Ramagundam Fertilizers & Chemicals Limited
(A Joint venture company of NFL, EIL & FCIL)
Corporate Office- 4th Floor, Wing-A, Kribhco Bhawan,
Sector-1, Noida, UP-201301

BIDS ARE INVITEDFOR

ESTABLISHMENT OF LIQUID CO2 PLANT ON RENTAL/ BOO BASIS HAVING CAPACITY OF 96 MTPD & SUPPLY OF LIQUID CO2
AT
RAMAGUNDAM FERTILIZERS AND CHEMICALS LIMITED (RFCL), TELANGANA UNIT, DIST-PEDDAPALLI, TELANGANA.

E-Tender No: RFCL-2026-32 dated 06.11.2026

NIT Ref No: - RFCL/CO/C&P/ LIQ. CO2/2026-27/126 DATED 06.11.2026

November-2026

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NOTE:

1. **Contractors are requested to see that all the papers of tender documents intacted as per above Index.**
2. **All the pages of tender documents shall be signed & stamped by the contractor. Digitally signed documents shall be uploaded on E-tender portal for E-tender category only.**

NOTICE INVITING TENDER

E-Tenders through https://www.tenderwizard.in/RFCL portal are invited from experienced and financially sound contractors in **"Two Part Bid System"** for "**ESTABLISHMENT OF LIQUID CO2 PLANT ON RENTAL/ BOO BASIS HAVING CAPACITY OF 96 MTPD & SUPPLY OF LIQUID CO2 AT RAMAGUNDAM FERTILIZERS AND CHEMICALS LIMITED (RFCL),TELANGANA UNIT,DIST-PEDDAPALLI,TELANGANA.**" as per following:

S. No.	NIT No.	EMD	Period of Contract	Start date to submit E-Tender	Last date & time for Submission of E-Tender	Opening of E-Tenders (Technical Bids)	Price Bid Opening
1.	**RFCL/CO/C&P/ LIQ. CO2/2026-27/126 DATED 06.11.2026**	**₹ 1 Lakhs**	**06 Months**	**1700 Hrs. on 06.11.2026**	**to 1630 Hrs. on 06.11.2026**	**At 1645 Hrs. on 06.11.2026**	To be intimated

RFCL reserves THE right to open the Price bids of only such contractors who are found to be meeting the eligibility criteria based on the documents submitted by him/them in the Technical bids. RFCL further reserves its right to accept / reject any / all tenders in whole or in part without assigning any reason thereof. Conditional tenders are liable to be rejected.

Special instructions to tenderers

1. Mode of Tendering:

Ramagundam Fertilizers and Chemicals Ltd. (A Joint Venture of NFL, EIL & FCIL) has decided to Lineup a contract for **"ESTABLISHMENT OF LIQUID CO2 PLANT ON RENTAL/ BOO BASIS HAVING CAPACITY OF 96 MTPD & SUPPLY OF LIQUID CO2 AT RAMAGUNDAM FERTILIZERS AND CHEMICALS LIMITED (RFCL), TELANGANA UNIT, DIST-PEDDAPALLI, TELANGANA.)"** as per details in NIT through e-tendering. The NIT will be posted on website **https://www.tenderwizard.in/RFCL** from where the registered vendors will be able to download the tender documents for participation in the tender and submit their bids online. The tender submission, tender closing and opening will be done electronically and online.

RFCL has appointed **M/s. Antares Systems Limited, Bangalore** as service provider for carrying out e-Procurement. Also, as per IT ACT 2000, use of digital signature certificate shall be mandatory for participating in e-tendering process.

It is presumed that accordingly, you can submit your bid and participate in this tender as per the requirements of the system. However, in case of any help/clarification, you may contact any one of the following:

a) Ramagundam Fertilizers and Chemicals Ltd.

1) Mr. Shashi Prakash, **Chief Manager (Contracts & Procurement)** RFCL-Noida Email: sprakash@rfcl.co.in	**2) Mr. Arvind Pal** **Manager (Contracts & Procurement)** RFCL-Noida **Mob No: 7042933996** Email: arvindpal@rfcl.co.in

b) M/s. Antares Systems Limited

e-Tendering Registration/ Sign Up Queries	Registration Help Desk	080-45811365	twregdelhi@etenderwizard.com
DSC Queries	Help Desk	080-45811365	dscdelhi@etenderwizard.com
For e-Tendering Support	Help Desk	080-45811365	rfcleproc@etenderwizard.com
	Mr. Abdhesh Pandey (Delhi)	**9870393814**	abdheshkumar680@etenderwizard.com
	Mr. Ramesh Kumar(Telangana)	8971299009	rfcleproc@etenderwizard.com
Office Hours:	Monday to Saturday- 09:00AM to 06:00PM (IST)		

2. (a) Pre-Requisites for System using e-Procurement sites:

- Bidders are strongly advised to refer Minimum System Requirement document uploaded on https://www.tenderwizard.in/RFCL under download section prior registration and Participating in e-Tenders invited by RFCL.

- For Quick Bidder Manual, you can download "Bidder Manual" from https://www.tenderwizard.in/RFCL website **OR** contact us.

(b) Pre-Requisites for DSC Registration:

- The Vendor becomes a valid Vendor only after the registration of the DSC
- Vendors need to possess a valid DSC for participating in e-Tendering (class III DSC)
- Vendors need to procure DSC 24 hrs prior to Registration on https://www.tenderwizard.in/RFCL .
- It can be procured from any of the Certifying Authority registered under CCA India.eg Sify, nCode, eMudra etc
- DSC can also be procured from the e-tendering service provider i.e., M/s. Antares Systems Limited
- Respective DSC Drivers needs to be installed.
- DSC needs to be physically inserted into the system.
- DSC should appear in the Browser.
- Vendor should map the DSC with their Log-ID immediately after registration, Email Verification.

(c) Pre-Requisites for Login Credentials:

For registration on the e-tender site **https://www.tenderwizard.in/RFCL**, one can be guided by the "Instructions to Vendors" available under the **User Manual (Download)** section of the homepage of the website. As the first step, bidder shall have to click the **"Register"** link and fill in the requisite information in the "Bidder Registration Form". Once you complete this process correctly, you shall get a system generated password and an email for verification. Thereafter, login in to the portal using your credentials. When you log in for the first time, system will ask you to map your Digital Signature Certificate. Digital Signature Certificate Class 3 Signing + Encryption is mandatory to attach at the time of Registration and to log-in. **Bidders should ensure that DSC is in the name of registered firm and person only.**

3. All the vendors participating in the online e-procurement have to abide by the process involved in the entire workflow of the e-procurement.

4. As a pre-requisite for participation in the tender, vendors are required to obtain a valid Digital Certificate of Class III (having both signing and encryption certificates) as per Indian IT Act from the licensed Certifying Authorities operating under the Root Certifying Authority of India (RCIA), Controller of Certifying Authorities (CCA). The cost of obtaining the digital certificate shall be borne by the vendor.

5. Corrigendum/amendment, if any, shall be notified on the site https://www.tenderwizard.in/RFCL .In case any corrigendum/amendment is issued after the submission of the bid, then such vendors who have submitted their bids, shall be intimated about the corrigendum/amendment by a system-generated email. It shall be assumed that the information contained therein has been taken into account by the vendor. They have the choice of making changes in their bid before the due date and time.

6. Vendors are required to complete the entire process online on or before the due date/time of closing of the tender

7. Directions for submitting online offers, electronically, against e-procurement tenders directly through internet:

(i) Vendors are advised to log on the website (https://www.tenderwizard.in/RFCL) and arrange to register themselves at the earliest

(ii) The system time (IST) that will be displayed on e-Procurement web page shall be the time considered for determining the expiry of due date and time of the tender and no other time shall be taken into cognizance.

(iii) Vendors are advised in their own interest to ensure that their bids are submitted Tenderwizard e-Tender system well before the closing date and time of bid.

(iv) If the vendor intends to change/revise the bid already submitted, they shall have to change /revise their bid already submitted within the due date and time. There is no need to Withdraw the bid to change / revise their Bid. If any Vendor Withdraw their bid in any case, they will not able to participate/submit/revise their bid in respective tender.

(v) After submission of tender Vendors can update/ revise their bid any number of times within the due date and time for respective tender.

(vi) Once the entire process of submission of online bid is complete, they will get an auto mail from the system stating you have successfully submitted your bid in the following tender with tender details.

(vii) Bids/Offers shall not be permitted in e-procurement system after the due date time of tender. Hence, no bid can be submitted after the due date and time of submission has elapsed.

(viii) No manual bids/offers along with electronic bids/offers shall be permitted except those specifically indicated.

8. No responsibility will be taken by RFCL and/or the e-procurement service provider (i.e. M/s. Antares Systems Limited) for any delay due to connectivity and availability of website. They shall not have any liability to vendors for any interruption or delay in access to the site irrespective of the cause. **It is advisable that vendors who are not well conversant with e-tendering procedures, start filling up the tenders much before the due date/ time so that there is sufficient time available with him/her to acquaint with all the steps and seek help if they so require. Even for those who are conversant with this type of e-tendering**, it is suggested to complete all the activities ahead of time. It should be noted that the individual bid becomes viewable only after the opening of the bid on/after the due date and time. Please be reassured that your bid will be viewable only to the time date and you nobody else till due the tender opening. The non-availability of viewing before due date and time is true for e tendering service provider as well as RFCL officials.

9. RFCL and/or the e-procurement service provider shall not be responsible for any direct or indirect loss or damages and or consequential damages, arising out of the bidding process including but not limited to systems problems, inability to use the system, loss of electronic information etc. In case of any clarification pertaining to e-procurement process, the vendor may contact the following agencies /personnel.

10. RFCL is not responsible for any mistake made by the vendor at the time of bidding process. In case any vendor submits an invalid bid due to any reason including typing mistake/human error, such invalid bid will be disqualified and such vendor shall not be allowed to further participate in that tender. The remaining process shall be completed considering the other valid bids.

11. For submitting price bid through e-Auction, the successful Pre-Qualified Vendors will have to use a Class III Digital Signature Certificate issued by any India CA approved by CCA of India as per IT Act 2000.

12. It is mandatory for the vendors to use the Digital Signature Certificate in all their bidding and Process. It is the entire responsibility of the vendors to protect their own login id and Password and keep their digital certificate safe so that is not misused by any other person.

13. Tender Schedule:

The notice of issue of enquiry and detailed schedule for downloading the NIT documents, submission of bids, tender closing, tender opening, and subsequent clarification/amendment in schedule etc. shall be available on the above-mentioned website against this tender.

TENDER SCHEDULE FOR "ESTABLISHMENT OF LIQUID CO2 PLANT ON RENTAL/ BOO BASIS HAVING CAPACITY OF 96 MTPD & SUPPLY OF LIQUID CO2 AT RAMAGUNDAM FERTILIZERS AND CHEMICALS LIMITED (RFCL), TELANGANA UNIT, DIST-PEDDAPALLI, TELANGANA.)"

Sr. No.	*Tender Stage*	*Date & Time*
1	Start Tender Document Download	**06.11.2026 at 17:00 Hrs**
2	End Tender Document Download	**18.11.2026 at 16:00 Hrs**
3	Due/ last date of submission Bids	**18.11.2026 at 16:30 Hrs**
4	Techno-commercial Bids Opening	**18.11.2026 at 16:45 Hrs**
5	Price Bid Opening	**To be intimated Later**

Note: After expiry of date & time for a particular activity as mentioned above, that particular activity cannot be done unless the schedule for the same is extended/ amended. Similarly, no activity can be done before start date & time specified for that particular activity.

14. The activity defined for vendors are Download of Tender document, Bids Preparation, Uploading of bids and Reverse Auction. Matching of Prices will be done manually. During the Download sequence, the vendors who have been invited will be able to download the main tender document and the supporting documents.

15. Tender Opening:

The tenders will be opened electronically by us from our RFCL Site Office in the presence of authorized representatives of Vendors who wish to attend the bid opening. The submission of bids may however be done by vendors from their office or from place of their choice. However, bids can't be submitted after the bid submission due date & time as per the schedule.

16. RFCL takes no responsibility for delay, loss or non-receipt of EMD sent by post/courier/By Hand. The bids not accompanied with the requisite Earnest Money may not be opened.

17. RFCL reserves the right to reject or accept any tender without giving any reason.

18. System failures and remedial measures thereof/course of action to be followed

RFCL shall make all out efforts to rectify the problem(s) leading to system failure during the live tendering. However, in case the system could not be restored within the reasonable time period as deemed fit by RFCL, the following remedial measures shall be taken under such an eventuality:

1.	Tender is prepared and released but vendors are not able to submit their bids.	The due date of closing/opening shall be extended suitably.
2.	Bids have been submitted but the same cannot be opened by RFCL.	The due date of opening shall be extended suitably.

3.	Bids including price bid have been opened and reverse auctioning could not start.	Under such eventuality, the reverse auction event shall be rescheduled and the new schedule shall be informed to all the bidders who have participated in the tender & submitted their bids online.

19. Name of Addresse & Address of Consignee:

GM (O&M),
Ramagundam Fertilizers and Chemicals Limited (RFCL),
Dist-Peddapalli,
Telangana
E-Mail: premkumar@rfcl.co.in

20. GST Nos.

Place	**GST NO.**
RFCL-Noida	09AAHCR2335P1ZV
RFCL-Telengana	36AAHCR2335P1ZY

21. In the event of any contradiction between General Terms & Conditions and Special Terms enclosed with this NIT, the latter shall prevail.

Thanking You

For & On Behalf Of
Ramagundam Fertilizers and Chemicals Limited

(Arvind Pal)
Manager (Contracts & Procurement)

ANNEXURE-I

COVERING LETTER OF NIT /INSTRUCTIONS TO THE TENDERER AND TENDER CONDITIONS

To,

As per List

Subject: ESTABLISHMENT OF LIQUID CO2 PLANT ON RENTAL/ BOO BASIS HAVING CAPACITY OF 96 MTPD & SUPPLY OF LIQUID CO2 AT RAMAGUNDAM FERTILIZERS AND CHEMICALS LIMITED (RFCL), TELANGANA UNIT, DIST-PEDDAPALLI, TELANGANA.

Dear Sir,

Online TENDERS are invited for the work as detailed below:

NAME OF WORK		**ESTABLISHMENT OF LIQUID CO2 PLANT ON RENTAL/ BOO BASIS HAVING CAPACITY OF 96 MTPD & SUPPLY OF LIQUID CO2 AT RAMAGUNDAM FERTILIZERS AND CHEMICALS LIMITED (RFCL),TELANGANA UNIT,DIST-PEDDAPALLI,TELANGANA.**
1)	Earnest Money: - (Tender received without EMD is liable torejected)	Tenderer to submit Earnest Money of ₹ 1,00,000 /- (Rs. One Lakhs only) in the form of crossed Demand Draft / Banker's Cheque only, issued by any scheduled bank except rural and co-operative bank in favour of "Ramagundam Fertilizers and Chemicals Limited" payable at New Delhi. Cheque shall not be accepted in any case. Alternatively, the above amount(s) can also be transferred through digital means directly to RFCL's bank account (SBI CC No. 40306767010, IFSC: SBIN0004298) along with intimation of the banks transfer reference number to us. In case party is seeking exception of EMD under MSMED Act / under Start-up, the party is required to submit the required documents showing eligibility.
2)	Validity of Tender	120 days from the Date of Opening of tender/Technical Bids for the acceptance.
3)	a) Validity / Period of Contract:	The Contract shall remain valid for **08 (Eight) months** from the date of issuance of the Work Order/Contract Order and may be extended for a further period of **03 (Three) months** on mutual consent. a) The initial **02 (Two) months** of the contract period shall be utilized for installation, pre-commissioning, commissioning (i.e. cut-in of the Liquid CO_2 Plant in system at Tie Point/joint). b) The **CO_2 supply period** shall commence from the date of successful commissioning and cut-in of the Liquid CO_2 Plant and shall remain valid for **06 (Six) months**, extendable by a further **03 (Three) months** on mutual consent.
4)	Start date and time to submit tender:	**06.11.2026 on 17:00 Hrs**
5)	Last date and time to submit tender:	**18.11.2026 up to 16:30 Hrs**
6)	Techno-commercial Bids Opening date and time:	**18.11.2026 up to 16:45 Hrs**
7)	Price Bid Opening	To be intimated
8)	**Place of receipt and Opening of Tenders:**	**Office of Chief Manager (C&P), RFCL ,Noida**

9) Tender Documents may be downloaded from our website www.rfcl.co.in/ or https://www.tenderwizard.in/RFCL. Parties are advised to visit RFCL website regularly. Any amendment / corrigendum to the above NIT will be displayed on aforesaid website only.

10) All requests for interpretation, clarification & queries in connection with tender shall be addressed, in writing to Chief Manager (C&P), Ramagundam Fertilizers And Chemicals Limited (RFCL) at least 5 (Five) days prior to the closing date of the tender.

11) The rates should be quoted for the complete Scope of Work as per Performa'Schedule of Rates'. The rates should be quoted only in the units given in the Schedule of Rates. The rates quoted shall be valid for 120 days from the date of opening of Technical bid for the acceptance.

12) In case of any discrepancy, the rates quoted in words shall be treated as final. Any corrections made in the prices shall be authenticated with signatures at all places. The Tenderer shall have to submit the Schedule of Rates Performa duly filled in, failing which their Price bid will not be acceptable.

13) The tenderer shall quote single rate against each item and not the multiple rates in theSchedule of Rates. Any tender with the multiple rates quoted will be summarily rejected. Price should be quoted strictly as per the Performa enclosed for Schedule of Rates.

14) Ramagundam Fertilizers And Chemicals Limited (RFCL) reserves the right to reject any or all tenders without assigning any reason whatsoever and are not bound to accept the lowest tender. The tender can be split between two or more tenderer without assigning any reason thereof as per the requirement on case-to-case basis.

15) Incomplete Tenders or Tenders not accompanied with the required Details / Documents / EMD would be liable to be rejected without any further reference whatsoever.

16) **Submission of Tenders:**

i) No oral, telephonic, fax or telegraphic tenders or modification thereof will be entertained.

ii) Tender documents should be submitted/uploaded along with duly filled in all Annexures.

iii) The tender will be divided in three parts:

a) Earnest money.

b) Technical and commercial bid

c) Price bid

Part. 1: Under this part Tenderer will upload scanned copy of Earnest Money of amount specified in NIT in form of DD/Banker's cheque/ Online Transfer/ Bank Guarantee in favour of "Ramagundam Fertilizers and Chemicals Limited" payable at New Delhi.

If the party is seeking exemption of EMD under MSMED Act, it is required to upload the requisite documents showing eligibility.

In case payment of EMD by Demand Draft/ Banker's Cheque/BG, the hardcopy of original documents should reach us before due date and time of opening of technical bid failing which the offer shall to be liable to be rejected.

Part. 2: Under this part Tenderer will upload scanned copy documents as under:

a) Signed copy of NIT and complete Tender Document as token of acceptance of all terms and conditions.
b) Duly filled Declaration Forms I, II & III (Annexure-II, III & IV) with supporting document
c) Duly filled Annexure-V for registration of GST.
d) Affidavit as per Annexure-VI **(In original)** on Non-Judicial Stamp paper of Rs.100/-
e) Notarized/ Certified copy Power of Attorney/ Authorization in name of person who has signed the tender documents/ bid.
f) Copy of the PAN Card.
g) Documentary Proof for GSTIN Registration No., Code No., Accounting Code.
h) PF Registration No. issued by RPFC.
i) Copy for ESI Registration.
j) Affidavit for proprietorship **in Original** (If Applicable) as per Annexure-XIII on Non- Judicial Stamp paper of Rs.100/-
k) Blank Cheque/ Bank details for bank A/c particulars etc.
l) Duly filled **Form-IV** & **Form-V** -attached with Annexure-XIV (Bidder who shares Land Border with India)
m) **Statement for Details of GST as per Annexure- "A" at Page 67 of NIT**
n) Documents required as per eligibility criteria mentioned at Annexure-VII

o) MSME certificate if applicable.
p) Pre-Contract Integrity Pact as per Annexure-XXIII

Part 3: This part should only contain the 'Schedule of Quantities & Rates"/ 'Price Bid' with prices given in respective columns against each item, as enclosed herein, duly completed and signed & stamped on each page of tender.

17) **Opening of Tender:** The Tender shall be opened electronically as under: -

Part 1: Containing Earnest Money shall be opened first on the Scheduled Date & Time of opening of tenders.

Part 2: Containing Technical Bid will then be opened. Necessary clarifications if required shall be taken from the bidders.

Part 3: Containing 'Price bid'. RFCL reserves it's right to open the Price bids of only such Tenderers who are found to be meeting the eligibility criteria / Found Technically/commercially suitable based on the documents submitted by him/them in the Technical bids. RFCL further reserves its right to accept / reject any / all tenders in whole or in part.

18) **Technical Selection cum Evaluation Criteria: (For Detail Please Refer ANNEXURE-VIII)**

19) All pages shall be initialized at the lower **left hand corner** and signed wherever requiredin the tender papers by the tenderers or by a person holding power of attorney/ authorization authorizing him to sign on behalf of the tenderer before submission of tender. All corrections and alterations in the entries of tender paper will be signed in fullby the tenderer with date. No eraser or overwriting is permissible.

20) No condition or deviation should be mentioned by tenderer in Price Bid. Price Bids with any condition or deviation shall liable to be rejected.

21) The prospective tenderer having any common Partner / Director / Managing Director etc. Or having any other common criteria shall be considered as sister / group / Associates Company. In such cases only one of them will be eligible for participating in the tender.

22) While submitting the offer, bidders may ensure that tender documents /offer have been signed by authorized signatory of the company. Subsequent withdrawal of offer / non- acceptance of orders placed based on the offer submitted by them will not be entertained on the ground that the offer was not signed by the authorized person.

23) RFCL reserves the right to postpone the tender opening date and / or time and will intimate all the tenderers well in time, of such postponement along with notice of revised opening date and time.

24) In case, due to some unforeseen circumstances, the date of opening of the tender happen to be a holiday / closed day, the tender will be opened on the next working day.

25) The tender is non-transferable. Unsigned tenders shall be out-rightly rejected.

26) RFCL further reserves its right to accept / reject any / all tenders in whole or in part without assigning any reason thereof. Conditional tenders are liable to be rejected.

27) RFCL shall not be responsible for delay, loss or non-receipt of tender document sent by post.

28) The personnel of the contractor shall not enter into any unlawful activity within the premises of RFCL and have a good character.

29) The contractor shall not appoint any sub company / agency to carry out any obligation under the contract without prior written permission from RFCL. If at any time such a discrepancy is detected, the contract shall stand terminated without any notice and thesecurity deposit shall be forfeited.

30) If the tenderer/(s) expire(s) after the submission of his / their tender or after the acceptance of his / their offer, RFCL shall deem such tender cancelled. If a partner of a firm expires after the submission of their tender or after the acceptance of their tender,RFCL shall deem such tender as cancelled, unless the firm retains its character.

31) RFCL will have the right to issue addendum to tender documents to clarify, amend, modify, supplement or delete any of the conditions, clauses or items stated. Addendumso issued will form part of original invitation to tender.

32) If a tenderer resorts to any frivolous, malicious or baseless complaints / allegations with intent to hamper or delay the tendering process or resorts to canvassing/ rigging/influencing the tendering process, RFCL reserves the right to debar such tenderer from participation in the present / future tenders up to a period of 2 years.

33) Any revision, clarification, corrigendum, time extension, etc. to this Tender Document will be hosted on the above mentioned website(s) only. Bidders are requested to visit the website regularly to keep themselves updated.

34) Throughout the Tender Documents, the terms 'Bid', 'Tender'& 'Offer'and their derivatives [Bidder/Tenderer, Bid/Tender/Offer etc.] are synonymous.

35) "Bidder shall not be affiliated with a firm or entity:

(a) That has provided consulting services related to the work to the RFCL during the preparatory stages of the work or of the project of which the works/services forms a part of. OR

(b) That has been hired (proposed to be hired) by the RFCL as an Engineer/ Consultant forthe contract."

36) Eligibility of any bidder from a country which shares a land border with India shall be dealt in accordance with the provisions mentioned in Annexure-XIV.

37) The Bidder shall submit Power of Attorney/ Authorization in favour of the authorized signatory(s) of the Bid. In case of partnership firm, one or more of the partners of the firm or any other person (s) shall be designated as the authorized person (s) on behalfof the firm, who will be authorized by all the partners to act on behalf of the firm through a "Power of Attorney", specially authorizing him / them to submit & sign the tender, sign the agreement, receive payment, witness measurements, sign measurement books, make correspondences, compromise / settle/ relinquish any claim(s) preferred by the firm, sign "No Claim Certificate", refer all or any dispute to arbitration and to take similar such action in respect of the said tender / contract. In case of Company, Notarized/Certified copy of Authorization/Power of Attorney (backedby the resolution of Board of Directors) in favour of the individual to sign the tender onbehalf of the company and create liability against the company should be submitted. Such "Power of Attorney" should be stamped and authenticated by a Notary Public or by Magistrate and submitted along with the tender."

38) In case there is any change in status of the declaration prior to award of contract, the same has to be promptly informed to RFCL by the bidder. It shall be the sole responsibility of the bidder to inform about their status on due date of submission of bidand during the course of finalization of the tender. Concealment of the facts shall tantamount to misrepresentation of facts and shall lead to action against such Bidders.

39) RFCL reserves the right to verify all statements, information and documents submitted by the bidder in his tender offer, and the bidder shall, when so required by RFCL, make available all such information, evidence and documents as may be necessary for suchverification. Any such verification or lack of such verification, by RFCL shall not relieve the bidder of its obligations or liabilities hereunder nor will it affect any rights of RFCL there under."

40) **Contract Agreement:** The contract agreement on behalf of Contractor shall be signed by the contractor or his authorized representative as per **Annexure-XVIII** within 15 days from the date of issue of DLOA/Work Order/Contract Order. **Contract agreement with partnership firm shall be executed in the name of the firm only and not in the name of any individual partner**.

41) **Public Procurement Policy for Micro and Small Enterprises (MSEs)**

"From time to time, the Government of India (Procuring Entity) lays down procurement policies to help inclusive national economic growth by providing long term support to micro, small and medium enterprises and disadvantaged sections of society. The Procurement Policy for Micro and Small Enterprises, 2012 [amended 2018 and 2021] has been notified by the Government in exercise of the powers conferred in Section 11 of the Micro, Small and Medium Enterprises Development (MSMED) Act, 2006. Details of the policy along with the amendments issued in 2018 and 2021 are available on the MSME website.

The offers submitted by MSE, shall be considered in Accordance with Public Procurement Policy for MSEs. However, no relaxation in prior experience & turnover will be allowed No relaxation to startups will be given.

The parties claiming benefits Under MSEs policy must enclose requisite valid Registration Certificate as per said policy along with their offer. Please also indicate whether the MSEs owned by SC/ST Entrepreneurs. If yes, please attach

relevant certificate issued by authorities concerned. However, RFCL reserve the right to cancel the order (if any) and blacklist/debar a firm in case it is determined that the firm benefitted wrongly from the Public Procurement Policy. Few Highlights of the benefits proposed to MSMEs are as under: -

- There is an exemption from payment of earnest money to registered MSEs (Applicable only for Manufacturers/Service Providers and not to Traders/dealers).

42) This letter / instructions shall form part of the contract document and shall be signed and returned along with the tender documents.

43) **The tender shall be addressed to Chief Manager (C&P), RFCL-Noida.**

ANNEXURE-II

DECLARARTION-FORM-I

(The following declaration to be signed by Tenderer / Contractor and to be submitted along with required documents which would be duly self- certified)

To,

CM (C&P)
RFCL-Noida

Subject: Tender No.: - RFCL/CO/C&P/ LIQ. CO2/2026-27/126 DATED 06.11.2026

Name of the Contract: - ESTABLISHMENT OF LIQUID CO2 PLANT ON RENTAL/ BOO BASIS HAVING CAPACITY OF 96 MTPD & SUPPLY OF LIQUID CO2 AT RAMAGUNDAM FERTILIZERS AND CHEMICALS LIMITED (RFCL), TELANGANA UNIT, DIST-PEDDAPALLI, TELANGANA.

I/We_____have read the conditions of tender attached hereto and agree to abide by such conditions. I/We offer to do the job of "**ESTABLISHMENT OF LIQUID CO2 PLANT ON RENTAL/ BOO BASIS HAVING CAPACITY OF 96 MTPD & SUPPLY OF LIQUID CO2 AT RAMAGUNDAM FERTILIZERS AND CHEMICALS LIMITED (RFCL),TELANGANA UNIT, DIST-PEDDAPALLI,TELANGANA.**" work at the rates quoted in the attached Schedule of Rates and in accordance with the specifications, standards and instructions in writing of the Engineer-in-charge of M/s. Ramagundam Fertilizers and Chemicals Limited and hereby bind myself/ourselves to complete the work schedule and progress of work.

I/We further agree to abide by the conditions of contract and to carry out all work within the specified time in accordance with specifications of materials and workmanship and instructions referredto in the Notice Inviting Tenders.

I / We agree to accept payment by ECS / EFT from your Bank. Detail of my/our Bank A/c No. is as under:

Bank A/c No. (In SBI / any Nationalized Bank)	
Type Account (Current A/c or Saving A/c)	
Name of the Bank	
Address of the Bank & Branch	
Branch Code:	
IFSC Code	

In case of acceptance of the tender by Ramagundam Fertilizers and Chemicals Limited, I/We bind myself/ourselves to execute the contract as per the conditions mentioned in the tender documents, failing which, I/We shall have no objection or claim to the forfeiture of the Earnest Money deposited with Ramagundam Fertilizers and Chemicals Limited.
Thanking you

Yours faithfully

For M/s _____
(Signature of Contractor/Tenderer with SEAL)
Address: _____

ANNEXURE-III

DECLARATION FORM-II

(The following declaration to be signed by Tenderer/Contractor and to be submitted along with required documents which would be duly self- certified)

<table>
<tr><td>Sr. No.</td><td>DESCRIPTION</td><td colspan="3"></td></tr>
<tr><td rowspan="3">1</td><td rowspan="3">If a Tenderer has relation(s) whether by blood or otherwise with any of employee(s) of RFCL (Owner), the Tenderer must disclose the relation at the time of submission of Tender. RFCL shall reserve the right to reject the Tender or rescind the Contract, if such information is found incorrect.</td><td colspan="3">YES / NO (If Yes, give the following details)</td></tr>
<tr><td>Name & Design. of the employee</td><td>Place of Posting</td><td>Relation with the Employee</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>2</td><td><u>PAN No.</u> (Permanent Account Number) of the firm / company issued by Income Tax Deptt. along with Documentary Proof thereof.</td><td colspan="3"></td></tr>
<tr><td>3</td><td><u>GST Registration No.</u> of the firm / company issued by GST authorities along with Documentary Proof thereof. Whether registered under composition scheme of GST</td><td colspan="3">Yes/NO</td></tr>
<tr><td>4</td><td><u>MSME Registration</u>
If the firm is registered as Micro/Small/Medium Enterprises as per MSMED Act, 2006, the same may be confirmed by the tenderer and submit a photocopy (Self certified) of the registration certificate of relevant services, in support thereof. Otherwise it will be construed that the firm is not registered as per MSMED Act, 2006.
(This contract is a Service contract)</td><td colspan="3">Yes / No

(If Yes, a Self-certified copy of registration certificate to be submitted)

Mention the category i.e. Micro/Small/Medium</td></tr>
<tr><td>5</td><td>Type of Firm to be specified
(Proprietor / Partnership / Limited Co. etc.)</td><td colspan="3"></td></tr>
<tr><td>6</td><td>Name of the Firm</td><td colspan="3"></td></tr>
<tr><td>7</td><td>Address of the Firm</td><td colspan="3"></td></tr>
<tr><td>8</td><td><u>Contact Details:</u>
a) Name of the Person:
b) Mobile number / Landline Number
c) Email</td><td colspan="3"><u>Contact Details:</u>
a)
b)
c)</td></tr>
<tr><td>9</td><td>Power of Attorney/Authorization for submission of tender document, as applicable Submitted</td><td colspan="3">Yes / No</td></tr>
<tr><td>10</td><td>EMD (Amount, DD Number and Date/ Transaction details)</td><td colspan="3"></td></tr>
</table>

Note: Please attach separate sheets for the details, wherever necessary.

Signature of the Contractor/ Tenderer with SEAL

Place:_____

Dated: _____

Tenderer's Sign & Stamp

ANNEXURE -IV

DECLARATION FORM-III

To,

Chief Manager (C&P)
RFCL-Noida

Subject: Tender No. RFCL/CO/C&P/ LIQ. CO2/2026-27/126 DATED 06.11.2026

Name of the Contract: ESTABLISHMENT OF LIQUID CO2 PLANT ON RENTAL/ BOO BASIS HAVING CAPACITY OF 96 MTPD & SUPPLY OF LIQUID CO2 AT RAMAGUNDAM FERTILIZERS AND CHEMICALS LIMITED (RFCL), TELANGANA UNIT, DIST-PEDDAPALLI, TELANGANA.

Dear Sir,

1	**UNDERTAKING:** a) I/We hereby confirm that Commercial Bid i.e. Price Bid is strictly as per Schedule of Quantities (Description/ Unit/Quantity of Items), Terms & Conditions and is also Un- conditional, including rebates offered. I/We shall have no objection for rejection of the offer, if found conditional. b) All the pages of NIT and GTC issued to us have been signed for its validity in token of its acceptance by us. c) It is confirmed that all the columns in the Price Bid, have been duly filled. d) I/We agree to evaluation of price bids and loading of GST under the terms of the NIT.
2	**ACCEPTANCE OF TENDER CONDITIONS** I/We have personally read and gone through the scope of work, General Terms and Conditions ofContract (G.T.C.) and Special Terms and Conditions of NIT for the subject work, and I/we acceptall the terms & conditions as mentioned in the G.T.C & NIT without any reservation and shall abide by the same.
4	I/We declare that the information and documents submitted along with the tender by me/us arecorrect and I/we are fully responsible for the correctness of the information and documents, submitted by us. It is further certified that I/We will not get myself/ourselves registered undermore than one name
5	I/We understand that in case of any information submitted by me/us is found to be false, forgedor incorrect at any time during process for evaluation of tenders, it shall lead to forfeiture of the tender Earnest Money Deposit besides banning of business as per rules of RFCL.
6	I/we also understand that if the certificates submitted by us are found to be false/forged or incorrect at any time after the award of the contract, it will lead to termination of the contract, along with forfeiture of EMD/SD and Performance guarantee besides any other action provided in the contract including banning of business as per rules of RFCL.

Thanking you

Yours faithfully
for & on behalf of Contractor

Signature of the Tenderer /Contractor with SEAL

Place:_____
Dated: _____

Tenderer's Sign & Stamp

ANNEXURE-V

REGISTRATION OF GST NUMBER

Requirement of GST Number:

The bidders are required to obtain the valid GST No., if applicable, as per laid down provisions under GST Act and submit a copy there of as a documentary evidence. Further in case the registration is not applicable under GST Act the same may be confirmed and following undertaking may be given by bidder

UNDERTAKING

Whether Registration certificate obtained: Yes / No (tick whichever is applicable)

a) In case Yes, copy of valid certificate enclosed.

b) In case No, it is confirmed that registration under GST Act is not applicable.

c) In case registration under GST Act becomes applicable during the currency of contract, same shall be obtained and copy of valid GST No. shall be submitted to the RFCL.

d) Whether registered under composition scheme of GST. Yes/No

(Signature & stamp of bidder)

Tenderer's Sign & Stamp

ANNEXURE-VI

(An Affidavit in **original** on Non-Judicial Stamp Paper of Rs.100.00 duly attested by Notary)

AFFIDAVIT

With reference to NIT No RFCL/CO/C&P/ LIQ. CO2/2026-27/126 DATED 06.11.2026 of Ramagundam Fertilizers and Chemicals Limited for the job of **"ESTABLISHMENT OF LIQUID CO2 PLANT ON RENTAL/ BOO BASIS HAVING CAPACITY OF 96 MTPD & SUPPLY OF LIQUID CO2 AT RAMAGUNDAM FERTILIZERS AND CHEMICALS LIMITED (RFCL),TELANGANA UNIT,DIST-PEDDAPALLI,TELANGANA"**I,_____S/o Sh._____R/o_____do hereby solemnly affirm and declare as_____(Proprietor / Partner / Authorized signatory of the firm) on behalf of M/s_____as under :-

i) That my / our firm / sister concern/their associates etc. has not been black listed, debarred, de-listed, suspended, Banned, put on holiday or on negative list etc. by any Institutional Agency / Government Department / Public Sector Undertaking for participating in the Tender, **in last 3 years.**

ii) No other Firm / Sister Concerns / Associates belonging to the same group are participating / submitting the Tender for this job.

iii) That information furnished by me / us in respect of the above tender is true and correct and nothing has been concealed. In case any of the information is found to be false and /or incorrect at any stage, RFCL shall be at liberty to take the necessary action as deemed fit.

DEPONENT

Dated:_____

VERIFICATION

It is certified that the above contents / facts are correct and true to the best of my knowledge and belief and nothing has been concealed therein.

DEPONENT

Place_____

Date:_____

Tenderer's Sign & Stamp

ANNEXURE –VII

ELIGIBILITY CRITERIA

The bidders, in order to become eligible to participate in the bid, need to meet the following eligibility criteria and submit the self-certified documentary evidences in support thereof; failing which price bid shall not be opened.

Techno-Commercial Criteria

S. No.	Conditions	Documents required (To be submitted along with Technical bid)	Uploaded(Y/N)
1.	**a)** The bidder shall submit the status **(i.e. Name and complete Address)** of the firm/company along with its constitution such as Sole Proprietorship / Partnership Firm or Limited / Private Company, Year of Establishment and Place of Business, etc. and	**i).** In case of sole proprietorship, the bidder shall submit affidavit on Non-Judicial stamp paper of Rs. 100 **in original**, duly attested by notary regarding status / style of the business entity as per **Annexure- XIII.** **ii).** Partnership firm shall submit a copy of Partnership Deed attested by notary. **iii).** Company shall submit a notarized / certified copy of Certificate of Registration / Incorporation and a copy of Articles of Association and Memorandum of Association. **iv).** For Transport unions/Co-operative societies/Registered societies/Registered Companies, Limited or Pvt - Copy of Registration certificate /Copy of Resolution of member's. **v).** Registered Society & Registered Trust shall submit certified copy of the Certificate of Registration and Deed of Formation/MOA.	Response not to be filled here. To be filled in online portal.
	b). Affidavit and Power of Attorney / Authorization.	**i).** Affidavit **in original** to be filled as per **Annexure-VI** on Non judicial paper in original to be submitted along with bids. **ii).** The bidder shall submit Notarized/ Certified copy of Power of Attorney on Non-Judicial stamp paper of **Rs. 100** duly attested by Notary /Magistrate in case of Sole Proprietor / Partnership Firm/Company or Authorization (backed by Board Resolution) in case of a Company **in favor of a person who has signed the tender documents on behalf of tenderer / Firm / Company**.	

Tenderer's Sign & Stamp

2.	The bidder should have successfully executed/completed **similar Works*** during the **last Ten (10) years**, reckoned from the last day of the month preceding the month in which the tender is invited. ***Similar Work means**" Proven experience in setting up a liquid CO_2 plant including design, engineering, installation, commissioning, storage systems in fertilizer, refinery industries. The bidder shall satisfy the following criteria: **i.** The bidder shall have successfully designed, engineered, supplied, erected and commissioned at least one CO_2 storage plant of minimum capacity of 77 MT. or The bidder shall have successfully designed, engineered, supplied, erected and commissioned at least two CO_2 storage plant of minimum capacity of 48 MT each. And **ii.** Bidder shall have successfully supplied liquid CO_2 of at least 17,280 MT in last two. The last two (02) years reckoned from the last day of the month preceding the month in which the tender is invited.	**i.** Copy of work / service order (indicating full scope of Work & SOR) along with Completion Certificate or any other relevant documents which contains following from the Concerned organization: - a) WO/SO No: b) Description of WO/SO: c) Order Value: d) Executed Value: e) Start Date: f) Scheduled Completion Date: g) Actual Completion Date: **ii.** In case No Work Order/ Service order is issued and work has been performed only on the basis of "Agreement", then party shall submit copy of Agreement which shall include Scope of Work, contract value, SOR, Contract Period.	Response not to be filled here. To be filled in online portal.
3.	The Average Annual Financial turnover of the bidder shall not be less than ₹4.70 crores during last three Financial years i.e. **(FY 2022-23, 2023-24 & 2024-25*) or** during the last three calendar years i.e. (CY 2023, CY2024, CY2025.	Bidder shall submit financial standing through Audited Balance Sheet **and** Profit & Loss Account for the last three financial years **(FY 2022-23, 2023-24 & 2024-25*)** for the companies having financial year ending in March or financial standing in the last three calendar years **(CY-2023, CY-2024, CY-2025)** for the companies having financial year ending other than March.	

	Note: • In case bidder is having subsidiaries but only a single consolidated annual report is prepared as per prevailing law of land and audited which includes the financial details of their subsidiaries, consolidated audited annual report shall be considered for establishing the financial criteria subject to statutory auditor /chartered accountant of the bidder certifying that separate annual report of Bidder (without the financial data of subsidiaries) is not prepared and audited. • Further, in case a bidder is a subsidiary company and separate annual report of the Bidder is not published, but only a consolidated annual report of the parent company is available, consolidated annual report shall be considered for establishing the financial criteria subject to statutory auditor of Parent Company /Chartered accountant of the Bidder certifying that separate annual report of the Bidder is not prepared and audited. • Bidder shall ensure that the certificate/reports issued/attested by practicing Chartered Accountant (CA)/Statutory Auditor in India **shall contain Unique Document Identification Number (UDIN)** of the CA, without which these Certificates/ reports shall not be considered for evaluation. However, this requirement of including UDIN shall not be applicable for certificate/reports issued/attested by a CA practicing in foreign country.	**Or** **Bidder can submit average annual financial turnover certificate from the Statutory Auditors / practicing Chartered Accountants (not being an employee or a director or not having any interest in the bidder's company) which shall contain Unique Document Identification Number (UDIN).**	Response not to be filled here. To be filled in online portal.

Note:

1. Turnover shall be taken as Revenue from operation (excluding GST) as stated in Financial statement of the bidder, excluding other income.
2. Balance sheet means all Annexures, notes etc. that must be submitted along with the offer.
3. In case of newly formed partnership firm, the credentials of individual partners from previous propriety firm(s) or dissolved previous partnership firm(s) or split previous partnership firm(s), shall be considered only to the extent of their share in previous entity on the date of dissolution / split and their share in newly formed partnership firm. For example, a partner A had 30% share in previous entity and his share in present partnership firm is 20%. In the present tender under consideration, the credentials of partner A will be considered to the extent of 0.3*0.2*value of the work done in the previous entity. For this purpose, the tenderer shall submit along with his bid all the relevant documents which include copy of previous partnership deed(s), dissolution deed(s) and proof of surrender of PAN No. (s) in case of dissolution of partnership firm(s) etc.

4. In case of existing partnership firm, if any one or more partners quit the partnership firm, the credentials of remaining partnership firm shall be reworked out i.e., the quitting partner(s) shall take away his credentials to the extent of his share on the date of quitting the partnership firm (e.g. in a partnership firm of partners A, B & C having share 30%, 30% & 40% respectively and credentials of Rs 10 crore; in case partner C quits the firm, the credentials of this partnership firm shall remain as Rs 6 crore). For this purpose, the tenderer shall submit along with his bid all the relevant documents which include copy of previous partnership deed(s), dissolution deed(s) and proof of surrender of PAN No.(s) in case of dissolution of partnership firm(s) etc.
5. In case of existing partnership firm if any other partner(s) joins the firm, the credentials of partnership firm shall get enhanced to the extent of credentials of newly added partner(s). on the same principles as mentioned in item 1 above. For this purpose, the tenderer shall submit along with his bid all the relevant documents which include copy of previous partnership, deeds, dissolution/splitting deeds and proof of surrender of PAN No.(s) in case of dissolution of partnership firm etc.
6. Any partner in a partnership firm cannot use or claim his credentials in any other firm without leaving the partnership firm i.e., In a partnership firm of A&B partners, A or B partner cannot use credentials of partnership firm of A&B partners in any other partnership firm or propriety firm without leaving partnership firm of A&B partners.
7. In case a partner in a partnership firm is replaced due to succession as per succession law, the proportion of credentials of the previous partner will be passed on to the successor.
8. If the percentage share among partners of a partnership firm is changed, but the partners remain the same, the credentials of the firm before such modification in the share will continue to be considered for the firm as it is without any change in their value. Further, in case a partner of partnership firm retires without taking away any credentials from the firm, the credentials of partnership firm shall remain the same as it is without any change in their value.
9. In a partnership firm "AB" of A&B partners, in case A also works as propriety firm "P" or partner in some other partnership firm "AX", credentials of A in propriety firm "P" or in other partnership firm "AX" earned after the date of becoming a partner of the firm AB shall not be added in partnership firm AB.
10. In case company A is merged with company B, then company B would get the credentials of company A also."
11. No relaxation in prior experience and turnover is allowed to startups and MSEs entities.

1. GENERAL

1.1 Bidder should not be under liquidation, court receivership or similar proceedings. In applicability of such cases, bidder shall provide Undertaking on their Company Letter head stating " [Name of Bidder] keeps RFCL indemnified against all claims, liabilities, demands, proceedings, expenses or obligations whatsoever arising out of or in relations to any such matters".

1.2 Experience of only the bidding entity shall be considered. A Job executed by a bidder for its own plants/projects shall not be considered as experience for the purpose of meeting requirement of experience criteria of the Bidding Document.

1.3 Bidder shall furnish all the relevant documents towards meeting the Experience & Financial Criteria.

1.4 Bidder shall furnish the required document in support of technical eligibility criteria, in the first instance itself.

1.5 Bidder are required to submit all such past experience (s) (PTR) meeting the TEC along with relevant supporting documents in the first instance itself, along with the bid. Accordingly, only such past experience (s) shall be considered for qualification, details of which are provided in the bid by the bidder and subsequently no additional past experience PTR shall be sought from the bidder.

1.6 RFCL reserve the right to complete the evaluation based on the details furnished without seeking any additional information/documents.

1.7 Submission of authentic documents is the prime responsibility of the bidder. Wherever RFCL has concern or apprehension regarding the authenticity/ correctness of any document, RFCL reserves a right of getting the document cross verified from the document issuing authority.

1.8 Bidder shall quote as per SOR Item only. No comment, explanation or clarification in SOR is acceptable.

No condition in price part shall be acceptable.

1.9 In the event of submission of any document/ certificate by the bidder in language other than English, the bidder shall get the same translated into English after getting the translation duly authenticated by local Chamber of Commerce of bidder's country.

1.10 RFCL reserve the right to assess bidder's capability and capacity to execute the work using in-house information.

1.11 All amendments, time extension, clarification etc. will be uploaded in the website only and will not be published in newspapers. Bidders should regularly visit RFCL website (www.rfcl.co.in) to keep themselves updated. No extension in the bid due date / time shall be considered on account of delay in receipt of any document by mail.

1.12 Bidder may note that the Bid shall be submitted on the basis of "ZERO DEVIATION" and shall be in full compliance to the requirements of Tender Document, failing which bid shall be considered as non – responsive and may be liable for rejection.

1.13 Time and date of opening of Price Bids shall be notified to the qualified and acceptable bidders at a later date.

1.14 RFCL shall not be responsible for any expense incurred by bidders in connection with the preparation & delivery of their bids, site visit, participating in the discussion and other expenses incurred during the bidding process.

1.15 RFCL reserves the right to reject any or all the bids received and to annul the bidding process at its discretion without assigning any reason whatsoever.

1.16 Canvassing in any form by the bidder or by any other agency on their behalf may lead to disqualification their bid.

1.17 In case any bidder is found to be involved in cartel formation, his bid will not be considered for further evaluation / placement of order. Such bidder"s EMD will be encashed and also debarred from bidding in future for RFCL.

1.18 Clarification, if any, can also be obtained from the office of Chief Manager (C&P), RFCL, Corporate Office 4th Floor, Wing-A, Kribhco Bhawan, Sector-1, Noida, UP-201301

ANNEXURE-VIII

Technical selection cum Evaluation Criteria

The essence of contract is to establish LIQUID CO2 PLANT ON RENTAL/ BOO BASIS HAVING CAPACITY OF 96 MTPD & SUPPLY OF LIQUID CO2 AT RAMAGUNDAM FERTILIZERS AND CHEMICALS LIMITED (RFCL), TELANGANA UNIT, DIST-PEDDAPALLI, TELANGANA.

EVALUATION OF BIDS

(A) Technical Bid Evaluation

1. Bidders are requested to submit all the relevant documents (experience, financial and others) in support of technical eligibility criteria as per Annexure-VII of Bid Documentsfor evaluation of Bids.
2. **RFCL reserves it's right to open the Price bids of only such contractors who are found to be meeting the eligibility criteria based on the documents submitted by him/them in the Technical bids.** RFCL further reserves its right to accept / reject any / all tenders in whole or in part without assigning any reason thereof. Conditional tenders are liable to be rejected.

(B) Price Bid Evaluation

a. Price bids of only those bidders shall be opened who qualifies Techno-Commercial bid evaluation as mentioned above.
b. Evaluation will be done on overall L-1 basis.

Tenderer's Sign & Stamp

ANNEXURE-IX

SCOPE OF WORK

TECHNICAL SCOPE OF WORK

SECTION – 1: Introduction

Ramagundam Fertilizers and Chemicals Limited (RFCL) is a state-of-the-art ammonia-urea fertilizer complex located at Ramagundam, Telangana. RFCL is a joint venture promoted by National Fertilizers Limited (NFL), Engineers India Limited (EIL), Fertilizer Corporation of India Limited (FCIL), GAIL (India) Limited and the Government of Telangana.

The plant was established as part of the revival of the erstwhile FCIL Ramagundam unit and commenced commercial operation in March 2021. The project was implemented with EIL as the EPCM consultant, with technology support from Topsoe, Denmark for Ammonia and Saipem, Italy for Urea.

RFCL has an installed capacity of approximately 2,200 MTPD of Ammonia and 3,850 MTPD of Neem-coated Urea, equivalent to about 12.7 lakh tonnes of urea per annum. The plant is also equipped with facilities like captive power generation and other utilities required for integrated fertilizer production.

RFCL plays an important role in supporting India's fertilizer security by producing urea for the domestic agricultural sector while focusing on safe, reliable and energy-efficient plant operation.

SECTION – 2: Project Description

RFCL intends to procure Liquid CO2 Storage System on Skid for BOO (Build on Operate)/ Rental Basis with Necessary Equipment's and Supply of Liquid CO2 as per ISBT standards including transportation and all incidental cost. The Complete scope divided in two Parts:

Part- A:
DESIGN, ENGINEERING, PROCUREMENT, FABRICATION, SUPPLY AND INSTALLATION/COMMISSIONING OF ALL EQUIPMENTS ON RENTAL/BOO BASIS FOR CO2 CONSUMPTION CAPACITY OF 4000 KG PER HOUR OF THE SKID (LIQUID STORAGE TANK, VAPORIZER, PIPING, ASSOCIATED FACILITIES AND OTHR RELEVANT ACCESSORIES REQUIRED TO RUN THE UNIT)

Part-B:
a) Supply of Liquid CO2 as per ISBT standards including transportation.

DESCRIPTION OF SYSTEM

In normal operation, CO2 is the limiting reactant to produce Urea. The proposed Rental/BOO CO2 skid system allows injection of 4MT/hr of additional CO2 into CO2 compressor suction.

For the purpose of the installation of a CO2 skid, consisting of a minimum capacity of 100 KL storage tanks and associated equipment, aims to provide a continuous supply of gaseous CO2 to produce neem-coated urea. The Liq. CO2 is purchased from a grain-based, food-grade source manufacturer and transported via tankers, while available surplus ammonia is also utilized in the synthesis process.

SECTION – 3: SITE METROLOGICAL DATA

1	Atmospheric Pressure	
	Barometric pressure for design	745 / 750.29 / 765 mmHg
2	Ambient Temperature	
	Maximum Dry Bulb Temperature	47.5°C
	Minimum Dry Bulb Temperature	8.4°C
	Normal Dry Bulb Temperature	36.6°C
	Design Wet Bulb Temperature	30°C
3	For Air-cooler, Air Blower, Air compressor	40 °C & 80% RH
4	For Heating and Ventilation	40°C & 80% RH
6	Rainfall Design Criteria	
	Maximum Rainfall mm/month Maximum Rainfall mm/day Average Rainfall mm/year	439 138.2 1331.3
7	Wind Velocity	
	Direction of prevailing wind	From South
6	Maximum recorded velocity	44 m/sec
	Relative Humidity	
	Maximum RH	97.4% (The coincident temperature and Relative humidity for Air blower and air compressor is 40 deg C and 80% respectively)
	Minimum RH	11%
	Seismic zone	IS 1893 part I and IV and site specific seismic spectra to be followed EIL Doc No. A747-000-16-54-DB-0001
8	Site Location	Ramagundam, Telangana, India Costal: No Height Above Sea Level: 167 m (APPROX)

SECTION – 4: SCOPE OF WORK

1) The scope of work for the vendor shall include the complete design, engineering, manufacturing, shop testing, supply, supervision for erection and commissioning of the specified units, all in accordance with the specifications and requirements. All items shall be complete in all respects, and any item not covered in this specification but essential for the proper design, operation, and maintenance will be provided by the vendor unless otherwise specifically excluded.

2) The scope of supply for Liquid CO2 storage system shall include the following facilities but not limited to with interconnecting piping's, valves and other accessories as detailed below:

Part-A:

- CO2 Storage Tank (Capacity 100 KL) on Horizontal Skid Basis (PUF insulated with Aluminum Cladding) designed as a pressure vessel and working under pressure range of 18.0 kg/cm2 - 25.0 kg/cm2
- Co2 outlet Pressure: 0.5 to 1.0 Kg/cm2 at battery limit. The tie-in connection operating pressure is 0.5 Kg/cm2g and operating temperature is 40 deg C and Design pressure is 12.5 Kg/cm2g and Design temperature is 100 degC. Vendor to ensure the condition of tie-in for the supply of Co2 shall be met.
- Liquid Co2 unloading Pump (1 Working + 1 Stand by)
- Tanker Unloading as per standard practice for unloading of Co2 tanker in shortest possible time. However, maximum desired time for unloading of 25 MT tanker is 15 Minutes.
- 1 Nos. of Refrigeration unit for storage tanks.
- 2 Nos Atmospheric Vaporizer (Capacity 4000 kg/hr each)
- Safety interlock with a provision of On/Off valve at the outlet of Liquid Co2 shall be provided to cut down the Co2 to the system. The actuation of interlock shall be from existing Co2 compressor/any other actuator which shall be decided post award.
- Pressure Reduction Station/ Safety Valve (1 Working + 1 standby)
- Refrigeration System to control the Tank Vapor Pressure automatically using in built pressure sensing control.
- Piping/Valve/fittings/supports etc.: SS304L for liquid Co2 system (Refer Piping Material Specification 31C attached as Annexure-N)
- Isolation valve along with NRV shall be provided near to tie-in point for isolation and prevention of back flow.
- Necessary control panel with isolation switch and starter switches.
- HAZOP shall be carried out for the Liq. Co2 system prior to installation.
- All kind of necessary supply, erection and commissioning job of piping, electrical, safety and mechanical job for setting-up of liq. CO2 of capacity 100MT.
- Operations & Maintenance (O&M) personnel for 24/7 basis along with the required mandatory spares, tools and consumables for the contractual period.
- Heater to be provided to maintain the temperature above the minimum temperature prevailing at RFCL to prevent frosting.

Part-B:

- Supply of Liquid CO2 as per ISBT standards including transportation and all incidental cost

3) The scope of work of the Vendor for Part-A shall include but not limited to the following:

- Complete Design & Engineering.
- Engineering Drawings and Documents.
- Supply of all equipment as required
- Inter-Connecting piping to 10" SS 304L (PMS 31C) tie-in connection already exists for interconnection of piping from Liq co2 skid to upstream of KoD of CO2 Compressor–with required expander / reducer shall be in the scope of vendor (for piping connection refer point no13 under SoW)
- Instrument air piping shall be SS 304L (PMS 31C).
- Service water connection if required shall be carbon steel (PMS 11A)
- Shipment, Transportation
- Insurance during transit.
- Supervision & erection of all mechanical, electrical, instrumentation & other allied works.
- Third party inspection as required
- Quality Assurance & Quality Control during fabrication and installation
- Supervision for Pre-Commissioning.
- Supervision for Start Up and Commissioning, Operations & Maintenance (O&M) personnel for 24/7 basis along with the required mandatory spares, tools and consumables for the contractual period.
- Submission of Technical Information.

4) The scope of work of the Vendor for Part-B shall include but not limited to the following:

- The Liquid Co2 Tanker shall be equipped with unloading pump and pressure regulator with capability of delivering CO2 into system.
- Appropriate arrangements/accessories so that CO2 can be drawn to the storage tank directly from the tanker.
- Purity of liquid CO2 to be maintained as per specification detailed below under Section 5.
- Laboratory analysis report from government authorized organization (preferably, BIS/NABL) for supplying the Liq Co2 of the above quality is to be submitted.
- Liquid Co2 will be accepted after carrying out lab analysis for CO2 by RFCL.
- Liq. Co2 should be supplied in Insulated tanker without any leakage.
- Please ensure the following while dispatching the Liq. Co2 as there are statutory requirements if applicable.
  i) As required under rule 134 of MV Rules 1989, emergency information panel (EIP), in prescribed format should be available at three locations i.e. both sides plus rear side of the tankers.
  ii) Transport emergency card (Term card) should be available with drivers of the tankers as required under the law.
  iii) Drivers of the tankers carrying hazardous material should get their licenses endorsed from licensing authority after successful completion of training for 3 days. Such endorsements are not available on the licensees of number of drivers coming with tankers, which must be avoided.
  iv) Mufflers / flame arrester must be provided on the exhaust of tankers entering inside the factory.

- Road tankers to be used for transportation of liquid Co2, should have valid license from PESO (Petroleum and Explosives safety organization) for pressure vessels & tanker must have copy of valid Pollution Under Control (PUC), RTO PAPERS, driver having original license and proper

PPE at the time of decanting

- Unloading hose and unloading pump (if applicable) must be provided by vendor and tanker side connection is in the scope of vendor.
- The vendor shall ensure that the tankers used for transportation of liquid Co2 are fully comprehensively insured and are fit to run in all respects duly passed by Motor vehicle department. Comply all statutory requirement prescribed under safety act and/or any other law/regulations, for safe transportation of liquid Co2.
- It is the sole responsibility of vendor to ensure safe movement of product and delivery of the same in sound condition to RFCL Ramagundam site. The liability of the seller, driver and transporter is not absolved till the tanker is unloaded safely at RFCL premises.

5) The Project shall be executed on a Rental/BOO basis and scope of supply shall be as per Scope of Works. The Scope of Works furnished herein are intended to be comprehensive; however, the Vendor shall be deemed to have included in their scope all additional works and provisions necessary to ensure the completeness and proper functioning of the facilities, whether or not such items are explicitly stated in the Tender Documents.

6) The design basis, design calculations, data sheets, drawings (GA, PFD, P&ID etc.), standards, specification, codes to be followed for different types of works shall be brought out in knowledge of RFCL and related documents thereof to be submitted with RFCL. Vendor shall carry out basic design & engineering works for the plant as per technical specifications and submit drawings and documents for approval of TPI as per QAP. However, in such case Vendor is responsible for all works to be completed in agreed time frame.

7) The vendor is required to comprehend the scope of work by thoroughly reviewing the requirements and may conduct a site visit prior to the issuance of the work order.

8) The selection of Material of Construction of Vessel, Valves, Piping, Vaporizer as per fluid service. Metallurgy selection and corrosion allowance shall be considered for standard design life.

9) Materials as per internationally acceptable code or ISO shall be used for Vessel, piping, Valves and other accessories based on fluid service requirement. All materials shall conform to Standard as per technical specifications. All units (Vessel, Piping, Instruments, PRV/PCV, PG, TG, etc. any other) shall be procured from the reputed approved suppliers/make only.

10) Raw material for tank and other equipment's/ piping shall be procured from reputed make having proven track record only.

11) After completion of erection jobs, all system will be tested hydraulically as per the standards.

12) Supply of all other materials whether specifically mentioned or not but required for completion of the job in all respect as per bid package.

13) For the piping from the Vendor skid battery limit to Owner Battery limit, an approximate length of 350 meters (approximate) may be considered and the same shall be in vendor scope. The remaining interconnecting piping among all equipment will be considered by the vendor as per their layout. At Owner battery limit, piping bellows Gasket, Fasteners, and valves (if required) to be provided and same is also in vendor scope.

14) The equipment/piping shall be inspected by the third-party inspection agency (TPIA), if required. It shall be the responsibility of the vendor to make available to the inspector all the drawings, calculations and other documents as required. However, the Owner shall have free access for inspection /sub-vendor at site during project execution.

15) All equipment's shall be suitably Protected, coated, capped, covered or boxed and crated to prevent damage during transportation, handling or storage at site till the time of erection. Vendor shall be responsible for any loss or damage during transportation, handling and storage due to improper packing etc. Loading and unloading of supplied material at RFCL site shall be in the scope of Vendor. However, Crane/Hydra shall be provided by Owner for Loading and Unloading of the CO2 Skid along with accessories at owner site. The scope will be considered as a final delivery, with duly packed of the equipment to Owner Site/Works. Necessary packing forwarding & transit insurance shall be considered by Vendor.

16) All Flanges, Pipes, Fittings shall be as per applicable standard used in Industry.

17) Vendor shall provide the following Civil drawings:
   a. GA drawing
   b. Foundation drawings for Tanks
   c. Design and drawings of rack structure, including foundation details
   d. Load Data / Anchor bolt details
   e. Other relevant Civil and structural data required for execution of the job.

18) Earthing cleat provision to be provided as per industry standard as applicable.

19) Painting (if applicable) as per Manufacturer and standard design suitable for Fluid Service Environment.

20) The Storage vessel is fully insulated with polyurethane foam (PUF), which is protected with Aluminium cladding. The tank is provided with inlet, outlet, vent, drain nozzles with isolation valves and 2 nos safety valves etc.

21) The Storage Tank is connected with the Frost Tube Level Indicator, which read the Liquid level. DP transmitter for DCS indication which will indicate the level of CO2 in the tank. Pressure & Temperature Gauges will be installed on the tank to read the storage tank.

22) All kind of necessary supply, erection and commissioning job of Piping, Electrical, safety and mechanical job required shall be in vendor scope.

23) Manpower Required for Operation and maintenance of complete system is in vendor scope.

24) Skid Structural design shall be as per standard and meet the requirement as per load

25) All welding shall be as per approved WPS & welder shall be qualified as per ASME Sec-IX.

26) The weighment on RFCL Ramagundam weighbridge for Liquid CO2 will be considered as final & binding.

SCOPE OF INSTALLATION:

Installation of the supplied Insulated vessel and interconnecting pipe shall include the following:

- Installation of Insulated CO2 Storage Tank(s) on the foundation along-with Suitable earthing system is to be considered.
- Installation of Vaporizers on the foundation/skid
- Installation of other required facilities/SS piping for interconnection of supply line of Insulated tank with the existing line/equipment.
- Hook up of all electronic instruments up to field Junction Box (JB) will be in vendor scope. Refer Annexure-M for detailed scope.

SCOPE OF COMMISSIONING:

Vendor shall commission the systems with liquid CO2.

- The 'first fill' of liquefied gas in the Insulated tank shall be observed for detecting leakages, if any and also for any abnormal rise of vessel (inside) pressure for 48 hrs. Any abnormality, if observed, shall be rectified by the vendor at no extra cost to Owner.
- Liquid CO2 required for commissioning of the CO2 plant shall be provided free of cost by the vendor.
- Interconnecting piping, upon installation, shall be tested at site at a pressure defined in applicable codes & standards. Super insulated piping, upon installation, shall be tested at site at a pressure defined in applicable codes & standards for 24 hours. There shall be no drop in pressure.

SECTION - 5: TECHNICAL SPECIFICATION STORAGE TANK

Quantity	1 Nos.
Design standard	IS 2825 Class I + SMPV (U) Rules 1981 with all amendments as per PESO
Material of Construction	SA-516 Gr. 70 Shell & Dish ends
Radiography	100 %
Hydro test	As per Design Standard
Fluid Service	Liquid Co2
Capacity	100 KL
Mounting	Horizontal Vessel with Skid
Insulation	Polyurethane foam (PUF) + Aluminum Cladding
Suitable Safety Valves	2 Nos.
Dimensions and thickness	Suitable for the capacity mentioned

Refrigeration Unit

Quantity	1 nos
Design standard	As per PESO
Capacity	Unit shall be designed to cater refrigeration load of the tank.

VAPOURIZER

Quantity	2 (1 working + 1 Stand by)
Design standard	ASME Sec VIII-Div-I, Latest Edition. & As per PESO
Capacity	Each shall be of 4000 Kg/hr capacity.
Type	Ambient Air Heated
Configuration	Horizontal
Fluid Service	Liquid Co2
Capacity	100KL
Mounting	Horizontal Vessel with Skid
Material of Construction	Aluminium A 6063-T5 / T6
Dimensions and thickness	Suitable for the capacity mentioned

Other Equipment's/Devices

Trim Heater	As applicable (if Required)
Necessary control panel	Isolation switch and starter switches will be installed
Pipe, Fittings & NRV	As per attached piping specification
Liquid level indication	1 LG shall be installed in the tank. 1 DP transmitter with DCS indication
Pressure indicator	As per project requirements.
Temperature indicator	As per project requirements.
Thermal relief valve	As per project requirements.
Necessary control panel	Isolation switch and starter switches will be installed
Pipe, Fittings & NRV	As per attached piping specification
Pressure indicator	As per project requirements.
Interconnecting Piping	SS 304L (Refer Annexure-N)
Valve	Stainless steel or Equivalent

Technical Specifications for Liquid CO2: As per ISBT standard for Grain based

CO2 Source	Grain Based
Composition (dry basis)	
CO2 Product	99.2% (vol.) min.
Inerts (including H2)	0.8% (vol) max
Oil	5 wt ppm max
H2	0.6% (vol.) max
CH4	40 ppm (vol.) max
CO	20 ppm (vol.) max
H2O	Saturated water expected with CO2
Methanol(CH3OH)	700 ppm (vol) max
H2S/Sulphur Content (TSC)	Not Expected
Nitrogen	0.035% (vol.) max
CO2 supply Pressure	0.5-1.0 Kg/cm2 g
CO2 supply temperature	Matching with tie-in point conditions

Note: There shouldn't be any variations in the supply pressure, and a continuous flow of CO2 through the skid must be guaranteed.

SECTION - 6: GENERAL TERMS

- Vendor shall make his own arrangement to carry out the job along with tools and tackles, consumables, etc.
- Vendor shall make his own arrangements for transportation of his men/team to respective place of work, boarding, lodging, local conveyance, To-and-fro travel cost etc.
- Vendor must ensure the payments as per Latest Minimum Wages Act as specified by the Govt. from time to time to their operational & maintenance persons.
- In case of exigency, the vendor shall deploy additional resources, as per direction of Engineer- in-charge.
- All Kind of Accommodation, lodging and boarding will be arranged by Vendor.
- All Kind of PPE's will be arranged by Vendor. Work shall be taken-up only after obtaining permit from RFCL.
- Vendor shall keep regular contact with EIC for any job requirement & shall be available on phone/mobile on a round-the-clock basis.
- Any type of fittings/Hoses/connection/any other required for safe plant operation not mentioned in scope and required during commissioning/operation is in vendor scope.
- Except with the Prior permission of the owner, the Vendor shall not assign or sublet this order or any part of this.

SECTION- 7: Owner's Scope

- Single Source Temporary connection for free electric Power. Refer Annexure-M for detailed scope
- Instrument air.
- Service water
- Crane/Hydra for Equipment loading and unloading at owner site. Vendor to specify the weight, dimensions, and lifting details of each skid/equipment at least one week in advance and specify the crane/hydra requirement for unloading at site.
- Civil Foundation for Skid.
- Electrical Power supply from the nearest junction.

SECTION- 8: WARRANTEE & GUARANTEE:

Vendor shall guarantee all components of package against faulty design, improper material of construction and poor workmanship for Rental storage system and equipments. Approval/Review by Owner for design calculation and detailed shop drawing, will not in any way absolve the Vendor from his responsibility. Should any repair or replacement be necessary owing to any type of failure on account of design material and workmanship of the item, vendor shall in view of this guarantee be bound to replace the same either in part or whole without additional cost to owner. Repaired or replaced part shall also be covered by same guarantee as in case of main supply.

SECTION-9: PROVEN TRACK RECORD

Vendor shall select equipment / material very carefully to meet the specified requirement ensuring proven track record of satisfactory performance of selected equipment / material for similar service. Vendor shall not offer prototype equipment / material or special design, which was not used in the past successfully. Owner shall revise or replace equipment / material at any stage, if Proven Track Record submitted by Vendor does not meet the criteria or not sufficient.

Tenderer's Sign & Stamp

SECTION –10: STATUTORY APPROVAL & CERTIFICATION

- Vendor shall be responsible for obtaining all required statutory approvals (as applicable) and submit their certificate.

- Equipment designed as per PESO, materials shall strictly comply with the requirement of the PESO code.

SECTION 11: INSPECTION TEST PLAN AND TPI SCOPE

- Vendor should submit the Inspection Test Plan (ITP) defining the minimum extent of NDT and testing requirements at manufacturer shop as per PESO Guidelines.
- The engagement of a Third-Party Inspector (TPI) is within the scope of the Vendor. TPI shall be PESO approved and experienced in same nature of Job.

  Inspection and/or witnessing of test by owner/ owner's representative/ Third Party Inspection Agency shall not relieve Vendor of his responsibility for material, quality, workmanship and others.

SECTION - 12: LIST OF DRAWINGS AND DOCUMENT

- Vendor shall furnish all the quality assurance plan (QAP), drawings/ documents to Owner for review. He shall incorporate all comments/ modification suggested by Owner. The drawings/documents should be properly organised, supplied & submitted. However, Owner review & approval shall not relieve the vendor of his responsibilities.
- Vendor shall submit complete data & documents required for final documentation in Soft and Hard Copy
- PESO approved copy of Fabrication Drawings.
- All Government statutory, PESO approval of erected CO2 supply system
- Safety valve manufacturing certificates from PESO approved third Party inspection agency.
- Tank fabrication and pressure vessel hydrotest, calibration TPI inspection report etc. wherever applicable shall be submitted.
- A list of minimum required drawings and documents is attached for reference. However, this list is not exhaustive, and the Vendor shall prepare and submit all additional drawings and documents as required to meet the project requirements.

Annexure- M

A. ELECTRICAL SCOPE OF WORK

1. CODES AND STANDARDS:

All electrical equipment/fittings such motors, Motor control centre, LCS, junction boxes and lighting fixtures shall comply with the requirements of latest revision of the standards issued by Bureau of India Standard (BIS) AND suitable for the applicable Zone-2 (Ex **ec** / Ex **nA**/Ex d) hazardous area suitable for Ammonia and comply with IEC 60079, including applicable Gas Group (IIA/IIB).

In case of imported equipment, standards followed in the country of origin shall be applicable, if these standards are equivalent or more stringent than the applicable Indian Standards.

The equipment shall also confirm to the provisions of Central Electricity Authority (CEA) regulations with latest amendments and other statutory regulations currently in force.
In case Indian standards are not available for any equipment, standards issued by IEC/BS/VDE/IEEE/NEMA or equivalent agency shall be applicable.

The equipment shall have test certificates issued by recognised independent testing agencies (PESO/CIMFR/ERTL/Baseefa/LCTE/UL/FM or equivalent).All indigenous equipment shall have valid BIS license marking as required by statutory authorities.

2. Incoming Power Supply:

RFCL shall provide incoming power supply to the Vendor's panel at the skid battery limit. Further power distribution shall be in Vendor's scope.

3. Cabling & Earthling:

Complete power/control cabling, cable trays, glands, terminations and equipment/structural earthing within the skid battery limit shall be in Vendor's scope as per applicable IS/IEC standards Zone-2 hazardous area and RFCL requirements. RFCL will provide two earth strip points till the battery limit of the Skid.

4. Local Control Station:

Weather proof and flameproof Local control panels shall be provided with independent control drives for each motor with Lockable LCS Start/Emergency Stop, Local/Remote selector, Local drives ON/OFF indication and ammeter/current indication.

5. Remote Control: All drives ON/OFF command, ON/OFF feedback and trip feedback, Local/remote feedback, current feedback hook up with owner’s DCS along with cabling shall be in vendor scope.

6. Weather Protection:

All outdoor electrical equipment such as motors, panels, LCS and junction boxes shall be provided with suitable canopy/weather protection and adequate IP rating for outdoor.
The Electrical panels shall be provided with space heaters to prevent moisture condensation. The space heaters shall be located in the bottom part inside and shall be supplied from 240 V AC auxiliary supply bus for space heater. The space heater shall be provided with a switch, fuse or double pole MCB and thermostat having adjustable setting ranges of 30-70 deg. Celsius.

7. Electrical Drawings:

All electrical drawings/documents, Electrical SLD, load list, panel GA, motor GA and wiring diagrams, shall be submitted to RFCL for approval.

8. Motor Make:
Motors shall be of reputed/approved makes such as ABB, Siemens, CG, Bharat Bijlee, BHEL, LHP or equivalent subject to review and approval by RFCL.

9. Motor Protection:
Suitable overload, short-circuit, earth-fault and other necessary motor protections shall be provided as applicable. If any motor used will be 75Kw or above, then numerical relay should be used for protection.

10. Isolation & LOTO:
Individual local isolation/pad lock facilities shall be provided for each motor/electrical drives and equipment to facilitate safe maintenance and LOTO.

11. Hazardous Area Certificates:
Valid PESO/CIMFR certificates/test reports for all hazardous-area electrical equipment shall be submitted by the Vendor.

12**. Degree of Protection:**
All outdoor electrical panels, junction boxes, LCS and other electrical enclosures shall have suitable IP protection, IP-55 or higher, as applicable to the installation and hazardous-area requirements.

13. **Nameplates and Identification:**
All motors, panels, LCS, junction boxes, isolators, cables and other electrical equipment shall be provided with permanent and weather-resistant identification/nameplates. Cable numbers and equipment tags shall be as per RFCL-approved tagging philosophy.

14. **Materials and Makes:**
All electrical equipment and components shall be of reputed/approved makes and shall be subject to RFCL approval. The Vendor shall submit a Manufacturer/Make List along with the technical offer.

15. **STATUTORY ELECTRICAL DRAWINGS, INSTALLATION AND ENERGISATION APPROVAL:**
Vendor shall take all electrical drawings, installation and energisation approvals from statutory authority CEIG (Govt. of Telangana) on behalf of RFCL.

B. Interfacing of I/O Signals with DCS (Instrumentation)

All required input and output signals from the field instruments shall be terminated at the Local Control Panel (LCP). The LCP shall be suitably designed and provided with all necessary hardware, terminals, marshalling arrangements, and provisions for receiving and collecting the required signals from the field instruments.

The LCP shall be provided with a suitable RS-485 communication interface/module for digital acquisition and transmission of the measured parameters to the DCS. The RS-485 interface shall serve as the physical communication interface for reliable digital communication between the LCP and the DCS.

A suitable shielded twisted-pair RS-485 communication cable of appropriate specification shall be provided for interfacing the RS-485 communication module of the LCP with the DCS. The communication link shall facilitate digital transmission of the required measured parameters to the DCS for monitoring and, wherever applicable, control purposes.

The bidder's scope shall include the complete hardware and software, RS-485 communication module/interface, communication cable, connectors, terminals, converters/gateways (if required), termination resistors, power supply arrangements, accessories, installation, termination, testing, commissioning, configuration, and all other necessary items required for establishing a complete, reliable, and functional communication link between the LCP and DCS.

The bidder shall ensure compatibility of the proposed RS-485 communication interface with the existing DCS and shall provide all necessary communication parameters/protocol details, configuration files, and documentation required for successful integration with the DCS.

The complete system shall be tested and commissioned to demonstrate proper acquisition and transmission of all specified parameters at the DCS.

Note: LCP Enclosure shall be "IP66 minimum + hazardous-area certification Zone-2 as applicable shall be considered."

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Annexure-N

PIPE CLASS : **31C**
RATING : 150
BASE MATERIAL : SS 304L
CORROSION ALLOWANCE : 0 MM
SPECIAL REQUIREMENT :

TEMPERATURE (Deg. C) AND PRESSURE (Kg/Sq. cm g) RATINGS

TEMP	-33	38	50	100	130	150	200	250	265
PRESS	16.11	16.11	15.62	13.53	12.78	12.28	11.33	10.38	10.15

SERVICE

CD-CU-DC-IA-LW-PA-PC-PV-DMW-TU-UN, COMPRESSOR CO2 INT.(IST STAGE)-HYDROLYZER(P), UREA MELT, SOLUTION & VACUUM (P)

NOTES

40 STIFFENER RINGS, IF NEEDED, SHALL BE PROVIDED AS PER ASME SEC. VIII, DIV. 1

65 FORGINGS ARE ACCEPTABLE IN LIEU OF PLATE MATERIAL FOR BLIND FLANGES AND SPACER & BLINDS.

96 VALVE TO BE TESTED FOR VACUUM AS PER ASME V, SUBSECTION-A, ARTICLE 10 (HOOD METHOD) APPENDIX IX TO CHECK SUITABILITY FOR VACUUM SERVICE.

101 NDT REQUIREMENTS AS PER JOB STD. A747-6-44-0016

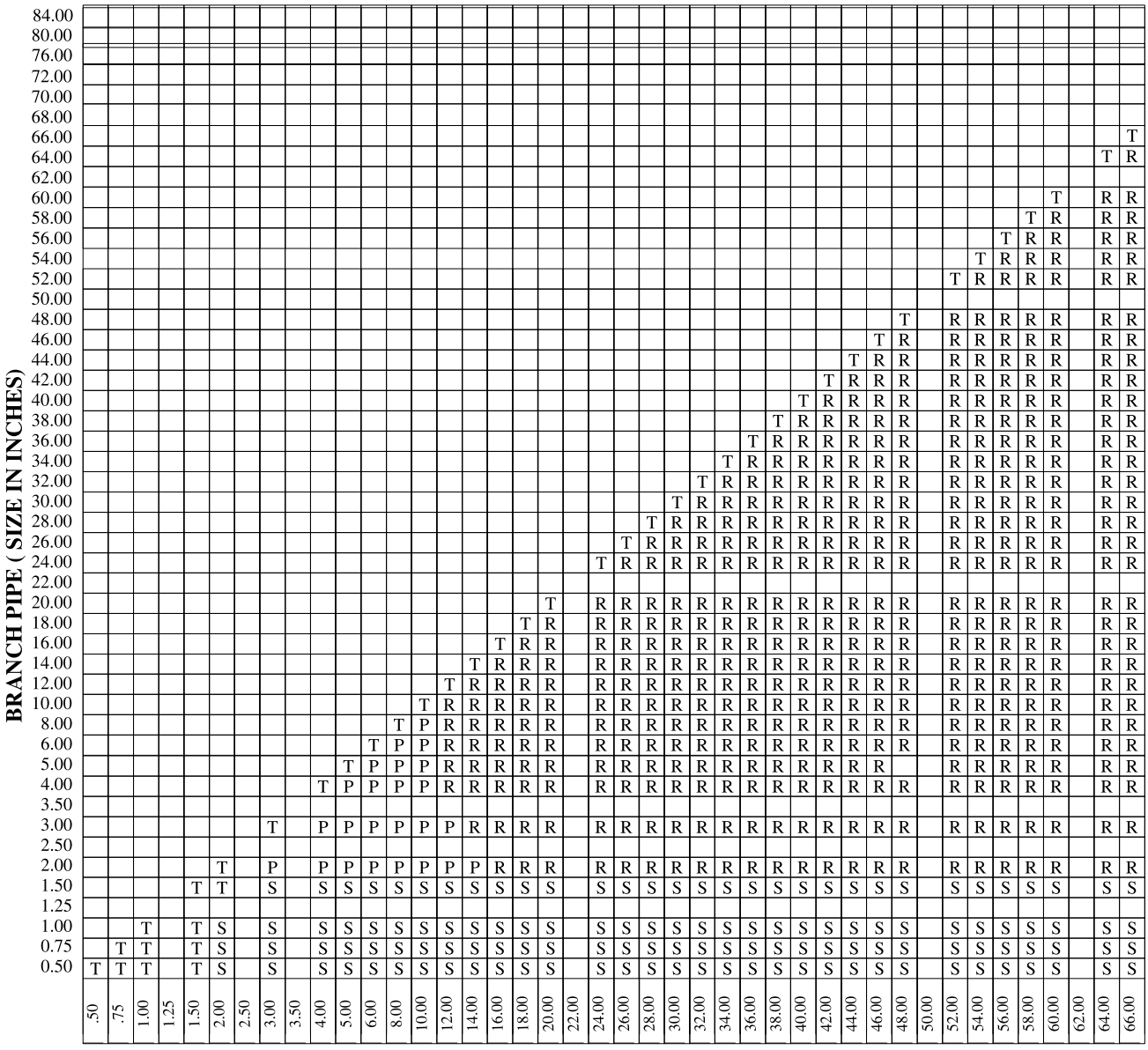
203 IN THIS SPEC WHERE UREA SERVICE IS COMING PRESSURE CONNECITON AND TEMPERATURE CONNECITON SHALL BE AS PER THE SAIPEM STNDARD TB. HPU.5002 (SH. 16)

SPECIAL NOTES

ITEM	SIZE	DESCRIPTION	A.CODE
MAINTAINENCE JOINTS	ALL	FLANGED, TO BE KEPT MINIMUM	
PIPE JOINTS	1.5" & BELOW	SW SOCKOLET	
	2.0" & ABOVE	BUTTWELDED	
DRAINS	ON LINES <= 1.5"	REFER JOB STD A747- 7-44-0350, DF3	
	ON LINES >= 2.0"	AS PER P&ID OR 0.75". REFER JOB STD.A747- 7-44-0351, D4	
VENTS	ON LINES <= 1.5"	REFER JOB STD. A747-7-44-0350, VF3	
	ON LINES >= 2.0"	AS PER P&ID OR 0.75". REFER JOB STD A747-7-44-0351, V4	
TEMP.CONN	1.5"	FLANGED. REFER JOB STD A747-7-44-0353	
PRESS.CONN	0.75"	SW NIPPLE WITH VALVE TO SPEC AS PER JOB STD A747-7-44-0354	

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RUN PIPE (SIZE IN INCHES)

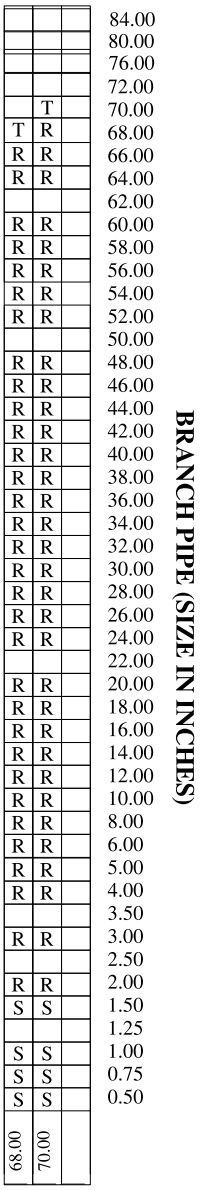
CODE	DESCRIPTION				
F	SADDLE FUSED JT	**T**	TEES	**J**	THREADOLET
H	H. COUPLING	**W**	WELDOLETS		
P	PIPE TO PIPE	**I**	INSTRUMENT TEE		
R	REINFORCED	**X**	Refer Notes		
S	SOCKOLETS	**L**	SWEEPOLET		

Package : IPMCS
Report No. : 50

31C

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Note :(The shaded portion of PMS body shows Field Fabricated Items)

Input Id.	Item Type	Lower Size (Inch)	Upper Size (Inch)	Sch/ Thk (mm)	Dmn. STD	Material	Description	Commodity Code	Note No
Pipe Group									
PIP	PIPE	.5	.75	80S	B-36.19	ASTM A 312 TP304L	PE, SEAMLESS	PI33777Z0	
PIP	PIPE	1	1.5	40S	B-36.19	ASTM A 312 TP304L	PE, SEAMLESS	PI33777Z0	
PIP	PIPE	2	2	40S	B-36.19	ASTM A 312 TP304L	BE, SEAMLESS	PI33717Z0	
PIP	PIPE	3	4	10S	B-36.19	ASTM A 312 TP304L	BE, SEAMLESS	PI33717Z0	
PIP	PIPE	6	24	10S	B-36.19	ASTM A 358 TP304L CL.1	BE, E.FS.W	PI36213Z0	
PIP	PIPE	26	26	6.35	B-36.19	ASTM A 358 TP304L CL.1	BE, E.FS.W	PI36213Z0	
PIP	PIPE	28	28	S10	B-36.10	ASTM A 358 TP304L CL.1	BE, E.FS.W	PI26213Z0	
PIP	PIPE	30	30	10S	B-36.19	ASTM A 358 TP304L CL.1	BE, E.FS.W	PI36213Z0	
PIP	PIPE	32	36	S10	B-36.10	ASTM A 358 TP304L CL.1	BE, E.FS.W	PI26213Z0	
PIP	PIPE	38	42	STD	B-36.10	ASTM A 358 TP304L CL.1	BE, E.FS.W	PI26213Z0	
PIP	PIPE	44	46	10.3	B-36.10	ASTM A 358 TP304L CL.1	BE, E.FS.W	PI26213Z0	
PIP	PIPE	48	48	11.1	B-36.10	ASTM A 358 TP304L CL.1	BE, E.FS.W	PI26213Z0	
PIP	PIPE	52	60	12.7	B-36.10	ASTM A 358 TP304L CL.1	BE, E.FS.W	PI26213Z0	
PIP	PIPE	64	70	15.9	B-36.10	ASTM A 358 TP304L CL.1	BE, E.FS.W	PI26213Z0	
NIP	NIPPLE	.5	.75	M	B-36.19	ASTM A 312 TP304L	PBE, SEAMLESS	PN33767Z0	
NIP	NIPPLE	1	1.5	M	B-36.19	ASTM A 312 TP304L	PBE, SEAMLESS	PN33767Z0	
Flange Group									
FLG/SP2	FLNG.SCRD	.5	10		TB.HPU.5002	ASTM A 105	SP2, SPECIAL	FTV01TMZ0	
FLG	FLNG.SW	.5	1.5	M	B-16.5	ASTM A 182 GR.F304L	600, RF/125AARH	FSC4367Z0	
FLG/1500	FLNG.SW	1.5	1.5	M	B-16.5	ASTM A 182 GR.F304L	1500, RTJ/63AARH	FSC4389Z0	
FLG	FLNG.WN	2	24	M	B-16.5	ASTM A 182 GR.F304L	150, RF/125AARH	FWC4327Z0	
FLG	FLNG.WN	26	60	M	B-16.47-B	ASTM A 182 GR.F304L	150, RF/125AARH	FWB4327Z0	
FLG/2500	FLNG.WN	.5	1.5	M	B-16.5	ASTM A 105	2500, RTJ/63AARH	FWC0199Z0	

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Location RAMAGUNDAM	**Pipe Class : 31C** Sheet 5 of 9

Note :(The shaded portion of PMS body shows Field Fabricated Items)

Input Id.	Item Type	Lower Size (Inch)	Upper Size (Inch)	Sch/ Thk (mm)	Dmn. STD	Material	Description	Commodity Code	Note No
Flange Group									
FLG/300	FLNG.WN	26	60	M	B-16.47-B	ASTM A 182 GR.F304L	300, RF/125AARH	FWB4347Z0	
FLG/1500	FLNG.WN	2	24	M	B-16.5	ASTM A 182 GR.F304L	1500, RTJ/63AARH	FWC4389Z0	
FLG/300	FLNG.WN	2	24	M	B-16.5	ASTM A 182 GR.F304L	300, RF/125AARH	FWC4347Z0	
FLG/600	FLNG.WN	2	24	M	B-16.5	ASTM A 182 GR.F304L	600, RF/125AARH	FWC4367Z0	
FLG	FLNG.SO	62	70		AWWA-C207 CL.D	ASTM A 182 GR.F304L	150, FF/125AARH	FN44321Z0	
FLB	FLNG.BLIND	.5	1.5		B-16.5	ASTM A 182 GR.F304L	600, RF/125AARH	FBC4367Z0	
FLB	FLNG.BLIND	2	24		B-16.5	ASTM A 182 GR.F304L	150, RF/125AARH	FBC4327Z0	
FLB	FLNG.BLIND	26	60		B-16.47-B	ASTM A 182 GR.F304L	150, RF/125AARH	FBB4327Z0	
FLB/300	FLNG.BLIND	2	12		B-16.5	ASTM A 182 GR.F304L	300, RF/125AARH	FBC4347Z0	
FEF	FLNG.FIG.8	.5	1.5		ASME-B16.48	ASTM A 182 GR.F304L	600, RF/125AARH	FGK4367Z0	
FEF	FLNG.FIG.8	2	8		ASME-B16.48	ASTM A 182 GR.F304L	150, RF/125AARH	FGK4327Z0	
FEF	SPCR&BLND	10	24		ASME-B16.48	ASTM A 182 GR.F304L	150, RF/125AARH	FCK4327Z0	
FEF	SPCR&BLND	26	60		EIL'STD	ASTM A 182 GR.F304L	150, RF/125AARH	FCE4327Z0	
Fitting Group									
ELB90	ELBOW.90	.5	1.5		B-16.11	ASTM A 182 GR.F304L	SW, 3000	WA644D2Z0	
ELB90	ELBOW.90	2	4	M	B-16.9	ASTM A 403 GR.WP304L-S	BW, 1.5D	WAG934Z10	
ELB90	ELBOW.90	5	48	M	B-16.9	ASTM A 403 GR.WP304L-WX	BW, 1.5D	WAG954Z10	
ELB90	ELBOW.90	50	70	M	MNF'STD	ASTM A 403 GR.WP304L-WX	BW, 1.5D	WAN954Z10	
ELB45	ELBOW.45	.5	1.5		B-16.11	ASTM A 182 GR.F304L	SW, 3000	WB644D2Z0	
ELB45	ELBOW.45	2	4	M	B-16.9	ASTM A 403 GR.WP304L-S	BW, 1.5D	WBG934Z10	
ELB45	ELBOW.45	5	48	M	B-16.9	ASTM A 403 GR.WP304L-WX	BW, 1.5D	WBG954Z10	
ELB45	ELBOW.45	50	70	M	MNF'STD	ASTM A 403 GR.WP304L-WX	BW, 1.5D	WBN954Z10	
BND	PIPE.BEND	16	36	M	MNF'STD	ASTM A 403 GR.WP304L-WX	BW, 3D	WCN9543Z0	

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Client :RFCL	**Dept./Sect. :** 16/43
Project :Revival of Ramagundam Fertilizer Complex	
Location RAMAGUNDAM	**Pipe Class : 31C** Sheet 6 of 9

Note :(The shaded portion of PMS body shows Field Fabricated Items)

Input Id.	Item Type	Lower Size (Inch)	Upper Size (Inch)	Sch/ Thk (mm)	Dmn. STD	Material	Description	Commodity Code	Note No
Fitting Group									
BND/1	PIPE.BEND	12	12	M	MNF'STD	ASTM A 403 GR.WP304L-WX	BW, 5D	WCN9545Z0	
TEQ	T.EQUAL	.5	1.5		B-16.11	ASTM A 182 GR.F304L	SW, 3000	WE644D2Z0	
TEQ	T.EQUAL	2	4	M	B-16.9	ASTM A 403 GR.WP304L-S	BW	WEG934ZZ0	
TEQ	T.EQUAL	5	48	M	B-16.9	ASTM A 403 GR.WP304L-WX	BW	WEG954ZZ0	
TEQ	T.EQUAL	50	70	M	MNF'STD	ASTM A 403 GR.WP304L-WX	BW	WEN954ZZ0	
TRED	T.RED	.5	1.5		B-16.11	ASTM A 182 GR.F304L	SW, 3000	WR644D2Z0	
TRED	T.RED	2	4	M, M	B-16.9	ASTM A 403 GR.WP304L-S	BW	WRG934ZZ0	
TRED	T.RED	5	48	M, M	B-16.9	ASTM A 403 GR.WP304L-WX	BW	WRG954ZZ0	
TRED	T.RED	50	70	M, M	MNF'STD	ASTM A 403 GR.WP304L-WX	BW	WRN954ZZ0	
REDC	REDUC.CONC	2	4	M, M	B-16.9	ASTM A 403 GR.WP304L-S	BW	WUG934ZZ0	
REDC	REDUC.CONC	5	48	M, M	B-16.9	ASTM A 403 GR.WP304L-WX	BW	WUG954ZZ0	
REDC	REDUC.CONC	50	70	M, M	MNF'STD	ASTM A 403 GR.WP304L-WX	BW	WUN954ZZ0	
REDE	REDUC.ECC	2	4	M, M	B-16.9	ASTM A 403 GR.WP304L-S	BW	WVG934ZZ0	
REDE	REDUC.ECC	5	48	M, M	B-16.9	ASTM A 403 GR.WP304L-WX	BW	WVG954ZZ0	
REDE	REDUC.ECC	50	70	M, M	MNF'STD	ASTM A 403 GR.WP304L-WX	BW	WVN954ZZ0	
SWGC	SWAGE.CONC	.5	3	M, M	BS-3799	ASTM A 182 GR.F304L	PBE	WNH446ZZ0	
SWGE	SWAGE.ECC	.5	3	M, M	BS-3799	ASTM A 182 GR.F304L	PBE	WPH446ZZ0	
CAP	CAP	.5	1.5		B-16.11	ASTM A 182 GR.F304L	SCRF, 3000	WF64482Z0	
CAP	CAP	2	48	M	B-16.9	ASTM A 403 GR.WP304L-S	BW	WFG934ZZ0	
CAP	CAP	50	70	M	JOB'STD	ASTM A 403 GR.WP304L-S	BW	WFM934ZZ0	
CPLF	CPLNG.FULL	.5	1.5		B-16.11	ASTM A 182 GR.F304L	SW, 3000	WJ644D2Z0	
CPLF/1	CPLNG.FULL	.5	1.5		B-16.11	ASTM A 182 GR.F304L	SCRF, 3000	WJ64482Z0	
CPLH	CPLNG.HALF	.5	1.5		B-16.11	ASTM A 182 GR.F304L	SW, 3000	WK644D2Z0	

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Client :RFCL	**Dept./Sect. :** 16/43
Project :Revival of Ramagundam Fertilizer Complex	
Location RAMAGUNDAM	**Pipe Class : 31C** Sheet 7 of 9

Note :(The shaded portion of PMS body shows Field Fabricated Items)

Input Id.	Item Type	Lower Size (Inch)	Upper Size (Inch)	Sch/ Thk (mm)	Dmn. STD	Material	Description	Commodity Code	Note No
Fitting Group									
CPLH/1	CPLNG.HALF	.5	1.5		B-16.11	ASTM A 182 GR.F304L	SCRF, 3000	WK64482Z0	
CPLL	CPLNG.LH	.5	1.5		B-16.11	ASTM A 182 GR.F304L	SW, 3000	WL644D2Z0	
CPLL/1	CPLNG.LH	.5	1.5		B-16.11	ASTM A 182 GR.F304L	SCRF, 3000	WL64482Z0	
CPLR	CPLNG.RED	.5	1.5		B-16.11	ASTM A 182 GR.F304L	SW, 3000	WM644D2Z0	
CPLR/1	CPLNG.RED	.5	1.5		B-16.11	ASTM A 182 GR.F304L	SCRF, 3000	WM64482Z0	
THDN	THNOZZLE	.5	10	M	TB.HPU5002	ASTM A 182 GR.F304L	SPCL, NA, LENSFACING	WZY44CZZ0	
O'let Group									
SLT	SOCKOLET	.5	1.5		MSS-SP97	ASTM A 182 GR.F304L	SW, 3000	YSS44D2Z0	
ELT	ELBOWLET	.5	1.5		MNF'STD	ASTM A 182 GR.F304L	SW, 3000	YEN44D2Z0	
TLT	THREADOLET	.5	1.5		MSS-SP97	ASTM A 182 GR.F304L	SCRF, 3000	YTS4482Z0	
NLT	NIPPOLET	.5	1.5	M, M	MNF'STD	ASTM A 182 GR.F304L	SCRM	YNN449ZZ0	
LLT	LATROLET	.5	1.5		MNF'STD	ASTM A 182 GR.F304L	SW, 3000	YLN44D2Z0	
Valves Group									
GAV	VLV.GATE	.5	1.5		API-602	BODY-ASTM A 182 GR.F304L,TRIM-SS 304L	SW, 800, 3000, B-16.11, SHT NO.- 510KL	510KLZZZ0	
GAV	VLV.GATE	2	20		API-600	BODY-ASTM A 351 GR CF8,TRIM-SS 304	FLGD, 150, B-16.5, RF/125AARH, SHT NO.- 513KL	513KLZZZ0	
GAV/1	VLV.GATE	2	3		API-600	BODY-ASTM A 351 GR.CF3,TRIM-SS 304L	FLGD, 300, B-16.5, RF/125AARH, SHT NO.- 514KL	514KLZZZ0	
GLV	VLV.GLOBE	.5	1.5		BS EN ISO 15761	BODY-ASTM A 182 GR.F304L,TRIM-SS 304L	SW, 800, 3000, B-16.11, SHT NO.- 520KL	520KLZZZ0	
GLV	VLV.GLOBE	2	12		BS-1873	BODY-ASTM A 351 GR CF8,TRIM-SS 304	FLGD, 150, B-16.5, RF/125AARH, SHT NO.- 523KL	523KLZZZ0	
CHV	VLV.CHECK	.5	1.5		BS EN ISO 15761	BODY-ASTM A 182 GR.F316L,TRIM-SS 316L	SW, 800, 3000, B-16.11, SHT NO.- 530KL	530KLZZZ0	
CHV	VLV.CHECK	2	12		BS-1868	BODY-ASTM A 351 GR CF3M,TRIM-SS 316L	FLGD, 150, B-16.5, RF/125AARH, SHT NO.- 533MU	533MUZZZ0	
CHV	VLV.CHECK	14	24		MNF'STD	BODY-ASTM A 351 GR CF3M,TRIM-SS	FLGD, 150, B-16.5, RF/125AARH, SHT	533MTZZZ0	

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Client :RFCL	**Dept./Sect. :** 16/43
Project :Revival of Ramagundam Fertilizer Complex	
Location RAMAGUNDAM	**Pipe Class : 31C** Sheet 8 of 9

Note :(The shaded portion of PMS body shows Field Fabricated Items)

Input Id.	Item Type	Lower Size (Inch)	Upper Size (Inch)	Sch/ Thk (mm)	Dmn. STD	Material	Description	Commodity Code	Note No
Valves Group									
						316L	NO.- 533MT		
CHV	VLV.CHECK	26	36		MNF'STD	BODY-ASTM A 351 GR.CF3,TRIM-SS 316L	WAF, 150, B-16.47 B, RF/125AARH, SHT NO.- 533KT	533KTZZZ0	
PLV	VLV.PLUG	.5	1.5		API-599	BODY-ASTM A 182 GR.F316L,TRIM-SS 316L + PTFE SLEEVE	SW, 800, 3000, B-16.11, SHT NO.- 550MU	550MUZZZ0	
PLV	VLV.PLUG	2	18		API-599	BODY-ASTM A 351 GR CF3M,TRIM-SS 316L + PTFE SLEEVE	BW, 150, B-16.25, SHT NO.- 553MU	553MUZZZ0	
PLV/2	VLV.PLUG	.5	1.5		API-599	BODY-ASTM A 182 GR.F316L,TRIM-SS 316L	SW, 800, 3000, B-16.11, SHT NO.- 550MP	550MPZZZ0	
PLV/1	VLV.PLUG	2	12		API-599	BODY-ASTM A 351 GR CF3M,TRIM-SS 316L + PTFE SLEEVE	BW, 150, B-16.25, SHT NO.- 553MP	553MPZZZ0	
BFV	VLV.BTRFLY	8	24		API-609	BODY-ASTM A 351 GR.CF3,TRIM-SS 304	WAFL, 150, B-16.5, WAF/125AARH, SHT NO.- 563KL	563KLZZZ0	
BFV	VLV.BTRFLY	26	36		API-609	BODY-ASTM A 351 GR.CF3,TRIM-SS 304	WAFL, 150, B-16.47 B, WAF/125AARH, SHT NO.- 563KT	563KTZZZ0	
P3V	VLV.3WYPLG	2	14		API-599	BODY-ASTM A 351 GR CF3M,TRIM-SS 316L + PTFE SLEEVE	BW, 150, B-16.25, SHT NO.- 613MU	613MUZZZ0	
P3V/1	VLV.3WYPLG	2	16		API-599	BODY-ASTM A 351 GR CF3M,TRIM-SS 316L + PTFE SLEEVE	BW, 150, B-16.25, SHT NO.- 613ML	613MLZZZ0	
Bolt Group									
BOS	BOLT.STUD	.5	70		B-18.2	BOLT:A193 GR.B7, NUT:A194 GR.2H		BS40404Z0	
Gasket Group									
GAS	GASKET	.5	1.5		B-16.20-ANSI B16.5	SP.WND SS316L+GRAFIL+ I RING	SPIRAL, 600	GK66376Z0	
GAS	GASKET	2	24		B-16.20-ANSI B16.5	SP.WND SS316L+GRAFIL+ I RING	SPIRAL, 150	GK66372Z0	
GAS	GASKET	26	60		B-16.20-ANSI B16.47B	SP.WND SS316L+GRAFIL+ I RING	SPIRAL, 150	GK56372Z0	
GAS	GASKET	62	72		AWWA-C207 CL.D	PTFE	FULLFACE, 150, 2 MM	GK21322Z0	

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Client :RFCL	**Dept./Sect. :** 16/43
Project :Revival of Ramagundam Fertilizer Complex	
Location RAMAGUNDAM	**Pipe Class : 31C** Sheet 9 of 9

Note :(The shaded portion of PMS body shows Field Fabricated Items)

Input Id.	Item Type	Lower Size (Inch)	Upper Size (Inch)	Sch/ Thk (mm)	Dmn. STD	Material	Description	Commodity Code	Note No
Gasket Group									
GAS/SP 2	GASKET	.5	10		TB.HPU.5002	SS 304L	LENS, SP2	GKJ78ATZ0	
GAS/25 00	GASKET	.5	1.5		B-16.20-ANSI B16.5	SOFT IRON	OVALRING, 2500	GK67249Z0	
GAS/15 00	GASKET	1.5	1.5		B-16.20-ANSI B16.5	SS 304L	OVALRING, 1500	GK67848Z0	
GAS/30 0	GASKET	26	30		B-16.20-ANSI B16.47B	SP.WND SS316L+GRAFIL+ I RING	SPIRAL, 300	GK56374Z0	
GAS/15 00	GASKET	2	24		B-16.20-ANSI B16.5	SS 304L	OVALRING, 1500	GK67848Z0	
GAS/30 0	GASKET	2	24		B-16.20-ANSI B16.5	SP.WND SS316L+GRAFIL+ I RING	SPIRAL, 300	GK66374Z0	
GAS/60 0	GASKET	2	24		B-16.20-ANSI B16.5	SP.WND SS316L+GRAFIL+ I RING	SPIRAL, 600	GK66376Z0	
Trap/Strainer Group									
PSR	STRNR.PERM	.5	1.5		JOB'STD	B:A182GR.F304L;I NT:SS304L	SW, Y-TYPE, 800	SP215D510	
PSR	STRNR.PERM	2	12		JOB'STD	B:A351GR.CF3M;I NT:SS316L	FLGD, Y-TYPE, 150,RF/125AARH	SP2F35530	
PSR	STRNR.PERM	14	24	M	JOB'STD	B:A403WP304L-WX;INT:SS304L	BW, T-TYPE	SP25644Z0	

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Client :RFCL	**Dept./Sect. :** 16/43
Project :Revival of Ramagundam Fertilizer Complex	
Location RAMAGUNDAM	**Pipe Class : 11A** Sheet 1 of 9

PIPE CLASS : **11A**
RATING : 150
BASE MATERIAL : CARBON STEEL
CORROSION ALLOWANCE : 1.27 MM
SPECIAL REQUIREMENT :

TEMPERATURE (Deg. C) AND PRESSURE (Kg/Sq. cm g) RATINGS

TEMP	-29	38	93	149	204	260	316	343	371	400	415
PRESS	20.04	20.04	18.28	16.17	14.06	11.95	9.84	8.78	7.73	6.64	6.02

SERVICE

COOLING WATER RETURN(CWR);COOLING WATER SUPPLY(CWS),INSTRUMENT AIR(IA),PASSIVATION AIR(PA),SERVICE WATER(SW), MEDIUM PRESSURE FLUSHING CONDENSATE(HW)- FULL VACUUM

NOTES

7 FOR RESTRICTION ON USE OF BALL,PLUG & BUTTERFLY VALVES,REFER GENERAL NOTES.

40 STIFFENER RINGS, IF NEEDED, SHALL BE PROVIDED AS PER ASME SEC. VIII, DIV. 1

65 FORGINGS ARE ACCEPTABLE IN LIEU OF PLATE MATERIAL FOR BLIND FLANGES AND SPACER & BLINDS.

92 GATE VALVES OF SIZE 26" AND ABOVE SHALL BE IN ACCORDANCE WITH B-16.34/ BS-1414 AND FLANGE ENDS SHALL BE IN ACCORDANCE WITH ASME B16.47 SERIES B.

96 VALVE TO BE TESTED FOR VACUUM AS PER ASME V, SUBSECTION-A, ARTICLE 10 (HOOD METHOD) APPENDIX IX TO CHECK SUITABILITY FOR VACUUM SERVICE.

101 NDT REQUIREMENTS AS PER JOB STD. A747-6-44-0016

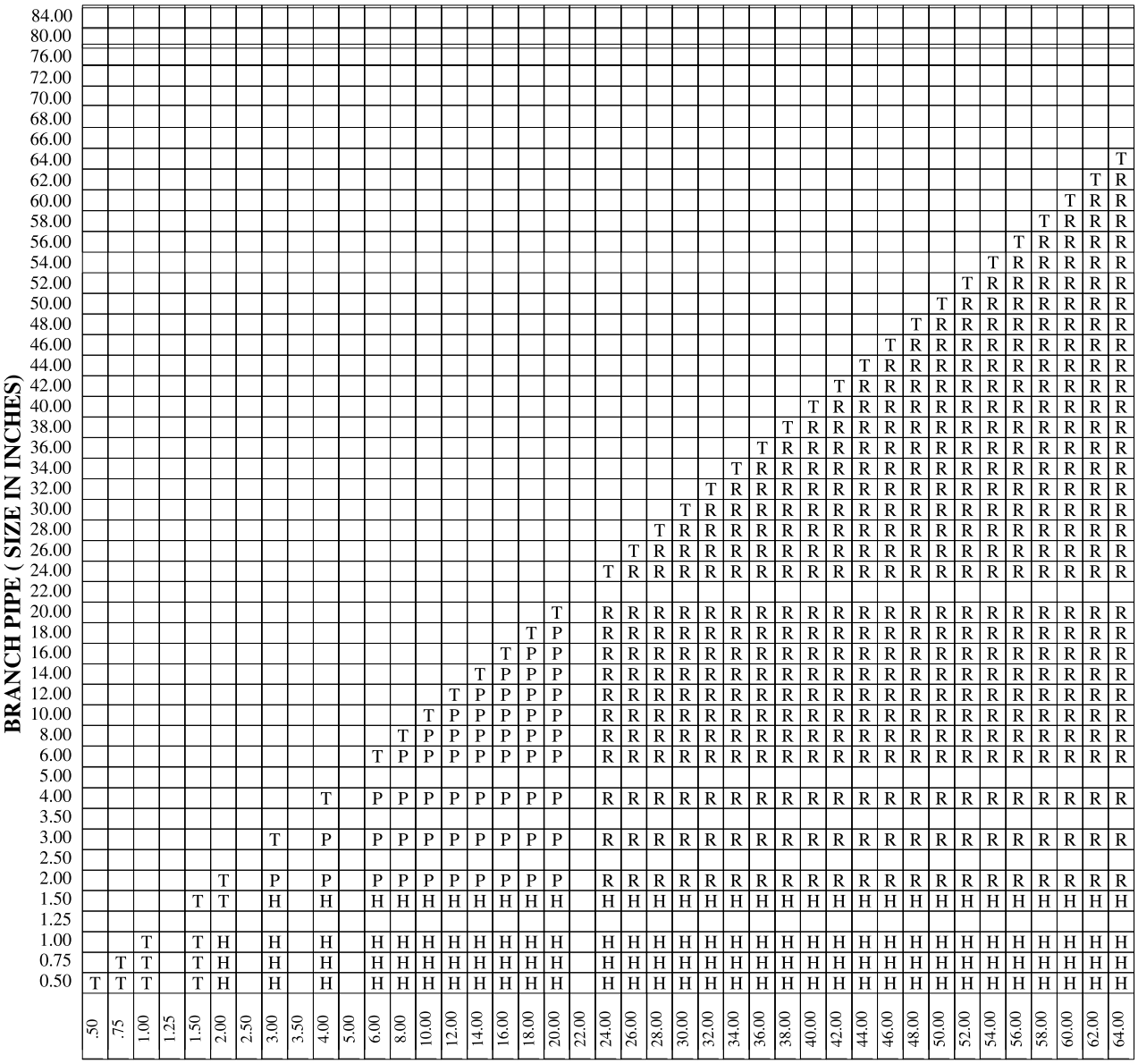
201 VACUUM REQUIREMENT IS NOT APPLICABLE FOR COOLING WATER SERVICES

SPECIAL NOTES

ITEM	SIZE	DESCRIPTION	A.CODE
MAINTAINENCE JOINTS	ALL	FLANGED, TO BE KEPT MINIMUM	
PIPE JOINTS	1.5" & BELOW	SW	
	2.0" & ABOVE	BUTTWELDED	
DRAINS	ON LINES <= 1.5"	REFER EILSTD. 7-44-0350, DF3	
	ON LINES >= 2.0"	AS PER P&ID OR 0.75". REFER EIL STD. 7-44-0351, D4	
VENTS	ON LINES <= 1.5"	REFER EIL STD. 7-44-0350, VF3	
	ON LINES >= 2.0"	AS PER P&ID OR 0.75". REFER EIL STD.7-44-0351, V4	
TEMP.CONN	1.5"	FLANGED. REFER EIL STD. 7-44-0353	
PRESS.CONN	0.75"	SW NIPPLE WITH VALVE TO SPEC AS PER EIL STD 7-44-0354	

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Location RAMAGUNDAM	**Pipe Class : 11A** Sheet 2 of 9



RUN PIPE (SIZE IN INCHES)

CODE	DESCRIPTION				
F	SADDLE FUSED JT	**T**	TEES	**J**	THREADOLET
H	H. COUPLING	**W**	WELDOLETS		
P	PIPE TO PIPE	**I**	INSTRUMENT TEE		
R	REINFORCED	**X**	Refer Notes		
S	SOCKOLETS	**L**	SWEEPOLET		

Package : IPMCS
Report No. : 50

11A

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Project :Revival of Ramagundam Fertilizer Complex	
Location RAMAGUNDAM	**Pipe Class : 11A** Sheet 3 of 9

BRANCH PIPE (SIZE IN INCHES)

84.00
80.00
76.00
72.00
70.00
68.00
66.00
64.00
62.00
60.00
58.00
56.00
54.00
52.00
50.00
48.00
46.00
44.00
42.00
40.00
38.00
36.00
34.00
32.00
30.00
28.00
26.00
24.00
22.00
20.00
18.00
16.00
14.00
12.00
10.00
8.00
6.00
5.00
4.00
3.50
3.00
2.50
2.00
1.50
1.25
1.00
0.75
0.50

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Project :Revival of Ramagundam Fertilizer Complex	
Location RAMAGUNDAM	**Pipe Class : 11A** Sheet 4 of 9

Note :(The shaded portion of PMS body shows Field Fabricated Items)

Input Id.	Item Type	Lower Size (Inch)	Upper Size (Inch)	Sch/ Thk (mm)	Dmn. STD	Material	Description	Commodity Code	Note No
Pipe Group									
PIP	PIPE	.5	.75	S160	B-36.10	ASTM A 106 GR.B	PE, SEAMLESS	PI21977Z0	
PIP	PIPE	1	1.5	XS	B-36.10	ASTM A 106 GR.B	PE, SEAMLESS	PI21977Z0	
PIP	PIPE	2	2	XS	B-36.10	ASTM A 106 GR.B	BE, SEAMLESS	PI21917Z0	
PIP	PIPE	3	14	STD	B-36.10	ASTM A 106 GR.B	BE, SEAMLESS	PI21917Z0	
PIP	PIPE	16	16	STD	B-36.10	API 5L GR.B PSL1	BE, SAW	PI2E916Z0	
PIP	PIPE	18	18	STD	B-36.10	API 5L GR.B PSL1	BE, SAW	PI2E916Z0	
PIP	PIPE	20	24	STD	B-36.10	API 5L GR.B PSL1	BE, SAW	PI2E916Z0	
PIP	PIPE	26	42	STD	B-36.10	API 5L GR.B PSL1	BE, SAW	PI2E916Z0	
PIP	PIPE	44	48	XS	B-36.10	API 5L GR.B PSL1	BE, SAW	PI2E916Z0	
PIP	PIPE	50	50	12.7	B-36.10	API 5L GR.B PSL1	BE, SAW	PI2E916Z0	
PIP	PIPE	52	56	14.3	B-36.10	API 5L GR.B PSL1	BE, SAW	PI2E916Z0	
PIP	PIPE	60	64	15.9	B-36.10	API 5L GR.B PSL1	BE, SAW	PI2E916Z0	
NIP	NIPPLE	.5	.75	M	B-36.10	ASTM A 106 GR.B	PBE, SEAMLESS	PN21967Z0	
NIP	NIPPLE	1	1.5	M	B-36.10	ASTM A 106 GR.B	PBE, SEAMLESS	PN21967Z0	
Flange Group									
FLG	FLNG.SW	.5	1.5	M	B-16.5	ASTM A 105	600, RF/125AARH	FSC0167Z0	
FLG	FLNG.WN	2	24	M	B-16.5	ASTM A 105	150, RF/125AARH	FWC0127Z0	
FLG	FLNG.WN	26	60	M	B-16.47-B	ASTM A 105	150, RF/125AARH	FWB0127Z0	
FLG/FF	FLNG.WN	2	3	M	B-16.5	ASTM A 105	150, FF/125AARH	FWC0121Z0	
FLG/1500	FLNG.WN	2	3	M	B-16.5	ASTM A 105	1500, RTJ/63AARH	FWC0189Z0	
FLG/600	FLNG.WN	2	24	M	B-16.5	ASTM A 105	600, RF/125AARH	FWC0167Z0	
FLG/300	FLNG.WN	2	24	M	B-16.5	ASTM A 105	300, RF/125AARH	FWC0147Z0	
FLG	FLNG.SO	62	64		AWWA-C207 CL.D	ASTM A 105	150, FF/250AARH	FN40122Z0	
FLB	FLNG.BLIND	.5	1.5		B-16.5	ASTM A 105	600, RF/125AARH	FBC0167Z0	

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Project :Revival of Ramagundam Fertilizer Complex	
Location RAMAGUNDAM	**Pipe Class : 11A** Sheet 5 of 9

Note :(The shaded portion of PMS body shows Field Fabricated Items)

Input Id.	Item Type	Lower Size (Inch)	Upper Size (Inch)	Sch/ Thk (mm)	Dmn. STD	Material	Description	Commodity Code	Note No
Flange Group									
FLB	FLNG.BLIND	2	24		B-16.5	ASTM A 105	150, RF/125AARH	FBC0127Z0	
FLB	FLNG.BLIND	26	60		B-16.47-B	ASTM A 105	150, RF/125AARH	FBB0127Z0	
FLB/600	FLNG.BLIND	2	2		B-16.5	ASTM A 105	600, RF/125AARH	FBC0167Z0	
FEF	FLNG.FIG.8	.5	1.5		ASME-B16.48	ASTM A 515 GR.70	600, RF/125AARH	FGK6067Z0	65
FEF	FLNG.FIG.8	2	8		ASME-B16.48	ASTM A 515 GR.70	150, RF/125AARH	FGK6027Z0	65
FEF	SPCR&BLND	10	24		ASME-B16.48	ASTM A 515 GR.70	150, RF/125AARH	FCK6027Z0	65
FEF	SPCR&BLND	26	60		EIL'STD	ASTM A 515 GR.70	150, RF/125AARH	FCE6027Z0	65
DRG	DRIPRING	1	1.5		EIL'STD	ASTM A 105	600, RF/125AARH	FDE0167Z0	
DRG	DRIPRING	2	24		EIL'STD	ASTM A 105	150, RF/125AARH	FDE0127Z0	
Fitting Group									
ELB90	ELBOW.90	.5	.75		B-16.11	ASTM A 105	SW, 6000	WA602D3Z0	
ELB90	ELBOW.90	1	1.5		B-16.11	ASTM A 105	SW, 3000	WA602D2Z0	
ELB90	ELBOW.90	2	14	M	B-16.9	ASTM A 234 GR.WPB	BW, 1.5D	WAG684Z10	
ELB90	ELBOW.90	16	48	M	B-16.9	ASTM A 234 GR.WPB-W	BW, 1.5D	WAG754Z10	
ELB90	ELBOW.90	50	56	M	MNF'STD	ASTM A 234 GR.WPB-W	BW, 1.5D	WAN754Z10	
ELB45	ELBOW.45	.5	.75		B-16.11	ASTM A 105	SW, 6000	WB602D3Z0	
ELB45	ELBOW.45	1	1.5		B-16.11	ASTM A 105	SW, 3000	WB602D2Z0	
ELB45	ELBOW.45	2	14	M	B-16.9	ASTM A 234 GR.WPB	BW, 1.5D	WBG684Z10	
ELB45	ELBOW.45	16	48	M	B-16.9	ASTM A 234 GR.WPB-W	BW, 1.5D	WBG754Z10	
ELB45	ELBOW.45	50	56	M	MNF'STD	ASTM A 234 GR.WPB-W	BW, 1.5D	WBN754Z10	
MIT90	MITRE.90	60	64	M	EIL'STD	ASTM A 234 GR.WPB-W	BW, 1.5D	WDK7541Z0	
MIT45	MITRE.45	60	64	M	EIL'STD	ASTM A 234 GR.WPB-W	BW, 1.5D	WGK7541Z0	
TEQ	T.EQUAL	.5	.75		B-16.11	ASTM A 105	SW, 6000	WE602D3Z0	
TEQ	T.EQUAL	1	1.5		B-16.11	ASTM A 105	SW, 3000	WE602D2Z0	

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Project :Revival of Ramagundam Fertilizer Complex	
Location RAMAGUNDAM	**Pipe Class : 11A** Sheet 6 of 9

Note :(The shaded portion of PMS body shows Field Fabricated Items)

Input Id.	Item Type	Lower Size (Inch)	Upper Size (Inch)	Sch/ Thk (mm)	Dmn. STD	Material	Description	Commodity Code	Note No
Fitting Group									
TEQ	T.EQUAL	2	14	M	B-16.9	ASTM A 234 GR.WPB	BW	WEG684ZZ0	
TEQ	T.EQUAL	16	48	M	B-16.9	ASTM A 234 GR.WPB-W	BW	WEG754ZZ0	
TEQ	T.EQUAL	50	64	M	MNF'STD	ASTM A 234 GR.WPB-W	BW	WEN754ZZ0	
TRED	T.RED	.5	.75		B-16.11	ASTM A 105	SW, 6000	WR602D3Z0	
TRED	T.RED	1	1.5		B-16.11	ASTM A 105	SW, 3000	WR602D2Z0	
TRED	T.RED	2	14	M, M	B-16.9	ASTM A 234 GR.WPB	BW	WRG684ZZ0	
TRED	T.RED	16	48	M, M	B-16.9	ASTM A 234 GR.WPB-W	BW	WRG754ZZ0	
TRED	T.RED	50	64	M, M	MNF'STD	ASTM A 234 GR.WPB-W	BW	WRN754ZZ0	
REDC	REDUC.CONC	2	14	M, M	B-16.9	ASTM A 234 GR.WPB	BW	WUG684ZZ0	
REDC	REDUC.CONC	16	48	M, M	B-16.9	ASTM A 234 GR.WPB-W	BW	WUG754ZZ0	
REDC	REDUC.CONC	50	64	M, M	MNF'STD	ASTM A 234 GR.WPB-W	BW	WUN754ZZ0	
REDE	REDUC.ECC	2	14	M, M	B-16.9	ASTM A 234 GR.WPB	BW	WVG684ZZ0	
REDE	REDUC.ECC	16	48	M, M	B-16.9	ASTM A 234 GR.WPB-W	BW	WVG754ZZ0	
REDE	REDUC.ECC	50	64	M, M	MNF'STD	ASTM A 234 GR.WPB-W	BW	WVN754ZZ0	
SWGC	SWAGE.CONC	.5	3	M, M	BS-3799	ASTM A 105	PBE	WNH026ZZ0	
SWGE	SWAGE.ECC	.5	3	M, M	BS-3799	ASTM A 105	PBE	WPH026ZZ0	
CAP	CAP	.5	.75		B-16.11	ASTM A 105	SCRF, 6000	WF60283Z0	
CAP	CAP	1	1.5		B-16.11	ASTM A 105	SCRF, 3000	WF60282Z0	
CAP	CAP	2	48	M	B-16.9	ASTM A 234 GR.WPB	BW	WFG684ZZ0	
CAP	CAP	50	64	M	MNF'STD	ASTM A 234 GR.WPB	BW	WFN684ZZ0	
PLG	PLUG	.5	1.5		B-16.11	ASTM A 105	SCRM, NA	WH6029ZZ0	
CPLF	CPLNG.FULL	.5	.75		B-16.11	ASTM A 105	SW, 6000	WJ602D3Z0	
CPLF	CPLNG.FULL	1	1.5		B-16.11	ASTM A 105	SW, 3000	WJ602D2Z0	

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Client :RFCL	**Dept./Sect. :** 16/43
Project :Revival of Ramagundam Fertilizer Complex	
Location RAMAGUNDAM	**Pipe Class : 11A** Sheet 7 of 9

Note :(The shaded portion of PMS body shows Field Fabricated Items)

Input Id.	Item Type	Lower Size (Inch)	Upper Size (Inch)	Sch/ Thk (mm)	Dmn. STD	Material	Description	Commodity Code	Note No
Fitting Group									
CPLF/2	CPLNG.FULL	1	1.5		B-16.11	ASTM A 105	SCRF, 3000	WJ60282Z0	
CPLF/1	CPLNG.FULL	.5	.75		B-16.11	ASTM A 105	SCRF, 6000	WJ60283Z0	
CPLH	CPLNG.HALF	.5	.75		B-16.11	ASTM A 105	SW, 6000	WK602D3Z0	
CPLH	CPLNG.HALF	1	1.5		B-16.11	ASTM A 105	SW, 3000	WK602D2Z0	
CPLH/2	CPLNG.HALF	1	1.5		B-16.11	ASTM A 105	SCRF, 3000	WK60282Z0	
CPLH/1	CPLNG.HALF	.5	.75		B-16.11	ASTM A 105	SCRF, 6000	WK60283Z0	
CPLL	CPLNG.LH	.5	.75		B-16.11	ASTM A 105	SW, 6000	WL602D3Z0	
CPLL	CPLNG.LH	1	1.5		B-16.11	ASTM A 105	SW, 3000	WL602D2Z0	
CPLL/2	CPLNG.LH	1	1.5		B-16.11	ASTM A 105	SCRF, 3000	WL60282Z0	
CPLL/1	CPLNG.LH	.5	.75		B-16.11	ASTM A 105	SCRF, 6000	WL60283Z0	
CPLR	CPLNG.RED	.5	.75		B-16.11	ASTM A 105	SW, 6000	WM602D3Z0	
CPLR	CPLNG.RED	1	1.5		B-16.11	ASTM A 105	SW, 3000	WM602D2Z0	
CPLR/2	CPLNG.RED	1	1.5		B-16.11	ASTM A 105	SCRF, 3000	WM60282Z0	
CPLR/1	CPLNG.RED	.5	.75		B-16.11	ASTM A 105	SCRF, 6000	WM60283Z0	
Valves Group									
GAV	VLV.GATE	.5	1.5		API 602/ ISO 15761	BODY-ASTM A 105,TRIM-13% CR.STEEL	SW, 800, 3000, B-16.11, SHT NO.-510AA	510AAZZZ0	
GAV	VLV.GATE	2	24		API 600/ ISO 10434	BODY-,TRIM-13% CR.STEEL	FLGD, 150, B-16.5, RF/125AARH, SHT NO.- 513AA	513AAZZZ0	
GAV	VLV.GATE	26	26		API-600	BODY-ASTM A 216 GR.WCB,TRIM-13% CR.STEEL	FLGD, 150, B-16.47 B, RF/125AARH, SHT NO.- 513BA	513BAZZZ0	92
GAV/1	VLV.GATE	2	4		API 600/ ISO 10434	BODY-ASTM A 216 GR.WCB,TRIM-13% CR.STEEL	FLGD, 300, B-16.5, RF/125AARH, SHT NO.- 514AA	514AAZZZ0	
GLV	VLV.GLOBE	.5	1.5		BS EN ISO 15761	BODY-ASTM A 105,TRIM-13% CR.STEEL	SW, 800, 3000, B-16.11, SHT NO.-520AA	520AAZZZ0	
GLV	VLV.GLOBE	2	12		BS-1873	BODY-ASTM A 216 GR.WCB,TRIM-13% CR.STEEL	FLGD, 150, B-16.5, RF/125AARH, SHT NO.- 523AA	523AAZZZ0	

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Client :RFCL	**Dept./Sect. :** 16/43
Project :Revival of Ramagundam Fertilizer Complex	
Location RAMAGUNDAM	**Pipe Class : 11A** Sheet 8 of 9

Note :(The shaded portion of PMS body shows Field Fabricated Items)

Input Id.	Item Type	Lower Size (Inch)	Upper Size (Inch)	Sch/ Thk (mm)	Dmn. STD	Material	Description	Commodity Code	Note No
Valves Group									
CHV	VLV.CHECK	.5	1.5		BS EN ISO 15761	BODY-ASTM A 105,TRIM-13% CR.STEEL	SW, 800, 3000, B-16.11, SHT NO.-530AA	530AAZZZ0	
CHV	VLV.CHECK	2	12			BODY-ASTM A 216 GR.WCB,TRIM-13% CR.STEEL	FLGD, 150, B-16.5, RF/125AARH, SHT NO.- 533AA	533AAZZZ0	
CHV	VLV.CHECK	14	24		MNF'STD	BODY-ASTM A 216 GR.WCB,TRIM-13% CR.STEEL	WAF, 150, B-16.5, RF/125AARH, SHT NO.- 533AT	533ATZZZ0	
CHV	VLV.CHECK	26	36		ANSI-B-16.34	BODY-ASTM A 216 GR.WCB,TRIM-13% CR.STEEL	FLGD, 150, B-16.47 B, RF/125AARH, SHT NO.- 533BT	533BTZZZ0	
BLV	VLV.BALL	.5	1.5		BS EN ISO 17292	BODY-ASTM A 105,TRIM-SS 304+PTFE SEATS	SPCL, 800, 3000, JOB'STD, REFER VMS SHT, SHT NO.- 540AA	540AAZZZ0	
BLV	VLV.BALL	14	14		API-6D	BODY- A 216GR.WCB,TRIM-SS 316 + PTFE SEATS	FLGD, 150, B-16.5, RF/125AARH, SHT NO.- 543AA	543AAZZZ0	
PLV	VLV.PLUG	.5	1.5		API-599	BODY-ASTM A 105/ASTM A216.WCB,TRIM-13% CR.STEEL + PTFE SLEEVE	SW, 800, B-16.11, SHT NO.- 550AA	550AAZZZ0	
PLV	VLV.PLUG	2	3		API-599	BODY-ASTM A 216 GR.WCB,TRIM-13% CR.STEEL+PTFE SLEEVE	FLGD, 150, B-16.5, RF/125AARH, SHT NO.- 553AA	553AAZZZ0	
PLV/1	VLV.PLUG	2	4		API-599	BODY-ASTM A 216 GR.WCB,TRIM-13% CR.STEEL + PTFE SLEEVE	FLGD, 300, B-16.5, RF/125AARH, SHT NO.- 554AA	554AAZZZ0	
BFV	VLV.BTRFLY	3	24		API-609	BODY-ASTM A 216 GR.WCB,TRIM-SLEEVE/ LINED EPDM - C.S. DISC	WAF, 150, B-16.5, RF/125AARH, SHT NO.- 563AA	563AAZZZ0	
BFV	VLV.BTRFLY	26	48		API-609/ BS EN 593	BODY-,TRIM-SLEEVE/ LINED EPDM - C.S. DISC	WAF, 150, B-16.47 B, RF/125AARH, SHT NO.- 563BA	563BAZZZ0	
BFV	VLV.BTRFLY	42	60		BS-5155	BODY-ASTM A 216 GR.WCB,TRIM-SLEEVE/ LINED EPDM - C.S. DISC	FLGD, 150, B-16.47 B, RF/125AARH, SHT NO.- 563CA	563CAZZZ0	
NDV	VLV.NEEDLE	.5	1.5		MNF'STD	BODY-ASTM A 105,TRIM-SS304 + STELLITED	SW, 800, 3000, B-16.11, SHT NO.-580AA	580AAZZZ0	
Bolt Group									
BOS	BOLT.STUD	.5	64		B-18.2	BOLT:A193 GR.B7, NUT:A194 GR.2H		BS40404Z0	

Package : IPMCS
Report No. : 50

11A

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Client :RFCL	**Dept./Sect. :** 16/43
Project :Revival of Ramagundam Fertilizer Complex	
Location RAMAGUNDAM	**Pipe Class : 11A** Sheet 9 of 9

Note :(The shaded portion of PMS body shows Field Fabricated Items)

Input Id.	Item Type	Lower Size (Inch)	Upper Size (Inch)	Sch/ Thk (mm)	Dmn. STD	Material	Description	Commodity Code	Note No
Gasket Group									
GAS	GASKET	.5	1.5		B-16.20-ANSI B16.5	SP.WND SS316L+GRAFIL+ I RING	SPIRAL, 600	GK66376Z0	
GAS	GASKET	2	24		B-16.20-ANSI B16.5	SP.WND SS316L+GRAFIL+ I RING	SPIRAL, 150	GK66372Z0	
GAS	GASKET	26	60		B-16.20-ANSI B16.47B	SP.WND SS316L+GRAFIL+ I RING	SPIRAL, 150	GK56372Z0	
GAS	GASKET	62	64		AWWA-C207 CL.D	ARAMIDIC FIBER13%+GRAPH (25%)	FULLFACE, 150, 2 MM	GK2DC22Z0	
GAS/150	GASKET	2	3		B-16.21-ANSI B16.5	NEOPRENE	FULLFACE, 150, 2 MM	GKB1122Z0	
GAS/1500	GASKET	2	3		B-16.20-ANSI B16.5	SOFT IRON	OVALRING, 1500	GK67248Z0	
GAS/600	GASKET	2	24		B-16.20-ANSI B16.5	SP.WND SS316L+GRAFIL+ I RING	SPIRAL, 600	GK66376Z0	
GAS/300	GASKET	2	24		B-16.20-ANSI B16.5	SP.WND SS316L+GRAFIL+ I RING	SPIRAL, 300	GK66374Z0	
Trap/Strainer Group									
PSR	STRNR.PERM	.5	1.5		JOB'STD	B:A105;INT:SS304	SW, Y-TYPE, 800	SP203D510	
PSR	STRNR.PERM	2	12		JOB'STD	B:A216GR.WCB;INT:SS304	FLGD, Y-TYPE, 1500,RF/125AARH	SP2805560	
PSR	STRNR.PERM	14	24	M	JOB'STD	B:A234GR.WPBW;INT:SS304	BW, T-TYPE	SP23644Z0	

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ATTACHMENT-I to Doc No.
A747-999-02-41-ODB-1001

Annexure-O

SITE SPECIFIC SEISMIC SPECTRA

PROJECT : **REVIVAL OF RAMAGUNDAM PROJECT**

OWNER : **Ramagundam Fertilizers and Chemicals Limited**

CONSULTANT : **Engineers India Ltd.**

JOB NO. : **A747**

Rev. No	Date	Purpose	Prepared by	Reviewed by	Approved by
0	09/09/2015	ISSUED FOR IMPLEMENTATION	MBA	GGSA	SVRS

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1.0 SITE SPECIFIC SEISMIC SPECTRA

A site specific seismic spectrum is generated separately for Design Basis Earthquake (DBE) & Maximum Considered Earthquake (MCE) for different damping values in accordance with Clause no. 8.1 of IS 1893 (Part 4): 2005. The spectral accelerations presented here shall be used along with Clause no. 8.3.1 of IS 1893 (Part 4): 2005.

1.1 Spectral Acceleration Coefficients (S_a/g) for Design Basis Earthquake (DBE):

Spectral Acceleration Coefficients (S_a/g) for Design Basis Earthquake (DBE) is given in Table 1 and shown in Figure 1.

S_a/g (damping: 5%)	= 0.08+1.2T	for 0.00<T<0.10 sec
	= 0.20	for 0.10<T<0.40 sec
	$= \frac{0.08}{T}$	for 0.40<T<4.00 sec
	$= \frac{0.32}{T^2}$	for T> 4.00 sec

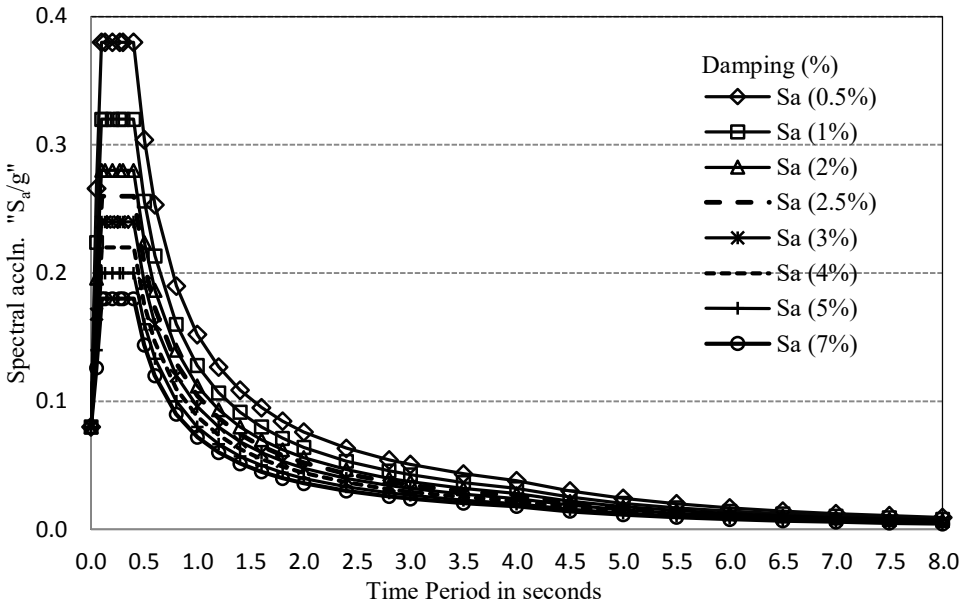


Figure 1: Site specific seismic spectra for DBE

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Table 1: Spectral Acceleration Coefficients (S_a/g) for Design Basis Earthquake (DBE)

Time Period (sec)	Percentage of critical damping							
	0.5	1.0	2.0	2.5	3.0	4.0	5.0	7.0
0.000	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080
0.050	0.266	0.224	0.196	0.182	0.168	0.154	0.140	0.126
0.100	0.380	0.320	0.280	0.260	0.240	0.220	0.200	0.180
0.130	0.380	0.320	0.280	0.260	0.240	0.220	0.200	0.180
0.200	0.380	0.320	0.280	0.260	0.240	0.220	0.200	0.180
0.270	0.380	0.320	0.280	0.260	0.240	0.220	0.200	0.180
0.300	0.380	0.320	0.280	0.260	0.240	0.220	0.200	0.180
0.400	0.380	0.320	0.280	0.260	0.240	0.220	0.200	0.180
0.500	0.304	0.256	0.224	0.208	0.192	0.176	0.160	0.144
0.600	0.253	0.213	0.187	0.173	0.160	0.147	0.133	0.120
0.800	0.190	0.160	0.140	0.130	0.120	0.110	0.100	0.090
1.000	0.152	0.128	0.112	0.104	0.096	0.088	0.080	0.072
1.200	0.127	0.107	0.093	0.087	0.080	0.073	0.067	0.060
1.400	0.109	0.091	0.080	0.074	0.069	0.063	0.057	0.051
1.600	0.095	0.080	0.070	0.065	0.060	0.055	0.050	0.045
1.800	0.084	0.071	0.062	0.058	0.053	0.049	0.044	0.040
2.000	0.076	0.064	0.056	0.052	0.048	0.044	0.040	0.036
2.400	0.063	0.053	0.047	0.043	0.040	0.037	0.033	0.030
2.800	0.054	0.046	0.040	0.037	0.034	0.031	0.029	0.026
3.000	0.051	0.043	0.037	0.035	0.032	0.029	0.027	0.024
3.500	0.043	0.037	0.032	0.030	0.027	0.025	0.023	0.021
4.000	0.038	0.032	0.028	0.026	0.024	0.022	0.020	0.018
4.500	0.030	0.025	0.022	0.021	0.019	0.017	0.016	0.014
5.000	0.024	0.020	0.018	0.017	0.015	0.014	0.013	0.012
5.500	0.020	0.017	0.015	0.014	0.013	0.012	0.011	0.010
6.000	0.017	0.014	0.012	0.012	0.011	0.010	0.009	0.008
6.500	0.014	0.012	0.011	0.010	0.009	0.008	0.008	0.007
7.000	0.012	0.010	0.009	0.008	0.008	0.007	0.007	0.006
7.500	0.011	0.009	0.008	0.007	0.007	0.006	0.006	0.005
8.000	0.010	0.008	0.007	0.007	0.006	0.006	0.005	0.005

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1.2 Spectral Acceleration Coefficients (S_a/g) for Maximum Considered Earthquake (MCE):

Spectral Acceleration Coefficients (S_a/g) for Maximum Considered Earthquake (MCE) is given in Table 2 and shown in Figure 2.

S_a/g (damping: 5%)	= 0.16+2.4T	for 0.00<T<0.10 sec
	= 0.400	for 0.10<T<0.40 sec
	$= \frac{0.16}{T}$	for 0.40<T<4.00 sec
	$= \frac{0.64}{T^2}$	for T>4.00 sec

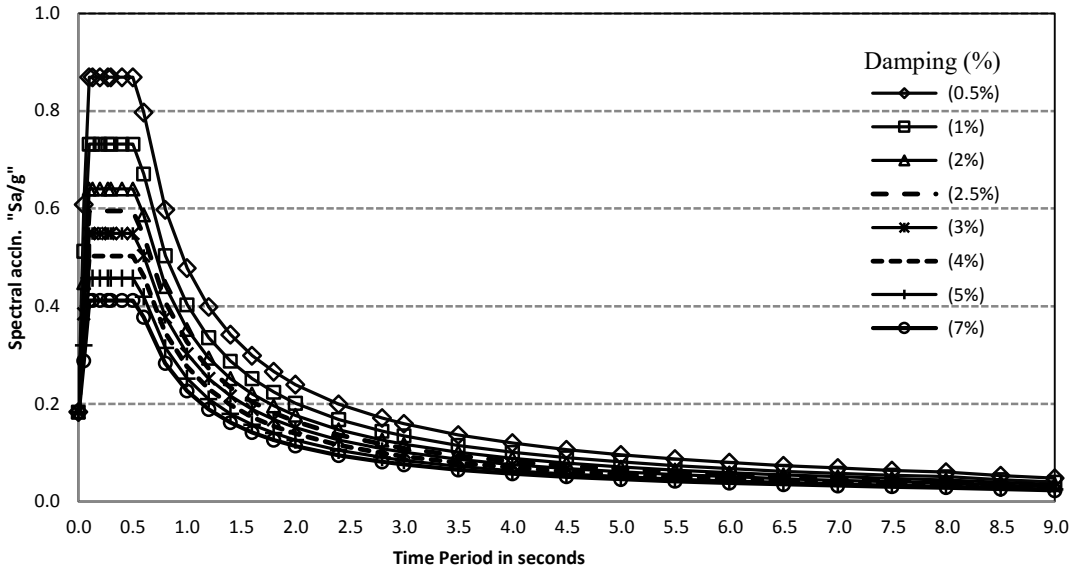


Figure 2: Site specific seismic spectra for MCE

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Table 2: Spectral Acceleration Coefficients (S_a/g) for Maximum Considered Earthquake (MCE)

Time Period (sec)	Percentage of critical damping							
	0.5	1.0	2.0	2.5	3.0	4.0	5.0	7.0
0.000	0.160	0.160	0.160	0.160	0.160	0.160	0.160	0.160
0.050	0.532	0.448	0.392	0.364	0.336	0.308	0.280	0.252
0.100	0.760	0.640	0.560	0.520	0.480	0.440	0.400	0.360
0.130	0.760	0.640	0.560	0.520	0.480	0.440	0.400	0.360
0.200	0.760	0.640	0.560	0.520	0.480	0.440	0.400	0.360
0.270	0.760	0.640	0.560	0.520	0.480	0.440	0.400	0.360
0.300	0.760	0.640	0.560	0.520	0.480	0.440	0.400	0.360
0.400	0.760	0.640	0.560	0.520	0.480	0.440	0.400	0.360
0.500	0.608	0.512	0.448	0.416	0.384	0.352	0.320	0.288
0.600	0.507	0.427	0.373	0.347	0.320	0.293	0.267	0.240
0.800	0.380	0.320	0.280	0.260	0.240	0.220	0.200	0.180
1.000	0.304	0.256	0.224	0.208	0.192	0.176	0.160	0.144
1.200	0.253	0.213	0.187	0.173	0.160	0.147	0.133	0.120
1.400	0.217	0.183	0.160	0.149	0.137	0.126	0.114	0.103
1.600	0.190	0.160	0.140	0.130	0.120	0.110	0.100	0.090
1.800	0.169	0.142	0.124	0.116	0.107	0.098	0.089	0.080
2.000	0.152	0.128	0.112	0.104	0.096	0.088	0.080	0.072
2.400	0.127	0.107	0.093	0.087	0.080	0.073	0.067	0.060
2.800	0.109	0.091	0.080	0.074	0.069	0.063	0.057	0.051
3.000	0.101	0.085	0.075	0.069	0.064	0.059	0.053	0.048
3.500	0.087	0.073	0.064	0.059	0.055	0.050	0.046	0.041
4.000	0.076	0.064	0.056	0.052	0.048	0.044	0.040	0.036
4.500	0.060	0.051	0.044	0.041	0.038	0.035	0.032	0.028
5.000	0.049	0.041	0.036	0.033	0.031	0.028	0.026	0.023
5.500	0.040	0.034	0.030	0.028	0.025	0.023	0.021	0.019
6.000	0.034	0.028	0.025	0.023	0.021	0.020	0.018	0.016
6.500	0.029	0.024	0.021	0.020	0.018	0.017	0.015	0.014
7.000	0.025	0.021	0.018	0.017	0.016	0.014	0.013	0.012
7.500	0.022	0.018	0.016	0.015	0.014	0.013	0.011	0.010
8.000	0.019	0.016	0.014	0.013	0.012	0.011	0.010	0.009

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NOTES :

1. For methodology of calculation of seismic forces and other seismic design criteria, refer latest revisions of the following codes:

   IS 1893 (Part 1) : General provisions and buildings
   IS 1893 (Part 4) : Industrial structures including stack-like structures

2. All parameters shall be in accordance with the above mentioned codes. However, in Table 3, the response reduction factors of some of the structures/equipment specific to the project are included for guidance. In case of ambiguity between the values mentioned here and those mentioned in the code, lower value shall be considered in the analysis/design.
3. For design purpose, spectra shall be considered as per the section 1.1 and 1.2. For any other purpose such as ductile detailing requirement, the site location shall be considered as Zone III.
4. When cylindrical storage tanks are designed as per API 650 using site-specific design methods, the percentage of critical damping and response reduction shall be taken in accordance with the API 650.

Table 3. Response reduction factors of some of the structures/equipments

S. No.	Structure/Equipment	Response Reduction Factor (R)
1	Piperacks: Designed as RC Special Moment Resisting Frame (SMRF).	5.0
2	Piperacks: Designed as RC Special Moment Resisting Frame (SMRF) upto 10 m and steel frame beyond 10 m.	4.0
3	Technological structures: In the direction of concentric braces.	4.0
4	Technological structures: In the direction of Steel moment resisting frame designed as per SP 6(6)	5.0
5	Staircase structure: Steel frame with concentric braces in both directions	4.0
6	Steel Reactors, Columns and Vessels	2.0

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