaning system for all pneumatic (or electric operated) flaps / gates operation etc. Drain from the air compressor, receiver shall be taken outside the room by the bidder through auto drain arrangement.

### **Lighting**

Electric power, 415 V, 3 phase & neutral shall be made available in lighting switch board located in LT room. Cables, distribution board for storage silo area lighting (including on raw material unloading area) shall 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 unloading area etc. including supply & installation of light fittings as details below, aviation light with wiring, lightning arrester, CU lightning conductor and necessary earth pits & CU earthing electrodes are in the bidder's scope of works.

Supply of Metal Halide 150W MH flood light fixture IP 65 with powder coated pressure dies cast aluminum housing and toughened glass cover. The fitting and the gear compartment should be complete with the necessary lamp, igniter, ballast, capacitor and mounting accessories. Model GE GEMFIX150CAI.

**RAW MATERIALS AND OTHER RESOURCES:** All consumables like gear oils, lubricants, packing for flanged joints etc. and commissioning spares required if any, for installation, testing & commissioning till taking over the System by the CLIENT shall be provided by successful bidder.

### **OTHER STATUTORY REQUIREMENTS**

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.

### **Civil, MEP, Firefighting Works:**

All civil, MEP, Fire fighting works including external development, 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 equipment like hoppers, conveyors, elevators etc., indicating dimensions, tolerances etc., as proposed by the bidder.
- **Layout drawing:** The machinery and equipment layout drawing of the silo system showing 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 with bid.
- **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 by supplier.
- **Catalogues** The relevant catalogues, technical data sheets, drawings, photographs etc., of each 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, cone angle at bottom and top, stiffeners and supporting structure, and thickness of the plate at various places along with detail of aeration blower and temperature sensors.

### **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 reports which can be printed. Detail of input/output ports and other technical details of the PLC panel & hardware of computer systems.

#### **TECHNICAL DETAILS AND DRAWINGS TO BE SUBMITTED AFTER AWARD OF CONTRACT**

The following shall be provided after award of contract:

- The final equipment GA drawing (in both hard -3 sets and soft form : AutoCAD) being manufactured as per design and product specifications of CLIENT
- Final services /utilities schematic with sizes of pipe lines, valves, insulation thickness, controls, showing all instruments and accessories
- Final foundation footprint
- Final electrical load details in HP/KW
- Final control schematic of the control panel/automation

#### **LIST OF APPROVED MAKES:**

The lists of approved makes of items are given below. The bidder shall note and confirm the make proposed by them. Deviations in makes are to be clearly mentioned.

<b>Description</b>	<b>Makes</b>
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 disconnecter 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

Note: - In case the bidder proposes any other makes to sufficiency to the technical specifications and the scope of the tender, they should submit a complying statement on all parameters and comparison statement at the time of pre bid meeting only. However HAFED's decision is final.

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/ output parameters/ and makes in the technical Bid.** Prior to supply and installation of all equipments and machinery, the successful bidder has to take written approval from the SPV/HAFED/Construction Manager.

Location	Allowable Bearing Pressure, Kg/cm <sup>2</sup>	
	Net	Gross
For (Bore Holes No ,5,6,7 & 8)	0.80	1.06

Bore Hole No. 5													
Depth below Ground level in feet	Soil type	Description	SPT ‘N’ Value	Triaxial Test Results		GWT	LL & PL %	BD & DBD g/cc	Sieve Analysis percent				
				$\phi$ Deg.	$c$ Kg/cm <sup>2</sup>				Gravel	Coarse Sand	Medium Sand	Fine Sand	Silt and Clay
5.0	ML	SANDY SILT	05						-	-	-	18	82
				28	0.00		NP	1.79	-	-	-	17	83
08					V		1.74	-	-	-	35	65	
10.0				28	0.00		NP	-	-	-	42	58	
			10					-	-	-	39	61	
15.0				28	0.00		NP	-	-	-	42	58	
			13					-	-	-	44	56	
20.0				30	0.00		NP	-	-	-	46	54	

**BORE HOLE DATA AND SOIL PROPERTIES  
AT THE SITE**

Bore Hole No. 6													
Depth below Ground level in feet	Soil type	Description	SPT 'N' Value	Triaxial Test Results		GWT	LL & PL %	BD & DBD g/cc	Sieve Analysis percent				
				ϕ Deg.	c Kg/cm <sup>2</sup>				Gravel	Coarse Sand	Medium Sand	Fine Sand	Silt and Clay
5.0	ML	SANDY SILT	05			V	NP	1.80 1.75	-	-	-	40	60
			28	0.00	-				-	-	18	82	
09							-	-	-	34	66		
10.0			28	0.00		NP	-	-	-	40	60		
11							-	-	-	38	62		
15.0			28	0.00		NP	-	-	-	44	56		
13							-	-	-	45	55		
20.0			30	0.00		NP	-	-	-	43	57		

**BORE HOLE DATA AND SOIL PROPERTIES  
AT THE SITE**

Bore Hole No. 7													
Depth below Ground level in feet	Soil type	Description	SPT ‘N’ Value	Triaxial Test Results		GWT	LL & PL %	BD & DBD g/cc	Sieve Analysis percent				
				$\phi$ Deg.	c Kg/cm <sup>2</sup>				Gravel	Coarse Sand	Medium Sand	Fine Sand	Silt and Clay
5.0	ML	SANDY SILT	04	28	0.00	V	NP	1.79 1.74	-	-	-	28	72
			09						-	-	-	27	73
10.0			09	28	0.00		NP		-	-	-	32	68
10			-						-	-	40	60	
15.0			10	28	0.00		NP		-	-	-	37	63
12			-						-	-	43	57	
20.0			12	30	0.00		NP		-	-	-	45	55
									-	-	-	48	52

**BORE HOLE DATA AND SOIL PROPERTIES AT THE SITE**

Bore Hole No. 8													
Depth below Ground level in feet	Soil type	Description	SPT ‘N’ Value	Triaxial Test Results		GWT	LL & PL %	BD & DBD g/cc	Sieve Analysis percent				
				$\phi$ Deg.	c Kg/cm <sup>2</sup>				Gravel	Coarse Sand	Medium Sand	Fine Sand	Silt and Clay
5.0	ML	SANDY SILT	05	28	0.00	V	NP	1.81 1.75	-	-	-	29	71
									-	-	-	24	76
10.0			09	28	0.00		NP		-	-	-	30	70
									-	-	-	38	62
15.0			12	28	0.00		NP		-	-	-	39	61
									-	-	-	41	59
20.0			14	30	0.00		NP		-	-	-	44	56
									-	-	-	46	54

**BORE HOLE DATA AND SOIL PROPERTIES AT THE SITE**

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## **TECHNICAL SPECIFICATIONS OF CIVIL, MEP WORKS**



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### **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, IS codes and as per direction of the Engineer-in-charge shall be followed.
- 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 latest amendments.
- Contractor will have to supply manufacturer's certificate certifying that materials have been manufactured as per ISI specification, duly supported by necessary documentation.
- Necessary certificate from the manufacturer for all the material brought at site shall be supplied to the Engineer-in-charge, certifying that this lot of material have been manufactured as per Standard of BIS and confirms to relevant ISI Code.
- 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 be rejected.
- 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 the Haryana P.W.D. specifications.
- All types of concreting is to be done with use of mechanical mixer and vibrator, which are to be arranged by the contractor at his own expenses.
- 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 the contractor.
- 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 Liability Period.
- 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 and noting extra shall be payable to the agency on this account.

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- ~~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 the department.~~
  - 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 be entertained.
  - The contractor shall provide suitable measuring arrangement at site for checking of various material supplied by him.
  - 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.
  - The rate will be firm and bidding 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.
  - 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 given below:-
    - 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 of tendering.
  - 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 the job.

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### **Other Special Conditions**

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## 1.1 SITE OFFICE FOR THE ENGINEER

### 1.1.1 Provision of Site Office

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 the Engineer

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 The Contractor shall provide at the site, at his own expense, set of surveying and measuring equipments as specified in the contract data. The set shall be used by the Contractor for requirement at site and also shall be made available from the commencement of contract for the use of the Engineer's Representative. The set shall consist of the following instruments:

1.1.3.2 All equipment shall be supplied with their tripods, staff and such other equipment/item as the Engineer's Representative may require for the measuring, or setting -out of the work.

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 the works.

1.1.3.4 The Contractor shall provide the Engineer, throughout the Contract period, with all necessary assistants and chainmen to assist with surveying work. The assistant shall keep the survey equipment in good order.

## 1.2 LABORATORY AND LABORATORY TESTING

### 1.2.1 Description

1.2.1.1 Testing of materials and completed work shall be carried out by a site laboratory established and allocated exclusively for that purpose, all testing shall be carried out under the direction and supervision of the Engineer's staff. All tests shall be performed in strict accordance with the appropriate Indian Standards or other standards as approved by the Engineer.

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- 1.2.1.2 Any testing relating to the Works as required by the Engineer which cannot be carried out in the site laboratory shall be carried out at the Contractor's expense, at an independent laboratory approved by the Engineer.
- 1.2.1.3 The provision of laboratory facilities on site, as specified, shall in no way relieve Contractor of the responsibility for providing additional laboratory space and testing equipment as necessary in order to control materials at mixing plants and elsewhere and enable him to fulfil his obligations under the Contract.
- 1.2.1.4 If for any reason a laboratory cannot be setup at site, all the tests shall be got done in a laboratory approved by the Engineer.

## **1.2.2 Laboratory Building**

- 1.2.2.1 The Contractor shall provide, furnish, equip, keep clean and maintain to the satisfaction of the Engineer a laboratory building of a floor area not less than 30sq.m. The building shall be provided with electrical power, potable water, drainage, and shall have adequate daylight and artificial lighting.
- 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 or unnecessary delay shall occur to construction activities due 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 following tests;
- (a) modified Proctor compaction tests
  - (b) Field Density tests using core cutter and sand replacement methods
  - (c) Crushing strength of 150mm size concrete cubes.
  - (d) Sieve analysis
  - (e) Slump tests
- 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 purposes for which they are intended and shall, together with all equipment, all samples and records, be open to inspection by the Engineer during all working hours.
- 1.2.2.4 The laboratory shall be fully operational within 15 days of commencement of Contract and remain so until all work in the opinion of the Engineer is complete. A sum of Rs. 5000/ day will be deducted from the money due to the Contractor for each day over the 15 day limit, for failure on the part of the Contractor to provide the laboratory to the Engineer's satisfaction. At the end of Construction

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the laboratory building with furniture and equipment shall revert to the Contractor. The laboratory shall not, however, be removed from site without the prior consent of the Engineer.

1.2.2.5 If in case the tests are to be done in an approved laboratory, such an approval shall be obtained from the Engineer within 15 days of commencement of Contract; in such cases the Clause 1.2.2.4 will not apply.

1.2.2.6 2 Vernier Callipers and 2 Screw Gauges having 0.01 mm least count shall be made always available at site by the Contractor

1.2.2.7 After removal of the laboratory the Contractor shall clean and level the site removing all foundations, drain water pipes and other services installed for the laboratory and return the ground to its original condition.

### **1.2.3 Contractor's Senior Materials Technician**

1.2.3.1 The Contractor shall provide a full-time senior materials technician to be responsible for the day-to-day activities of the laboratory and for site testing. 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, including asphalt concrete, and of concrete for structures, and shall 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 the Engineer.

### **1.2.4 Sample**

1.2.4.1 The Contractor shall submit samples of all materials and goods for inclusion in the works to the Engineer and only those approved by the Engineer and to the standards specified elsewhere in the Contract may be ordered for supply. Samples shall be submitted promptly in order not to delay the works.

All work executed shall be of equal standard in all respects to the approved samples and the Engineer may reject any work which, in his opinion, does not comply with the approved samples.

## **1.3 SITE SURVEYS, SETTING OUT AND DESIGN DETAILING**

### **1.3.1 Description**

The Contractor shall be responsible for the true and proper setting-out of the works in relation to the lines and levels of reference given by the Engineer or shown on the Drawings and for the correctness of the position, levels, dimensions and alignment of all parts of the works and for the provision of all necessary instruments, appliances and labour used in connection therewith.

He shall carry out a detailed survey of the site in advance of his commencement of Construction work, and shall supply full details to the Engineer as specified in

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the following sub clauses.

All setting out and levelling shall be based on permanent Benchmarks obtained from the Local Authority.

### **1.3.2 Existing levels and Layouts**

- 1.3.2.1 Before commencing operations of any section of the works, the Contractor shall 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 weeks in advance of the start for services specified in the specification and, in any event, at least four weeks before the intended commencement of construction on the section. Unless otherwise instructed by the Engineer the detailed survey plots will be supplied in 1:200 scale and printed on high quality transparent draughting medium as approved by the Engineer.
- 1.3.2.2 In addition to the requirements of Sub - clause 1.3.2.1 above, horizontal control lines shall be marked out by pegs at intervals of not more than 20m and the lines traversed with theodolite by steel band or by any other method acceptable to the 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 conspicuous colour.
- 1.3.2.3 Cross sections of the existing ground and of the ground after completion of earthworks shall be taken at intervals not exceeding 20m along the horizontal control lines in an approved and acceptable manner.

### **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 subsequent setting out and levelling shall be carried out. The location of the benchmarks shall be agreed with the Engineer before they are established.
- 1.3.3.2 Benchmarks shall be constructed in class 20/20 concrete, with minimum dimensions of 0.3m x 0.3m, the upper surface being approximately 50mm above ground level. A 20mm diameter mild steel rod, not less than 300mm in length, shall be cast into the concrete so that it projects about 10mm above the centre of 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 benchmark shall be determined in metres to 3 decimal places.
- 1.3.3.3 The Contractor shall check co-ordinates and levels of benchmarks at monthly intervals and immediately notify the Engineer of any discrepancies.

### **1.3.4 Survey, Design, Working and Shop Drawings**

- 1.3.4.1 The Contractor should note that the Drawings and Quantities in the Tender Documents, whilst detailed, have to be considered as preliminary, and only provide an indication of the locations, layouts and scope of works. The

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locations, layout and scope of works may be altered and in such cases the Contractor shall not be entitled to any claim whatsoever for such alterations over and above the measured works or measured variations at the tendered rates except in accordance with the provisions of relevant Clauses of the Conditions of Contract.

1.3.4.2 Subject to the above limitation, design detail will be provided by the Engineer in advance of the Contractor's intended commencement of construction as indicated in his approved construction programme or as otherwise agreed with the Engineer.

1.3.4.3 Should any Contractor's proposals for the any specialised items differ in entirely or substantially from that of the Engineer's or should it affect another component of the element or item of work beyond permissible variations from it, then the Contractor shall, at his own cost, be responsible for redesign to provide a complete acceptable system before approval of any part thereof. For such works, the Contractor shall furnish, at his own expense, the Engineer with copies of all design calculation, sketches, working drawings and similar information in as much detail as the Engineer may reasonable require for his full information and subsequent approval.

Such approval of the Contractor's design shall not relieve the Contractor from any of his duties, responsibilities or obligations under the Contract.

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 specified in the relevant Tender Document all to the approval of the Engineer.

1.3.4.4 Contractor shall prepare the working drawings/shop drawings and documents, 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 :

To illustrate in detail the arrangement of the various section of the works and to identify the various components.

To integrate the various sections of the works.

The shop drawings required shall include but not be limited to the following

General layout drawings for equipment and like items as deemed necessary by the Engineer.

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 earthing system



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- b) Detailed layout drawings showing sections such as through ceiling voids and vertical shafts.
  - c) System diagrams, circuit diagrams and wiring diagrams for all installations and equipment.
  - d) The drawings, specifications and technical information for materials and equipment of building components such as doors, windows etc.

1.3.4.5 Working drawings and documents shall be made available in sufficient time in order to maintain the Programme of Work on site.

The Contractor shall liaise 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.

Materials or equipment shall be ordered nor construction of the associated works be commenced until such approval has been obtained from the Engineer.

The Contractor shall be deemed to have obtained a full and proper understanding 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 reasonable requests made by the Contractor in furnishing design information and the like to the Contractor. No claim in respect of lack of knowledge will be admissible.

### 1.3.5 Construction Levels

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 drawing shall clearly indicate the location of the boundary walls wherever available. Where boundary walls are not available the survey should show the extent of the right of way of the road. The existing services, as determined by site excavation, should also be marked up on these plans.
- (c) Profile of the existing road as directed by the Engineer
- (d) In the dual carriageway, profile shall be drawn for both carriageways.

## 1.4 SOIL INVESTIGATION AND REPORT

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- 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 promptly carry out such investigations as advised by the Engineer.

**1.5 PROGRESS PHOTOGRAPHS**

- 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 purpose shall be such that the date is printed out.

- 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 photographs are subject to the approval of the Engineer and shall be discussed at as early a date as possible so that complete coverage can be assured.

**1.6 NOTICE BOARDS**

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 painted by a skilled sign writer to show the details described in the Contract. The Contractor is responsible for obtaining all necessary approvals for the erection of these notice boards.

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 the Engineer.

- 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 relevant Clauses.

**1.8 SITE SAFETY**

- 1.8.1 Site Safety**

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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 throughout 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 to take special precautions for public safety and to minimise the scale and extent of disruption. Plans for diversion shall always be submitted to the Engineer for prior approval.

## **1.8.2 Safety on Site**

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 the Engineer.

1.8.2.2 The following requirements shall be complied with by the Contractor:

- a) Excavation - All excavations shall be adequately supported to avoid collapses and effective safety barriers shall be erected with warning signs and devices 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 suitably secured.

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 working area.

- 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 being performed.
- 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 from a 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 sufficient strength to afford safe support. Protective headgear shall always be worn.

- d) Lifting Device - Every rope, chain, pulley, bloc, hook, winch, crane or other lifting gear used for raising or lowering loads or as a means of suspending them shall be of good construction, sound material, 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 the Engineer.
- e) Working in existing manholes etc. , - Checks shall be carried out before entry to ensure that the atmosphere is fit for respiration and no smoking

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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 acetate papers.
- b) Lifting harness with ropes
- c) Handlamps with spare batteries
- d) First aid kit.
- e) Protective head gear.
- f) Rubber Gloves.
- g) Breathing apparatus.

- 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 the public.

### **1.8.3 Vehicular Movement**

- 1.8.3.1 Before commencing the works, the Contractor shall consult with and obtain from 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 other contractors.

- 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 the safety management staff shall be subject to the approval of the Engineer.

- 1.8.3.3 Throughout the Contract, the Contractor shall maintain vehicular and personnel access to all parts within the site at all time.

Adequate warning 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 the Engineer.

- 1.8.3.5 All diversions and safety 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 be used.

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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 on site.

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 management plan.

## 1.9 SERVICES

### 1.9.1 Contractor to establish location of Services

Before the Contractor may proceed with the Works in any given area he is required to establish the precise location of all services in that area as executed by other contractors.

## 1.10 AS BUILT RECORDS

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 two hard copies of the as built records to the scale advised by the Engineer.

## 1.11 PROGRAMME OF WORKS

1.11.1 In respect of the programme of works required under Clause 17 of the General Conditions of Contract the following specific requirements shall apply: -

- ☐ The works shall be programmed in such a way as to minimise disruption to other works
- ☐ 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 other areas.
- ☐ Works, which, by their nature, will create disruption and / or obstructions to other works, shall be programmed to be undertaken in a continuous sequence of events from the initial disruption until the restoration of access without and significant delay between operations.

1.11.2 The Contractor's Programme of Works, submitted in accordance with Clause 17 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 the Contractor shall do so forth, for this reason the Contractor is advised to liaise closely with the Engineer during the production of his Programme.

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- 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, without the specific permission of the Engineer's Representative.
- 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 in such a manner as to minimise the duration of the disruption.
- 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 liaise 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 adjacent contractors.
- 1.12 CONTRACTOR'S OFFICES, YARD, STORES AND PLANT AREA
- 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 become unsightly.
- 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 Objection Certificates.
- 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 all sanitary arrangements, and for the supply of water and electricity. Until the Engineer has given his approval in writing, no construction of any of the Contractor's facilities shall commence. The area shall be fenced in accordance with the Engineer's approval.
- 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 approval of the dimensions and specifications of such buildings or structures and their location.
- 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.

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- 1.12.6 Under no circumstances shall overnight accommodation be permitted on site except for Site watchman in carrying out their duties.
- 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 and suppliers.
- 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 original condition.

## 2.1 SITE PREPARATION

### 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 mentioned items.

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 of Trees

#### 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 the tree.
2. If any tree is conflicting with the road works then Contractor shall inform the Consultant.

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Removal of trees shall be performed only after written approval from the Employer.

b) Measurement and Payment

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 directed by the Engineer and for all material, labour equipment, supplies and incidentals necessary to complete the Work.

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 of Fence**

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 to assess its suitability for re-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 and Payment

Payment under this Item shall be made per linear metre of fence removed.

The unit price shall constitute full compensation for the works described herein and as directed by the Engineer and for all material, labour, equipment, supplies and incidentals necessary to complete the Works.

**2.1.4 Removal of Concrete Structures**

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.



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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 and Payment

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 and as directed by the Engineer.

3.0 CONSTRUCTION OF STORM WATER DRAINS

**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 for drains**

3.2.1 General Specifications in Section -2 - Earthworks are applicable for excavation for Drains also.

3.2.2 Stacking of excavated material

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.

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### **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 of Drains**

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 earth excavation.

3.6.2 Before laying concrete base slab, the surface of the bedding layer shall be sprinkled with water in order to reduce the loss of water from the concrete bed.

3.6.3 The concrete shall be vibrated and compacted.

3.6.4 There shall be an interval of at least 24 hours before the sidewalls of the drain are cast on the base slab

3.6.5 The sides of the excavation shall be moistened with water to reduce the loss of water from the concrete walls to be placed.

3.6.6 Expansion joints shall be provided at 20m interval in the concrete walls.

3.6.7 Expansion joints shall also be provided wherever there is a change in alignment.

### **3.7 Concrete Cover slabs**

3.7.1 Insitu cover slabs

The insitu cover slabs shall be cast as per the general specification for concrete.

3.7.2 Precast cover slabs

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**

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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' Civil Works**

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## INTRODUCTION

1. These Specifications contain guidelines and directions to be followed jointly and severally in the implementation of the subject project to deliver a quality product.
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 specific requirements herein, the relevant provisions in the above documents shall apply.
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 construction projects while the latter deals with the items of particular application.
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 take precedence.
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 the items.
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 are concerned.
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 issued thereto.
8. Definitions

Unless specified otherwise in related clauses or sections, definition of terms and expressions in the Specifications, will be those given against the terms below.

- a. Best: The most superior material/article and workmanship obtainable in the context of the work.
- b. IS: The standards, specifications and code of Practices issued by the Bureau of Indian Standards. Any IS designated by a number means its latest revision and edition including all additions and amendments thereto.
- 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 the Contract.
- d. Floor level: For ground floor, top level of finished floor and for other floors above ground level, top level of the structural slab.
- 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, volume etc.
- 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 the Engineer.

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## 1. **EARTHWORK, EXCAVATION AND SUB BASE**

### 1.1. Applicable Codes

The following Indian Standard Codes, unless otherwise specified herein, shall be applicable. In all cases, the latest editions including all applicable official amendments and revisions shall be referred to.

- |    |                      |   |   |
|----|----------------------|---|---|
| a) | IS: 783              | - | Code of practice for laying of concrete pipes.                                  |
| b) | IS: 3764             | - | Excavation work - Code of Safety .  |
| c) | IS: 2720             | - | Methods of test for soils:  |
| d) | (Part-1)             | - | Preparation of dry soil samples for various tests.                              |
| e) | (Part-2)             | - | Determination of Water Content.   |
| f) | (Part-4)             | - | Grain size analysis.  |
| g) | (Part-5)             | - | Determination of liquid and plastic limit.                                      |
| h) | (Part-7)             | - | Determination of water content - dry density relation using light compaction.   |
| h) | (Part-8)<br>using    | - | Determination of water content - dry density relation heavy compaction.         |
| i) | (Part-9)<br>constant | - | Determination of dry density – moisture content by weight of soil method.       |
| l) | (Part-14)            | - | Determination of density index (relative density) of cohesionless soils.        |
| m) | (Part-22)            | - | Determination of organic matter.  |
| n) | (Part-26)            | - | Determination of pH Value.  |
| o) | (Part-27)            | - | Determination of total soluble sulphates.                                       |
| p) | (Part-28)            | - | Determination of dry density of soils in place, by the sand replacement method. |
| q) | (Part-33)            | - | Determination of the density in place by the ring and water replacement method. |
| r) | (Part-34)            | - | Determination of density of soil in place by rubber balloon method.             |
| s) | (Part-38)            | - | Compaction control tests (Hilf Method).   |

### 1.2. Excavation

#### 1.2.1 General

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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.

All excavation work shall be carried out by mechanical equipment unless, in the opinion of Engineer-in-charge, the work involved requires it to be carried out by manual methods.

#### 1.2.2 Grubbing and Clearing

Before excavation is started, the area coming under cutting / excavation shall be thoroughly grubbed and cleared off shrubs, rank vegetation, grass, bush wood, debris, trees / sapling of girth upto 300 mm. The roots shall be removed upto depth of 600 mm below ground. The rubbish shall be removed outside the site as directed by the Engineer-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 conditions in accordance with the construction programme. Sumps made for dewatering must be kept clear of the excavations/trenches required for further work. The method of pumping shall be approved by Engineer-in-charge, but in any case, the pumping arrangement shall be such that there shall be no movement of subsoil or blowing in due 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) seven days after the last pour of the concrete. The Contractor shall, however, ensure that no damage to the structure results on stopping of dewatering.

The Contractor shall study the sub-soil conditions carefully and shall conduct any tests necessary at the site with the approval of the Engineer-in-charge to test the permeability and drainage conditions of the sub-soil for excavation, concreting etc., below ground level.

The scheme for dewatering and disposal of water shall be approved by the Engineer-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 obstructs the progress of the work, leads to unsanitary conditions by stagnation, retards the speed of construction and is detrimental to the safety of men, materials, structures and equipment.

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

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diameter of well points, headers etc., and the number, capacity and location of pumps for 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 provided for, the unit of measurement shall be as indicated in the Schedule of Quantities.

#### 1.2.4 Timbering to excavation (shoring)

Where the soil is soft and sides of excavation needs supporting, suitably designed planking and strutting shall be provided.

Close timbering shall be done by completely covering the sides of the trenches and pits generally with short, upright members called 'polling boards'. These shall be of minimum 25 cm x 4 cm sections or as approved by the Engineer-in-charge. The boards shall generally be placed in position vertically side by side without any gap on each side of the excavation and shall be secured by horizontal walings of strong wood at maximum 1.2 metre spacings, struttled with ballies or as approved by the Engineer-in-charge. The length of the ballie struts shall depend on the width of the trench or pit. If the soil is very soft and loose, the boards shall be placed horizontally against each side of the excavation and supported by vertical wallings, which in turn shall be suitably struttled. The lowest boards supporting the sides shall be taken into the ground and no portion of the vertical side of the trench or pit shall remain exposed, so as to render the earth liable to slip out.

Timber shoring shall be 'close' or 'open' type, depending on the nature of soil and the depth of pit or trench. The type of timbering shall be as approved by the Engineer-in-charge. It shall be the responsibility of the Contractor to take all necessary steps to prevent the sides of excavations, trenches, pits, etc. from collapsing.

Timber shoring may also be required to keep the sides of excavations vertical to ensure 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 the Engineer-in-charge.

The withdrawal of the timber shall be done carefully to prevent the collapse of the pit or trench. It shall be started at one end and proceeded with, systematically to the other end. Concrete or masonry shall not be damaged during the removal of the timber. In the case of open timbering, the entire surface of the side of trench or pit is not required to be covered. The vertical boards of minimum 25 cm x 4 cm sections shall be spaced sufficiently apart to leave unsupported strips of maximum 50 cm average width. 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 open timbering.

In case of large pits and open excavations, where shoring is required for securing safety of adjoining structures or for any other reasons and where the planking across sides of excavations/pits cannot be struttled against, suitable inclined struts supported on the excavated bed shall be provided. The load from such struts shall be suitably distributed on the bed to ensure no yielding of the strut. If however, Engineer-in-charge directs any timbering to be left-in, keeping in mind the type of construction or any other factor, Contractor shall be paid for at the scheduled item rate for such left-in timbering.



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Unless otherwise separately provided for in Schedule of Quantities, the timber shoring 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 of large 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 unit rates.

#### 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 Hard Soils

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) Hard Rock

This shall include all rock occurring in large continuous masses, which cannot be removed except by blasting for loosening 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 Decomposed Rock

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 Loose Rock

All loose boulders, detached rocks partially and other loose material which might move therewith not directly in the excavation but so close to the area to be excavated as to be liable, in the opinion of Engineer-in-charge, to fall or otherwise endanger the workmen, 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 and safe.

Any material not requiring removal in order to complete the permanent works, but which, in the opinion of Engineer-in-charge, is likely to become loose or unstable later,

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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

Where blasting has to be resorted to for rock cutting it shall be the responsibility of the contractor to arrange for the following at his entire risk, cost and responsibility.

- 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 the contractor.
  - 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 adhere to according to the various regulations in force.
  - 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) Storing of blasting materials shall be strictly as per Explosive Regulations.
- The tenderer must acquaint him-self with the site conditions in regard to blasting, nature of rock likely to be met with, timing and other restrictions to blasting etc. No. Claims whatsoever in these regards shall be entertained.

#### 1.2.7 Disposal of Surplus excavated materials

All materials considered surplus shall be removed to destinations and disposed off as approved by Engineer in charge. The disposal of the material can be in any of the following ways as directed by the Engineer-in-charge.

1. Filling in low lying areas
2. Filling in at places of filling such as under floors, in roads, etc.
3. Stacking of material in pre-designated stacking yard.
4. Removal of material outside the plot for disposal.

#### 1.2.8 Measurements

Measurements for all excavation, filling, carting away and earthwork shall be in solid measure. The rates quoted by the tenderers are thus for solid measure units. The following factors shall be applied to obtain quantities of solid measure.

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- Excavation : Volume shall be determined by levels taken before commencement of excavation and after completion up to the required level.
  - 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.
  - Stack measure as in rubble, etc. : Volume of stack less 40%

The mode of measurement for various types of excavations & disposal shall be 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 measured separately.
- 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 the quantities.
- 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 for voids.
- 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's expense.

#### 1.2.9 Rates

The rates shall be inclusive of all the operations described above including clearing and grubbing, dewatering, shoring and disposal at site as directed by the Engineer-in-charge.

### 1.3 Earth Filling, Backfilling and Site Grading

#### 1.3.1 General

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**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 properly intercepted or otherwise dealt with to the approval of the Engineer-in-charge.

The Contractor shall not commence the placement of any fill or back fill at any location without the approval of the Engineer-in-charge.

#### 1.3.2 Material

To the extent available, selected surplus soils from excavations shall be used as backfill. Backfill material shall be free from lumps, organic or other foreign material. All lumps 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 graded fine material consisting of murum or earth to fill the voids and the mixture used for filling.

If fill material is required to be imported, the Contractor shall make arrangements to bring such material from outside borrow pits. The material and source shall be subject to the prior approval of the Engineer-in-charge. The pH value of soil shall be between 5.5 to 9 and the soil shall have the following grading analysis.

Sand : 20% to 75%

Silt : 10% to 60%

Clay : 05% to 30%

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 removed shall be disposed off as directed by Engineer-in-charge. The Contractor shall provide the necessary access roads to borrow areas and maintain the same if such roads do not exist, at his cost.

#### 1.3.3 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 properly consolidated, before the succeeding one is laid. Each layer shall be consolidated 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 the Engineer-in-charge.

#### 1.3.4 Sand Filling in Plinth and Other Places

At places where backfilling is required to be carried out with local sand it shall be clean, medium grained and free from impurities. The filled-in-sand shall be kept flooded with 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's account. The surface of the consolidated sand shall be dressed to required

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level 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.

#### 1.3.5 Murum Filling

The liquid limit & plasticity index of such materials shall be below 20 and 6 respectively and the fraction passing 75-micron sieve does not exceed 10 %. It shall be laid in layers not exceeding 15 cm & compacted as per the directions of Engineer-in-charge.

#### 1.3.6 Filling in Trenches

Filling in trenches for pipes and drains shall be commenced as soon as the joints of pipes and drains have been tested and passed. The backfilling material shall be properly consolidated by watering and ramming, taking due care that no damage is caused to the pipes.

Where the trenches are excavated in soil, the filling from the bottom of the trench to the 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 line of the pipes shall be done with selected earth by hand compaction, or other approved means in layers not exceeding 15 cm.

In case of excavation of trenches in rock, the filling up to a level 30 cm above the top of 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 whereas the filling above the center line of the pipe shall be done by hand compaction or approved means in layers not exceeding 15 cm. The filling from a level 30 cm above the 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 the voids.

Filling of the trenches shall be carried out simultaneously on both sides of the pipe to avoid unequal pressure on the pipe.

##### 1.3.6.1 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 concrete bed/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 is more.
- (b) For depths exceeding 1 meter as allowance of 5 cm per meter of depth 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 is more
- (c) When more than one pipe, cable, conduit etc. are laid, the diameter shall be reckoned as the horizontal distance from outside to outside of the outermost pipes, cables, conduits etc.

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#### 1.3.7 General Site Grading

Site grading shall be carried out as indicated in the drawings and as approved by the Engineer-in-charge. Excavation shall be carried out as specified in the Specifications. Filling and compaction shall be carried out as specified and elsewhere unless specified otherwise shall be carried out as indicated below.

The fill shall be placed in layers not exceeding 200 mm and leveled uniformly and mechanically compacted before the next layer is deposited.

To ensure that the fill has been compacted as specified, field and laboratory tests shall be carried out by the Contractor at his own cost.

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.

The Contractor shall protect the earth fill from being washed away by rain or damaged in any other way. Should any slip occur the Contractor should remove the affected material and make good the slip at his cost.

If so specified, the rock as obtained from excavation may be used for filling and leveling 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 taken up.

#### 1.3.8 Fill Density

The compaction, where so called for, shall comply with minimum 95% of maximum dry 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 been obtained.

#### 1.3.9 Lead

Lead for deposition/disposal of excavated material, shall be the crow flight distance as 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.

#### 1.3.10 Measurements

Backfilling as per specification the sides of foundations of columns, 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 stacked material,

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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.

Actual quantity of consolidated sand filling and murrum filling shall be measured and paid for in cubic meters.

#### 1.3.11 Rates

The rates shall be inclusive of clearing and grubbing, spreading, watering and compaction etc. as per specification above.

### 1.4 Anti Termite Treatment

#### 1.4.1 Type of Treatment

Anti Termite Treatment is for prevention of termites infecting the building. The treatment shall be done during the time of construction with application of chemical / insecticide emulsions.

#### 1.4.2 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 potable water to obtain specified emulsion concentration. For example one part of chemical of 30% concentration when mixed with 59 parts of water shall give 0.5% emulsion concentration.

#### 1.4.1 Applicator

The treatment work at site shall be got done only from qualified and competent applicator agencies using chemicals procured from reputed manufacturers

#### 1.4.4 Treatment

The treatment shall be applied for masonry foundations and basements, RCC foundation and 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 the building.

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**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 quantity of chemical is used for the required area during the operation.**

**1.4.4.3 Time of Application**

Soil treatment should start when foundation trenches and pits are ready to take bed concrete / leveling course in foundations. Laying of bed concrete/leveling course should start when the chemical emulsion has been absorbed by the soil and the surface is quite dry. Treatment should not be carried out when it is raining or soil is wet with rain or sub soil water. Treatment to the surface of earth filling within the plinth shall also be done in the same manner before laying the sub-grade for flooring.

**1.4.4.3 Disturbance**

The treated soil barriers shall not be disturbed. If for some reasons the treated soil barriers are disturbed, immediate steps shall be taken to restore the continuity and completeness of the barrier system.

**1.4.4.4 Treatment for Masonry Foundations and Basements**

- 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 liters per square metre surface area.
- b. After the masonry foundations and the retaining wall of the basements come up, the backfill in the immediate contact with the foundation structure shall be treated at the rate of 7.5 liters 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 that the earth in contact with these surfaces is well treated with the chemical.

**1.4.4.5 Treatment for RCC Foundation and Basements**

In the case of RCC foundations, the concrete mix is dense (being 1:2:4 or richer). It is, therefore, unnecessary to start the treatment from the bottom of excavations. The treatment



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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 RCC foundations shall be treated at the rate of 7.5 litres per square metre. The other details of treatment shall be as laid down in 1.4.4.4.

#### 1.4.4.6 Treatment of Top Surface of Plinth Filling

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.

Holes upto 50 to 75 mm deep at 150 mm centers both ways shall be made with crow bars on the surface to facilitate saturation of the soil with chemical emulsion.

#### 1.4.4.7 Treatment at Junction of the Walls and the Floor

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 of Buildings

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 to 75 mm deep at 150 mm centers both ways may be made with 12 mm diameter mild steel rod on the surface to facilitate saturation of the soil with the chemical emulsion.

#### 1.4.4.10 Treatment for expansion joints

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 Floor Level

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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 effect a continuous outer chemical barrier, in continuation of the one formed under 1.4.4.4.

1.4.4.12      Treatment of Soil Surrounding Pipes, Wastes and Conduits

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 the soil external to the foundations, they shall be similarly treated for a distance of over 300 mm unless they stand clear of the walls of the buildings by about 75 mm.

1.4.4.13      Measurements

All dimensions shall be measured correct to a cm. The measurements for all the operations described above shall be the plinth area of the building in square-meters at floor 1 level (Ground floor). Nothing extra shall be measured for payment.

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 Base Formation

1.5.1      Types of Sub Base

The sub base is laid on the dressed sub grade prepared as per specification in 1.2 & 1.3.

- ☐ Rubble Soling
- ☐ 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      Rubble Soling

Rubble for soling shall be locally available stone of approved variety. It shall be hard, durable and free from defects such as fissures, etc. After grade is prepared to the 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 between them shall be carefully packed with stone chips of appropriate sizes. These shall

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be hammered in to obtain a finished hard and compact and level surface. Mere spreading of loose spalls or stone chips is prohibited.

The surface shall then be examined for any protrusion and if found the same shall be knocked off to obtain as even a surface as possible.

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 size is then spread very gradually to fill up the interstices and dry rolling is continued till 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 be allowed to dry and loose excess screening if any shall be removed.

#### 1.5.3 WBM Sub base

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 aggregate stops. Further work i.e. filling interstices with screenings is carried out as 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.**

Graded aggregates	1.21 to 1.43 cubic meters
Screenings	0.27 to 0.44 cubic meters
Binding materials	0.08 to 0.10 cubic meters

#### 1.5.4 Measurements

Measurements for rubble soling and WBM shall be on volumetric basis taking plan area of actual work multiplied by compacted thickness.

#### 1.5.5 Rates

Rates shall be inclusive of all work as per specification above.

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## 2.0 PLAIN & REINFORCED CONCRETE

### 2.1. Applicable Codes

The following Indian Standard Codes, unless otherwise specified herein, shall be applicable. In all cases, the latest editions including all applicable official amendments and revisions shall be referred to.

#### 2.1.1. Materials

- |     |           |  |
|-----|-----------|--|
| 1)  | IS.269    | Specification for 33 grade ordinary Portland cement.   |
| 2)  | IS.455    | Specification for Portland slag cement.  |
| 3)  | IS.1489   | Specification for Portland-pozzolana cement (Part 1 & 2).  |
| 4)  | IS: 8112  | Specification for 43 grade ordinary Portland cement.   |
| 5)  | IS: 12330 | Specification for sulphate resisting Portland cement.  |
| 6)  | IS: 383   | Specification for coarse and fine aggregates from natural sources for concrete.  |
| 7)  | IS: 432   | Specification for mild steel and medium (tensile steel bars and hard-drawn steel) wires for concrete reinforcement. (Part 1 & 2) |
| 8)  | IS: 786   | Specification for concrete reinforcement deformed steel bars and wires   |
| 9)  | IS: 1566  | Specification for hard-drawn steel wire fabric for concrete reinforcement.   |
| 10) | IS: 9103  | Specification for admixtures for concrete.   |
| 11) | IS: 2645  | Specification for integral cement water- proofing compounds.   |
| 12) | IS: 4990  | Specification for plywood for concrete shuttering work.  |

#### 2.1.2. Material Testing

- |    |          |  |
|----|----------|--|
| 1) | IS.4031  | Methods of physical tests for hydraulic cement (Parts 1 to 15)                       |
| 2) | IS: 4032 | Method for chemical analysis of hydraulic cement.                                    |
| 3) | IS: 650  | Specification for standard sand for testing of cement.                               |
| 4) | IS: 2430 | Methods for sampling of aggregates for concrete.                                     |
| 5) | IS.2386  | Methods of test for aggregates for concrete (Parts 1 to 8)                           |
| 6) | IS: 3025 | Methods of sampling and test (physical and chemical) for water used in industry.     |
| 7) | IS: 6925 | Methods of test for determination of water soluble chlorides in concrete admixtures. |

#### Material Storage

- |    |          |  |
|----|----------|--|
| 1) | IS: 4082 | Recommendations on stacking and storing of construction materials at site. |
|----|----------|--|

#### 2.1.3. Concrete Mix Design

- |    |              |   |
|----|--------------|---|
| 1) | IS: 10262    | Recommended guidelines for concrete mix design. |
| 2) | SP: 23 (S&T) | Handbook on Concrete Mixes                      |

#### 2.1.4. Concrete Testing

- |    |         |  |
|----|---------|--|
| 1) | IS.1199 | Method of sampling and analysis of concrete. |
| 2) | IS: 516 | Method of test for strength of concrete.     |

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- |    |          |   |
|----|----------|---|
| 3) | IS: 9013 | Method of making, curing and determining compressive strength of accelerated cured concrete test specimens. |
| 4) | IS: 8142 | Method of test for determining setting time of concrete by penetration resistance.                          |
| 5) | IS: 9284 | Method of test for abrasion resistance of concrete.   |
| 6) | IS: 2770 | Methods of testing bond in reinforced concrete.   |

#### 2.1.5. Equipments

- |     |           |   |
|-----|-----------|---|
| 1)  | IS: 1791  | Specification for batch type concrete mixers.   |
| 2)  | IS: 2438  | Specification for roller pan mixer.   |
| 3)  | IS: 4925  | Specification for concrete batching and mixing plant.   |
| 4)  | IS: 5892  | Specification for concrete transit mixer and agitator.  |
| 5)  | IS: 7242  | Specification for concrete spreaders.   |
| 6)  | IS: 2505  | General Requirements for concrete vibrators: Immersion type.                                  |
| 7)  | IS: 2506  | General Requirements for screed board concrete vibrators.                                     |
| 8)  | IS: 2514  | Specification for concrete vibrating tables.  |
| 9)  | IS: 3366  | Specification for pan vibrators.  |
| 10) | IS: 4656  | Specification for form vibrators for concrete.  |
| 11) | IS: 11993 | Code of practice for use of screed board concrete vibrators.                                  |
| 12) | IS: 7251  | Specification for concrete finishers.   |
| 13) | IS: 2722  | Specification for portable swing weigh batchers for concrete (single and double bucket type). |
| 14) | IS: 2750  | Specification for steel scaffoldings.   |

#### Codes of Practice

- |     |          |   |
|-----|----------|---|
| 1)  | IS: 456  | Code of practice for plain and reinforced concrete.   |
| 2)  | IS: 457  | Code of practice for general construction of plain and reinforced concrete for dams and other massive structures. |
| 3)  | IS: 3370 | Code of practice for concrete structures for storage of liquids (Parts 1 to 4)                                    |
| 4)  | IS: 3935 | Code of practice for composite construction.  |
| 5)  | IS: 2204 | Code of practice for construction of reinforced concrete shell roof.  |
| 6)  | IS: 2210 | Criteria for the design of reinforced concrete shell structures and folded plates.                                |
| 7)  | IS: 2502 | Code of practice for bending and fixing of bars for concrete reinforcement.                                       |
| 8)  | IS: 5525 | Recommendation for detailing of reinforcement in reinforced concrete works.                                       |
| 9)  | IS: 2751 | Code of practice for welding of mild steel plain and deformed bars used for reinforced concrete construction.     |
| 10) | IS: 9417 | Specification for welding cold worked bars for reinforced concrete construction.                                  |
| 11) | IS: 3558 | Code of practice for use of immersion vibrators for consolidating concrete.                                       |
| 12) | IS: 3414 | Code of practice for design and installation of joints in buildings.  |
| 13) | IS: 4326 | Code of practice for earthquake resistant design and construction of building.                                    |
| 14) | IS: 4014 | Code of practice for steel tubular scaffolding (Parts 1 & 2)  |
| 15) | IS: 2571 | Code of practice for laying in situ cement concrete flooring.   |
| 16) | IS: 7861 | Code of practice for extreme weather concreting: Part 1 Recommended practice for hot weather concreting.          |

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- 17) IS: 1893 Criteria for earthquake resistant structures subjected to seismic forces.
  - 18) IS: 13920 Code of Practice for Ductile Detailing of Reinforced Concrete Structures subjected to Seismic forces.
  - 19) IS: 13827 Improving Earthquake Resistance of Earthen Buildings-Guidelines.
  - 20) IS: 13828 Improving Earthquake Resistance of Low Strength Masonry Buildings-Guidelines

#### 2.1.6. Construction Safety

- 1) IS:3696 Safety code for scaffolds and ladders. (Parts 1 & 2)
- 2) IS: 7969 Safety code for handling and storage of building materials.
- 3) IS: 8989 Safety code for erection of concrete framed structures.

#### 2.1.7. Measurement

- 1) IS 1200 Method of measurement of building and Engineer-in-chargeing Works
- 2) IS 3385 Code of practice for measurement of Civil Engineer-in-chargeing Works

#### 2.2. General

Concrete and reinforced concrete work shall be carried out generally in conformity with the latest Indian Standard IS: 456 except for provisions indicated herein below. All work is to be carried out with utmost precision and up to date scientific know-how and the contractor shall employ thoroughly competent staff to achieve the highest standards.

#### 2.3. Materials

##### 2.3.1. Cement

Cement for the work shall be ordinary Portland/Slag Cement conforming to the latest Indian Standards IS: 8112-43 grade and of the best normal setting quality unless a quick setting quality is expressly instructed in the specifications or otherwise during the course of the work by the Engineer-in-charge. Only one type of cement shall be used in any one mix. The source of supply, type or brand of cement within the same structure or portion thereof shall not be changed without approval from the Engineer-in-charge. The contractor shall always purchase Portland cement as fresh as possible after manufacture and shall supply the manufacture's test certificate, corresponding to the batch of cement intended for use in work. Where there is reason to believe the cement has been long stored, the Engineer-in-charge may demand a Laboratory Test Certificate regarding the 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 required standards.

All bags and containers in which cement is packed shall be stored in a dry, weather-tight, and properly ventilated structure with adequate provision for prevention and absorption of moisture. The contractor shall at all times maintain for the inspection 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 the work.

Cement shall be consumed on the works in the same sequence as that of its receipt at site. Cement reclaimed from cleaning of bags or from spillage from containers or otherwise shall on no account be used.

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 shall be stacked in any tier. Storage arrangement shall be approved by the Engineer-in-charge. Storage under tarpaulins shall not be permitted.

2.3.2. Sand (Refer Table No. I)

Sand (fine aggregated) shall generally conform to IS 383. Sand shall be natural sand, crushed gravel sand or crushed stone sand at the discretion of the Contractor. Use of sea sand is prohibited. Sand shall be composed of hard siliceous material and shall be clean and of sharp angular grit type. Sand shall be properly graded minimizing voids. Allowance for bulk age of sand shall be made. The fineness modulus of sand shall neither be less than 2.2 nor more than 3.2.

2.3.3. Coarse Aggregate (Refer Table No. II & III)

Coarse aggregate shall be approved hard aggregate generally conforming to IS 383.

Each size of coarse and fine aggregates shall be stacked separately and shall be protected from leaves and contamination with foreign material. The stacks shall be on hard, clean, free draining bases, draining away from the concrete mixing area.

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 contractor shall be maintained properly to preclude contamination of water by any of the harmful substances. The quantity of water to be added to concrete for mixing shall be such as to afford workability consistent with strength.

The Contractor shall make his own arrangements for storing water at site in tanks to prevent contamination.

**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 Zone II	Grading Zone III	Grading Zone IV
10 mm	100	100	100	100
4.75 mm	90 – 100	90 – 100	90 – 100	95 – 100

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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

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**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 DELETERIOUS MATERIALS IN COARSE & FINE AGGREGATES

The percentages of deleterious substances in the aggregate delivered to the mixer shall not exceed the following:-

**Percent by Weight**

**Uncrushed**

**Crushed**



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i)	Material finer than 75 micron I.S sieve - Coarse Aggregates (CA) - Fine Aggregates (FA)	3.00 3.00	3.00 15.00
ii)	Coal and lignite (CA) and (FA)	1.00	1.00
iii)	Clay lumps (CA) and (FA)	1.00	1.00
iv)	Soft fragments (CA) (FA)	3.00 0.00	0.00 0.00
v)	Total of all above substances (CA) (FA)	5.00 5.00	5.00 2.00

## Reinforcement Steel

### 2.3.5.1 Material Specification

Steel used for reinforcement shall be any of following types specifically applicable as per Bill of Quantities

- ☐ Mild steel and medium tensile bar IS 432 Part I (FE 415)
- ☐ HYS deformed bars IS 1786
- ☐ Structural steel section (Grade A) IS 2062

### 2.3.5.2 Tolerance in Mass

Refer to the following: -

TABLE

(Tolerance of Nominal Mass)

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 not specified

(x) For coil batch tolerance is not applicable.

Tolerance shall be determined in accordance with method given in IS 1786.

### 2.3.5.3 a) HYS Deformed Bars

High strength deformed bars and wires shall conform to IS : 1786. The physical properties for all sizes of steel bars are mentioned below in Table below.

TABLE

Sr. No.	Property	Grade		
		Fe 415	Fe 500	Fe 550
1.	0.2% proof stress / yield stress, min	415	500	550

	N/mm <sup>2</sup>			
2.	Elongation, percent min. on gauge length 5.65 $\sqrt{A}$ , 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 <sup>2</sup>	8% more than actual 0.2% proof stress but not less than 545 N/mm <sup>2</sup>	6% more than actual 0.2% proof stress but not less than 585 N/mm <sup>2</sup>

**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 of bars  
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 part of 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 by machining or otherwise shall be permissible. No test piece shall be enacted or otherwise subject to heat treatment. Any straightening, which a test piece may require shall be done cold.

#### 2.3.5.4 Stacking and Storage

Steel for reinforcement shall be stacked on top of timber sleepers to avoid contact with ground / water and shall be stored in such a way to prevent distorting and corrosion. Bars of different classifications, sizes and lengths shall be stored separately to facilitate issue in such sizes and lengths to cause minimum wastage in cutting from standard length.

#### 2.3.5.5 Fabrication and Fixing of Reinforcement

- a) General Requirements

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Steel for reinforcement shall be clear and free from loose miscalls, dust, loose rust, coats of paints, oil or other coatings, which may destroy or reduce bond. It shall be stored in such a way as to avoid distortion and to prevent deterioration and corrosion. Prior to assembly of reinforcement on no account any oily substance shall be used for removing the rust.

b) Assembly of Reinforcement

Bars shall be bent correctly and accurately to the size and shape as shown in the detailed drawing or as directed by the Engineer-in-charge. Preferably bars of full length shall be used. 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  $1 \frac{1}{4}$  times the maximum size of the coarse aggregate whichever is greater. But where this is not possible, the overlapping bars shall be bound together at intervals not exceeding twice the 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.

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### Bonds and Hooks Forming End Anchorages

Reinforcement shall be bent and fixed in accordance with procedure specified in IS 2502, code of practice for bending and fixing of bars for concrete reinforcement.

#### c) Anchoring Bars in Tension

Deformed bars may be used without end anchorages provided, development length requirement is satisfied. Hooks should normally be provided for plain bars in tension. Development length of bars will be determined as per IS : 456.

#### d) Anchoring Bars in Compression

The anchorage length of straight bar in compression shall be equal to the “Development Length” of bars in compression as specified in IS : 456. The projected length of hooks, bends and straight lengths beyond bend, if provided for a bar in compression, shall be considered for development length.

#### e) Binders, stirrups, links and the like

In case of binders, stirrups, links etc. the straight portion beyond the curve at the end shall be not less than eight times nominal size of bar.

#### f) Welding of Bars

Welded joints or mechanical connections in reinforcement may be used but in all cases of important connections, tests shall be made to prove that the joints are of full strength of bars connected.

The Engineer-in-charge shall be approved the location and type of welding. Welding shall be as per IS: 2751 for mild steel bars and for cold worked bars.

#### g) Placing in Position

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 specified cover shall be placed between the bars and shuttering, so as to secure and maintain the requisite cover of concrete over reinforcement.
- 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 support bars of steel at 1.0 metre or at shorter spacing to avoid sagging.
- 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 reinforcement to ensure that they are in correct position during concreting.
- iv. In case of other RCC structure a combination of cover blocks, spacers and templates shall be used as directed by Engineer-in-charge.

#### h) Tolerance on Placing of Reinforcement

Unless otherwise specified by the Engineer-in-charge, reinforcement shall be placed within the following tolerances:

	Tolerance In spacing
a) For effective depth, 200 mm or less	± 10 mm
b) For effective depth, more than 200 mm	± 15 mm

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 Construction Joints

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 should be taken to ensure that at no time the radius of the bend is less than 4 bar diameters for plain mild steel or 6 bar diameters for deformed bars. Care shall also be taken when bending back bars to ensure that the concrete around the bar is not damaged.