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|  | सीएसआईआर- भारतीय रासायनिक प्रौद्योगिकी संस्थान CSIR – INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY |  |
| | (वैज्ञानिक तथा औद्योगिक ँ नुसंधान परिषद् / Council of Scientific & Industrial Research | |
| | उप्पल रोड, हैदराबाद / Uppal Road, Hyderabad-500 007, (तलंगाना/Telangana), भारत/India | |
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| निविदा कललए नलमंत्रण। INVITATION TO TENDER | | |

निविदा सं./ TENDER ENQUIRY No. - PUR/IICT/DMS/986/23-24

निविदा दस्तावज / BID DOCUMENT FOR

सामग्रियों का विवरण / ITEMS DESCRIPTION

“Supply & Installation of Pilot Plant Facility for Bulk Chemical of 5KG/H STEP 1 and STEP-2 (Two Steps/modules) as per the Specifications”

e-Bids under **TWO BID System** (Technical Bid and Financial / Price Bid) shall be submitted through Central Public Procurement Portal(CPPP) (URL:<https://etenders.gov.in/>) only

Bidder must necessarily comply with conditions of ‘Make in India(MII)’ Order No. P-45021/2/2017-PP (BE-II) dated 16th September 2020 of Ministry of Commerce and Industry, Government of India (Gol), as amended from time to time, as on the date of issue of tender and related instructions of the Gol.

सम्पर्क/ contact-

भंडार एव क्रय नियंत्रक

Controller of Stores & Purchase

सीएसआईआर- भारतीय रासायनिक प्रौद्योगिकी संस्थान
 CSIR - INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY

उप्पल रोड, तारनाका/Uppal Road, TARNAKA,

हदराबाद/ Hyderabad – 500 007

(तलंगाना /TELANGANA), भारत/ INDIA

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ईमल /E-Mail: csiriicthyd@csiriict.in; cosp@iict.res.in; spodk@iict.res.in

Website: <http://www.iictindia.org>

| | | |
|---|--|---|
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| | (वैज्ञानिक तथा औद्योगिक ंनुसंधान परिषद् / Council of Scientific & Industrial Research | |
| | उप्पल रोड, हैदराबाद / Uppal Road, Hyderabad-500 007, (तलंगाणा/Telangana), भारत/India | |
| | दूरभाष/Tel: +91 40 27191245 / 2719 1243 / 27191241 ई-मेल/Email: csiriicthyd@csiriict.in | |

TENDER ENQUIRY No. - PUR/IICT/DMS/986/23-24

Dt. 07-11-2023

INVITATION FOR BIDS / NIT

Sir / Madam

Sub: Quotation for Supply, Installation and commissioning of “Pilot Plant Facility for Bulk Chemical STEP1 and STEP 2”_as per the specifications – Reg.

CSIR- Indian Institute of Chemical Technology(IICT), Hyderabad, India is one of the premier constituent laboratory of Council of Scientific and Industrial Research, an autonomous body under the aegis of Department of Scientific & Industrial Research(DSIR), Government of India, New Delhi. CSIR-IICT is a science and knowledge based Research, Development and Consulting organization. It is internationally known for its excellence in scientific research in chemical sciences.

2. Director, CSIR- IICT, Hyderabad invites **ONLINE BIDS** from manufacturers and their authorized distributors and Indian Agent of Foreign principals, if any, under the provisions of various policy initiatives and notifications issued by various Ministries / Department of the Govt. of India for purchase of items listed below:

| Sl. No. | Description | Quantity | Single/ Two bid | Bid Security (EMD) |
|---------|--|-------------|-----------------|---|
| 1 | Supply, installation and commissioning of “Pilot Plant Facility for Bulk Chemical Step 1 and Step 2”, as per the specifications and details indicated under Chapter 4 | 1 Unit each | Two bid | EMD to be submitted in the form of BSD Bid Securing Declaration(BSD) Form as per the FORM-3 OR Earnest Money Deposit FOR Rs 5,50,000.00 |

3. **E-Bids** are invited through the electronic tendering process and the Tender Document can be downloaded from the e-Tender Central Public Procurement Portal (CPPP) of Government of India, <http://etenders.gov.in>. Copy of the Tender document is also available on CSIR-IICT website www.iictindia.org. The submission of **e-bids** will be only through the e-tender portal <https://etenders.gov.in>. Bids will not be accepted in any other form. The prospective bidders should adhere to deadlines specified in tender details screen corresponding to this tender on e-tender portal <https://etenders.gov.in>

4. A **Pre-bid conference(PBC)** will be held on scheduled as mentioned below. All prospective bidders are requested to kindly submit their queries to the address indicated above so as to reach the Controller of Stores and Purchase at least **two days** before PBC-

| | Date | Time in Hours IST | Venue |
|---------------------------------|-------------------|-------------------|---|
| Pre-bid conference (PBC) | 16.11.2023 | Fore noon | Stores & Purchase Meeting Room, CSIR-IICT, Hyderabad |

5. The bid have to be submitted only after **PBC** scheduled on **NA** and after taking a note of the **PBC minutes**, which will be hosted in IICT website www.iictindia.org (under tenders column) and in Central Public Procurement Portal(CPPP).

Note: - Tender specific OEM Authorization certificate for this particular tender number is mandatory.

Last Due Date for submission: 06-12-2023 up to 1300 hrs. (IST)

Date of Opening Technical Bid: 07-12-2023 - 1430 hrs. onward (IST)

6. This is an Open Tender Enquiry(O TE) and is open to all local bidders meeting the Tender requirements as per the Make in India(MII) order. Bidder must necessarily comply with conditions of 'Make in India' Order No. P-45021/2/2017-PP (BE-II), dated 16th September 2020 of the Ministry of Commerce and Industry, Government of India(Gol), as amended from time to time, as on the date of issue of tender and related instructions of the Government of India.

This tender document is published on CPP Portal(CPPP) and also on CSIR-IICT website-<https://www.iictindia.org/tenders.php> and can be downloaded from there "FREE of COST".

CORRIGENDUM, IF ANY, SHALL BE PUBLISHED ON THE PORTAL / WEBSITE ONLY AND NO SEPARATE NEWSPAPER ADVERTISEMENT OR COMMUNICATION SHALL BE ISSUED.

7. This "Invitation to bid (ITB)' is open only to all 'Class I and Class II suppliers' complying with the latest Government of India(Gol) instructions related to 'Make in India(MII)'.

8. In case of authorized dealer/agent quoting on behalf of their principal/ Original Equipment Manufacturer(OEM) –

- i. One dealer/agent cannot represent two OEM sor quote on their behalf in this particular tender enquiry.
- ii. One OEM can also authorise only one agent/ dealer.
Hence, there can be only **one bid** from the following:
 - a) The Principal /OEM directly or through authorized dealer/ agent on his behalf; and
 - b) One authorized dealer/ agent on behalf of only one principal.

9. ADDRESS FOR COMMUNICATION:

**Controller of Stores & Purchase
CSIR-INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY(IICT),
UPPAL ROAD, HYDERABAD-500 007, TELANGANA, INDIA.
Phone No.040 – 2719 1243/ 1245/ 1241/ 3111.**

Email: csiriicthyd@csiriict.in / cosp@iict.res.in / spodk@iict.res.in

10. Bids will be opened **ONLINE** in CPP Portal(**CPPP**). If the bids cannot be opened on scheduled due date/ time due to any technical or administrative issues (holidays, office closure etc.), the same will be opened on next working day, as the case maybe.

11. Purchaser follows Govt. of India's public procurement policies:

Important Note for MSEs / Start Up India / Make In India - DPIIT Policy Bidders · Although provisions related to Government's public procurement purchase preference policy are briefly stated in the tender document under relevant clauses. Any bidder seeking exemptions / benefits / preferences under MSEs / Start Up India / Make in India / DPIIT, Ministry of Commerce and Industry policy or any other policy / scheme of the Government of India, which is currently in force **MUST** specifically **declare** its eligibility in "**Bidder Information Form**" to avail the benefit/preference sought under the relevant policy of the Government at the time of bid submission itself while enclosing all supporting documents / certificates etc. for claiming such benefits, if so desired . The bidder must also clearly highlight the provisions of the specific policy with respect to the benefit/preference being sought by the bidder for which it meets the eligibility conditions with relevant documents in support of the same.

IF THE BIDDER FAILS TO DECLARE ITS STATUS AND/ OR FAILS TO CLAIM THE ELIGIBLE SPECIFIC POLCIY BENEFIT/ PREFERENCE/ EXEMPTION ETC. AND/OR FAIL TO SUBMIT NECESSARY DOCUMENTS/ CERTIFICATES IN SUPPORT OF ITS CLAIM AT THE TIME OF BIDDING ITSELF, ITS CLAIM FOR SUCH BENEFIT SHALL NOT BE ENTERTAINED AT A LATER STAGE IN THE BIDDING PROCESS.

However, a brief **overview** of the main tendering related provisions of various policies is provided in **Annexure VII** of this bid document.

12. The **Director, CSIR-IICT, Hyderabad** reserves the right to **accept or reject** any bids or accept all tenders either in part or in full or to split the order, or to annul the bidding process.

The Bid prepared by the Bidder shall include the following: -

| Bid Securing Declaration / Earnest Money Deposit (EMD) | |
|---|---|
| a) | BID Security: The Bid Securing Declaration Form (BSD) as per the FORM-3 or proof of submission of Earnest Money Deposit (EMD) as per Tender Document terms shall accompany the Technical Bid (Part I) , failing which bid shall be rejected summarily. Scanned copy of EMD should be uploaded along with the E-bid and original shall be submitted to this office on or before last day of bid submission. NOTE: Bidders submitting Bid Securing Declaration (BSD) in prescribed Form need not submit any EMD separately. |

निबंधन एवं शर्तें/ Terms & Conditions

1. **E-Bids** are invited through the electronic tendering process and the Tender Document can be downloaded '**free of cost**' from the e-Tender portal of Central Public Procurement Portal(**CPPP**) of the Government of India i.e. <https://etenders.gov.in>. A copy of the Tender Document is also available on CSIR-IICT Website, <http://www.iict.res.in> for information. However, the submission of e-Bids will be

only through the CPP e-Tender portal <https://etenders.gov.in>. **Bids will not be accepted in any other form.**

2. For participation in e-procurement all bidders (~~including foreign bidders~~) need to enroll themselves on the Central Public Procurement Portal (URL:<https://etenders.gov.in>) which will be **free of cost**. For further information, kindly refer "Bidder Manual Kit" in the said portal.
3. Only enrolled/registered bidders with the above said portal shall be allowed to participate in the e-tendering process.
4. The quotation must be in the form furnished by the Purchaser and should be free from corrections/erasures. In case there is any unavoidable correction, it should be properly attested. If not, the quotation will not be considered. ~~Hand written Quotations will not be considered.~~
5. It may kindly be noted that your online **Bid** should be in **Single BID System / Two BID System**.
6. In the event of award of Contract in your favour, you need to submit a **Performance Bank Guarantee** valid for a period of **2 Months** beyond the Warranty period of **12 months within a period of 21 days from the date of receipt of the Purchase order(PO)**. ~~(Not Applicable)~~
7. Price quoted should be **net** and valid for a minimum period of **90 days** from the date of opening of the quotation.
8. **It may be noted that Conditional / Unsigned tenders shall not be considered.**
9. The bidder must submit the applicable **Price Schedule Form** as annexed to the **BOQ** in etenders.gov.in / Tender Document in support of Price Bid details.
10. Complete specifications with manufacturer's Name and address should be given while quoting. **Supporting literature / brochures / pamphlets / technical data sheets / drawings** must be enclosed with the quotation wherever applicable.
11. Prices are required to be quoted in **units** indicated in the enquiry. When quotations are given in terms of other units, relationship between two sets of units should be furnished. Quantity discounts, if any should also be indicated. The items should be quoted indicating the serial No. of our RFQ.
12. Currency of the Quote essentially be **Indian Rupee only**. ~~However, multi-currency bidding is allowed in case of proprietary equipment procured from overseas manufacturer and spares and consumables of such proprietary equipment / spares, etc. eligible for Global Tender Enquiry (GTE) permitted in terms of Govt. of India orders No. No. F/12/17/2019/PPD dt. 29th Oct., 2020 and No. F.20/45/2020-PPD dt. 8th Jan., 2021, as amended from time to time.~~
13. **Delivery period** required for supplying the material should be invariably specified in the quotation. The offered delivery period shall have to be strictly adhered to in case an order is placed.
14. **Liquidated Damages** The applicable rate is **0.5%** per week and maximum deduction is **10%** of the contract price, at the discretion of the Competent Authority, CSIR- IICT.
15. If the deliveries/service are not maintained and due to that account the purchaser is forced to buy the material/service at your risk and cost from elsewhere, the loss or damage that may be sustained there by will be recovered from the defaulting supplier.
16. All supplies are subject to inspection and approval before acceptance. Manufacturer warranty certificates and manufacturer/Government approved lab test certificate shall be furnished along with the supply, wherever applicable.
17. **IT / GST TDS** would be recovered as per applicable rule / regulations / provisions of applicable Indian laws.
18. Kindly furnish your **Permanent Account No.(PAN) & GST Number**, etc. in your quotation for our records.
19. Tender conditions (printed on the reverse), if any, or otherwise sent along with the tender **shall not be binding** on us.
20. This Institute intends to extend purchase preference policy benefits available to bidders in terms of policies and instructions issued by the Govt. of India in pursuance of 'Micro, Small and Medium

Enterprises(MSME) Development Act, 2006' as made applicable, as on the date of issue of this tender inquiry.

A supplier or bidder shall be considered to be from a country if (i) the entity is incorporated in that country, or ii) a majority of its shareholding or effective control of the entity is exercised from that country; or (iii) more that 50% of the value of the item being supplied has been added in that country. Indian suppliers shall mean those entities which meet any of these tests with respect to India.

MSEs would be treated as owned by Scheduled Caste/Scheduled Tribe enterprises as under:

- a) In the case of proprietary MSE, the proprietor(s) shall be SC/ST.
- b) In the case of partnership MSE, the SC/ST partners shall be holding at least 51% (fifty-one percent) shares in the unit.
- c) In the case of Private Limited Companies, at least 51% (fifty-one percent) share shall be held by SC/ST promoters

MSEs owned by women shall also be determined as per the above analogy/criteria.

The instructions regarding MSEs, as amended from time to time as on the date of Tender Inquiry shall be made applicable.

21. **Jurisdiction** - All disputes related to this tender shall be subject to the local court of competent jurisdiction at **HYDERABAD, Telangana, India** only.

22. If bidder is Indian agent of foreign principal, the following instructions shall be complied -

- i. Bidder must **necessarily comply** with conditions of '**Make in India**' Order No. **P-45021/2/2017-PP (BE-II) dated 16th September 2020** of Ministry of Commerce and Industry, Government of India(Gol), as amended from time to time on the date of issue of tender and related instructions of the Gol. The relaxation to invite **GTE** for spares of equipment from OEM extended vide Govt. of India, Ministry of Finance OM No. F/12/17/2019/PPD dt. 29th Oct., 2020 and provisions for inviting **GTE** for specialized equipment required for research purposes, and spares consumables for such equipment in terms of Govt. of India, Ministry of Finance No. F.20/45/2020-PPD dt. 8th Jan., 2021 shall be applicable in in the relevant cases as per instructions of the Govt. of India, as amended from time to time.
- ii. Bidder shall **comply with restrictions under Rule 144 (xi) of the GFR, 2017 related to restrictions on participation of Foreign Bidders and their Authorized Indian Agent/ Dealer** in terms of **Order No. P-45021/112/2020-PP(BE-II) (E-43780) dated 24.08.2020** of the Ministry of Commerce and Industry, Department for Promotion of Industry and Internal Trade and Govt. of India, Ministry of Finance, Dept. of Expenditure, PP Division OM No. F-7/10/2021/PPD (1) dt. 23.02.2023 and related instruction, as amended from time to time as on the date of issue of tender.

23. This Institute is registered with Dept. of Scientific & Industrial Research(DSIR), Govt. of India and concessional Customs Duty and all imports covered under notification No.51/96-Customs dated 23.07.1996, Notification No.47/2017-Integrated Tax (Rate) and Notification No.45/2017-Central Tax (Rate) both dated 14th November, 2017, as amended from time to time. There is no concession available in case of GST(IGST/CGST/SGST). This registration is valid till **31.08.2026**.

24. The Director, CSIR- Indian Institute of Chemical Technology(IICT), Hyderabad reserves the right to accept or reject any or all tenders / offers either in part or in full or to annul the tender process at any stage or to split the order without assigning any reasons thereof.

25. IMPORTANT NOTE:

- i. KINDLY ENCLOSE COPIES OF PURCHASE ORDERS OF SAME/SIMILAR ITEMS (EVEN IF MODEL NUMBER / ACCESSORIES DIFFER) THAT YOU HAVE RECEIVED FROM ANY GOVERNMENT INSTITUTES/ UNIVERSITIES / CSIR INSTITUTES IN PARTICULAR, DURING THE LAST 03 YEARS.
- ii. IF NO SAME/SIMILAR EQUIPMENT HAS BEEN SUPPLIED TO ANY GOVERNMENT INSTITUTES/ UNIVERSITIES/CSIR INSTITUTES IN PARTICULAR DURING THE LAST 03 YEARS, PLEASE PROVIDE AN UNDERTAKING STATING 'WE CERTIFY THAT NEITHER WE NOR OUR PRINCIPALS (WHEREVER APPLICABLE) HAS SOLD SAME / SIMILAR ITEM TO ANY GOVERNMENT INSTITUTES / UNIVERSITIES / CSIR INSTITUTES IN PARTICULAR'.
- iii. REASONABILITY OF PRICES:
 - A) PLEASE QUOTE BEST MINIMUM PRICES APPLICABLE FOR A PREMIER RESEARCH INSTITUTION, LEAVING NO SCOPE FOR ANY FURTHER NEGOTIATIONS ON PRICES.
 - B) A CERTIFICATE SHOULD BE GIVEN TO THE EFFECT THAT THE QUOTED PRICES ARE THE MINIMUM AND THEY HAVE NOT QUOTED THE SAME ITEM ON LESSER RATES THAN THOSE BEING OFFERED TO CSIR-IICT TO ANY OTHER CUSTOMERS NOR THEY WILL DO SO TILL THE VALIDITY OF OFFER OR EXECUTION OF THE PURCHASE ORDER, WHICHEVER IS LATER.

25. The address for obtaining further information:

CONTROLLER OF STORES & PURCHASE,

CSIR-IICT, Uppal Road,

Tarnaka, Hyderabad - 500007, India.

Tel # : 00 91 40 2719 1243/1241/1245

Email: csiriictyd@csiriict.in / spodk@iict.res.in

Website: <http://www.iictindia.org>

Sd/-
(Dharmendra Kumar)
Controller of Stores & Purchase Officer
For and on behalf of CSIR

CRITICAL DATE SHEET

| क्रमांक Sl. No. | प्रक्रम / Stage | दिनांक और समय /Date & Time |
|--------------------|---|---|
| 1. | प्रकाशन का दिनांक और समय Publish Date & Time | 07-11-2023 |
| 2. | दस्तावेज डाउनलोड का प्रारंभ दिनांक और समय Document Download Start Date & Time | 07-11-2023 |
| 3. | संदर्भ / सवाल पूछना की अंतिम दिनांक और समय Last Date & time for receipt of queries | 15.11.2023 |
| 4. | बोली पूर्व सम्मेलन, यदि हो तो Pre-bid Conference, if any | 16-11-2023 on Fore noon onward in Stores & Purchase Meeting Room of CSIR-IICT, Hyderabad |
| 5. | बोली जमा करना की प्रारंभिक दिनांक और समय Bid Submission Start Date & time | 23-12-2023 - 2.30 PM |
| 6. | बोली जमा करना की अंतिम दिनांक और समय Bid Submission End Date & Time | 06-12-2023 - 01.00 PM |
| 7. | बोली खोल जान की दिनांक और समय Bid Opening Date & Time | 07-12-2023 - 02.30 PM |
| | Mode of submission of Bid | e-procurement Bids ONLY THROUGH ONLINE ON THE Central Public Procurement Portal of e-TENDERS: (WEB LINK: https://etenders.gov.in) HARD COPIES OF QUOTATIONS WILL NOT BE ACCEPTED BY IICT |

* The final dates shall be as per the dates given in CPPP Portal.

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CHAPTER – 1

INSTRUCTIONS TO BIDDERS

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A. Introduction

1.1. **Eligible Bidders**

- 1.1.1 This is an **Open Tender Enquiry(OTE)** and is open only to **Indian Manufacturers and their Authorized Dealers/Agents** meeting the tender requirements of '**Make in India(MII)**' policy of the Govt. of India. Overseas Manufacturers or their authorized Indian Agent not satisfying the requirements of said **MII policy** of the Govt. of India are **not eligible** to participate in this tender.
- 1.1.2 Bidders should not be associated, or have been associated in the past, directly or indirectly, with a firm or any of its affiliates which have been engaged by the Purchaser to provide consulting services for the preparation of the design, specifications, and other documents to be used for the procurement of the goods to be purchased under this Invitation of Bids.
- 1.1.3 Bids from Joint Ventures, Consortium or Associations so long as they are formed and registered prior to the bid submission date.
- 1.1.4 The bidders who have been temporarily suspended or removed from the list of registered suppliers by the purchaser or banned from Ministry/country wide procurement shall **not** be ineligible for participation in the bidding process.
- 1.1.5 "Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial judicial person not falling in any of the descriptions of bidder stated hereinbefore, including any agency branch or Officer controlled by such person, participating in a procurement process.
- 1.1.6 "Bidder from a country which shares a land border with India" for the purpose of this order means:
- i. An entity incorporated, established or registered in such a country; or
 - ii. A subsidiary of an entity incorporated, established or registered in such a country; or
 - iii. An entity substantially controlled through entities incorporated, established or registered in such a country; or
 - iv. An entity whose beneficial owner is situated in such a country; or
 - v. An Indian (or other) agent of such an entity; or
 - vi. A natural person who is a citizen of such a country; or
 - vii. A consortium or joint venture where any member of the consortium or joint venture fails under any of the above
- 1.1.7 The beneficial owner for the purpose of above will be as under
1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more judicial person, has a controlling ownership interest or who exercise control through other means.
Explanation -
 - a) "Controlling ownership interest" means ownership of a or entitlement to more than twenty-five percent of shares or capital or profits of the company;
 - b) "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders' agreements or voting agreements.
 2. In case of a partnership firm, the beneficial owner is the natural persons(s) who, whether acting alone or together, or through one or more judicial person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;
 3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more judicial

person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals;

4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;
5. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.

1.2 Cost of Bidding

- 1.2.1 The Bidder shall bear all costs associated with the preparation and submission of its bid, and "the Purchaser", will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.

1.3 Code of Integrity

- 1.3.1 The bidders/suppliers should sign a declaration about abiding by the Code of Integrity for Public Procurement in bid documents. In case of any transgression of this code, the bidder is not only liable to be removed from the list of registered suppliers, but it would be liable for other punitive actions such as cancellation of contracts, banning and blacklisting or action in Competition Commission of India.
- 1.3.2 **Code of integrity for Public Procurement:** The Purchaser as well as bidders, suppliers, contractors and consultants should observe the highest standard of ethics and should not indulge in the following prohibited practices, either directly or indirectly, at any stage during the procurement process or during execution of resultant contracts:
 - i. "**corrupt practice**": making offers, solicitation or acceptance of bribe, rewards or gifts or any material benefit, in exchange for an unfair advantage in the procurement process or to otherwise influence the procurement process or contract execution;
 - ii. "**Fraudulent practice**": any omission or misrepresentation that may mislead or attempt to mislead so that financial or other benefits may be obtained or an obligation avoided. This includes making false declaration or providing false information for participation in a tender process or to secure a contract or in execution of the contract;
 - iii. "**anti-competitive practice**": any collusion, bid rigging or anti-competitive arrangement, or any other practice coming under the purview of the Competition Act, 2002, between two or more bidders, with or without the knowledge of the purchaser, that may impair the transparency, fairness and the progress of the procurement process or to establish bid prices at artificial, non-competitive levels.
 - iv. "**coercive practice**": harming or threatening to harm, persons or their property to influence their participation in the procurement process or affect the execution of a contract;
 - v. "**conflict of interest**": participation by a bidding firm or any of its affiliates that are either involved in the consultancy contract to which this procurement is linked; or if they are part of more than one bid in the procurement; or if the bidding firm or their personnel have relationships or financial or business transactions with any official of purchaser who are directly or indirectly related to tender or execution process of contract; or improper use of information obtained by the (prospective) bidder from the purchaser with an intent to gain unfair advantage in the procurement process or for personal gain; and
 - vi. "**Obstructive practice**": materially impede the purchaser's investigation into allegations of one or more of the above mentioned prohibited practices either by deliberately destroying, falsifying, altering; or by concealing of evidence material to the investigation; or by making

false statements to investigators and/or by threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or by impeding the purchaser's Entity's rights of audit or access to information;

1.3.3 Obligations for Proactive disclosures

- i) The Purchaser as well as bidders, suppliers, contractors and consultants, are obliged under Code of Integrity for Public Procurement to *suomoto* proactively declare any conflicts of interest (coming under the definition mentioned above – pre- existing or as and as soon as these arise at any stage) in any procurement process or execution of contract. Failure to do so would amount to violation of this code of integrity; and
- ii) The bidder must declare, whether asked or not in a bid document, any previous transgressions of such a code of integrity with any entity in any country during the last three years or of being debarred by any other Procuring Entity. Failure to do so would amount to violation of this code of integrity;
- iii) To encourage voluntary disclosures, such declarations would not mean automatic disqualification for the bidder making such declarations. The declared conflict of interest would be evaluated and mitigation steps, if possible, taken by the purchaser. Similarly, voluntary reporting of previous transgressions of Code of Integrity elsewhere may be evaluated and barring cases of various grades of debarment, an alert watch may be kept on the bidder's actions in the tender and subsequent contract.

1.3.4 Punitive Provisions

Without prejudice to and in addition to the rights of the Purchaser to other penal provisions as per the bid documents or contract, if the Purchaser comes to a conclusion that a (prospective) bidder/supplier, directly or through an agent, has violated this code of integrity in competing for the contract or in executing a contract, the purchaser may take appropriate measures including one or more of the following:

- i) If his bids are under consideration in any procurement:
 - a) Forfeiture or encashment of biosecurity;
 - b) Calling off of any pre-contract negotiations; and
 - c) Rejection and exclusion of the bidder from the procurement process.
- ii) If a contract has already been awarded
 - a) Cancellation of the relevant contract and recovery of compensation for loss incurred by the purchaser;
 - b) Forfeiture or encashment of any other security or bond relating to the procurement;
 - c) Recovery of payments including advance payments, if any, made by the purchaser along with interest thereon at the prevailing rate.
- iii) Provisions in addition to above:
 - a) Removal from the list of registered suppliers and banning/debarment of the bidder from participation in future procurements of the purchaser for a period not less than one year;
 - b) In case of anti-competitive practices, information for further processing may be filed under a signature of the Joint Secretary level officer, with the Competition Commission of India;
 - c) Initiation of suitable disciplinary or criminal proceedings against any individual or staff found responsible.

B. The Bidding Documents

1.4 Cost of Tender Documents

1.4.1 The bidding documents are available to bidders as indicated in the Invitation for Bids/NIT, **free of cost.**

1.5 Content of Tender Documents

1.5.1 The goods required, bidding procedures and contract terms are prescribed in the bidding documents which should be read in conjunction. The bidding documents, apart from the invitation for bids and Critical Date Sheet have been divided into **8** Chapters as under:

Chapter 1: Instructions to Bidder (ITB)

Chapter 2: General Conditions of Contract (GCC) and Special Condition of Contract (SCC)

Chapter 3: Schedule of Requirements

Chapter 4: Specifications and Allied Technical Details

Chapter 5: Price Schedule Forms

Chapter 6: Qualification requirements

Chapter 7: Contract Form

Chapter 8: Other Standard Forms comprising:

| Sl. No. | Name |
|---------|--|
| 01. | Bidder Information Form |
| 02. | Manufacturers' Authorization Form (MAF) |
| 03. | Bid Securing Declaration (BSD) |
| 04. | Performance Statement Form |
| 05. | Deviation Statement Form |
| 06. | Service Support Detail Form |
| 07. | Bid Form |
| 08. | Performance Security (PS) Form |
| 09. | Acceptance Certificate Form |
| 10. | Integrity Pact (IP) |
| 11. | Format of declaration of abiding by the 'Code of integrity and conflict of interest; |
| 12. | Price Schedule |
| 13. | Format of Affidavit of self-certification regarding domestic value addition |
| 14. | Format of Certificate to be provided by bidder in case of subcontracting. |
| 15. | Format of self-declaration to be provided by bidder |

1.5.2 The Bidder is expected to examine all instructions, forms, terms, and specifications in the bidding documents. Failure to furnish all information required by the bidding documents or submission of a bid not substantially responsive to the bidding documents in every respect will be at the Bidder's risk and may result in rejection of its bid.

1.6 Clarification of tender documents

1.6.1 A prospective Bidder requiring any clarification of the Bidding Documents shall contact the Purchaser **in writing in advance before the PBC/~~due date of opening~~**. Should the Purchaser deem it necessary to amend the Bidding Documents as a result of a clarification, it shall do so following the procedure under Clause relating to amendment of Bidding Documents and Clause relating to deadline for submission of bids.

The queries, clarifications and amendments issued would also be hosted on the website of the Purchaser for the benefit of the other prospective bidders.

1.7 Amendment of Tender Documents

1.7.1 At any time prior to the deadline for submission of bids, the Purchaser may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder, **modify** the tender documents by amendment. The same would also be hosted on the website of the Purchaser and on <https://eprocure.gov.in/epublish/app>. and all prospective bidders are expected to surf the website before submitting their bids to take cognizance of the amendments.

1.7.2 In order to allow prospective bidders' reasonable time in which to take the amendment into account in preparing their bids, the Purchaser, at its discretion, may extend the deadline for the submission of bids and host the changes on the website of the Purchaser and on <https://eprocure.gov.in/epublish/app>.

1.7.3 If a bid is submitted without considering these amendments/clarifications (issued online / Website), it will be treated as non-responsive and rejected summarily.

1.7.4 In order to allow prospective bidders' reasonable time in which to take the amendment into account in preparing their bids, the Purchaser, at its discretion, may extend the deadline for the submission of bids and host the changes on the <https://eprocure.gov.in/epublish/app> and website of the Purchaser

C. PREPARATION OF BIDS

1.8. Language of Bid

1.8.1 The bid prepared by the Bidder, as well as all correspondence and documents relating to the bid exchanged by the Bidder and the Purchaser shall be written in English language.

1.8.2 The Supplier shall bear all costs of translation, if any, to the English language and bear all risks of the accuracy of such translation, for documents provided by the Supplier.

1.9 Purchase Preference Policies:

1. Public Procurement Policy of the Govt. of India for MSEs, 2012, as amended from time to time
2. Purchase Preference under 'MAKE IN INDIA(MII) Policy of the Govt. of India, 2020 as amended from time to time

1.10 Documents Comprising the Bid

1.10.1 The bid prepared by the Bidder shall include documents as under:

A. Technical bid

- a. Bidder Information Form;
- b. Declaration abiding by the 'Code of Integrity and no conflict of interest for public

- procurement’;
- c. **Bid security** as specified in the Invitation to Bids;
 - d. Service support details form;
 - e. Deviation Statement Form;
 - f. Performance Statement Form;
 - g. Manufacturer’s Authorization Form(MAF) along with a certified copy of the Agency Agreement between the bidders and the Indian Agent.
 - h. Documentary evidence establishing that the bidder is eligible to bid and is qualified to perform the contract if its bid is accepted;
 - i. Documents establishing goods eligibility and conformity to bidding document; indicating the Indian Customs Tariff Number (ICT & HSN No.)
 - j. Self-certification that the item offered meets the minimum **local content** as *per class of suppliers* and shall give details of the location(s) at which the local value addition is made in case the bidder wishes to avail the benefits under the ‘Make in India’ policy, *if applicable*. The certification will be done by the authorised signatory as envisaged by the Order No. P-45021/2/2017-PP (BE-II) dated 16th September 2020, as amended from time to time (**if applicable**).
 - k. Bill of materials showing all the part numbers, detailed specifications with quantities of all items individually.
 - l. MSME CERTIFICATE - If applicable
 - m. Valid Registration Certificate for Bidders as per order no. P-45021/112/2020-PP (BE- II)(E-43780) dated 24.08.2020 (if applicable).
- B Price bid**
- (a) Bid form;
 - (b) Applicable Price Schedule Form;

1.11. Bid form and price schedule

- 1.11.1 The bidder shall complete the **Bid Form** and the appropriate price schedule form furnished in the bidding documents. These forms must be completed without any alterations to its format and no substitutes shall be accepted. All blank spaces shall be filled in with the information requested. The Bid Form and the appropriate Price Schedule form shall be submitted in accordance with Clause 1.18.3 of the bidding documents.

1.12. Bid Prices

- 1.12.1 The Bidder shall indicate on the appropriate price schedule form, the unit prices and total bid prices of the goods it proposes to supply under the contract.
- 1.12.2 Prices indicated on the price-schedule form shall be entered separately in the following manner:
 - (a) **For Goods manufactured within India.**
 1. The price of the goods quoted Ex-works including taxes already paid.
 2. **GST** and other taxes, explicitly mentioning **applicable rate** if any which will be payable on the goods if the contract is awarded.
 3. The charges for inland transportation, insurance and other local services required for delivering the goods at the desired destination as specified in the price schedule form.
 4. Wherever applicable, the cost towards the installation, commissioning, spares,

extended warranty, AMC/CMC, site preparation and training including any incidental services, if any.

1.12.3 Where there is no mention of packing, forwarding, freight, insurance charges, taxes etc. such offer shall be rejected as incomplete.

1.12.4 The **price** quoted shall remain **fixed** during the contract period and shall not vary on any account

1.12.5 All lots and items must be listed and priced separately in the Price Schedules. If a Price Schedule shows items listed but not priced, their prices shall be assumed to be included in the prices of other items. Lots or items not listed in the Price Schedule shall be assumed to be not included in the bid.

1.12.6 The Purchaser is registered with Dept. of Scientific & Industrial Research(DSIR), Govt. of India and concessional Customs duty are leviable for its procurement related to R&D use vide notification no. 54/2002- Customs on all imports covered under notification No.51/96-Customs dated 23.07.1996 Notification No.47/2017-Integrated Tax (Rate) and Notification No.45/2017-Central Tax (Rate) both dated 14th November, 2017. **No concession is available in respect of GST (IGST/CGST/SGST), which needs to be paid at applicable rate.**

1.12.7 Please state specifically in your offer whether the duties and taxes are extra over the prices quoted, failing which it will be presumed that the prices are inclusive of taxes and duties and no claim would be entertained for statutory variations at a later date.

1.12.8 Stipulations like “GST is presently not applicable but the same will be charged if it becomes leviable later on” is **not acceptable**, unless in such cases it is clearly stated that GST will not be charged if the same becomes applicable later on due to increase in turn over etc. If a bidder fails to comply with this requirement, his quoted price shall be loaded with the quantum of duty which is normally applicable on the item in question for the purpose of comparison with the prices of other tenderers.

Note : All payments due under the contract shall be paid after deduction of statutory levies at source (like ESIC, IT-TDS, GST-TDS etc.,) wherever applicable.

1.13. Bid Currencies

1.13.1 **Prices** shall be quoted in **Indian Rupees** only.

1.14. Documents Establishing Bidder's Eligibility and qualifications

1.14.1 The bidder shall furnish, as part of its bid, documents establishing the bidders' eligibility to bid and its qualification to perform the contract if its bid is accepted.

1.14.2 The documentary evidence of the bidder's qualification to perform the contract if the bid is accepted shall establish to the purchaser's satisfaction that;

- a) The bidder meets the qualification criteria listed in bidding documents if any.
- b) Bidder who doesn't manufacture the goods it offers to supply shall submit Manufacturers' Authorization Form (MAF) using the form specified in the bidding document to demonstrate that it has been duly authorized by the manufacturer of the goods to quote and/or supply the goods.
- c) **'Make in India' local content** declaration - if applicable
- d) **MSE certificate**, if applicable.
- e) Registration certificate as per order no. P-45021/112/2020-PP(BE-II)(E-43780) dated 24.08.2020, if applicable

1.14.3 Conditional tenders shall not be accepted.

1.15 Documents Establishing Goods' Eligibility and Conformity to Bidding Documents

- 1.15.1 To establish the goods' eligibility, the documentary evidence of the goods and services eligibility shall consist of a statement on the **country of origin** of the goods and services offered which shall be confirmed by a certificate of origin at the time of shipment.
- 1.15.2 To establish the conformity of the goods and services to the specifications and schedule of requirements of the bidding document, the documentary evidence of conformity of the goods and services to the bidding documents may be in the form of literature, drawings and data, and shall consist of:
- (a) A detailed description of the essential technical and performance characteristics of the goods;
 - (b) A list giving full particulars, including available sources and current prices, of spare parts, special tools, etc., necessary for the proper and continuing functioning of the goods during the warranty period following commencement of the use of the goods by the Purchaser in the Priced-bid; and
 - (c) An item-by-item commentary on the Purchaser's Technical Specifications demonstrating **substantial responsiveness** of the goods and services to those specifications or a statement of deviations and exceptions to the provisions of the Technical Specifications.
- 1.15.3 For purposes of the commentary to be furnished pursuant to above, the Bidder shall note that standards for workmanship, material and equipment, designated by the Purchaser in its Technical Specifications are intended to be descriptive only and not restrictive. The Bidder may substitute these in its bid, provided that it demonstrates to the Purchaser's satisfaction that the substitutions ensure substantial equivalence to those designated in the Technical Specifications.
- 1.15.4 Bids with offers for alternate/makes/models in deviation to bid specifications will not be accepted.**

1.16. Bid Security / EMD :

It may kindly be noted that **Technical Bid (Part-I)** shall be accompanied either with a **Bid Securing Declaration(BSD) or Earnest Money Deposit (EMD)** as indicated at page No.-2. ~~In case foreign bidders and Bid Securing Declaration Form as per the FORM-3 in case Indian bidders. Bids not accompanied by Earnest Money Deposit / bid securing declaration will be summarily rejected and~~

- 1.16.1 The Bidder shall furnish, as part of its Technical Bid a **Bid Securing Declaration(BSD) or Bid Security (BS)** for an amount as specified in the Invitation for Bids. ~~In the case of foreign bidders, the BS shall be submitted either by the principal or by the Indian agent and in the case of indigenous bidders; the BS shall be submitted by the manufacturer or their specifically authorized dealer/bidder.~~
- 1.16.2 The bid security is required to protect the Purchaser against the risk of Bidder's conduct, which would warrant the security's forfeiture. Bid security, in forms as mentioned in 1.16.3 (a), (b), (c) should physically reach the office of Controller of Stores, CSIR-IICT, Uppal Road, Hyderabad- 500007, Telangana, India on or before the due date and times of submission of bid. If bid security is not physically available, the bid will be rejected *ab-initio*.
- 1.16.3 The bid security shall be in **Indian Rupees** for offers received for supply within India ~~and denominated in the currency of the bid or in any freely convertible foreign exchange in the case of offers received for supplies from foreign countries in equivalent Indian Rupees. The bid security shall be in one of the following forms at the bidders' option:~~
- (a) A bank guarantee (including e-Bank guarantee) issued/confirmed by a Scheduled

Commercial Bank in India in the form provided in the bidding documents and valid for 45 days beyond the validity of the bid. ~~In case a bidder desires to submit a BG issued from a foreign bank, then the same should be confirmed by a Scheduled commercial bank in India.~~ **Physical original instrument must reach as mentioned in clause 1.16.2 or**

- (b) Fixed Deposit receipt pledged in favour of the Director, IICT. **Physical original instrument must reach as mentioned in clause 1.16.2 or**
- (c) A Banker's cheque or demand draft in favour of the purchaser issued by any scheduled commercial bank in India. **Physical original instrument must reach as mentioned in clause 1.16.2 or**
- (d) **Bid Securing Declaration(BSD) to be submitted along with the technical bid in the prescribed format. Bidders submitting BSD need not submit any EMD separately in terms of (a), (b) and (c) above.**

1.16.4 The bid security shall be payable promptly upon written demand by the purchaser in case the conditions listed in the ITB clause 1.16.9 are invoked.

1.16.5 The bid security should be submitted in its original form. Copies shall not be accepted.

1.16.6 The bid security of unsuccessful bidder will be discharged /returned as promptly as possible positively within a period of **30 days** after the expiration of the period of bid validity or placement of order whichever is later, without any interest.

1.16.7 The successful Bidder's bid security will be discharged upon the Bidder furnishing the performance security, without any interest.

1.16.8 Bidders that are currently registered with the purchaser or registered as MSEs will continue to remain registered during the tender validity period also and are exempted from payment of EMD. In case the tenderer falls in these categories, the bidder should furnish a certified copy of its valid registration details. **Copy of valid document in support of claim must be enclosed along with tender documents. MSEs should provide proof of their being registered as MSE (indicating the Terminal Validity Date of their Registration) for the item offered.** Except for MSEs, this exemption is valid for the trade group and monetary value of registration only. The MSEs are provided tender document free of cost and are exempted from the payment of Bid Security provided the goods are produced and the services are rendered by them and not for any trading activities undertaken by them. Further firms who are having Udyog Aadhar Memorandum are entitled to all benefits available for MSEs under the Public Procurement Policies for MSEs and can get registered with any of the following agencies:

- a) District Industries Centre
- b) Khadi and Village Industries Commission
- c) Khadi and Village Industries Board
- d) Coir Board
- e) National Small Industries Corporation
- f) Directorate of Handicraft and handloom and
- g) Any other body specified by the Ministry of MSME

1.16.9 Where any aggregator has been appointed by the Ministry of MSME, themselves quote on behalf of some MSE units, such offers will be considered as offer from MSE units and all such facilities would be extended to these aggregators also.

1.16.10 The bid security may be forfeited:

- (a) If a Bidder withdraws or amends or modifies or impairs or derogates its bid during the

period of bid validity specified by the Bidder on the Bid Form; or

- (b) In case of a successful Bidder, if the Bidder fails to furnish order acceptance within 14 days of the order or fails to sign the contract and/or fails to furnish Performance Security within 21 days from the date of contract/order.

1.16.11 Whenever the bidder chooses to submit the Bid Security in the form of Bank Guarantee, then he should advise the banker issuing the Bank Guarantee to immediately send by Registered Post (A.D.) an unstamped duplicate copy of the Guarantee directly to the Purchaser with a covering letter to compare with the original BG for the correctness, genuineness, etc.

1.17. Period of Validity of Bids

- 1.17.1 Bids shall remain valid for minimum of **90 days** after the date of bid opening prescribed by the Purchaser. A bid valid for a shorter period shall be rejected by the Purchaser as non-responsive.
- 1.17.2 In exceptional circumstances, the Purchaser may solicit the Bidder's consent to an extension of the period of validity. The request and the responses thereto shall be made in writing (by post, fax or e-mail). The bid security provided shall also be suitably extended failing which the bid would be summarily ignored. A Bidder may refuse the request without forfeiting its bid security. A Bidder granting the request will not be required nor permitted to modify its bid.
- 1.17.3 Bid evaluation will be based on the bid prices without taking into consideration the above corrections.

1.18. Format and Signing of Bid

- 1.18.1 The bids may be submitted in **two parts** as specified in the Invitation for Bids.
- 1.18.2 In case the bids are invited on two-bid system, the Bidder shall submit the bids in two separate parts. One part shall contain **Technical bid (Part I)** comprising all documents listed under clause relating to Documents Comprising the Bid excepting bid form and price schedules. The other part shall contain the **Priced-bid (Part II)** comprising price bid form and price schedules.
- 1.18.3 The bid shall be typed or written in indelible ink and shall be signed by the Bidder or a person or persons duly authorized to bind the Bidder to the Contract. All pages of the bid, except for un-amended printed literature, shall be initialed by the person or persons signing the bid detailing his/her name and contact details.
- 1.18.4 Any interlineations, erasures or overwriting shall be valid only if they are initialed by the persons or persons signing the bid.

D. Submission and sealing of Bids – NOT APPLICABLE IN CASE OF ONLINE BIDS

1.19. Submission, Sealing and Marking of Bids –(Not Applicable, as e-bids to be submitted online through CPPP only)

- ~~1.19.1 The bidders may submit their duly sealed bids generally by post or hand. (Bids received by e-mail would not be considered for evaluation)~~
- ~~1.19.2 In the case of bids invited on two part basis, the Bidder shall seal the original bid in separate inner envelopes, duly marking the envelopes. The envelopes shall then be sealed in an outer envelope.~~
- ~~1.19.3 In the case of bids invited on two part basis, the Bidder shall seal the un-priced commercial and technical bid comprising the documents as listed in ITB 1.10.1 excepting for 'j' & 'k' and the priced bid in two separate envelopes duly marked as "Technical bid" and "priced bid". Both~~

~~the envelopes shall then be sealed in one outer envelope.~~

~~1.19.4 Firms submitting bids in a single envelope against the requirement of two-bid system would be considered for further evaluation at the risk & responsibility of the bidder. However, the opened priced bid, if prepared separate from the technical bid, would be sealed immediately by the Tender Opening Committee without disclosing the price.~~

~~1.19.5 The inner and outer envelopes shall be addressed to: **The Director, CSIR-Indian Institute of Chemical Technology, Uppal Road, Hyderabad – 500 007, Telangana, India– Attention: Controller of Stores & Purchase** and deposited in the Tender box kept in Purchase Section, if delivered by hand.~~

~~If the outer envelope is not sealed and marked as required above, The Purchaser will assume no responsibility for the bid's misplacement or premature opening. In such cases, bids received in open condition within the due date and time will be accepted at the risk of the bidder if the same is presented to the Controller of Stores & Purchase before expiry of the due date and time of opening of the bids.~~

~~1.19.5 Firms submitting bids in a single envelope against the requirement of two-bid system would be considered for further evaluation at the risk & responsibility of the bidder. However, the opened priced bid if prepared separate from the technical bid, would be sealed immediately by the Tender Opening Committee without disclosing the price.~~

1.20. Deadline for Submission of Bids

~~1.20.1 Bids must be received by the Purchaser at the address specified not later than the time and date specified in invitation to bid. In the event of the specified date for the submission of Bids being declared a holiday for the Purchaser, the Bids will be received up to the appointed time on the next working day. **E-bids** to be submitted only **online** through **CPPP** on or before stipulated date and time.~~

~~1.20.2 The Purchaser may, at its discretion, extend the deadline for submission of bids by amending the bid documents in accordance with Clause relating to Amendment of Bidding Documents in which case all rights and obligations of the Purchaser and Bidders previously subject to the deadline will thereafter be subject to the deadline as extended, which shall be invariably hosted in CPPP.~~

1.21. Late Bids

~~1.21.1 Any bid received by the Purchaser after the deadline for submission of bids prescribed by the Purchaser will be rejected.~~

~~1.21.2 Such tenders shall be marked as late and not considered for further evaluation. They shall not be opened at all and be returned to the bidders in their original envelope without opening.~~

1.22 Withdrawal, substitution and Modification of Bids. **(Online bidding norms of CPPP shall apply automatically)**

~~1.22.1 A Bidder may withdraw, substitute, or modify its Bid after it has been submitted by sending a written notice in accordance with ITB Clause 1.19 duly signed by an authorized representative, and shall include a copy of the authorization in accordance with ITB Sub-Clause 1.18.4 (except that no copies of the withdrawal notice are required). The corresponding substitution or modification of the bid must accompany the respective written notice. All notices must be:~~

~~a. Submitted in accordance with ITB Clauses 1.18 and 1.19 (except that withdrawal notices~~

do not require copies), and in addition, the respective envelopes shall be clearly marked "WITHDRAWAL," "SUBSTITUTION," or "MODIFICATION"; and

- b. Received by the Purchaser prior to the deadline prescribed for submission of bids, in accordance with ITB Clause 1.20.

- 1.22.2 ~~Bids requested to be withdrawn in accordance with ITB Sub Clause 1.22.1 shall be returned unopened to the Bidders. No bid may be withdrawn, substituted, or modified in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder on the Bid Form or any extension thereof.~~

E. Opening and Evaluation of Bids

1.23 Opening of Bids by the Purchaser (Online bidding norms of CPPP shall apply automatically)

~~1.23.1 The Purchaser will open all bids one at a time in the presence of bidders' authorized representatives who choose to attend, as per the schedule given in invitation for bids. The Bidders' representatives who are present shall sign the quotation opening sheet evidencing their attendance. In the event of the specified date of Bid opening being declared a holiday for the Purchaser, the Bids shall be opened at the appointed time and location on the next working day. In two part bidding, the financial bid shall be opened only after technical evaluation.~~

~~1.23.2 First, envelopes marked "WITHDRAWAL" shall be opened and read out and the envelope with the corresponding bid shall not be opened, but returned to the Bidder. No bid withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at bid opening. Next, envelopes marked "SUBSTITUTION" shall be opened and read out and exchanged with the corresponding Bid being substituted, and the substituted Bid shall not be opened, but returned to the Bidder. No Bid substitution shall be permitted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out at bid opening. Envelopes marked "MODIFICATION" shall be opened and read out with the corresponding Bid. No Bid modification shall be permitted unless the corresponding modification notice contains a valid authorization to request the modification and is read out at Bid opening. Only envelopes that are opened and read out at Bid opening shall be considered further.~~

~~1.23.3 The bidders' names, bid modifications or withdrawals, bid prices, discounts, and the presence or absence of requisite bid security and such other details as the Purchaser, at its discretion, may consider appropriate, will be announced at the opening. No bid shall be rejected at bid opening, except for late bid(s). The contents of the bid forms and price schedules would however be announced only at the time of opening of Priced bids in the case of two-bid system.~~

1.23.4 Bids that are received late shall not be considered further for evaluation, irrespective of the circumstances.

1.23.5 Bidders interested in participating in the bid opening process, should depute their representatives along with an authority letter to be submitted to the purchaser at the time of bid opening as per form Annexed at Chapter-8. (Not applicable in case of e-bid)

1.24. Confidentiality

1.24.1 Information relating to the examination, evaluation, comparison, and post qualification of bids, and recommendation of contract award, shall not be disclosed to bidders or any other persons not officially concerned with such process until publication of the Contract Award.

1.24.2 Any effort by a Bidder to influence the Purchaser in the examination, evaluation, comparison,

and post qualification of the bids or contract award decisions may result in the rejection of its Bid.

1.25. Clarification of Bids

1.25.1 To assist in the examination, evaluation, comparison and post qualification of the bids, the Purchaser may, at its discretion, ask the Bidder for a clarification of its bid. The request for clarification and the response shall be in writing and no change in prices or substance of the bid shall be sought, offered or permitted. However, no negotiation shall be held except with the lowest bidder at the discretion of the purchaser. Any clarification submitted by a bidder in respect to its bid which is not in response to a request by the purchaser shall not be considered.

1.26. Preliminary Examination

1.26.1 The Purchaser shall examine the bids to confirm that all documents and technical documentation requested in ITB Clause 1.10 have been provided, and to determine the completeness of each document submitted.

1.26.2 The Purchaser shall confirm that the following documents and information have been provided in the Bid. If any of these documents or information is missing, the offer shall be rejected.

- (a) Bid Form and Price Schedule, in accordance with ITB Clause 1.10;
- (b) All the tenders received will first be scrutinized to see whether the tenders meet the basic requirements as incorporated in the tender enquiry document. The tenders, who do not meet the basic requirements, are to be treated as unresponsive and ignored. The following are some of the important points, for which a tender may be declared as unresponsive and to be ignored, during the initial scrutiny:
 - (i) The Bid is unsigned.
 - (ii) The Bidder is not eligible.
 - (iii) The Bid validity is shorter than the required period.
 - (iv) The Bidder has quoted for goods manufactured by a different firm without the required authority letter from the proposed manufacturer.
 - (v) Bidder has not agreed to give the required Performance Security (PS) or
 - (vi) Bidder has not furnished the bid security or furnished EMD exemption documents or bid securing declaration or EMD
 - (vii) The goods quoted are sub-standard, not meeting the required specification, etc.
 - (viii) Against the schedule of Requirement (incorporated in the tender enquiry), the bidder has not quoted for the entire requirement as specified in that schedule.
 - (ix) The bidder has not agreed to some essential condition(s) incorporated in the tender enquiry.

1.27 Bidder's right to question rejection.

1.27.1 A Bidder shall have the right to be heard in case he feels that a proper procurement process is not being followed and/or his tender has been rejected wrongly. Only a directly affected bidder can represent in this regard as under:

- i) Only a bidder who has participated in the concerned procurement process i.e. pre-qualification, bidder registration or bidding, as the case may be, can make such representation;
- ii) In case pre-qualification bid has been evaluated before the bidding of Technical bids, an application for review in relation to the technical bid may be filed only by a bidder who has qualified in pre-qualification bid;

- iii) In case technical bid has been evaluated before the opening of the financial bid, an application for review in relation to the financial bid may be filed only by a bidder whose technical bid is found to be acceptable.
- iv) Following decisions of the purchaser in accordance with the provision of internal guidelines shall not be subject to review:
 - a) Determination of the need for procurement;
 - b) Selection of the mode of procurement or bidding system;
 - c) Choice of selection procedure;
 - d) Provisions limiting participation of bidders in the procurement process;
 - e) The decision to enter into negotiations with the L1 bidder;
 - f) Cancellation of the procurement process except where it is intended to subsequently re-tender the same requirements;
 - g) Issues related to ambiguity in contract terms may not be taken up after a contract has been signed, all such issues should be highlighted before consummation of the contract by the vendor/contractor; and
 - h) Complaints against specifications except under the premise that they are either vague or too specific so as to limit competition may be permissible.

1.27.2 In case a Bidder feels aggrieved by the decision of the purchaser, he may then send his representation in writing to the Purchaser's address as indicated in invitation to bids within **05 working days** from the date of communication of the purchaser intimating the rejection for reconsideration of the decision by the purchaser.

1.28 Responsiveness of Bids

1.28.1 Prior to the detailed evaluation, the purchaser will determine the substantial responsiveness of each bid to the bidding documents. For purposes of this clause, a substantive responsive bid is one, which conforms to all terms and condition of the bidding documents without material deviations, reservations or omissions. A material deviation, reservation or omission is one that:

- (a) Affects in any substantial way the scope, quality, or performance of the Goods and Related Services specified in the Contract; or
- (b) Limits in any substantial way, inconsistent with the Bidding Documents, the Purchaser's rights or the Bidder's obligations under the Contract; or
- (c) If rectified, would unfairly affect the competitive position of other bidders presenting substantially responsive bids.

1.28.2 The purchasers' determination of a bid's responsiveness is to be based on the contents of the bid itself without recourse to extrinsic evidence.

1.28.3 If a bid is not substantially responsive, it will be rejected by the Purchaser and may not subsequently be made responsive by the Bidder by correction of the material deviation, reservation or omission.

1.28.4 If a bidder quotes Nil Charges/consideration, the bid shall be treated as unresponsive and will not be considered.

1.29 Non-Conformity, Error and Omission

1.29.1 Provided that a Bid is substantially responsive, the Purchaser may waive any nonconformities or omissions in the Bid that do not constitute a material deviation.

1.29.2 Provided that a bid is substantially responsive, the Purchaser may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities or omissions in the bid related to documentation requirements. Such omission shall not be related to any aspect of the price of the Bid. Failure

of the Bidder to comply with the request may result in the rejection of its Bid.

1.29.3 Provided that the Bid is substantially responsive, the Purchaser shall correct arithmetical errors on the following basis:

- a) if there is a discrepancy between the unit price and the line item total that is obtained by multiplying the unit price by the quantity, the unit price shall prevail and the line item total shall be corrected, unless in the opinion of the Purchaser there is an obvious misplacement of the decimal point in the unit price, in which case the line item total as quoted shall govern and the unit price shall be corrected;
- b) if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and
- c) if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above.

1.29.4 Provided that a bid is substantially responsive, the purchaser may request that a bidder may confirm the correctness of arithmetic errors as done by the purchaser within a target date. In case, no reply is received then the bid submitted shall be ignored and its Bid Security may be forfeited.

1.30 Examination of Terms & Conditions, Technical Evaluation

1.30.1 The Purchaser shall examine the Bid to confirm that all terms and conditions specified in the GCC have been accepted by the Bidder without any material deviation or reservation.

1.30.2 The Purchaser shall evaluate the technical aspects of the Bid submitted in accordance with ITB Clause 1.15, to confirm that all requirements specified in Schedule of Requirements of the Bidding Documents have been met without any material deviation or reservation.

1.30.3 If, after the examination of the terms and conditions and the technical evaluation, the Purchaser determines that the Bid is not substantially responsive in accordance with ITB Clause 1.28, it shall reject the Bid.

1.31 Conversion to Single Currency

1.31.1 To facilitate evaluation and comparison, the Purchaser will convert all quoted prices expressed in various currencies to Indian Rupees at the selling exchange rate established by any bank in India as notified in the Newspapers on the date of bid opening (techno-commercial bid in the case of two-part bidding). For this purpose, exchange rate notified in www.xe.com or www.rbi.org or any other website could also be used by the purchaser. *(Not applicable in case of Open Tender Enquiry (OTE), as Bids to be submitted in Indian Rupees only).*

1.32 Evaluation and comparison of bids

1.32.1 The Purchaser shall evaluate each bid that has been determined, up to this stage of the evaluation, to be substantially responsive.

1.32.2 To evaluate a Bid, the Purchaser shall only use all the factors, methodologies and criteria defined below. No other criteria or methodology shall be permitted.

The quoted model:

Shall meet the technical Specifications as stated in Chapter 4.

1.32.3 The bids shall be evaluated on the basis of final landing cost which shall be arrived as under:

For goods manufactured in India

- (i) The price of the goods quoted ex-works including all taxes already paid.
- (ii) GST and other taxes, if any which will be payable on the goods if the contract is awarded.
- (iii) Charges for inland transportation, insurance and other local services required for delivering the goods at the desired destination.

(iv) Wherever applicable, the cost towards the installation, commissioning, spares, extended warranty, AMC/CMC, site preparation and training including any incidental services, if any.

- 1.32.8 **There is no provision to purchase optional items.** The specifications embodied in the tender documents would be the basis of evaluating the responsiveness of bids received.
- 1.32.9 The Purchaser shall compare all **substantially responsive bids** to determine the lowest valuated bid, in accordance with ITB Clause 1.32.
- 1.32.8** In case a bidder is **eligible** to seek benefit under Purchase Preference(PP) in terms of Public Procurement Policy (PPP) Order dt. 23.03.2012 issued in pursuance of Section 11 of the MSME Development Act, 2006 and Department of Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry, Government of India(GoI) Order No. P-45021/2/2017-PP (BE-II) dated 16th September 2020 issued in pursuance of Public Procurement (Preference to Make in India) Order,2017(PPP-MII order), as amended from time to time, then the bidder shall **categoriesly seek eligible benefits** against the said policies in its **BIDDER INFORMATION FORM**. Bidders in their own interest shall carefully go through these policies already available in public domain at the relevant website of the Govt. of India and categoriesly specify their status for availing the policy benefits of MSE and MII in their Bid Form, while enclosing documents in support of their eligibility for benefits claimed under the same. Purchaser shall not be responsible for any inadvertent error in bid evaluation process to extend the eligible benefits available under MSE and MII policies, due to failure on part of the bidder to categoriesly indicate the eligible status, which shall be claimed in Bidder Information Form enclosing supporting documents by the bidder concerned.
- 1.32.9 Purchase preference benefits shall be extended to the bidder based on the declared option subject to the bidder meeting the requirements contained in that purchase preference policy.
- 1.32.10 For price matching opportunities and distribution of quantities among bidders (bidder's option to avail any one out of two applicable purchase preference policies, i.e., MAKE IN INDIA 2020 or PPP for MSE,-2012 will be considered), the precedence shall be in terms of purchase preference policy notified vide **Govt. of India, Ministry of Finance, Dept. of Expenditure OM No. F.1/4/2021-PPD dt. 18.05.2023** shall apply, as amended from time to time.

1.33 Contacting the Purchaser

- 1.33.1 Subject to ITB Clause 1.25, no Bidder shall contact the Purchaser on any matter relating to its bid, from the time of the bid opening to the time the Contract is awarded.
- 1.33.2 Any effort by a Bidder to influence the Purchaser in its decisions on bid evaluation, bid comparison or contract award may result in rejection of the Bidder's bid.

1.34 Post qualification

- 1.34.1 In the absence of pre-qualification, the Purchaser will determine to its satisfaction whether the Bidder that is selected as having submitted the **lowest evaluated responsive bid** is qualified to perform the contract satisfactorily, in accordance with the criteria listed in ITB Clause 1.14.
- 1.34.2 The determination will take into account the eligibility criteria listed in the bidding documents and will be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, as well as such other information as the Purchaser deems necessary and appropriate.
- 1.34.3 An affirmative determination will be a prerequisite for award of the contract to the Bidder. A negative determination will result in rejection of the Bidder's bid.

F - AWARD OF CONTRACT

1.35 Negotiations

1.35.1 Normally, there shall not be any negotiation. Negotiations, if at all, shall be an exception and only in the case of items with limited source of supply. Negotiations shall be held with the lowest evaluated responsive bidder. Counter offers tantamount to negotiations and shall be treated at par with negotiations in the case of one time purchases.

1.36 Award Criteria

1.36.1 Subject to ITB Clause 1.39, the Purchaser will award the contract to the successful Bidder whose bid has been determined to be substantially responsive and has been determined to be the lowest evaluated bid, provided further that the Bidder is determined to be qualified to perform the contract satisfactorily. The details of the award would be hosted on the website of the Purchaser.

1.37 Purchaser's right to vary Quantities at Time of Award

1.38 The Purchaser reserves the right at the time of Contract award to increase or decrease the quantity of goods and services originally specified in the Schedule of Requirements to the extent of 25% without any change in unit price or other terms and conditions.

1.39 Option Clause

1.39.1 The Purchaser reserves the right to increase or decrease the quantity of the required goods up to 25% (Twenty-Five) per cent at any time, till final delivery date (or the extended delivery date of the contract), by giving reasonable notice even though the quantity ordered initially has been supplied in full before the last date of the delivery period (or the extended delivery period)

1.40 Purchaser's right to accept Any Bid and to reject any or All Bids

The Purchaser reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to award of Contract, without thereby incurring any liability to the affected Bidder or Bidders.

1.41 Notification of Award

1.41.1 Prior to the expiration of the period of bid validity, the Purchaser will notify the successful bidder in writing by registered letter or by cable or telex or fax or e mail that the bid has been accepted and a separate purchase order shall follow through post.

1.41.2 Until a formal contract is prepared and executed, the notification of award should constitute a binding contract.

1.41.3 Upon the successful Bidder's furnishing of the signed Contract Form and performance security pursuant to ITB Clause 1.43, the Purchaser will promptly notify each unsuccessful Bidder and will discharge its bid security.

1.42 Signing of Contract

1.42.1 Promptly after notification, the Purchaser shall send the successful Bidder the Agreement/Purchase Order.

1.42.2 Within fourteen (14) days of date of the Purchase Order, the successful Bidder shall sign, date, and return it to the Purchaser.

1.43 Order Acceptance

1.43.1 The successful bidder should submit Order acceptance within 14 days from the date of

issue of order/signing of contract, failing which it shall be presumed that the vendor is not interested and his bid security is liable to be forfeited pursuant to clause 1.16.9 of ITB.

- 1.43.2 The order confirmation must be received within **14 days**. However, the Purchaser has the powers to extend the time frame for submission of order confirmation beyond the original date. Even after extension of time, if the order confirmation is not received, the contract is liable to be cancelled provided that the purchaser, on being satisfied that it is not a case of cartelization and the integrity of the procurement process has been maintained, may, for cogent reasons, offer the next successful bidder an opportunity to match the financial bid of the first successful bidder, and if the offer is accepted, award the contract to the next successful bidder at the price bid of the first successful bidder.

1.44 Performance Security :

- 1.44.1 Within **21 days** of receipt of the notification of award/PO, the Supplier shall furnish performance security (PS) in the amount specified in the purchase order, valid till 60 days after the warranty period.
- 1.44.2 The proceeds of the performance security shall be payable to the Purchaser as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract.
- 1.44.3 The Performance Security shall be denominated in Indian Rupees for the offers received for supplies within India and denominated in the currency of the contract in the case of offers received for supply from foreign countries or in equivalent Indian rupees in case the performance security is submitted by the Indian Agent.
- 1.44.4 In the case of imports, the PS may be submitted either by the principal or by the Indian agent and, in the case of purchases from indigenous sources, the PS may be submitted by either the manufacturer or their authorized dealer/bidder.
- 1.44.5 The **Performance Security(PS) or Performance Bank Guarantee (PBG)** shall be in one of the following forms:
- (a) A Bank guarantee (including e-Bank Guarantee) or stand-by Letter of Credit issued by a Nationalized/ Scheduled bank located in India or a foreign bank with preferably its operating branch in India in the form provided in the bidding documents. Or
 - (b) A Banker's cheque or Account Payee demand draft in favour of the purchaser. Or,
 - (c) A Fixed Deposit Receipt pledged in favour of the Purchaser.
- 1.44.6 The performance security will be discharged by the Purchaser and returned to the Supplier not later than **60 days** following the date of completion of the Supplier's performance obligations, including any warranty obligations, unless specified otherwise, without levy of any interest.
- 1.44.7 In the event of any contract amendment, the supplier shall, within 21 days of receipt of such amendment, furnish the amendment to the performance security, rendering the same valid for the duration of the contract, as amended for further period of 60 days thereafter.
- 1.44.8 The performance security must be received within 21 days. However, the Purchaser has the powers to extend the time frame for submission of Performance Security (PS). Even after extension of time, if the PS is not received, the contract is liable to be cancelled provided that the purchaser, on being satisfied that it is not a case of cartelization and the integrity of the procurement process has been maintained, may, for cogent reasons, offer the next successful bidder an opportunity to match the financial bid of the first successful bidder, and if the offer is accepted, award the contract to the next successful bidder at the price bid of the first successful bidder.

1.44.9 Whenever, the bidder chooses to submit the Performance Security in the form of Bank Guarantee, then he should advise the banker issuing the Bank Guarantee to immediately send by Registered Post (A.D.) an unstamped duplicate copy of the Guarantee directly to the Purchaser with a covering letter to compare with the original BG for the correctness, genuineness, etc.

1.44. **Pre-bid Conference(PBC) – Applicable/ Not Applicable.**

1.45 Integrity Pact

1.45.1 Integrity Pact (IP) binds both buyers and sellers to ethical conduct and transparency in all activities from pre-selection of bidders, bidding and contracting, implementation, completion and operation related to the contract.

1.45.2 The Integrity pact essentially envisages an agreement between the prospective vendors/bidders and the buyer, committing the persons/officials of both sides, not to resort to any corrupt practices in any aspect/stage of the contract. Only those vendors/bidders, who commit themselves to such a Pact with the buyer, would be considered competent to participate in the bidding process. In other words, entering into this Pact would be a preliminary qualification. The essential ingredients of the Pact include:

- i) Promise on the part of the Purchaser to treat all bidders with equity and reason and not to seek or accept any benefit, which is not legally available;
- ii) Promise on the part of bidders not to offer any benefit to the employees of the Purchaser not available legally and also not to commit any offence under Prevention of Corruption Act, 1988 or Indian Penal Code 1860;
- iii) Promise on the part of bidders not to enter into any undisclosed agreement or understanding with other bidders with respect to prices, specifications, certifications, subsidiary contracts; etc.
- iv) Undertaking (as part of Fall Clause) by the bidders that they have not and will not sell the same material/equipment at prices lower than the bid price;
- iv) Foreign bidders to disclose the name and address of agents and representatives in India and Indian Bidders to disclose their foreign principals or associates;
- v) Bidders to disclose the payments to be made by them to agents/brokers or any other intermediary;
- vi) Bidders to disclose any past transgressions committed over the specified period with any other company in India or Abroad that may impinge on the anti-corruption principle;
- vii) Integrity Pact lays down the punitive actions for any violation.

1.45.3 Each page of such Integrity pact proforma would be duly signed by Purchaser's competent signatory. All pages of the Integrity Pact are to be returned by the bidder (along with the technical bid) duly signed by the same signatory who signed the bid, i.e. who is duly authorized to sign the bid and to make binding commitments on behalf of his company. Any bid not accompanied by Integrity Pact duly signed by the bidder shall be considered to be a non-responsive bid and shall be rejected straightway.

1.45.4 The SCC shall specify whether there is a need to enter into a separate Integrity pact or not.

1.45.5 The Integrity Pact would be effective from the date of invitation of bids till complete execution of the contract.

1.44.6 The names and contact details of the Independent External Monitors (IEM) on the event of the need of IP is as detailed in the SCC.

1.45.7 The modal format of IP is at Chapter-8.

CHAPTER 2
CONDITIONS OF CONTRACT

A. GENERAL CONDITIONS OF CONTRACT(GCC)

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GENERAL CONDITIONS OF CONTRACT (GCC)

2.1 Definitions

2.1.1 The following words and expressions shall have the meanings hereby assigned to them:

- (a) "Contract" means the Contract Agreement entered into between the Purchaser and the Supplier, together with the Contract Documents referred to therein, including all attachments, appendices, and all documents incorporated by reference therein.
- (b) "Contract Documents" means the documents listed in the Contract Agreement, including any amendments thereto.
- (c) "Contract Price" means the price payable to the Supplier as specified in the Contract Agreement, subject to such additions and adjustments thereto or deductions there from, as may be made pursuant to the Contract.
- (d) "Day" means calendar day.
- (e) "Completion" means the fulfilment of the Goods and related Services by the Supplier in accordance with the terms and conditions set forth in the Contract.
- (f) "GCC" means the General Conditions of Contract.
- (g) "Goods" means all of the commodities, raw material, machinery and equipment, and/or other materials that the Supplier is required to supply to the Purchaser under the Contract.
- (h) "Related Services" means the services incidental to the supply of the goods, such as transportation, insurance, installation, training and initial maintenance and other such obligations of the Supplier under the Contract.
- (i) "Subcontractor" means any natural person, private or government entity, or a combination of the above, to whom any part of the Goods to be supplied or execution of any part of the Related Services is subcontracted by the Supplier.
- (j) "Supplier" means the natural person, private or government entity, or a combination of the above, whose bid to perform the Contract has been accepted by the Purchaser and is named as such in the Contract Agreement.
- (k) The "Council" means the Council of Scientific & Industrial Research (CSIR), registered under the Societies Registration Act, 1860 of the Govt. of India having its registered office at 2, Rafi Marg, New Delhi-110001, India.
- (l) The "Purchaser" means any of the constituent Laboratory/Institute of the Council situated at any designated place in India as specified in invitation to bids.
- (m) "The final destination," where applicable, means CSIR – Indian Institute of Chemical Technology, Hyderabad, Telangana - 500007, India
- (n) For definitions regarding terms in Make in India please refer to order no. P-45021/2/2017-PP (BE-II) dated 16.09.2020 by Ministry of Commerce and Industry, Government of India and any amendment / revisions thereof.
- (o) For definitions regarding terms in MSE refer MSE order 2012 and amendments and revisions thereof.
- (p) For registration of bidders quoting for products from countries that share land border with India refer to Order No. P-45021/112/2020-PP(BE-II)(E-43780) dated 24.08.2020 of Ministry of Commerce and Industry, Department for Promotion of Industry and Internal Trade and any amendments thereon, as mended from time to time.

2.1 Contract Documents

2.2.1 Subject to the order of precedence set forth in the Contract Agreement, all documents forming

the Contract (and all parts thereof) are intended to be correlative, complementary, and mutually explanatory. The Contract Agreement shall be read as a whole.

2.2 Code of Integrity

2.3.1 Without prejudice to and in addition to the rights of the Purchaser to other penal provisions as per the bid documents or contract, if the Purchaser comes to a conclusion that a (prospective) bidder/supplier, directly or through an agent, has violated this code of integrity in competing for the contract or in executing a contract, the Purchaser may take appropriate measures including one or more of the following:

- a) Cancellation of the relevant contract and recovery of compensation for loss incurred by the purchaser;
- b) Forfeiture or encashment of any other security or bond relating to the procurement;
- c) Recovery of payments including advance payments, if any, made by the Purchaser along with interest thereon at the prevailing rate.
- d) Provisions in addition to the above:
 - 1) Removal from the list of registered suppliers and banning/debarment of the bidder from participation in future procurements of the purchaser for a period not less than one year;
 - 2) In case of anti-competitive practices, information for further processing may be filed under a signature of the Joint Secretary level officer, with the Competition Commission of India;
 - 3) Initiation of suitable disciplinary or criminal proceedings against any individual or staff found responsible.

2.4 Joint Venture, Consortium or Association

2.4.1 If the Supplier is a joint venture, consortium, or association, all of the parties shall be jointly and severally liable to the Purchaser for the fulfilment of the provisions of the Contract and shall designate one party to act as a leader with authority to bind the joint venture, consortium, or association. The composition or the constitution of the joint venture, consortium, or association shall not be altered without the prior consent of the Purchaser.

2.5 Scope of Supply

2.5.1 The Goods and Related Services to be supplied shall be as specified in Chapter 4 i.e. Specifications and allied technical details.

2.6 Suppliers 'Responsibilities

2.6.1 The Supplier shall supply all the Goods and Related Services included in the Scope of Supply in accordance with Scope of Supply Clause of the GCC, and the Delivery and Completion Schedule, as per GCC Clause relating to delivery and document.

2.7 Contract price

2.7.1 Prices charged by the Supplier for the Goods supplied and the Related Services performed under the Contract shall not vary from the prices quoted by the Supplier in its bid. All supplies of foreign are governed by INCOTERMS 2010 as amended/modified from time to time.

2.8 Copy Right

2.8.1 The copyright in all drawings, documents, and other materials containing data and information furnished to the Purchaser by the Supplier herein shall remain vested in the Supplier, or, if they are furnished to the Purchaser directly or through the Supplier by any third party, including suppliers of materials, the copyright in such materials shall remain vested in such third party.

2.9 Application

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

2.10 Standards

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

2.11 Use of Contract Documents and Information

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

2.11.2 The Supplier shall not, without the Purchaser's prior written consent, make use of any document or information enumerated above except for purposes of performing the Contract.

2.11.3 Any document, other than the Contract itself, enumerated above shall remain the property of the Purchaser and shall be returned (in all copies) to the Purchaser on completion of the Supplier's performance under the Contract if so required by the Purchaser.

2.12 Patent Indemnity

2.12.1 The Supplier shall, subject to the Purchaser's compliance with GCC Sub-Clause 2.12.2 Indemnify and hold harmless the Purchaser and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of any nature, including attorney's fees and expenses, which the Purchaser may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright, or other intellectual property right registered or otherwise existing at the date of the Contract by reason of:

- (a) the installation of the Goods by the Supplier or the use of the Goods in India; and
- (b) the sale in any country of the products produced by the Goods.

2.12.2 If any proceedings are brought or any claim is made against the Purchaser, the Purchaser shall promptly give the Supplier a notice thereof, and the Supplier may at its own expense and in the Purchaser's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim.

2.13 Performance Security :

2.13.1 Within 21 days of receipt of the notification of award/PO, the Supplier shall furnish performance security in the amount specified in Purchase Order, valid till 60 days after the warranty period.

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

- 2.13.3 The Performance Security shall be denominated in Indian Rupees for the offers received for supplies within India and denominated in the currency of the contract in the case of offers received for supply from foreign countries or in equivalent Indian Rupees in case the Performance Security is submitted by the Indian Agent.
- 2.13.4 In the case of imports, the PS may be submitted either by the principal or by the Indian agent and, in the case of purchases from indigenous sources, the PS may be submitted by either the manufacturer or their authorized dealer/bidder.
- 2.13.5 The Performance Security shall be in one of the following forms:
- (a) A Bank guarantee or stand-by Letter of Credit issued by a Nationalized/Scheduled bank located in India or a bank located abroad in the form provided in the bidding documents.

Or

 - (b) A Banker's cheque or Account Payee demand draft in favour of the purchaser.

Or

 - (c) A Fixed Deposit Receipt pledged in favour of the Director, CSIR-IICT, Hyderabad
- 2.13.6 The performance security will be discharged by the Purchaser and returned to the Supplier not later than **60 days** following the date of completion of the Supplier's performance obligations, including any warranty obligations, unless specified otherwise, without levy of any interest.
- 2.13.7 In the event of any contract amendment, the supplier shall, within **21 days** of receipt of such amendment, furnish the amendment to the performance security, rendering the same valid for the duration of the contract, as amended for further period of 60 days thereafter.
- 2.13.8 The order confirmation must be received within 14 days. However, the Purchaser has the powers to extend the time frame for submission of order confirmation and submission of Performance Security (PS). Even after extension of time, if the order confirmation /PS are not received, the contract shall be cancelled provided that the purchaser, on being satisfied that it is not a case of cartelization and the integrity of the procurement process has been maintained, may, for cogent reasons, offer the next successful bidder an opportunity to match the financial bid of the first successful bidder, and if the offer is accepted, award the contract to the next successful bidder at the price bid of the first successful bidder.
- 2.13.9 Whenever, the bidder chooses to submit the Performance Security in the form of Bank Guarantee, then he should advise the banker issuing the Bank Guarantee to immediately send by Registered Post (A.D.) an unstamped duplicate copy of the Guarantee directly to the Purchaser with a covering letter to compare with the original BG for the correctness, genuineness, etc.

2.14 Inspections and Tests

- 2.14.1 The inspections & test, training required would be as detailed in invitation to bid.
- 2.14.1 The Supplier shall at its own expense and at no cost to the Purchaser carry out all such tests and/or inspections of the Goods and Related Services as are specified in the SCC or as discussed and agreed to during the course of finalization of contract.
- 2.14.2 The Purchaser or its representative shall have the right to inspect and/or to test the Goods to confirm their conformity to the Contract specifications at no extra cost to the Purchaser. The Technical Specifications and SCC shall specify what inspections and tests the Purchaser requires and where they are to be conducted. The Purchaser shall notify the Supplier in writing in a timely manner of the identity of any representatives retained for these purposes.

- 2.14.3 The inspections and tests may be conducted on the premises of the Supplier or its subcontractor(s), at the point of delivery and/or at the Goods final destination. If conducted on the premises of the Supplier or its subcontractor(s), all reasonable facilities and assistance, including access to drawings and production data - shall be furnished to the inspectors at no charge to the Purchaser.
- 2.14.4 Whenever the Supplier is ready to carry out any such test and inspection, it shall give a reasonable advance notice, including the place and time, to the Purchaser. The Supplier shall obtain from any relevant third party or manufacturer any necessary permission or consent to enable the Purchaser or its designated representative to attend the test and/or inspection.
- 2.14.5 Should any inspected or tested Goods fail to conform to the specifications, the Purchaser may reject the goods and the Supplier shall either replace the rejected Goods or make alterations necessary to meet specification requirements free of cost to the Purchaser.
- 2.14.6 The Purchaser's right to inspect, test and, where necessary, reject the Goods after the Goods' arrival at final destination shall in no way be limited or waived by reason of the Goods having previously been inspected, tested and passed by the Purchaser or its representative prior to the Goods shipment.
- 2.14.7 The Supplier shall provide the Purchaser with a report of the results of any such test and/or inspection.
- 2.14.8 With a view to ensure that claims on insurance companies, if any, are lodged in time, the bidders and /or the Indian agent shall be responsible for follow up with their principals for ascertaining the dispatch details and informing the same to the Purchaser and he shall also liaise with the Purchaser to ascertain the arrival of the consignment after clearance so that immediately thereafter in his presence the consignment could be opened and the insurance claim be lodged, if required, without any loss of time. Any delay on the part of the bidder/Indian Agent would be viewed seriously and he shall be directly responsible for any loss sustained by the purchaser on the event of the delay.

2.15 Packing

- 2.15.1 The Supplier shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination as indicated in the Contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the Goods' final destination and the absence of heavy handling facilities at all points in transit.
- 2.15.2 The packing, marking and documentation within and outside the packages shall comply strictly with such special requirements as shall be provided for in the Contract including additional requirements, if any, specified in Purchase Order and in any subsequent instructions ordered by the Purchaser.
- 2.15.3 The marking and documentation within and outside the packages shall be:
- (a) Each package should have a packing list within it detailing the part No(s), description, quantities.
 - (b) Outside each package, the contract No., the name and address of the purchaser and the final destination should be indicated on all sides and top.
 - (c) Each package should be marked as 1/x, 2/x, 3/x.....x/x, where "x" is the total No. of packages contained in the consignment.
 - (d) All the sides and top of each package should carry an Appropriate indication/ label/ stickers indicating the precautions to be taken while handling/storage.

2.16 Delivery and Documents

2.16.1 Delivery of the Goods and completion and related services shall be made by the Supplier in accordance with the terms specified by the Purchaser in the contract. The details of shipping and/or other documents to be furnished by the supplier are as under:-

For goods manufactured within India

Within 24 hours of dispatch, the supplier shall notify the purchaser the complete details of dispatch and also supply following documents by registered post / speed post and copies thereof by FAX/Email.

- (a) Two copies of Supplier's Invoice indicating, *inter-alia* description and specification of the goods, quantity, unit price, total value;
- (b) Packing list;
- (c) Insurance certificate, if required under the contract;
- (d) Railway receipt/Consignment note;
- (e) Manufacturer's guarantee certificate and in-house inspection certificate;
- (f) Inspection certificate issued by purchaser's inspector, if any; and
- (g) Any other document(s) as and when required in terms of the contract;

Note:

01 The nomenclature used for the item description in the Invoices (s), packing list(s) and the delivery note(s) etc. should be identical to that used in the contract. The dispatch particulars including the name of the transporter should also be mentioned in the Invoice(s).

02 The above documents should be received by the Purchaser before arrival of the Goods and, if not received, the Supplier will be responsible for any consequent expenses

Note:

01. The nomenclature used for the item description in the invoices(s), packing list(s) and the delivery note(s) etc. should be identical to that used in the contract. The dispatch particulars including the name of the transporter should also be mentioned in the Invoice(s).

02. The above documents should be received by the Purchaser before arrival of the Goods and, if not received, the Supplier will be responsible for any consequent expenses.

2.16.2 The mode of transportation shall be as specified in Invitation to bid. In case the purchaser elects to have the transportation done through Air, then air lifting needs to be done through Air India only. In case Air India does not operate in the Airport of dispatch, then the bidder is free to engage the services of any other Airlines.

2.17 Insurance

2.17.1 Should the purchaser elect to buy on CSIR-IICT basis, the Goods supplied under the Contract shall be fully insured against any loss or damage incidental to manufacture or acquisition, transportation, storage and delivery. The Insurance shall be for an amount equal to 110% of the order value of the contract from within "supplier warehouse to buyer warehouse (final destination)" on "all risk basis" including strikes, riots and civil commotion.

2.18 Transportation

2.18.1 Where the Supplier is required under the Contract to deliver the Goods at CSIR-IICT,

Hyderabad Stores / any other location as per the P.O.

2.18.2 In the case of supplies from within India, where the Supplier is required under the Contract to transport the Goods to a specified destination in India, defined as the Final Destination, transport to such destination, including insurance and storage, as specified in the Contract,

2.19 Incidental Services

2.19.1 The supplier may be required to provide any or all of the services, including training, if any, specified in invitation to bid.

2.20 Spare Parts

2.20.1 The Supplier shall be required to provide any or all of the following materials, notifications, and information pertaining to spare parts manufactured or distributed by the Supplier:

- (a) Such spare parts as the Purchaser may elect to purchase from the Supplier, providing that this election shall not relieve the Supplier of any warranty obligations under the Contract; and
- (b) In the event of termination of production of the spare parts:
 - (i) Advance notification to the Purchaser of the pending termination, in sufficient time to permit the Purchaser to procure needed requirements; and
 - (ii) Following such termination, furnishing at no cost to the Purchaser, the blueprints, drawings and specifications of the spare parts, if requested.

2.21 Warranty

2.21.1 The Supplier warrants that all the Goods are new, unused, and of the most recent or current models, and that they incorporate all recent improvements in design and materials, unless provided otherwise in the Contract.

2.21.2 The Supplier further warrants that the Goods shall be free from defects arising from any act or omission of the Supplier or arising from design, materials, and workmanship, under normal use in the conditions prevailing in India.

2.21.3 Unless and until mentioned in the Notice Inviting Tender or the Purchase order the warranty shall remain valid for a period **12 months** after the goods or any portion thereof as the case may be have been delivered to and installed and accepted at the final destination by CSIR-IICT.

2.21.4 The Purchaser shall give notice to the Supplier stating the nature of any such defects together with all available evidence thereof, promptly following the discovery thereof. The Purchaser shall afford all reasonable opportunity for the Supplier to inspect such defects.

2.21.5 Upon receipt of such notice, the Supplier shall, within a reasonable period of time, expeditiously repair or replace the defective Goods or parts thereof, at no cost to the Purchaser.

2.21.6 If having been notified, the Supplier fails to remedy the defect within a reasonable period of time; the Purchaser may proceed to take within a reasonable period such remedial action as may be necessary, at the Supplier's risk and expense and without prejudice to any other rights which the Purchaser may have against the Supplier under the Contract.

2.21.7 Goods requiring warranty replacements must be replaced on free of cost basis to the purchaser.

2.22 Terms of Payment

2.22.1 The method and conditions of payment to be made to the Supplier under this Contract shall be as specified in the Purchase Order.

2.22.2 The Supplier's request(s) for payment shall be made to the Purchaser in writing, accompanied by an invoice describing, as appropriate, the Goods delivered and the Services performed, and by documents, submitted pursuant to Delivery and document Clause of the GCC and upon fulfilment of other obligations stipulated in the contract.

2.22.3 Payments shall be made promptly by the Purchaser but in no case later than thirty (30) days after submission of the invoice or claim by the Supplier. While claiming the payment, the supplier should certify in the bill/invoice that the payment being claimed strictly in terms of the contract and all obligations on the part of the supplier for claiming the payment have been fulfilled as required under the contract. This shall be subject to submission of submission of prescribed Performance Security.

1.22.4 Payment shall be made in **Indian Rupees**, as indicated in the contract.

Note: All payments due under the Contract shall be paid after deduction of statutory levies at source (like ESIC, Income Tax, GST etc.), wherever applicable.

1.23 Change Orders and Contract Amendments

2.23.1 The Purchaser may at any time, by written order given to the Supplier pursuant to Clause on Notices of the GCC make changes within the general scope of the Contract in any one or more of the following:

- (a) Increase or decrease in the quantity required, exercise of quantity opinion clause;
- (b) Changes in schedule of deliveries and terms of delivery;
- (c) The changes in inspection arrangements;
- (d) Changes in terms of payments and statutory levies;
- (e) Changes due to any other situation not anticipated;

2.23.2 No changes in the price quoted shall be permitted after the purchase order has been issued except on account of statutory variations,

2.23.3 No variation or modification in the terms of the contract shall be made except by written amendment signed by the parties.

2.24 Assignment

2.24.1 The Supplier shall not assign, in whole or in part, its obligations to perform under the Contract, except with the Purchaser's prior written consent.

2.25 Subcontracts

2.25.1 The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority.

2.25.2 In all cases where subcontract has been done the Supplier shall notify the Purchaser in writing of all subcontracts awarded under this Contract if not already specified in the bid. Such notification, in the original bid or later, shall not relieve the Supplier from any liability or duties or obligation under the contract

2.25.3 Where ever subcontracting is applicable a certificate on the letter head of the bidder along with seal and signature of the person signing the bid must be submitted along with other necessary certificates

2.26 Extension of time.

2.26.1 Delivery of the Goods and performance of the Services shall be made by the Supplier in accordance with the time schedule specified by the Purchaser.

- 2.26.2 If at any time during performance of the Contract, the Supplier or its sub-contractor(s) should encounter conditions impeding timely delivery of the Goods and performance of Services, the Supplier shall promptly notify the Purchaser in writing of the fact of the delay, its likely duration and its cause(s). As soon as practicable after receipt of the Supplier's notice, the Purchaser shall evaluate the situation and may, at its discretion, extend the Supplier's time for performance with or without liquidated damages, in which case the extension shall be ratified by the parties by amendment of the Contract.
- 2.26.3 Except as provided under the Force Majeure clause of the GCC, a delay by the Supplier in the performance of its delivery obligations shall render the Supplier liable to the imposition of liquidated damages pursuant to liquidated damages Clause of the GCC unless an extension of time is agreed upon pursuant to above clause without the application of penalty clause.

2.27 Liquidated Damages

- 2.27.1 Subject to GCC Clause on Force Majeure, if the Supplier fails to deliver any or all of the Goods or to perform the Services within the period(s) specified in the Contract, the Purchaser shall, without prejudice to its other remedies under the Contract, deduct from the Contract Price, as penalty, a sum equivalent to 0.5% of the delivered price of the delayed Goods or unperformed Services or contract value in case the delivered price of the delayed goods or unperformed services cannot be ascertained from the contract, for each week or part thereof of delay until actual delivery or performance, up to a maximum deduction of 10%. Once the maximum is reached, the Purchaser may consider termination of the Contract pursuant to GCC Clause on Termination for Default.

2.28 Termination for Default

- 2.28.1 The Purchaser may, without prejudice to any other remedy for breach of contract, by written notice of default sent to the Supplier, terminate the Contract in whole or part**
- (a) If the Supplier fails to deliver any or all of the Goods within the period(s) specified in the contract, or within any extension thereof granted by the Purchaser pursuant to GCC Clause on Extension of Time; or
 - (b) If the Supplier fails to perform any other obligation(s) under the Contract.
 - (c) If the Supplier, in the judgment of the Purchaser has engaged in corrupt or fraudulent or collusive or coercive practices, etc. as defined in GCC Clause and ITB clause on code of integrity in competing for or in executing the Contract.
- 2.28.2 In the event the purchaser terminates the contract in whole or in part, he may take recourse to any one or more of the following action:
- (a) The Performance Security is to be forfeited;
 - (b) The purchaser may procure, upon such terms and in such manner as it deems appropriate, stores similar to those undelivered, and the supplier shall be liable for all available actions against it in terms of the contract.
 - (c) However, the supplier shall continue to perform the contract to the extent not terminated.

2.29 Force Majeure

- 2.29.1 Notwithstanding the provisions of GCC Clauses relating to extension of time, Liquidated damages and Termination for Default the Supplier shall not be liable for forfeiture of its performance security, liquidated damages or termination for default, if and to the extent that, its delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.
- 2.29.2 For purposes of this Clause, "Force Majeure" means an event or situation beyond the control

of the Supplier that is not foreseeable, is unavoidable, and its origin is not due to negligence or lack of care on the part of the Supplier. Such events may include, but not be limited to, acts of the Purchaser in its sovereign capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions, and freight embargoes.

- 2.29.3 If a Force Majeure situation arises, the Supplier shall promptly notify the Purchaser in writing of such conditions and the cause thereof within 21 days of its occurrence. Unless otherwise directed by the Purchaser in writing, the Supplier shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.
- 2.29.4 If the performance in whole or in part or any obligations under the contract is prevented or delayed by any reason of Force Majeure for a period exceeding 60 days, either party may at its option terminate the contract without any financial repercussions on either side.

2.30 Termination for Insolvency

- 2.30.1 The Purchaser may at any time terminate the Contract by giving written notice to the Supplier, if the Supplier becomes bankrupt or otherwise insolvent. In this event, termination will be without compensation to the Supplier, provided that such termination will not prejudice or affect any right of action or remedy, which has accrued or will accrue thereafter to the Purchaser.

2.31 Termination for Convenience

- 2.31.1 The Purchaser, by written notice sent to the Supplier, may terminate the Contract, in whole or in part, at any time. The notice of termination shall specify that termination is for the Purchaser's convenience, the extent to which performance of the Supplier under the Contract is terminated, and the date upon which such termination becomes effective.
- 2.31.2 The Goods that are complete and ready for shipment within 30 days after the Supplier's receipt of notice of termination shall be accepted by the Purchaser at the Contract terms and prices. For the remaining Goods, the Purchaser may elect:
- (a) To have any portion completed and delivered at the Contract terms and prices; and/or
 - (b) To cancel the remainder and pay to the Supplier an agreed amount for partially completed Goods and for materials and parts previously procured by the Supplier.

2.32 Settlement of Disputes

- 2.32.1 The Purchaser and the supplier shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the Contract.
- 2.32.2 If, after twenty-one (21) days, the parties have failed to resolve their dispute or difference by such mutual consultation, then either the Purchaser or the Supplier may give notice to the other party of its intention to commence arbitration, as hereinafter provided, as to the matter in dispute, and no arbitration in respect of this matter may be commenced unless such notice is given. Any dispute or difference in respect of which a notice of intention to commence arbitration has been given in accordance with this Clause shall be finally settled by arbitration. Arbitration may be commenced prior to or after delivery of the Goods under the Contract.
- 2.32.3 The dispute settlement mechanism/arbitration proceedings shall be concluded as under:
- (a) If any dispute or difference arises between the parties hereto as to the construction, interpretation, effect and implication of any provision of this agreement including the rights or liabilities or any claim or demand of any party against other or in regard to any other matter under these presents but excluding any matters, decisions or determination of

which is expressly provided for in this Agreement, such disputes or differences shall be referred to Delhi International Arbitration Centre(DIAC), Delhi High Court, New Delhi. A reference to the Arbitration under this Clause shall be deemed to be submission within the meaning of the Arbitration and Conciliation Act, 1996 and the rules framed thereunder for the time being in force. Each party shall bear and pay its own cost of the arbitration proceedings unless the Arbitrators otherwise decides in the Award.

2.32.4 Notwithstanding, any reference to arbitration herein,

(a) The parties shall continue to perform their respective obligations under the Contract unless they otherwise agree; and

(b) the Purchaser shall pay the Supplier any monies due the Supplier.

2.33 Governing Language

2.33.1 The contract shall be written in English language which shall govern its interpretation. All correspondence and other documents pertaining to the Contract, which are exchanged by the parties, shall be written in the English language only.

2.34 Applicable Law

2.34.1 The Contract shall be interpreted in accordance with the laws of the Union of India and all disputes shall be subject to place of jurisdiction from where the Purchase Order has been issued.

2.35 Notices

2.35.1 Any notice given by one party to the other pursuant to this contract/order shall be sent to the other party in writing or by cable, telex, FAX, e-mail or and confirmed in writing to the other party's address specified in the invitation to bid.

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

2.36 Taxes and Duties

2.36.1 For goods / services, the Supplier shall be entirely responsible for all taxes, duties, license fees, etc., incurred till its final manufacture/production / delivery / installation / commissioning / training.

2.36.2 If any tax exemptions, reductions, allowances or privileges may be available to the Supplier in India, the Purchaser shall make its best efforts to enable the Supplier to benefit from any such tax savings to the maximum allowable extent.

2.36.3 All payments due under the contract shall be paid after deduction of statutory **levies (at source) (like IT, GST etc.)** wherever applicable.

2.37 Right to use Defective Goods

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

2.38 Protection against Damage

2.38.1 The system shall not be prone to damage during power failures and trip outs. The normal voltage and frequency conditions available at site as under:

(a) Voltage 230 volts – Single phase/ 415 V 3 phase (+_10%)

(b) Frequency 50Hz.

2.39 Site preparation and installation

2.39.1 The Purchaser is solely responsible for the construction of the equipment sites in compliance with the technical and environmental specifications defined by the Supplier. The Purchaser will designate the installation sites before the scheduled installation date to allow the Supplier to perform a site inspection to verify the appropriateness of the sites before the installation of the Equipment, if required. **The supplier shall inform the purchaser about the site preparation, if any, needed for installation, of the goods at the purchaser's site immediately after notification of award/contract.**

2.40 Import and Export Licenses

~~2.40.1 If the ordered materials are covered under restricted category of EXIM policy in India the Vendor / Agent may intimate such information for obtaining necessary, license in India.~~

~~2.40.2 If the ordered equipment is subject to Vendor procuring an export license from the designated government agency / country from where the goods are shipped / sold, the vendor has to mention the name, address of the government agency / authority. The vendor must also mention the time period within which the license will be granted in normal course.~~

2.41 Risk Purchase Clause

2.41.1 If the supplier fails to deliver the goods within the maximum delivery period specified in the contract or Purchase Order, the purchaser may procure, upon such terms and in such a manner as it deems appropriate, Goods or Services similar to those undelivered and the Supplier shall be liable to the purchaser for any excess costs incurred for such similar goods or services.

2.42 Option Clause

2.42.1 The Purchaser reserves the right to increase or decrease the quantity of the required goods up to **25%** (Twenty-Five) per cent at any time, till final delivery date (or the extended delivery date of the contract), by giving reasonable notice even though the quantity ordered initially has been supplied in full before the last date of the delivery period (or the extended delivery period)

2.43 Order Acceptance

2.43.1 The successful bidder should submit Order acceptance within 14 days from the date of issue of order/signing of contract, failing which it shall be presumed that the vendor is not interested and his bid security is liable to be forfeited pursuant to clause 1.16.9 of ITB.

B SPECIAL CONDITIONS OF CONTRACT

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Special conditions of contract (SCC)

The following Special Conditions of Contract (SCC) shall supplement and / or amend the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions herein shall prevail over those in the GCC.

| S.N. | GCC Clause Ref | Condition |
|------|-------------------|--|
| 1 | GCC 2.1.1(l) | The Purchaser is: Director, CSIR – Indian Institute of Chemical Technology (IICT) Uppal Road, Hyderabad – 500007 - Telangana, India |
| 2 | GCC 2.1.1(m) | The Final Destination is: CSIR – Indian Institute of Chemical Technology (IICT), Uppal Road, Tarnaka, Hyderabad, Telangana - 500007, India |
| 3 | GCC 2.13.1 | The amount of the Performance Security(PS) shall be 10% of the contract value. |
| 4 | GCC 2.15.2 | The marking and documentation within and outside the packages shall be: (a) Each package should have a packing list within it detailing the part No(s), description, quantity etc. (b) Outside each package, the contract No., the name and address of the purchaser and the final destination should be indicated on all sides and top. (c) Each package should be marked as 1/x, 2/x, 3/x.....x/x, where “x” is the total No. of packages contained in the consignment. (d) All the sides and top of each package should carry an Appropriate indication/ label/ stickers indicating the precautions to be taken while handling/storage. |
| 5 | GCC 2.16.1 | Details of Shipping and other Documents to be furnished by the Supplier are: <u>For goods manufactured within India.</u> Within 24 hours of dispatch, the supplier shall notify the purchaser the complete details of dispatch and also supply following documents by registeredpost / speed post and copies thereof by FAX/Email. (a) Two copies of Supplier’s Invoice indicating, <i>inter-alia</i> description and specification of the goods, quantity, unit price, total value; (b) Packing list; (c) Certificate of country of origin; (d) Insurance certificate, if required under the contract; |

| | | |
|----|------------|---|
| | | <p>(e) Railway receipt/Consignment note;</p> <p>(f) Manufacturer's guarantee certificate and in-house inspection certificate;</p> <p>(g) Inspection certificate issued by purchaser's inspector, if any; and</p> <p>(h) Any other document(s) as and when required in terms of the contract.</p> <p>Note:</p> <p>01. The nomenclature used for the item description in the invoices(S), packing list(s) and the delivery note(s) etc. should be identical to that used in the contract. The dispatch particulars including the name of the transporter should also be mentioned in the Invoice(s).</p> <p>02. The above documents should be received by the Purchaser before arrival of the Goods and, if not received, the Supplier will be responsible for any consequent expenses.</p> |
| 6 | GCC 2.16.3 | In case of supplies from within India, the mode of transportation shall be by Road . |
| | | Delivery: The Supply shall be completed within 12 weeks from the date of Purchase Order. Installation - Shall be completed within 3 week from the date of receipt material at CSIR – IICT, Hyderabad. |
| 7. | GCC 2.17.1 | The Insurance shall be for an amount equal to 110% of the F.O.R Destination, CSIR-IICT, Hyderabad, Telangana ,India value of the contract from within "warehouse to warehouse (final destination)" on "all risk basis" including strikes, riots and civil commotion. |
| 8. | GCC 2.21.3 | The period of validity of the Warranty shall be 12 months from the date of delivery of ordered equipment in complete quantity, successful installation at CSIR-IICT site and its final acceptance of the same by CSIR-IICT user. |
| 9. | GCC2.22.1 | <p>The method and conditions of payment to be made to the Supplier under this Contract shall be as follows:</p> <p>100% payment within thirty (30) days - after receipt of tendered equipment/Goods in complete ordered quantity and its successful installation & commissioning upon submission of claim duly supported by the acceptance certificate issued by the CSIR-IICT user along with the prescribed Performance Security(PS), if any.</p> |
| 10 | GCC 2.27.1 | The penalty shall be 0.5% per week or part of a week towards late delivery and towards delay in installation and commissioning. |

| | | |
|-----|------------|--|
| | GCC 2.27.1 | The maximum amount of penalty shall be 10% |
| 11. | GCC 2.34.1 | The place of jurisdiction is Hyderabad, Telangana, India |
| 12. | GCC 2.35.1 | For notices, the Purchaser's address is The Director, CSIR – Indian Institute of Chemical Technology, Uppal Hyderabad – 500 007, Telangana, India Attention- Controller of Stores & Purchase, CSIR-IICT |
| 13. | GCC 2.35.1 | Telephone: :+91-040 – 2719 1245 / 1246 / 1241 / 3228 E-mail address: csiriicthyd@csiriict.in / cosp@iict.res.in / spodk@iict.res.in |
| 14. | GCC 2.43.1 | Integrity Pact(IP) – The Integrity Pact is not to be signed . However, all efforts must be made to realize the objectives & spirits thereof. |
| 15. | GCC 2.43.2 | The name and contact details of the IEMs are as under: Not Applicable to this Tender |

CHAPTER 3

(To be filled by the bidder as appropriate and enclosed with the Technical Bid)

SCHEDULE OF REQUIREMENT

| Sl. No. | Brief Description of Goods & Services | Quantity | Physical Unit | Final destination/ Place | Delivery Schedule (to be filled by the bidder) | Time frame required for conducting installation, commissioning of the eqpt., acceptance test, etc. after the arrival of consignment (to be filled by the bidder) |
|---------|---|----------|---------------|--------------------------|---|--|
| | Supply and Installation of “ Pilot Plant Facility for Bulk Chemical Step 1 and Step 2 ”, as per the specifications mentioned in Chapter - 4 | 1 No. | | | | |

Term of delivery: **F.O.R Destination** _____ **(ICT Hyderabad, Telangana, India)**

(retain only one)

Period of delivery shall count from : _____

(to be filled by the bidder)

Scope of Supply : _____

Training requirement: _____

(Location, no. of persons, period of training, nature of training)

Date :

Place :..... **Signature of the Bidder**

Notes for Bidders:

- (1) The delivery schedule shall clearly indicate the time period within which the successful bidder must deliver the consignment in full from the date of establishment of LC or from the date of contract or from the date of advance payment etc. It should also indicate separately the time period desired for installation and commissioning of the equipment after arrival of the consignment at the premises of the Purchaser.
- (2) The date or period for delivery should be carefully specified, taking into account
 - (a) The date prescribed herein from which the delivery obligations start (i.e., notice of award, contract signature, opening or confirmation of the letter of credit, date of releasing advance payment etc.).

Chapter 4

Specifications and allied Technical Details for “PILOT PLANT FACILITY FOR BULK CHEMICALS OF 05 KG/H CAPACITY STEP 1 and STEP 2” at PPC Moulaali, CSIR-IICT-Hyderabad

4.1 End Use: Research: Production of Dicyandiamide (DCDA) at scale of 0.125 TPD

4.2 Scope of Supply and incidental works: Please refer to Para 4.2 above.

Detailed Technical specifications are appended at Annexure as STEP 1 and STEP 2 at the end of this tender document and related Diagrams are uploaded at CSIR-IICT Website for reference and submissions of bid in consonance of the same. The tendered requirements have got TWO (02) independent but interrelated Steps or modules, as follows -

1. “PILOT PLANT FACILITY FOR BULK CHEMICALS OF 05 KG/H CAPACITY STEP 1

2. “PILOT PLANT FACILITY FOR BULK CHEMICALS OF 05 KG/H CAPACITY STEP 2”

Bidders may note -

- i. Bidders are free to quote either ‘**STEP 1**’ or ‘**STEP 2**’ or both as per their convenience/technical capabilities and in their “**Technical Bid**” they must mention the same clearly as to whether they are submitting their bid for **STEP 1** or **STEP 2** or **both** the STEPS.
- ii. If bidder wish to participate for only/any **one STEP** of this tender bidder shall submit Technical Bid and Price Bid for that particular STEP only clearly mentioning the particular STEP.
- iii. Evaluation of Technical Bids for **STEP 1** and **STEP 2** shall also be done by CSIR-IICT **independently/ individually** for acceptance or rejection of Technical Bid for Step 1 and STEP 2 of requirements above.
- iii. **PRICE BIDS** of **STEP 1** and **STEP 2** in excel **BOQ** in **CPPP** shall be submitted by the bidders **independently/ individually**. Bidder shall not submit a combined PRICE BID for STEP 1 and STEP 2. Please also ensure to submit BID PRICE for STEP 1 and STEP 2 in pdf in support of PRICE quoted in BOQ sheet and it shall be same without any discrepancy.
- iv. After evaluation of **TECHNICAL BIDS** for STEP 1 and STEP 2 PRICE BIDS of successful bidders will be opened accordingly. The **Lowest technically responsive bidder (L1 bidder)** for **STEP 1**

and **STEP 2** will be decided **independently / individually** for to award the Purchase Order for each STEP. Thus L 1 bidder for STEP 1 will be considered for award of Purchase Order (PO) for STEP 1 and L 1 bidder for STEP 2 will be considered for award of Purchase Order (PO) for STEP 2 independently. If same bidders happens to be L 1 bidder for both the STEPs in individual evaluation, combined PO can be issued at the discretion of CSIR-IICT.

All the bidders may refer to CSIR-IICT website for more details of this tender and carefully go through the relevant drawings and designs. In their own interests bidders are also requested to forward their queries before the PBC and attend the same for requested clarifications. As it is not feasible to attach all the relevant drawings here, same are being displayed at CSIR website under the 'Tender' tab against this particular tender.

All the bidder are requested to submit their price bid in PDF also in CPPP in the separate packet given, as per instructions.

4.3 Inspection & Tests -

Will be done to check the efficiency and efficacy of the contractual supply, if required.

4.3.1 General

1. Total Cost must include **12 months comprehensive onsite warranty** (labor + parts, etc.) on the complete system.
2. Total **price** must include transportation and complete installation of the unit(s) at user end.
3. Technical presentation/ demonstration of the offered equipment as per tendered specification need to be provided, if so required by CSIR-IICT.
4. List of users (Govt. of India Institutes and research laboratories) of the similar works as the one(s) offered along with the names, addresses, telephone numbers and e-mail ID's to be enclosed. Supplier may also facilitate CSIR-IICT user to see the working condition of similar or offered equipment with existing customer, if available.
5. The Supplier shall at its own expense and at no cost to the Purchaser carry out all such tests and/or inspections of the Goods and Related Services as are specified here.
6. The inspections and tests may be conducted on the premises of the Supplier or its subcontractor(s), at the point of delivery and/or at the Goods final destination. Should any inspected or tested Goods fail to conform to the specifications, the Purchaser may reject the goods and the Supplier shall either replace the rejected Goods or make alterations necessary

to meet specification requirements free of cost to the Purchaser.

7. The Purchaser's right to inspect, test and, where necessary, reject the Goods after the Goods' arrival at final destination shall in no way be limited or waived by reason of the Goods having previously been inspected, tested and passed by the Purchaser or its representative prior to the Goods shipment. The Supplier shall provide the Purchaser with a report of the results of any such test and/or inspection, if required.
8. Detailed original literature indicating all technical specifications and features must be enclosed with the offer. Merely stating "compiled" in the compliance statement will not be considered and offer made will be disqualified.
9. All standard/essential accessories that would be supplied along with the system must be clearly mentioned in the offer.
10. Availability of service support at site and response time for a service call during and after warranty to be specified.
11. The principals / local agents are responsible for the installation, testing and commissioning of the system and accessories.
12. **Pre-installation and utility requirements** for installation and running the system, if any, should be clearly mentioned well in advance.
13. All other clauses of payment details, validity of quotation, delivering schedule, shipment etc. to be clearly indicated in the offer.
14. With a view to ensure that claims on insurance companies, if any, are lodged in time, the bidders shall be responsible for follow up with their principal/OEM for ascertaining the dispatch details and informing the same to the Purchaser and he shall also liaise with the Purchaser to ascertain the arrival of the consignment. So that immediately thereafter in his presence the consignment could be opened and the insurance claim be lodged, if required, without any loss of time. Any delay on the part of the bidder would be viewed seriously and he shall be directly responsible for any loss sustained by the purchaser on the event of the delay.
15. Before the goods and equipment are taken over by the Purchaser, the Supplier shall supply operation and maintenance Manuals together with Drawings of the goods and equipment built. These shall be in such details as will enable the Purchase to operate, maintain, adjust and repair all parts of the works as stated in the specifications. Unless and otherwise agreed, the goods and equipment shall not be considered to be completed for the purposes of taking over until such user Manuals and Drawing have been supplied to the Purchaser.
16. On successful completion of acceptability test, receipt of deliverables, etc. and after the Purchaser is satisfied with the working of the equipment, the acceptance certificate signed by the Supplier and the representative of the Purchaser will be issued. The date on which such certificate is signed shall be deemed to be the date of successful commissioning and final acceptance of the equipment.

4.3.2 Manufacturer's Inspection Certificate`

After the goods are manufactured and assembled, inspection and testing of the goods shall be carried out at the supplier's plant by the supplier, prior to shipment to check whether the goods are in conformity with the technical specifications. Manufacturer's test certificate with data sheet shall be issued to this effect and submitted along with the delivery documents. The purchaser reserves the options to be present at the supplier's premises during such inspection and testing, if required.

4.3.3 Pre Dispatch Inspection. Documents to be provided, if required

4.3.4 Acceptance Test

The acceptance test will be conducted by the Purchaser, their consultant or other such person nominated by the Purchaser at its option after the equipment is installed at Purchaser's site in the presence of supplier's representatives. The acceptance will involve trouble free operation. There shall not be any additional charges for carrying out acceptance test. No malfunction, partial or complete failure of any part of the equipment is expected to occur. The Supplier shall maintain necessary log in respect of the result of the test to establish to the entire satisfaction of the Purchaser, the successful completion of the test specified.

On the event of the ordered item failing to pass the acceptance test, a period not exceeding two weeks will be given to rectify the defects and clear the acceptance test, failing which, the Purchaser reserve the right to get the equipment replaced by the Supplier at no extra cost to the Purchaser.

Successful conduct and conclusion of the acceptance test for the installed goods and equipment shall also be the responsibility and at the cost of the Supplier.

4.1 Training : Free training should be imparted to CSIR-IICT users at the purchaser's premises on operation and application of the supplied item after installation.

4.4 Warranty

12 months comprehensive onsite warranty from the date of successful installation and final acceptance of the supplied system by CSIR-IICT user.

Selection of the system would be based on the response to all the above points apart from the proven technical specifications and features, support, service and suitability to CSIR-IICT's requirements. Please therefore respond to all the points with sufficient details. Merely stating "Complied" will not be considered as a suitable justification.

Price Schedule Form

CHAPTER 5

PRICE SCHEDULE FOR GOODS BEING OFFERED WITHIN INDIA

Name of the Bidder _____

Tender No. _____

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|--------|-----------------------------------|-------------------|------|----------|--|---|---|---|--|-------------|--|
| Sl. No | Item Description With HSN code | Country of origin | Unit | Quantity | Unit Rate Ex-Works, Ex-warehouse, Ex-show room off the shelf price (inclusive of all taxes already paid) | Total price Ex-Works, Ex-warehouse, Ex-show room off the shelf price (inclusive of all taxes already paid) 5x6 | GST & other taxes payable, if contract is awarded | Packing & forwarding up to station of dispatch if any | Charges for inland transportation, insurance up to Lab. / Instt.by air/road/rail (retain one only) | Total Price | Installation, Commissioning and training charges, if any |
| | | | | | | | | | | | |

Note:

(a) The cost of AMC, if any shall be indicated separately

(b) Cost of Spares, if any

Total Bid price in **INR** _____

in words _____

Signature of Bidder _____

Name _____

Business Address _____

Note: The bidder may fill in the appropriate Price Schedule Form and enclose as per Clause 1.10 and 1.18.3 of the bidding documents

CHAPTER 6

Qualification Requirements

1. The bidder / Manufacturer / Principal Supplier must have delivered, Installed, commissioned with the same, similar or higher model / version of the quoted equipment to any Government Organisation / Research Organisation of repute / any CSIR laboratories, within past three financial years. At least **one order copy** with successful installation certificate of same or similar works /Purchase Order must be enclosed.
2. The turnover of the firm in last three years shall be at least **50%** of the estimated cost of the tendered project/requirement. It can be relaxed in case of Start ups. MSME, etc. as per applicable policy of the Govt. of India, subject to bidder meeting other prescribed tendered specifications and requirements.
3. The Bidder as a Company / Joint venture Company (Joint Venture should have been formed before tender date) and should have proven capabilities in supply and installation of same or higher model.
4. The bidders must not have been under any declaration of **ineligibility** by any authority. A declaration to the effect should be furnished;
5. A consistent history of litigation or arbitration awards against the applicant may result in disqualification;
6. The Bidder (manufacturer or principal of authorized representative) should not have suffered any financial loss for more than one year during the last three years.
7. The net worth of the Bidder (manufacturer or principal of authorised representative) should not be negative by more than 30% (thirty percent) in the last three years.
8. ~~Foreign bidders to disclose the name and address of agent and representatives in India and Indian bidder to disclose their foreign principal or associates.~~

Documentary evidence in support of each of above points must be accompanied with Technical Bid for further consideration and evaluation

PLEASE NOTE: ONE OR MORE OF THE QUALIFICATION CRITERIA / REQUIRMENT COULD ALSO HAVE BEEN MENTIONED IN **CHAPTER 4**, VIZ. UNDER TECHNICAL SPECIFICATIONS (AS THESE ARE COMMUNICATED BY THE END USERS) AND THEREFORE SHALL ALSO DEEM TO BE PART OF THIS BID DOCUMENT/CHAPTER FOR THE PURPOSE OF DETERMINING ELIGIBILITY.

CHAPTER 7

Contract Form

Contract No. _____ Date: _____

THIS CONTRACT AGREEMENT is made the *[insert: number]* day of *[insert: month], [insert: year]*.

BETWEEN

(1) The Council of Scientific & Industrial Research registered under the Societies Registration Act 1860 of the Government of India having its registered office at 2, Rafi Marg, New Delhi-110001, India represented by _____ *[insert complete name and address of Purchaser* (hereinafter called "the Purchaser"), and

(2) *[insert name of Supplier]*, a corporation incorporated under the laws of *[insert: country of Supplier]* and having its principal place of business at *[insert: address of Supplier]* (hereinafter called "the Supplier").

WHEREAS the Purchaser invited bids for certain Goods and ancillary services, viz., *[insert brief description of Goods and Services]* and has accepted a Bid by the

Supplier for the supply of those Goods and Services in the sum of *[insert Contract Price in words and figures, expressed in the Contract currency(ies)]* (hereinafter called "the Contract Price").

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

01. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract referred to.

02. The following documents shall constitute the Contract between the Purchaser and the Supplier, and each shall be read and construed as an integral part of the Contract:

- (a) This Contract Agreement
- (b) Special Conditions of Contract
- € General Conditions of Contract
- (d) Technical Requirements (including Schedule of Requirements and Technical Specifications)
- € The Supplier's Bid and original Price Schedules
- (f) The Purchaser's Notification of Award
- (g) *[Add here any other document(s)]*

03. This Contract shall prevail over all other Contract documents. In the event of any discrepancy or inconsistency within the Contract documents, then the documents shall prevail in the order listed above.

04. In consideration of the payments to be made by the Purchaser to the Supplier as hereinafter mentioned, the Supplier hereby covenants with the Purchaser to provide the Goods and Services and to remedy defects therein in conformity in all respects with the provisions of the Contract.

05. The Purchaser hereby covenants to pay the Supplier in consideration of the provision of the Goods and Services and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the laws of Union of India on the day, month and year indicated above.

For and on behalf of the Council of Scientific & Industrial Research

Signed: *[insert signature]*

in the capacity of *[insert title or other appropriate designation]*

in the presence of *[insert identification of official witness]*

Signed: *[insert signature]*

in the capacity of *[insert title or other appropriate designation]*

in the presence of *[insert identification of official witness]*

For and on behalf of the Supplier

Signed: *[insert signature of authorized representative(s) of the Supplier]*

in the capacity of *[insert title or other appropriate designation]*

in the presence of *[insert identification of official witness]*

CHAPTER 8

Other Standard Forms

(To be enclosed as indicated below)

Table of Contents

| Sl. No. | Name |
|---------|---|
| 01. | Bidder Information Form (to be enclosed with the technical bid) |
| 02. | Manufacturers' Authorization Form (to be enclosed with the technical bid) |
| 03. | Bid Securing Declaration. (to be enclosed with the technical bid) |
| 04 | Performance Statement Form (to be enclosed with the technical bid) |
| 05 | Deviation Statement Form (to be enclosed with the technical bid) |
| 06 | Service Support Detail Form (to be enclosed with the technical bid) |
| 07 | Bid Form (to be enclosed with the priced bid) |
| 08 | Performance Security Form |
| 09 | Acceptance Certificate Form |
| 10 | Integrity Pact (to be enclosed with the technical bid) |
| 11 | Format of declaration of abiding by the code of integrity and conflict of interest to be submitted by the bidder. (to be enclosed with the technical bid) |
| 12 | Price Schedule |
| 13 | Format of Affidavit of self-certification regarding domestic value addition (to be enclosed with the technical bid) |
| 14 | Format of Certificate to be provided by bidder in case of subcontracting. (to be enclosed with the technical bid) |
| 15 | Format of self-declaration in terms of land border instructions |
| 16 | Format for Technical Compliance (to be enclosed with the technical bid) |

Note : Please refer clause 1.10.1 of the bidding documents for other documents to be attached with the bids/offers.

Form –1

Bidder Information Form

- (a) *The Bidder shall fill in this Form in accordance with the instructions indicated below. No alterations to its format shall be permitted and no substitutions shall be accepted. This should be done of the letter head of the firm]*

Date: *[insert date (as day, month and year) of Bid Submission]*

Tender No.: *[insert number from Invitation for bids]*

Page 1 of _____pages

| | |
|-----|--|
| 01. | Bidder's Legal Name <i>[insert Bidder's legal name]</i> |
| 02. | In case of JV, legal name of each party: <i>[insert legal name of each party in JV]</i> |
| 03. | Bidder's actual or intended Country of Registration: <i>[insert actual or intended Country of Registration]</i> |
| 04. | Bidder's Year of Registration: <i>[insert Bidder's year of registration]</i> |
| 05. | Bidder's Legal Address in Country of Registration: <i>[insert Bidder's legal address in country of registration]</i> |
| 06 | NAME AND ADDRESS OF BANK: BANK ACCOUNT NUMBER: TYPE OF ACCOUNT: IFSC CODE: |
| 07. | Bidder's Authorized Representative Information Name: <i>[insert Authorized Representative's name]</i> Address: <i>[insert Authorized Representative's Address]</i> Telephone/Fax numbers: <i>[insert Authorized Representative's telephone/fax numbers]</i> Email Address: <i>[insert Authorized Representative's email address]</i> |
| 08 | COUNTRY OF ORIGIN OF PRODUCT (S): |
| 09 | ADDRESS OF THE PLACE OF MANUFACTURE / FACTORY / PLACE WHERE LOCAL CONTENT VALUE ADDITION IS DONE BY MANUFACTURER: |
| 10 | If item is imported and is from a country sharing land border with India, then |

| | |
|-----|---|
| | Registration certificate details like number, date and validity date: |
| 11 | Are you a MSE registered for the Item under procurement : if Yes, then furnish details of the certificate, date and validity along with copy of the same. Do you intend to opt for the purchase preference policies of the Government of India as applicable to MSEs in this tender?? If So, write Yes |
| 12 | Do you intend to opt for the purchase preference policies of Government of India as applicable by "Make in India(MII) order/ circular? If So, write Yes |
| 13 | Are you Class I Vendor or Class II Vendor as defined by Make In India circular. It is mandatory to attach the certificate from the OEM for Local content percentage and place of value addition. |
| 14. | Attached are copies of original documents of: <i>[check the box(es) of the attached original documents]</i> Articles of Incorporation or Registration of firm named in 1, above. |
| 15. | Whether bidder intends to claim the benefit of purchase preference in under the MSEs Policy and Make in India policy of the Govt. of India with reference to point 11, 12 & 13 above. If yes , please specifically indicate your status as the bidder under one of the following category in terms of the Govt. of India, Ministry of Finance, Department of Expenditure OM No. F.1/4/2021-PPD dt. 18.05.2023 – i. "MSE Class-I local supplier", or ii. 'MSE but non-Class-I local supplier" or iii. 'Non-MSE but Class-I local supplier" or iv. 'Non-MSE non-Class-I local supplier' <u>(Delete or Strike out, whichever not applicable. Write "NO" if none of above four category is applicable).</u> |

Signature of Bidder _____

Name _____

Business Address _____

MANUFACTURERS' AUTHORIZATION FORM

[The Bidder shall require the Manufacturer to fill in this Form in accordance with the instructions indicated. This letter of authorization should be on the letterhead of the Manufacturer and should be signed by a person with the proper authority to sign documents that are binding on the Manufacturer and be enclosed with the technical bid.]

Date: *[insert date (as day, month and year) of Bid Submission]*

Tender No.: *[insert number from Invitation For Bids]*

To,

The Director,

CSIR-IICT, Hyderabad-500007.

WHEREAS

We *[insert complete name of Manufacturer]*, who are official manufacturers of *[insert type of goods manufactured]*, having factories at *[insert full address of Manufacturer's factories]*, do hereby authorize *[insert complete name of Bidder]* to submit a bid the purpose of which is to provide the following Goods, manufactured by us *[insert name and or brief description of the Goods]*, and to subsequently negotiate and sign the Contract.

We hereby extend our full guarantee and warranty in accordance with Clause 2.21 of the General Conditions of Contract, with respect to the Goods offered by the above firm.

Signed: *[insert signature(s) of authorized representative(s) of the Manufacturer]*

Name: *[insert complete name(s) of authorized representative(s) of the Manufacturer]*

Title: *[insert title]*

Duly authorized to sign this Authorization on behalf of: *[insert complete name of Bidder]*

Dated on _____ day of _____, _____ *[insert date of signing]*

Form-3

Bid-Securing Declaration Form

Date: _____

Bid No. _____

To (insert complete name and address of the purchaser)

I/We. The undersigned, declare that:

I/We understand that, according to your conditions, bids must be supported by a Bid Securing Declaration.

I/We accept that I/We may be disqualified from bidding for any contract with you for a period of two years from the date of notification if I am /We are in a breach of any obligation under the bid conditions, because I/We

- (a) have withdrawn/modified/amended, impairs or derogates from the tender, my/our Bid during the period of bid validity specified in the form of Bid; or
- (b) having been notified of the acceptance of our Bid by the purchaser during the period of bid validity (i) fail or reuse to execute the contract, if required, or (ii) fail or refuse to furnish the Performance Security, in accordance with the Instructions to Bidders.

I/We understand this Bid Securing Declaration shall cease to be valid if I am/we are not the successful Bidder, upon the earlier of (i) the receipt of your notification of the name of the successful Bidder; or (ii) thirty days after the expiration of the validity of my/our Bid.

Signed: (insert signature of person whose name and capacity are shown) in the capacity of (insert legal capacity of person signing the Bid Securing Declaration).

Name: (insert complete name of person signing the Bid Securing Declaration)

Duly authorized to sign the bid for an on behalf of : (insert complete name of Bidder)

Dated on _____ day of _____ (insert date of signing)

Corporate Seal (where appropriate)

(Note: In case of a Joint Venture, the Bid Securing Declaration must be in the name of all partners to the Joint Venture that submits the bid)

Form –4

PERFORMANCE STATEMENT FORM

(For a period of last 5 years)

Name of the Firm.....

| Order Placed by (full address of Purchaser) | Order No. and date | Description and quantity of ordered equipment | Value of order | Date of completion of deliver as per Contract | Date of actual completion of delivery | Remarks indicating reasons for late delivery, if any | Has the equipment been installed satisfactory ? (Attach a certificate from the purchaser/ Consignee) | Contact person along with Telephone No., FAX No. and e-mail address |
|---|--------------------|---|----------------|---|---------------------------------------|--|--|---|
| | | | | | | | | |

Signature and Seal of the manufacturer/Bidder

Place :

Date :

Form – 5

DEVIATION STATEMENT FORM

| Sl.No. | Name of Specifications / Parts / Accessories of Tender Enquiry | Specifications of Quote Model / Part /Accessory | Compliance Whether Yes of No | Deviation, if any to be indicated in unambiguous terms (The compliance / Deviation should be supported by relevant Technical Literature) | Technical justification for the deviation, if any. If specification is superior /inferior than asked for in the enquiry, it should be clearly brought out in the justification |
|--------|--|---|------------------------------|--|--|
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |

Signature of Bidder

- ✓ If the bidder offers more than one model, then the Compliance Statement must be enclosed for each and every model separately.
- ✓ The technical and commercial deviations should be indicated separately.
- ✓ If the bidder fails to enclose the compliance statement, his bid is likely to be rejected.

Place:

Date:

Signature and seal of the

Manufacturer/Bidder

Note: Where there is no deviation, the statement should be returned duly signed with an endorsement indicating “No Deviations”.

Form – 6

SERVICE SUPPORT FORM

| Sl. No. | Nature of training Imparted | List of similar type of equipment serviced in the past 3 years | Address, Telephone Nos., Fax Nos. and e-mail address |
|---------|-----------------------------|--|--|
| | | | |
| | | | |
| | | | |
| | | | |

Signature and Seal of the manufacturer/Bidder.....

Place :

Date :

Form -7

Bid Form

[The Bidder shall fill in this Form in accordance with the instructions indicated. No alterations to its format shall be permitted and no substitutions shall be accepted.]

Date: *[insert date (as day, month and year) of Bid Submission]*

Tender No.: *[insert number from Invitation for Bids]*

Invitation to Bid No.: (Insert No. of IFB)

To: Insert the complete name of the Purchaser)

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda No.: *[insert the number and issuing date of each Addenda]*;
- (b) We offer to supply in conformity with the Bidding Documents and in accordance with the Delivery Schedules specified in the Schedule of Requirements the following Goods and Related Services *[insert a brief description of the Goods and Related Services]*;
- (c) The total price of our Bid, excluding any discounts offered in item (d) below, is: *[insert the total bid price in words and figures, indicating the various amounts and the respective currencies]*;
- (d) The discounts offered and the methodology for their application are:
Discounts: If our bid is accepted, the following discounts shall apply. *[Specify in detail each discount offered and the specific item of the Schedule of Requirements to which it applies.]*
- (e) Our bid shall be valid for the period of time specified in ITB Sub-Clause 1.17.1 from the date fixed for the bid opening, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- (f) If our bid is accepted, we commit to obtain a performance security in accordance with ITB Clause 1.43 and GCC Clause 2.13 for the due performance of the Contract and also submit order acceptance within 14 days from the date of contract in accordance with ITB Clause 1.42 and GCC Clause 2.44;
- (g) The following commissions, gratuities, or fees have been paid or are to be paid with respect to the bidding process or execution of the Contract: *[insert complete name of each Recipient, its full address, the reason for which each commission or gratuity was paid and the amount and currency of each such commission or gratuity]*

| Name of Recipient | Address | Reason | Amount |
|-------------------|---------|--------|--------|
|-------------------|---------|--------|--------|

(If none has been paid or is to be paid, indicate — “None.”)

(h) We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed.

(i) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.

Signed: *[insert signature of person whose name and capacity are shown]*

In the capacity of *[insert legal capacity of person signing the Bid Submission Form]*

Name: *[insert complete name of person signing the Bid Submission Form]*

Duly authorized to sign the bid for and on behalf of: *[insert complete name of Bidder]*

Dated on _____ day of _____, _____ *[insert date of signing]*

Form -8

PERFORMANCE SECURITY FORM

MODEL BANK GUARANTEE FORMAT FOR PERFORMANCE SECURITY

To,

.....

WHEREAS..... (name and address of the supplier) (hereinafter called "the supplier") has undertaken, in pursuance of contract No. datedto supply (description of goods and services) (herein after called "the contract").

AND WHEREAS it has been stipulated by you in the said contract that the supplier shall furnish you with a bank guarantee by a scheduled commercial bank recognized by you for the sum specified therein as security for compliance with its obligations in accordance with the contract;

AND WHEREAS we have agreed to give the supplier such a bank guarantee;

NOW THEREFORE we hereby affirm that we are guarantors and responsible to you, on behalf of the supplier, up to a total of(amount of the guarantee in words and figures), and we undertake to pay you, upon your first written demand declaring the supplier to be in default under the contract and without cavil or argument, any sum or sums within the limits of (amount of guarantee) as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the supplier before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the contract to be performed there under or of any of the contract documents which may be made between you and the supplier shall in any way release us from any liability under this guarantee and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid until the day of, 20.....

(Signature of the authorized officer of the Bank)

.....

Name and designation of the officer

.....

Seal, Name & Address of the Issuing Branch of the Bank

Note: Whenever, the bidder chooses to submit the Performance Security in the form of Bank Guarantee, then he should advise the banker issuing the Bank Guarantee to immediately send by Registered Post (A.D.) an unstamped duplicate copy of the Guarantee directly to the Purchaser with a covering letter to compare with the original BG for the correctness, genuineness, etc.

Form – 09

ACCEPTANCE CERTIFICATE FORM

No. _____

Dated: _____

M/s. _____

Sub: Certificate of commissioning of equipment

01. This is to certify that the equipment as detailed below has/have been received in good condition along with all the standard and special accessories (subject to remarks in Para 2). The same has been installed and commissioned.

- (a) Contract No. _____ Date _____
- (b) Description of the equipment _____
- (c) Name of the consignee _____
- (d) Scheduled date of delivery of the consignment to the Lab./Instts. _____
- (e) Actual date of receipt of consignment by the Lab./Instts. _____
- (f) Scheduled date for completion of installation/commissioning _____
- (g) Training Starting Date _____
- (h) Training Completion Date _____
- (i) Names of People Trained _____
- (j) Actual date of completion of installation/commissioning _____
- (k) Penalty for late delivery (at Lab./Instts. level) ₹ _____
- (l) Penalty for late installation (at Lab./Instts. level ₹ _____

Details of accessories/items not yet supplied and recoveries to be made on that account:

| Sl. No. | Description | Amount to be recovered |
|---------|-------------|------------------------|
| | | |

02. The acceptance test has been done to our entire satisfaction. The supplier has fulfilled his contractual obligations satisfactorily

or

The supplier has failed to fulfil his contractual obligations with regard to the following:

(a)

(b)

(c)

(d)

The amount of recovery on account of failure of the supplier to meet his contractual obligations is as indicated at Sr. No. 3.

For Supplier

For Purchaser

Signature

Signature.....

Name

Name.....

Designation

Designation.....

Name of the firm.....

Name of the Lab/Instt.....

Date

Date.....

Form -10

Format of Integrity Pact

Between

Council of Scientific & Industrial Research (CSIR) a Society registered under the Indian Societies Act 1860 represented by _____ hereinafter referred to as "The Principal".

And herein referred to as "The Bidder/ Contractor."

Preamble

The Principal intends to award, under laid down organizational procedures, contract/s for The Principal values full compliance with all relevant laws of the land, rules, regulations, economic use of resources and of fairness/ transparency in its relations with its Bidder(s) and/or Contractor(s).

In order to achieve these goals, the Principal will appoint an Independent External Monitor (IEM), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1 – Commitments of the Principal

- (1) The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:
 - (a) No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
 - (b) The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
 - (c) The Principal will exclude from the process all known prejudiced persons.
- (2) If the Principal obtains information on the conduct of any of its employees which is a criminal offence under the IPC/PC Act, or if there be a substantive suspicion in this regard, the Principal will inform the Chief Vigilance Officer and in addition can initiate disciplinary action.

Section 2 – Commitments of the Bidder(s)/Contractor(s)

- (1) The Bidder(s)/Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.
 - (a) The Bidder(s)/Contractor(s) will not, directly or through any other Person or firm, offer, promise or give to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
 - (b) The Bidder(s)/Contractor(s) will not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, Certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

- (c) The Bidder(s)/Contractor(s) will not commit any offence under the relevant IPC/PC Act; further the Bidder(s)/Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
 - (d) The Bidder(s)/Contractor(s) of foreign origin shall disclose the name and address of the Agents/representatives in India, if any. Similarly the Bidder(s)/Contractors(s) of Indian Nationality shall furnish the name and address of the foreign principals, if any. Further details as mentioned in the “Guidelines on Indian Agents of Foreign Suppliers” shall be disclosed by the Bidder(s)/Contractor(s). Further, as mentioned in the Guidelines all the payments made to the Indian agent/representative have to be in Indian Rupees only. Copy of the “Guidelines on Indian Agents of Foreign Suppliers” is annexed and marked as Annexure.
 - (e) The Bidder(s)/Contractor(s) will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
- (2) The Bidder(s)/Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

Section 3 – Disqualification from tender process and exclusion from future Contracts

- (1) If the Bidder(s)/Contractor(s), before award or during execution has committed a transgression through a violation of Section 2, above or in any other form such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/Contractor(s) from the tender process or take action as per the procedure mentioned in the “Guidelines on Banning of business dealings”. Copy of the “Guidelines on Banning of business dealings” is annexed and marked as Annex -“B”.

Section 4 – Compensation for Damages

- (1) If the Principal has disqualified the Bidder(s) from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.
- (2) If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to Section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages of the contract value or the amount equivalent to Performance Bank Guarantee.

Section 5 – Previous transgression

- (1) The Bidder declares that no previous transgressions occurred in the last 3 Years with any other Company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.
- (2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or action can be taken as per the procedure mentioned in “Guidelines on Banning of business dealings.”

Section 6 – Equal treatment of all Bidders / Contractors/ Sub-contractors

- (1) The Bidder(s)/Contractor(s) undertake(s) to demand from all Subcontractors a commitment in conformity with this Integrity Pact, and to submit it to the Principal before contract signing.
- (2) The Principal will enter into agreements with identical conditions as this one with all Bidders, Contractors and Subcontractors.
- (3) The Principal will disqualify from the tender process all bidders who do not sign this Pact or violate its provisions.

Section 7 – Criminal charges against violating Bidders / Contractors/ Subcontractors

- (1) If the Principal obtains knowledge of conduct of a bidder, Contractor or Subcontractor or of an employee or a representative or an associate of a bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the same to the Chief Vigilance Officer.

Section 8 - Independent External Monitors

- (1) The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.
- (2) The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the JS (A), CSIR.
- (3) The Bidder(s)/Contractor(s) accepts that the Monitor has the right to access without restriction to all Project documentation of the Principal including that provided by the Contractor. The Contractor will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors. The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s) / Subcontractor(s) with confidentiality.
- (4) The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.
- (5) As soon as the Monitor notice, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or to take other relevant action. The monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.
- (6) The Monitor will submit a written report to the JS(A), CSIR within 8 to 10 weeks from the date of reference or intimation to him by the Principal and should the occasion arise, submit proposals for correcting problematic situations.
- (7) Monitor shall be entitled to compensation on the same terms as being extended to/provided to Independent Directors on the CSIR.
- (8) If the Monitor has reported to the JS(A),CSIR, a substantiated suspicion of an offence under relevant IPC/PC Act, and the JS(A), CSIR has not, within the reasonable time taken visible action to proceed against such offence or reported it to the Chief Vigilance Officer, the Monitor may also transmit this information directly to the Central Vigilance Commissioner.
- (9) The word 'Monitor' would include both singular and plural.

Section 9 – Pact Duration

This Pact begins when both parties have legally signed it. It expires for the Contractor 10 months after the last payment under the contract, and for all other Bidders 6 months after the contract has been awarded.

If any claim is made/lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged/determined by JS(A), CSIR.

Section 10 – Other provisions

- (1) This agreement is subject to Indian Law. Place of performance and Jurisdiction is the Registered Office of the Principal, i.e. New Delhi
- (2) Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.
- (3) If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.
- (4) Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

| | |
|------------------------------------|--|
| (For & On behalf of the Principal) | (For & On behalf of Bidder/Contractor) |
| (Office Seal) | (Office Seal) |
| Place..... | Place..... |
| Date..... | Date..... |
| Witness 1:(Name & Address): _____ | |
| Witness 2::(Name & Address): _____ | |

FORM - 11

Format for declaration by the Bidder for "Code of Integrity & conflict of interest"(On the Letter Head of the Bidder)

Ref. No: _____

Date _____

To,

(Name & address of the Purchaser)

Sir,

With reference to your Tender No. _____ dated _____ I/We hereby declare that we shall abide by the Code of Integrity for Public Procurement as mentioned under Para 1.3.0 of ITB of your Tender document and have no conflict of interest.

The details of any previous transgressions of the code of integrity with any entity in any country during the last three years or of being debarred by any other Procuring Entity are as under:

a

b

c

We undertake that we shall be liable for any punitive action in case of transgression/contravention of this code.

Thanking you,

Yours sincerely,

Signature

(Name of the Authorized Signatory)

Company Seal

Form -12

PRICE SCHEDULE FORM FOR GOODS BEING OFFERED WITHIN INDIA

Name of the Bidder _____

Tender No. _____

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---------|-----------------------------------|-------------------|------|----------|--|--|---|--|---|-------------|--|
| Sl. No. | Item Description With HSN code | Country of origin | Unit | Quantity | Unit Rate Ex-Works, Ex-warehouse, Ex-show room off the shelf price (inclusive of all taxes already paid) | Total price Ex-Works, Ex-warehouse, Ex-show room off the shelf price (inclusive of all taxes already paid) 5x6 | GST & other taxes payable, if contract is awarded | Packing & forwarding up to station of dispatch, If any | Charges for inland transportation, insurance up to Lab. / Instt.by air/road/ rail (retain one only) | Total Price | Installation, Commissioning and training charges, if any |
| | | | | | | | | | | | |

Note:

(a) The cost of AMC, if any shall be indicated separately

(b) Cost of Spares, if any

Total Bid price in Indian currency _____

in words _____

Signature of Bidder _____

Name _____

Business Address _____

Form - 13

Format for Affidavit of Self Certification regarding Local Content in a R & D

EquipmentTENDER NUMBER: _____ Date: _____

I _____ S/o, D/o, W/o _____, Resident of _____
_____do hereby

solemnly affirm and declare as under:

That I will agree to abide by the terms and conditions of the policy of Government of India issued vide Notification – Public procurement (preference to Make in India) Order No.P-45021/2/2017 - PP (BE-II) dated 16.09.2020

That the information furnished hereinafter is correct to be of my knowledge and belief and I undertake to produce relevant records before the procuring entity or any authority so nominated for the purpose of assessing the local content.

That the local content for all inputs which constitute the said equipment has been verified by me and I am responsible for the correctness of the claims made therein.

That in the event of the domestic value addition of the product mentioned herein is found to be incorrect and not meeting the prescribed value-addition norms, based on the assessment of an authority so nominated for the purpose of assessing the local content, action will be taken against me as per Order No. P-45021/2/2017/-PP(B.E-II) dated 16.09.2020.

I agree to maintain the following information in the Company's record for a period of 8 years and shall make this available for verification to any statutory authority: (Kindly fill up the below mentioned particulars)

i. Name and details of the PLACE OF LOCATION OF VALUE ADDITION:

ii. R &D Equipment for which the certificate is produced

iii. Procuring entity to whom the certificate is furnished

iv. Percentage of local content claimed:

This is to certify that the information / details given above are true. If it is found at a later stage that any or all of the certification is found to be false or documents establishing value addition is not produced or insufficient I shall be liable for the false declaration. I shall co-operate with the nodal ministry or the procuring entity for verification of records establishing local content.

For and on behalf of (Name of firm/entity)

Authorized signatory (To be duly authorized by the Board of Director / Partner / Proprietor)

NOTE: AUTHORISED SIGNATORY AS PER THE PPMI ORDER

FORM – 14

(For details refer to OM No.P-45021/112/2020-PP(BE-II)(E-43780) dated 24.08.2020 of Ministry of Commerce and Industry, Department for Promotion of Industry and Internal Trade and any amendments thereon.)

Certificate for subcontracting

(Applicable and to be provided by bidder in case of subcontracting)

I have read the tender document of tender no. _____ along with clause regarding restriction on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries; I certify that this bidder is not from such a country or, if from a such a country, has been registered with the Competent Authority and will not sub-contract any work to a contractor from such countries unless such contractor is registered with the competent Authority. A valid certificate issued by the competent Authority has been attached with the bid. I hereby certify that this bidder fulfil all requirements in this regard and is eligible to be considered.

Signature of the bidder

Name of the Signatory

FORM – 15

(For details, please refer to the Govt. of India(Gol.), Ministry of Finance, Department of Expenditure OM No. **F 6/18/2019-PPD dated 23.78.2020** and Gol., Department for Promotion of Industry and Internal Trade(DPIIT) Order P-45021/112/2020-PP(BE-II) (E-43780) read with any other amendment/ related instructions issued by the Govt. of India, from time to time as on date of issue of this tender)

To,
The Director,
CSIR-IICT,
Hyderabad-500007.

Certificate by bidder for participation

With reference to CSIR-IICT, Hyderabad Tender Enquiry bearing No. dated it is certified that:

*I/we have read clauses regarding restriction on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries and I / We certify that the bidder is not from such a country **or** if from a such a country, has been registered with the Competent Authority and will not sub-contract any work to a contractor from such countries unless such contractor is registered with the competent Authority. (A valid certificate issued by the Competent Authority has been attached with the bid, **if applicable**).*

Further, I hereby certify that this bidder fulfills all requirements in this regard and is eligible to be considered. Details of offered goods are as under-

- i. Country of Origin of the Offered Item _____
- ii. Manufacturer of the offered item _____
- iii. _____ Complete Address of the manufacturer
- iv. Manufacturer of the offered item does not pertain to such a country which shares Land Border with India.

For and on behalf of M/s.....

(Sign and Seal of authorized representative of the firm)

This Annexure provides only brief overview of the main tendering related provisions of various policies of the Govt. of India (those related to MSEs, Make in India(MII), Start Up India, DPIIT guidelines etc. Bidders are encouraged in their own interest to go through the original policy documents issued by concerned ministries / departments of the Government of India, as these are revised from time to time. For the purpose of tender evaluation and deciding eligibility / ineligibility of bidder's offer, interpretation will be based on the current provisions in the original document of the concerned policy.

1. The bidder must

1. **Comply with Make in India Order No. P-45021/2/2017-PP (BE-II)** dated 16th September 2020 of Ministry of Commerce and Industry, Government of India and any amendment thereto from time to time.
2. **Comply with Order No. P-45021/112/2020-PP(BE-II)(E-43780)** dated 24.08.2020 of Ministry of Commerce and Industry, Department for Promotion of Industry and Internal Trade and any amendments thereon.
2. **CSIR-IICT is registered with Dept. of Scientific & Industrial Research, Govt. of India** and eligible for concessional Custom Duty. However, GST(IGST/CGST/SGST) shall be paid at applicable rates only.
3. **Purchase Preference to Micro and Small Enterprises (MSEs) and Purchase Preference linked with MAKE IN INDIA Order shall be applicable subject to full compliance of other terms and conditions of the RFQ / NIT and Contract, as per Government of India procurement policies. The purchaser intends to give purchase preference to:**
 - a. Make in India (as per Order No. P-45021/2/2017-PP (BE-II) dated 16th September 2020 of Ministry of Commerce and Industry, Government of India. The preference to Public Procurement (Preference to Make in India) Order 2012" shall be subject to meeting technical specifications and full compliance of other terms and conditions of the RFQ / NIT and Contract.
 - b. Products / goods manufactured by Micro and Small Enterprises shall be eligible for purchase preference as per MSE order 2012 and any amendments thereon. If the bidder wants to avail the Purchase preferences, **the bidder must be the manufacturer of the offered product in case of bid for supply of goods.** Traders are excluded from the preview of public procurement policy for Micro and Small Enterprises. In respect of bid for services, the bidder must be the service provider of the offered service. Relevant documentary evidence in this regard shall be uploaded along with the bid in respect of the offered product or service. The aforesaid Policy is meant for procurement of only goods produced and Services rendered by MSEs and not for any trading activities by them. An MSE unit will not get any Purchase Preference over any other MSE Unit.

In case a bidders are eligible to seek benefit under Purchase Preference Policy(PPP) under 'MAKE IN INDIA(MII)' policy as well as PPP for 'MSE ,2012', then the bidder should categorically seek benefits specifying benefits claimed by the bidder with reference to MAKE IN INDIA OR MSE policy in BID FORM itself. Please also refer to the Govt. of India, Ministry of Finance, Department of Expenditure **OM No. F.1/4/2021-PPD dt. 18.05.2023** for order of *inter se* purchase preference applicable in such concurrent applicability of MII and MSEs policy in such cases.

4. Any bidder from a country which shares a land border with India will be eligible to bid in this tender **only if the bidder is registered with the Competent Authority** (Registration Committee as constituted by Department of Promotion of Industry and Internal Trade) and submits a valid registration Certificate. (please refer to Order no.6/18/2019-PPD dated 23 July 2020 and any amendments thereon.)
- 4.1 "Bidder" (including the term 'tendered', 'consultant' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial judicial person not falling in any of the descriptions of

bidder stated hereinbefore, including any agency branch or Officer controlled by such person, participating in a procurement process.

4.2 "Bidder from a country which shares a land border with India" for the purpose of this order means:

- a) An entity incorporated, established or registered in such a country; or
- b) A subsidiary of an entity incorporated, established or registered in such a country; or
- c) An entity substantially controlled through entities incorporated, established or registered in such a country; or
- d) An entity whose beneficial owner is situated in such a country; or
- e) An Indian (or other) agent of such an entity; or
- f) A natural person who is a citizen of such a country; or
- g) A consortium or joint venture where any member of the consortium or joint venture fails under any of the above

4.3 The beneficial owner for the purpose of above will be as under

- i. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more judicial person, has a controlling ownership interest or who exercise control through other means.

Explanation -

- a) "Controlling ownership interest" means ownership of a or entitlement to more than twenty-five percent of shares or capital or profits of the company;
 - b) "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholder's agreements or voting agreements.
- ii. In case of a partnership firm, the beneficial owner is the natural persons(s) who, whether acting alone or together, or through one or more judicial person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;
 - iii. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more judicial person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals;
 - iv. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;
 - v. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.

4.4 An agent is a person employed to do any act for another, or to represent another in dealings with third person.

5 Eligibility with respect to 'Make in India'

- a) In procurement of all goods, services or works in respect of which the Nodal Ministry I Department has communicated that there is sufficient local capacity and local competition, only 'Class-I local supplier', as defined under the Order No. P-45021/2/2017-PP (BE-II) dated 16th September 2020 of Ministry of Commerce and Industry, Government of India, shall be eligible to bid irrespective of purchase value.
- b) Only 'Class-I local supplier' and 'Class-II local supplier', as defined under the Order, shall be eligible to bid in procurements undertaken by procuring entities, except when Global tender enquiry has been issued. In global tender enquiries, 'Non-local suppliers' shall also be eligible to bid along with 'Class-I local suppliers' and 'Class-II local suppliers'. In procurement of all goods, services or works, not covered by sub- para 3(a) of Order No. P-45021/2/2017-PP (BE-II) dated 16th September 2020 of Ministry of Commerce and Industry, Government of India, and with estimated value of purchases less than Rs 200 Crore, in accordance

with Rule 161(iv) of General Finance Rules, 2017, Global tender enquiry shall not be issued except with the approval of competent authority as designated by Department of Expenditure.

6 Purchase Preference Policies:

A) Purchase Preference Policy in respect of MSEs

- a) The purchaser intends to give product reservation/purchase preference/price preference in line with current Govt. of India procurement policies to help inclusive national economic growth by providing long term support to Micro and Small enterprises and disadvantaged sections of the society and to address environmental concerns along with preferential market access in govt. procurements.
- b) A bidder in the category of Micro and Small Enterprises (to be supported by valid documents – to be uploaded along with technical bid), qualifying for price-bid and quoting price within price band of L1+15 percent shall also be allowed to supply a portion of requirement by bringing down their price to L1 price in a situation where L1 price is from someone other than a Micro and Small Enterprise shall be allowed to supply upto 25 percent of the total tendered value (ratio of non-MSME and MSME will be 80:20).
- c) In case more than one such Micro and Small Enterprise, the supply shall be shared proportionately.
- d) If the lowest is MSME then the entire order will be finalized on L1.

B) Purchase Preference Policy in respect of Make in India

- a) Subject to the provisions of Order No.P-45021/2/2017-PP (BE-II) dated 16th September 2020 of Ministry of Commerce and Industry, Government of India and to any specific instructions issued by the Nodal Ministry or in pursuance of this Order, purchase preference shall be given to **Class-I local supplier** in procurements undertaken by procuring entities in the manner specified here under.
- b) In the procurements of goods or works, which are covered by para 3(b) of Order No.P- 45021/2/2017-PP (BE-II) dated 16th September 2020 of Ministry of Commerce and Industry, Government of India above and which are divisible in nature, the **'Class-I local supplier'** shall get purchase preference over 'Class-II local supplier' as well as 'Non-local supplier', as per following procedure.
 - i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is 'Class-I local supplier', the contract for full quantity will be awarded to L1.
 - ii. If L1 bid is not a 'Class-I local supplier', 50% of the order quantity shall be awarded to L1. Thereafter, the lowest bidder among the 'Class-I local supplier' will be invited to match the L1 price for the remaining 50% quantity subject to the Class-I local supplier's quoted price falling within the margin of purchase preference, and contract for that quantity shall be awarded to such 'Class-I local supplier' subject to matching the L1 price. In case such lowest eligible 'Class-I local supplier' fails to match the L1 price or accepts less than the offered quantity, the next higher Class-I local supplier' within the margin of purchase preference shall be invited to match the L1 price for remaining quantity and so on, and contract shall be awarded accordingly. In case some quantity is still left uncovered on Class-I local suppliers, then such balance quantity may also be ordered on the L1 bidder.
- c) In the procurements of goods or works, which are covered by para 3(b) Order No.P-45021/2/2017- PP (BE-II) dated 16th September 2020 of Ministry of Commerce and Industry, Government of India and which are not divisible in nature, and in procurement of services where the bid is evaluated on price alone, the 'Class-I local supplier' shall get purchase preference over Class-II local supplier' as well as 'Non-local supplier', as per following procedure-
 - i. Among all qualified bids. the lowest bid will be termed as L 1. If L1 is 'Class-1 local supplier', the contract will be awarded to L1.

ii. If L1 is not 'Class-I local supplier', the lowest bidder among the 'Class-I local supplier', will be invited to match the L1 price subject to Class-I local supplier's quoted price falling within the margin of purchase preference. and the contract shall be awarded to such 'Class-I local supplier' subject to matching the L1 price.

iii. In case such lowest eligible 'Class-I local supplier' fails to match the L1 price, the 'Class-I local supplier' with the next higher bid within the margin of purchase preference shall be invited to match the L1 price and so on and contract shall be awarded accordingly. In case none of the 'Class-I local supplier' within the margin of purchase preference matches the L1 price, the contract may be awarded to the L1 bidder.

iv. "Class-II local supplier" will not get purchase preference in any procurement, undertaken by procuring entities.

7. Concurrent application of Public Procurement Policy for Micro and Small Enterprises Order, 2012 and Public Procurement (Preference to Make in India) Order, 2017 shall be governed in terms of the Govt. of India, Ministry of Finance, Department of Expenditure OM No. F.1/4/2021-PPD dt. 18.05.2023, as amended from time to time. The brief guidelines under situation of concurrent application of aforesaid policies are briefly detailed as under

-

7.1 The Class-I local suppliers, under PPP-MII Order, participating in any government tender, may or may not be MSEs, as defined under the MSME Act. Similarly, MSEs participating in any government tender, may or may not be Class-I local suppliers. Suppliers may be categorised in following four broad categories for consideration or applicability of purchase preference:

| Category | Terminology |
|--|--------------------------------------|
| Supplier is both MSE & Class-I local supplier. | "MSE Class-I local supplier" |
| Supplier is MSE but not Class-I local supplier. | 'MSE but non-Class-I local supplier" |
| Supplier is not MSE but is Class-I local supplier. | 'Non-MSE but Class-I local supplier" |
| Supplier is neither MSE nor Class-I local. | 'Non-MSE non-Class-I local supplier' |

7.2 The applicability of PPP-MSE Order and PPP-MII Order in various scenarios, involving simultaneous purchase preference to MSEs and Class-I local suppliers under PPP-MSE Order and PPP-MII Order respectively, shall be as under -

a. Items covered under Para 3(a) of PPP- MII Order, 2017 for which Nodal Ministry has notified sufficient local capacity and competition: For these items, only Class-I local suppliers are eligible to bid irrespective of purchase value. Hence, Class-II local suppliers or Non-local suppliers, including MSEs which are Class-II local suppliers/ Non-local suppliers, are not eligible to bid. Possible scenarios can be as under:

i. L-1 is "MSE Class-I local supplier" - 100% of the tendered quantity is to be awarded to L-1.

ii. L-1 is "Non-MSE but Class-I local supplier" - Purchase preference is given to MSEs as per PPP-MSE Order. Balance quantity is to be awarded to the L-1 bidder.

b. Items reserved exclusively for procurement from MSEs as per PPP-MSE Order: These items are reserved exclusively for purchase from MSEs. Hence, non-MSEs are not eligible to bid for these items. Possible scenarios can be as under:

- i. L-1 is “MSE Class-I local supplier” - 100% of the tendered quantity is to be awarded to L-1.
 - ii. L-1 is “MSE non-Class—I local supplier” - Purchase preference is to be given to Class-I local supplier as per PPP-MII Order. Balance quantity, is to be awarded to L-1 bidder.
- c. If items are neither notified for sufficient local capacity nor reserved for MSEs, then the process will be as follows:

c(a) Items covered under Para 3A(b) of PPP-MII Order are divisible items and both MSEs as well as Class-I local suppliers are eligible for purchase preference. Possible scenarios can be as under:

- i. L-1 is “MSE Class-I local supplier” - 100% of the tendered quantity is to be awarded to L-1.
- ii. L-1 is “Non-MSE but Class-I local supplier” - Purchase preference is to be given to MSEs, if eligible, as per PPP-MSE Order. Balance quantity is to be awarded to L-1 bidder.
- iii. L-1 is “MSE but non-Class-I local supplier” - Purchase preference is to be given to Class-I local suppliers, if eligible, as per PPP-MII Order. Balance quantity is to be awarded to L-1 bidder.
- iv. L-1 is “Non-MSE non-Class-I local supplier” - Purchase preference is to be given to MSEs as per PPP-MSE Order. Thereafter, purchase preference is to be given to Class-I local suppliers for “50% of the tendered quantity minus quantity allotted to MSEs above” as per PPP- MII Order. For the balance quantity, contract is to be awarded to L-1 bidder. (Kindly refer to the illustrative example in the annexure to said OM dt. 18.05.2023 under reference).

c(b) Items covered under Para 3A(c) of PPP-MII Order, 2017 are non-divisible items and both MSEs as well as Class-I local suppliers are eligible for purchase preference. Possible scenarios can be as under:

- i. L-1 is “MSE Class-I local supplier” - Contract is awarded to L-1.
- ii. L-1 is not “MSE Class-I local supplier” but the “MSE Class-I local supplier” falls within 15% margin of purchase preference - Purchase preference is to be given to lowest quoting “MSE Class-I local supplier”. If lowest quoting “MSE Class-I local supplier” does not accept the L-1 rates, the next higher “MSE Class-I local supplier” falling within 15% margin of purchase preference is to be given purchase preference and so on.
- iii. If conditions mentioned in sub paras (i) and (ii) above are not met
i.e. L-1 is neither “MSE Class-I local supplier” nor “MSE Class-I local supplier” is eligible to take benefit of purchase preference, the contract is to be awarded/ purchase preference to be given in different possible scenarios as under:
 - A. L1 is “MSE but non-Class-I local supplier” or “Non-MSE but Class-I local supplier” — Contract is to be awarded to L1.
 - B. L1 is “Non-MSE non-Class-I local supplier” - First

purchase preference to be given to MSE as per PPP-MSE Order. If MSE not eligible/ does not accept - purchase preference to be given to Class- I Local supplier as per PPP-MII Order. If Class-I Local supplier also not eligible/ does not accept -contract to be awarded to L-1.

7.3 Items reserved for both MSEs and Class-I local suppliers:

These items are reserved exclusively for purchase from MSEs as well as Class-I local suppliers. Hence, only “MSE Class-I local supplier” are eligible to bid for these items. Non-MSEs/Class-II local suppliers/ Non-local suppliers cannot bid for these items. Hence the question of purchase preference does not arise.

7.4 Non-local suppliers, including MSEs falling in the category of Non-local suppliers, shall be eligible to bid only against Global Tender Enquiry.

(Bidders are advised to refer to said OM No. F.1/4/2021-PPD dt. 18.05.2023 and related instructions for further details).

NOTE ABOUT ‘LOCAL CONTENT’: As per Letter No. P- 45021/102/2019-PP(BEII)(E-29930) dated 26.11.2020 and OM P- 45021/102/2019-PP(BE-II)-BE-Part-(1)(E-50310) dated 04.03.2021 of Ministry of Commerce and Industry, Department for Promotion of Industry and Internal Trade, it is clarified that bidders offering imported products will fall under the category of ‘Non-local suppliers’. They cannot claim themselves as Class-I local supplier / Class-II local supplier by claiming the services such as transportation, Insurances, Installation, Commissioning, training and after sales services support like AMC/CMC etc. as local value addition.

TENDER DOCUMENT

For

Pilot Plant Facility for Bulk Chemical of 5Kg/h Capacity- Step I



Prepared by

CSIR- INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY

(Council of Scientific & Industrial Research)

HYDERABAD - 500 007

October 2023

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1.0 BID INVITATION

CSIR-Indian Institute of Chemical Technology (IICT), Hyderabad has taken up a project to set-up **Pilot plant facility for bulk chemical of 5 kg/h capacity-Step I**. This facility is intended for R & D studies at CSIR-IICT, Hyderabad.

The information on general features of Pilot plant facility, its location, time frame and scope of contract is appended herewith.

CSIR-IICT invites bids from reputed turnkey contractors for procurement, fabrication, erection, testing and mechanical commissioning of the Continuous Pilot plant facility consisting mainly of the following type of equipment: Reactors, Stirred Vessels, Storage Tanks, Separators, Condensers, Pumps along with interconnecting Tubing / Piping / associated Instrumentation and Electricals etc. This step shall be mounted / assembled on separate skids. The facility will be located in IICT-Moulaali premises, Hyderabad.

GENERAL FEATURES OF THE PILOT PLANT FACILITY

The Pilot plant facility is designed for Semi-Continuous operation. The process equipment are reactors, stirred vessels, storages, separators, filters, condensers etc. with required utilities. Necessary instrumentation to measure and control the process parameters like temperature, pressure, pH and level are to be provided as shown in P&IDs, Instruments list.

PILOT PLANT FACILITY LOCATION

The Pilot plant facility will be located at PPC, Moulaali, CSIR-IICT, Hyderabad (Telangana).

CIVIL AND STRUCTURAL WORKS

The facility shall be housed in a shed. The equipments are to be supported on separate steel structure/ skids with operating platforms wherever necessary. The contractor shall provide the civil foundations for equipment and structure if required. Turnkey contractor shall provide equipment arrangement drawings (plan and elevation) and skid details for approval prior to assembly.

ELECTRICALS / INSTRUMENTATION

CSIR-IICT will provide power supply at 440 V (3-phase) and 230 V (single-phase), 50 Hz. The MCC Panel, wiring from the MCC Panel to the individual consumer units is under the scope of the Turnkey Contractor. Earthing of equipments, earth pit, cabling for instrumentation / panel mounted instruments and the electrical and instrument panels are in the scope of Turnkey contractor and to be suitably located near the skid.

TIME FRAME / DELIVERY PERIOD

The turnkey job is to be executed by the contractor in a period of 8-12 weeks from the date of award of the contract (contractor should submit time schedule for execution of the project along with the offer).

SUBMISSION OF TENDERS

The bid is invited for single contract for the entire Pilot plant facility comprising procurement, fabrication, erection, testing and mechanical commissioning as a turnkey job as per the scope of work given in Annexure I and II.

You are requested to send your offer in two parts. Part - 1 consisting of technical offer and Part - 2 consisting of financial offer along with terms and conditions including validity. You are also requested to provide the following additional particulars along with the offer.

Part - 1:

- a) The infrastructure available with your company in terms of trained manpower for procurement, inspection, installation etc.
- b) The list of such jobs executed during the last five years with the addresses of locations and the value of contract.
- c) Profile of your company with annual turnover, number of employees, number of projects executed etc.
- d) Details of time schedule to complete the job in 12-16 weeks.

Part - 2:

The financial offer for the turnkey contract should be given for the Turnkey pilot plant facility which includes the following:

- i) Fabricated equipment and vendor equipment
- ii) Instrumentation
- iii) Tubing/ piping and valves, fittings
- iv) Electrical
- v) Erection
- vi) Commissioning and service charges

2.0 GENERAL TERMS AND REQUIREMENTS FOR TURNKEY PROJECT BID

Unless modified or cancelled in writing by a Purchase Order Amendment the following conditions will govern the purchase order.

OBLIGATION

The obligation under this agreement as per the scope of work is to be fulfilled entirely by the Turnkey Contractor. All the information provided is confidential and all the bidders shall enter into a secrecy agreement with IICT.

CONTRACTUAL DELIVERY DATE

Contractual delivery date for completion of the Turnkey Project is 12-16 weeks from the date of award of Purchase Order.

WORKMANSHIP

It is a condition of the agreement (in addition to all conditions and warranties, implied by law) that the said Turnkey project shall conform to the description and specifications here in provided, shall be now, of good workmanship, merchantable and adaptable for the purpose to which they are intended and free from any defects and that their sale or use does not infringe any Indian patent, registered design, trade-mark or trade name.

ACTIVITY SCHEDULE

The Turnkey Contractor shall submit to Purchaser in the bid an activity schedule for execution of the order identifying delivery dates. Such scheduling shall in no way relieve the Turnkey Contractor of the time and delivery obligations under the terms of the order.

INSPECTION

All equipment, materials covered by the Purchase Order shall be subject to inspection and testing prior to dispatch by IICT, without which no equipment shall be dispatched to site by the Turnkey Contractor. IICT will make final inspection after arrival at the place of delivery, for quality workmanship and specifications according to methods devised. At all reasonable times and places before, during and after manufacture, the Turnkey Contractor on prior notice shall grant free access to Purchaser all parts of vendor's and his sub-vendor's works involved in the manufacturing and processing of Turnkey Project under this Purchase Order. (Turnkey Contractor to physically visit the site before proceeding and to take care of road permits etc.)

The Turnkey Contractor shall give the Purchaser at least 3 days notice of the availability of equipment/Material for inspection of quantity/quality/specifications so as to enable the Purchaser, if he so chooses, to inspect the same before dispatch and shall specify the place and period during which inspection can be made. Within 2 days of receipt of notice mentioned here in above, the Purchaser shall inform the Turnkey Contractor whether or

not it shall inspect the Turnkey Project. Local hospitality to be provided by Turnkey contractor for the IICT team visiting works for inspection.

- a) All tests mechanical and others and particularly those required by codes shall be performed at the Turnkey Contractor's expenses when such tests are performed.
- b) The Turnkey Contractor shall bear the expenses concerning tests required by all statutory agencies.

Before dispatch, the equipment/material shall be checked and stamped by Purchaser/Inspector/Inspector of Turnkey Contractor.

Even if the inspections and tests are fully carried out, Turnkey Contractor would not be absolved from his responsibility in ensuring that all equipments and materials supplied comply strictly with requirements as per agreement during manufacture, at the time of delivery and inspection, on arrival at site and after its erection or start up and Warranty period as stipulated in the Purchase Order.

ENGINEERING FACILITIES

Tools and tackles for erection is the responsibility of the Turnkey Contractor. Turnkey Contractor is also responsible for receipt, storage and issue of all materials.

INDEMINITY

The Turnkey Contractor shall indemnify, protect, defend and hold the Purchaser harmless from any and all claims, actions and proceedings arising from any right or title pertaining to the Turnkey Project supplied by the Turnkey Contractor.

WARRANTY

- a) The Turnkey Contractor shall Warranty that all items supplied under the Purchase Order strictly comply with characteristics, requirements and specifications referred to there in, that the materials used are new and free from latent/patent defects, and that fabrication is carried out in accordance with best engineering practice and with most up to date techniques.
- b) In the event any defects or deficiencies are found in the Turnkey Project, which are ascribable to the non-compliance with characteristics, specifications and requirements stated in the Purchase Order shall be conveyed, **within 12 months from the date of mechanical commissioning**. The Turnkey Contractor shall provide at his cost, expense and care for any repairs/replacement of such defective or deficient Turnkey project in the shortest possible time.
- c) In case of modification and/or repairs, the Turnkey Contractor shall obtain the Purchaser's prior approval before carrying them out. The Warranty for the part replaced shall be for 12 months starting from the date of replacement. Should the Turnkey project notwithstanding such modification and/or repairs, still fail to

comply with requirements they shall be replaced at the suppliers/vendors cost/expense and care in accordance with the schedule to be agreed upon.

- d) If defects are found and the Turnkey Contractor fails to replace, modify or repair the defective Turnkey project within the time required by the Purchaser, the Purchaser shall effect such modifications, replacement and repairs and all expenses for such modifications/repairs will be charged to the Turnkey Contractor. Notwithstanding such modifications/repairs, the Turnkey Contractor shall remain responsible for the Warranty under the Purchase Order.
- e) The Turnkey Contractor shall provide catalogues, installation, operation and maintenance manuals and any other technical information for all the bought out / vendor items.
- f) The Turnkey Contractor can take any counter Warranty from vendors of bought out items. However, it is the responsibility of Turnkey Contractor to provide Warranty to IICT for all bought out items on his own.

LIABILITY AGREEMENT

The Turnkey Contractor shall indemnify the Purchaser from all claims for injury that may be caused to any person by an act of the Turnkey Contractor or his agents or servants, whether employed by him or not while in or upon the Purchaser's premises and in respect of any other damages that may be caused to any plant, machinery or property of the Purchaser in the course of deliver of the materials and/or works.

TURNKEY CONTRACTOR'S SPECIALIST

The Turnkey Contractor shall provide the services of the specialists for erection/testing and commissioning of Turnkey project supplied by the Turnkey Contractor at the terms and conditions stated in the Purchase Order.

SUPPLIER'S LIABILITY

The receipt of the equipment/material within Purchaser's premises shall not discharge the Turnkey Contractor from liability for damages or other legal remedy for any breach of any conditions or warranty contained herein or implied by law, if after receiving equipment/material any discrepancies or defects therein, either in material, workmanship, or otherwise become known to the Purchaser and such defects amount to a breach of any condition or warranty here under are implied by law. The Purchaser shall as soon as it comes within his knowledge, notify the Turnkey Contractor of such defects and shall, in addition to any other rights or remedies that the Purchaser may possess by entitled to reject the defective materials and/or work.

SUPPLIER'S/VENDER'S DRAWINGS AND DATA REQUIREMENTS

The submission of drawing data and documentation by the Turnkey Contractor to the Purchaser is an integral part of the order. The quantities and the time limits for

submitting the documentation by the Turnkey Contractor shall be specified in the attachment to the Purchase Order. These quantities and time limits must be adhered to failing which the order will not be deemed to have been duly executed for all purposes and the Purchaser reserves the right to hold and/or deduct a suitable amount from payments due to the Turnkey Contractor.

TECHNICAL INFORMATION & CONFIDENTIALITY

- a) Drawings specifications and details given by the Purchaser shall be the property of the Purchaser and shall be returned by the Turnkey Contractor on demand. The Turnkey Contractor shall not make use of drawing and specifications for any other purposes at any time save and except for the purpose of the Purchaser.
- b) The Turnkey Contractor shall furnish to the Purchaser free of charge at the time of deliver, documentation which contains all necessary information as to the operation and maintenance of the equipment/material under the normal conditions. Such documentation shall be in English language and shall remain the exclusive property of the Turnkey Contractor and would not be used by the Purchaser for any other purpose than for which it was handed over to it nor shall it become the property of the Purchaser.
- c) It is here by agreed that the Purchaser and Turnkey Contractor respectively shall keep confidential all information, specifications drawings and shall not disclose such information unless when required statutorily and/or to any third party specifically permitted with assent of both parties subject always to the signing of essentially similar secrecy and non-use undertaking by such third party.
- d) Further the Purchaser and Turnkey Contractor shall also ensure that its employees shall comply with such confidentiality undertaking.

Annexure I

EQUIPMENT SUMMARY SHEET, EQUIPMENT SPECIFICATIONS AND INSTRUMENTS SUMMARY SHEET


EQUIPMENT SUMMARY SHEET

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| S.No. | UNIT No. | No. Req. | DESIGNATION | OPERATING CONDITIONS | | CAPACITY | | HEAT TRANSFER AREA sq. m. | MAJOR DIMENSIONS (mm) | M.O.C. | RATING HP | INSULATION | REMARKS | R |
|-------|------------|----------|------------------------|----------------------|-------------------|--------------|-----------|---------------------------|-------------------------------------|----------|-----------|------------|---|----|
| | | | | TEMP. °C | PRESSURE kg/sq.cm | VESSELS Lit. | PUMPS lph | | | | | | | |
| 01 | Fi-201 | 1 | Centrifuge | 10-25 | Atm. | 100 kg | - | - | - | SS 316 | - | - | Pore Size 11 microns Feed Composition 25% Solid and 75% Liquid. | 1 |
| 02 | Fi-202 | 1 | Centrifuge | 25-30 | Atm. | 10 kgs | - | - | - | SS 316 | - | - | Pore Size 2 microns Feed Composition 1% Solid and 99% Liquid. | 2 |
| 03 | P-201 | 1 | W Transfer Pump | 25-30 | Atm. | - | 3000 LPH | - | - | SS 316 | 1.0 | - | | 3 |
| 04 | P-202 | 1 | WC Transfer Pump | 5-10 | Atm. | - | 900 LPH | - | - | SS 316 | 1.0 | - | | 4 |
| 05 | P-203 | 1 | C3 Transfer Pump | 20-30 | Atm. | - | 3000 LPH | - | - | SS 316 | 1.0 | - | | 5 |
| 06 | P-204 | 1 | C3 Transfer Pump | 20-30 | Atm. | - | 3000 LPH | - | - | SS 316 | 1.0 | - | | 6 |
| 07 | P-205 | 1 | C3 Transfer Pump | 20-30 | Atm. | - | 3000 LPH | - | - | SS 316 | 1.0 | - | | 7 |
| 08 | P-206 a,b | 2 | C3 Feed Metering Pumps | 20-30 | Atm. | - | 180 LPH | - | - | SS 316 | 1.0 | - | | 8 |
| 09 | R-201 | 1 | Hydrolysis Reactor | 10 | Atm. | 1600 | - | - | 1100 DIA X 1475/ 1200 DIA X 1180 | SS316/CS | 5.0 | CCI | pH - 7.5 to 8.5 Rotary Valve to be Operated Based on pH Value (Feed Approx. 2kg in 10 Min.) | 9 |
| 10 | RV-201 | 1 | Rotary Valve | 25-30 | Atm. | 2kg/10 min | - | - | - | - | - | - | | 10 |
| 11 | SB-201 | 1 | C1 Storage Bin | 25-30 | Atm. | 300 kg | - | - | 800 DIA X 530 | SS 316 | - | - | | 11 |
| 12 | ST-201 | 1 | W Storage Tank | 25-30 | Atm. | 1250 | - | - | 1000 DIA X 1400 | SS316 | - | - | | 12 |
| 13 | ST-202 | 1 | WC | 5 | Atm. | 400 | - | - | 700 DIA X 910/ 800 DIA X 725 | SS316/CS | - | CCI | | 13 |
| 14 | ST-203 | 1 | C3 Collection Tank | 10-20 | Atm. | 1250 | - | - | 1000 DIA X 1400 | SS316 | - | - | | 14 |
| 15 | ST-204 | 1 | C3 Preparation Vessel | 20-25 | Atm. | 1250 | - | - | 1000 DIA X 1400 | SS316 | - | - | pH - 7.5 to 8.5 | 15 |
| 16 | ST-205 a,b | 2 | C3 Feed Tanks | 25-30 | Atm. | 1250 | - | - | 1000 DIA X 1400 | SS316 | - | - | pH - 7.5 to 8.5 | 16 |
| 17 | Tray-201 | 5 | Trays | Amb. | Atm. | 100 kg | - | - | - | SS316 | - | - | Dimensions (lxbxh)=1000x530x180 | 17 |
| 18 | | | | | | | | | | | | | | 18 |
| 19 | | | | | | | | | | | | | | 19 |
| 20 | | | | | | | | | | | | | | 20 |
| 21 | | | | | | | | | | | | | | 21 |
| 22 | | | | | | | | | | | | | | 22 |
| 23 | | | | | | | | | | | | | | 23 |

Notes : 1. VTS = Vendor to Specify

NOTES : HCI = HEAT CONSERVATIVE INSULATION ; CCI = COLD CONSERVATIVE INSULATION ; PPI = PERSONEL PROTECTION INSULATION ; VTS = Vendor to Specify



DESIGN & ENGINEERING DIVISION
CSIR-INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDERABAD - 500 007

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 1) CLIENT : -
 LOCATION :- CAPACITY : 0.125 TPD
TITLE: EQUIPMENT LIST - (SECTION 200) CODE :-

| | | | | | | | | | | | | | | | | |
|------|-----------|-------------|-----------|------------|------------|--------|------------|------------|--------------------------------|---|---|---|---|---|---|---|
| S.No | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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MECH ENGR PRCS ENGR INST ENGR ELECT ENGR CIVIL ENGR CLIENT CONSULTANT CONTRACTOR

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| SCALE | REFERENCES | DWG/DOC/SK No. | SHEET |
| | | CD/FP/ FOLDER | FILE |
| | | | REV |

1 OF 1



CENTRIFUGAL PUMP SPECIFICATION DATA SHEET

Page
- of -

| | |
|--|----------------------|
| PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 1) | PROJECT CODE : - |
| CLIENT : - | CAPACITY : 0.125 TPD |
| LOCATION : - | R |

| | | | | | | | |
|--------------------------|-----------------|---|--|-------------------|----------------------------|------------------------|----|
| GEN. | 1 | Unit No. : P-201 | Dwg. No. : - | Code : - | 1 | | |
| | 2 | Title : W Transfer Pump | Type : Centrifugal | | 2 | | |
| | 3 | Service : To Transfer W from ST-201 to R-201, S-301, ST-202 and Recirculation | | | | 3 | |
| | 4 | Normal Capacity : 3000 LPH | Nos. required (Total) : 1 | Working : 1 | Stand By : 0 | 4 | |
| PROCESS DATA | 1 | Fluid Handled : W | | | 5 | | |
| | 2 | Capacity : lpm | Normal : 35 | Maximum : 50 | Design : 50 | 6 | |
| | 3 | Operating Temperature : °C | Normal : 25 | Maximum : 30 | Design : 30 | 7 | |
| | 4 | Operating Pressure : kg/sq.cm.-g/a | Suction : Atm. | Discharge : 3.0 | | 8 | |
| | 5 | Density at 30°C : kg/cu.m. | 1000 | | | 9 | |
| | 6 | Viscosity at 30 : cP | 1 | | | 10 | |
| | 7 | Vapour Pressure at °C : mm Hg | - | | | 11 | |
| | 8 | Nature of Fluid : | - | | | 12 | |
| | 9 | pH | | | | 13 | |
| | 10 | Suspended Solids : | Type : - | % wt / Vol. : - | Avg. particle size:mic.: - | 14 | |
| | 11 | Dissolved Gases : | - | | | 15 | |
| | 12 | Hazard Condition : | | | | 16 | |
| CONSTRUCTION DATA | 1 | Suction Details : | Condition : Flooded | | | 17 | |
| | 2 | Discharge Details : | Condition : Discharge to R201 at Atm. Pressure | | | 18 | |
| | | | m of water | Head : 30.0 m | | 19 | |
| | 3 | Total Discharge Pressure : | kg/sq.cm.-g/a = | 3.0 | | 20 | |
| | 4 | NPSH Available : | m of W.C. | VTS | | 21 | |
| | 5 | Material Of Construction | Casing : | SS 316 | | 22 | |
| | | | Gears : | - | | 23 | |
| | | | Shaft : | SS 316 | | 24 | |
| | | | Bolting : | SS 316 | | 25 | |
| | 6 | Nozzles | Suction | End Connection : | Flanged | Size NB (mm) : 50 | 26 |
| | | | | Pressure Rating : | 150# | Standard : ANSI, B16.5 | 27 |
| | | | Discharge | End Connection : | Flanged | Size NB (mm) : 50 | 28 |
| Pressure Rating : | | | | 150# | Standard : ANSI, B16.5 | 29 | |
| 7 | Drive Details : | Motor : | Electric | | 30 | | |
| | | Power Supply : | VTS | | 31 | | |
| | | R.P.M. : | 1440 | | 32 | | |
| 8 | Seal : | Type : Stuffing Box | H.P. : 1.0 | Seal Fluid : VTS | 33 | | |
| NOTES | 1 | Vendor shall supply 2 sets of all relevant catalogues, performance curves, dimensioned drawings and maintenance manuals and shall guarantee mechanical performance. | | | | 34 | |
| | 2 | Vendor to indicate a list of recommended spare parts. | | | | 35 | |
| | 3 | Scope of supply shall include Pump, Motor, coupling & guard common base plate and foundation details. | | | | 36 | |
| | 4 | VTS : Vendor to specify. | | | | 37 | |
| | 5 | Stroke length to be adjustable through flow range. | | | | 38 | |
| | 6 | Pump shall operate at +/- 1% accuracy. | | | | 39 | |
| | 7 | All non contact parts should be coated with corrosion acid resistant paint. | | | | 40 | |
| | 8 | Vendor shall indicate whether the suction conditions meet NPSH requirements. | | | | 41 | |

| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--------------------------------|--------|-------------|----|-----|-----|------|------|---------|---|---|---|---|---|---|---|---|
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|--|--|------------|--|---------------|--|------------|--|----------------|--|---------------|--|------------|--|------------|--|
| All dimensions in mm, unless specified | | | | | | | | | | | | | | | |
| DO NOT SCALE | | | | | | | | | | | | | | | |
| MECH ENGR | | PRCS ENGR | | INST ENGR | | ELECT ENGR | | CIVIL ENGR | | CLIENT | | CONSULTANT | | CONTRACTOR | |
| CLEARANCES | | | | | | | | | | | | | | | |
| MR | | - | | MR | | 19.07.23 | | MR/SAK | | - | | TPK/MR/SAK | | - | |
| DESIGN | | | | PREPARED | | | | VER/CHD | | | | APPROVED | | | |
| SCALE | | REFERENCES | | SOFT COPY REF | | | | DWG/DOC/SK No. | | | | SHEET | | REV 0 | |
| | | | | CD/FP | | FOLDER | | FILE | | DE-XXX-XXX-ED | | 1 of 1 | | | |

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CENTRIFUGAL PUMP SPECIFICATION DATA SHEET

Page
- of -

| | |
|--|----------------------|
| PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 1) | PROJECT CODE : - |
| CLIENT : - | CAPACITY : 0.125 TPD |
| LOCATION : - | R |

| | | | | | | | |
|--------------------------|-----------------|---|--|----------------------------|-----------------------------|-------------|----|
| GEN. | 1 | Unit No. : P-202 | Dwg. No. : - | Code : - | 1 | | |
| | 2 | Title : WC Transfer Pump | Type : Centrifugal | | 2 | | |
| | 3 | Service : To Transfer Chilled Water from ST-202 to Fi-201, FI-301 a,b and Recirculation | | | | 3 | |
| | 4 | Normal Capacity : 900 LPH | Nos. required (Total) : 1 | Working : 1 | Stand By : 0 | 4 | |
| PROCESS DATA | 1 | Fluid Handled : | W | | | 5 | |
| | 2 | Capacity : | lpm | Normal : 10 | Maximum : 15 | Design : 15 | 6 |
| | 3 | Operating Temperature : | °C | Normal : 5 | Maximum : 10 | Design : 10 | 7 |
| | 4 | Operating Pressure : | kg/sq.cm.-g/a | Suction : Atm. | Discharge : 3.0 | | 8 |
| | 5 | Density at 30°C | kg/cu.m. | 1000 | | | 9 |
| | 6 | Viscosity at 30 | cP | 1 | | | 10 |
| | 7 | Vapour Pressure at °C - | mm Hg | - | | | 11 |
| | 8 | Nature of Fluid : | - | | | 12 | |
| | 9 | pH | | | | 13 | |
| | 10 | Suspended Solids : | Type : - | % wt / Vol. : - | Avge. particle size:mic.: - | | 14 |
| | 11 | Dissolved Gases : | - | | | 15 | |
| | 12 | Hazard Condition : | | | | 16 | |
| CONSTRUCTION DATA | 1 | Suction Details : | Condition : Flooded | | | 17 | |
| | 2 | Discharge Details : | Condition : Discharge to Fi-201 at Atm. Pressure | | | 18 | |
| | 3 | Total Discharge Pressure : | kg/sq.cm.-g/a | = 3.0 | | 21 | |
| | 4 | NPSH Available : | m of W.C. | VTS | | 22 | |
| | 5 | Material Of Construction | Casing : SS 316 | Seal : - | | | 23 |
| | | | Gears : - | Gasket : PTFE | | | 24 |
| | | | Shaft : SS 316 | Others : | | | 25 |
| | | | Bolting : SS 316 | All contact parts : SS 316 | | | 26 |
| | 6 | Nozzles | Suction | End Connection : Flanged | Size NB (mm) : 25 | | 27 |
| | | | | Pressure Rating : 150# | Standard : ANSI, B16.5 | | 28 |
| | | | Discharge | End Connection : Flanged | Size NB (mm) : 25 | | 29 |
| | | | | Pressure Rating : 150# | Standard : ANSI, B16.5 | | 30 |
| 7 | Drive Details : | Motor : Electric | H.P. : 1.0 | | | 31 | |
| | | Power Supply : VTS | | | | 32 | |
| | | R.P.M. : 1440 | | | | 33 | |
| 8 | Seal : | Type : Stuffing Box | Seal Fluid : VTS | | | 34 | |
| NOTES | 1 | Vendor shall supply 2 sets of all relevant catalogues, performance curves, dimensioned drawings and maintenance manuals and shall guarantee mechanical performance. | | | | 35 | |
| | 2 | Vendor to indicate a list of recommended spare parts. | | | | 36 | |
| | 3 | Scope of supply shall include Pump, Motor, coupling & guard common base plate and foundation details. | | | | 37 | |
| | 4 | VTS : Vendor to specify. | | | | 38 | |
| | 5 | Stroke length to be adjustable through flow range. | | | | 39 | |
| | 6 | Pump shall operate at +/- 1% accuracy. | | | | 40 | |
| | 7 | All non contact parts should be coated with corrosion acid resistant paint. | | | | 41 | |
| | 8 | Vendor shall indicate whether the suction conditions meet NPSH requirements. | | | | 42 | |
| | | | | | 43 | | |
| | | | | | 44 | | |
| | | | | | 45 | | |
| | | | | | 46 | | |

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| | | | | | | | | | | | | | | | | |
|--|------------|---------------------|------------|------------|----------------|------------|------------|---------|-------|---|---|---|---|---|---|---|
| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| ISSUES / DISTRIBUTION / COPIES | | | | | | | | | | | | | | | | |
| All dimensions in mm, unless specified | | DO NOT SCALE | | | | | | | | | | | | | | |
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR | | | | | | | | | |
| CLEARANCES | | | | | | | | | | | | | | | | |
| MR | - | MR | 19.07.23 | MR/SAK | - | TPK/MR/SAK | - | | | | | | | | | |
| DESIGN | | PREPARED | | VER/CHD | | APPROVED | | | | | | | | | | |
| SCALE | REFERENCES | SOFT COPY REF | | | DWG/DOC/SK No. | | SHEET | | REV 0 | | | | | | | |
| | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED | | 1 of 1 | | | | | | | | | |



CENTRIFUGAL PUMP SPECIFICATION DATA SHEET

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| | |
|--|----------------------|
| PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 1) | PROJECT CODE : - |
| CLIENT : - | CAPACITY : 0.125 TPD |
| LOCATION : - | R |

| | | | | | | | |
|--------------------------|-----------------|---|--|-------------------|-----------------------------|------------------------|----|
| GEN. | 1 | Unit No. : P-203 | Dwg. No. : - | Code : - | 1 | | |
| | 2 | Title : C3 Transfer Pump | Type : Centrifugal | | 2 | | |
| | 3 | Service : To Transfer Filtrate from Fi-201 to ST-203 and Recirculation | | | | 3 | |
| | 4 | Normal Capacity : 3000 LPH | Nos. required (Total) : 1 | Working : 1 | Stand By : 0 | 4 | |
| PROCESS DATA | 1 | Fluid Handled : | C3 | | | 5 | |
| | 2 | Capacity : | lpm | Normal : 35 | Maximum : 50 | Design : 50 | 6 |
| | 3 | Operating Temperature : | °C | Normal : 20 | Maximum : 30 | Design : 30 | 7 |
| | 4 | Operating Pressure : | kg/sq.cm.-g/a | Suction : Atm. | Discharge : 3.0 | | 8 |
| | 5 | Density at 30°C | kg/cu.m. | 1000 | | | 9 |
| | 6 | Viscosity at 30 | cP | - | | | 10 |
| | 7 | Vapour Pressure at °C - | mm Hg | - | | | 11 |
| | 8 | Nature of Fluid : | - | | | 12 | |
| | 9 | pH | | | | 13 | |
| | 10 | Suspended Solids : | Type : - | % wt / Vol. : - | Avg. particle size:mic. : - | 14 | |
| | 11 | Dissolved Gases : | - | | | 15 | |
| | 12 | Hazard Condition : | | | | 16 | |
| CONSTRUCTION DATA | 1 | Suction Details : | Condition : Flooded | | | 17 | |
| | 2 | Discharge Details : | Condition : Discharge to ST-202 at Atm. Pressure | | | 18 | |
| | 3 | Total Discharge Pressure : | kg/sq.cm.-g/a | = 3.0 | | 21 | |
| | 4 | NPSH Available : | m of W.C. | VTS | | 22 | |
| | 5 | Material Of Construction | Casing : | SS 316 | | 23 | |
| | | | Gears : | - | | 24 | |
| | | | Shaft : | SS 316 | | 25 | |
| | | | Bolting : | SS 316 | | 26 | |
| | 6 | Nozzles | Suction | End Connection : | Flanged | Size NB (mm) : 50 | 27 |
| | | | | Pressure Rating : | 150# | Standard : ANSI, B16.5 | 28 |
| | | | Discharge | End Connection : | Flanged | Size NB (mm) : 50 | 29 |
| | | | | Pressure Rating : | 150# | Standard : ANSI, B16.5 | 30 |
| 7 | Drive Details : | Motor : | Electric | | 31 | | |
| | | Power Supply : | VTS | | 32 | | |
| | | R.P.M. : | 1440 | | 33 | | |
| 8 | Seal : | Type : | Stuffing Box | Seal Fluid : VTS | 34 | | |
| NOTES | 1 | Vendor shall supply 2 sets of all relevant catalogues, performance curves, dimensioned drawings and maintenance manuals and shall guarantee mechanical performance. | | | | 35 | |
| | 2 | Vendor to indicate a list of recommended spare parts. | | | | 36 | |
| | 3 | Scope of supply shall include Pump, Motor, coupling & guard common base plate and foundation details. | | | | 37 | |
| | 4 | VTS : Vendor to specify. | | | | 38 | |
| | 5 | Stroke length to be adjustable through flow range. | | | | 39 | |
| | 6 | Pump shall operate at +/- 1% accuracy. | | | | 40 | |
| | 7 | All non contact parts should be coated with corrosion acid resistant paint. | | | | 41 | |
| | 8 | Vendor shall indicate whether the suction conditions meet NPSH requirements. | | | | 42 | |
| | | | | | 43 | | |
| | | | | | 44 | | |
| | | | | | 45 | | |
| | | | | | 46 | | |

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| | | | | | | | | | | | | | | | | |
|--|------------|-------------|----|---------------|--------|------------|----------------|------------|---|--------|---|------------|-------|------------|---|---|
| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| ISSUES / DISTRIBUTION / COPIES | | | | | | | | | | | | | | | | |
| All dimensions in mm, unless specified DO NOT SCALE | | | | | | | | | | | | | | | | |
| MECH ENGR | | PRCS ENGR | | INST ENGR | | ELECT ENGR | | CIVIL ENGR | | CLIENT | | CONSULTANT | | CONTRACTOR | | |
| CLEARANCES | | | | | | | | | | | | | | | | |
| MR | | - | | MR | | 19.07.23 | | MR/SAK | | - | | TPK/MR/SAK | | - | | |
| DESIGN | | | | PREPARED | | | | VER/CHD | | | | APPROVED | | | | |
| SCALE | REFERENCES | | | SOFT COPY REF | | | DWG/DOC/SK No. | | | SHEET | | | REV 0 | | | |
| | | | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED | | | 1 of 1 | | | | | | |



CENTRIFUGAL PUMP SPECIFICATION DATA SHEET

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of

| | |
|--|----------------------|
| PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 1) | PROJECT CODE : - |
| CLIENT : - | CAPACITY : 0.125 TPD |
| LOCATION : - | R |

| | | | | | | | |
|--------------------------|-----------------|---|--|--------------------------|----------------------------|-------------|----|
| GEN. | 1 | Unit No. : P-204 | Dwg. No. : - | Code : - | 1 | | |
| | 2 | Title : C3 Transfer Pump | Type : Centrifugal | | 2 | | |
| | 3 | Service : To Transfer Filtrate from ST-203 to Fi-202 and Recirculation | | | | 3 | |
| | 4 | Normal Capacity : 3000 LPH | Nos. required (Total) : 1 | Working : 1 | Stand By : 0 | 4 | |
| PROCESS DATA | 1 | Fluid Handled : | C3 | | | 5 | |
| | 2 | Capacity : | lpm | Normal : 35 | Maximum : 50 | Design : 50 | 6 |
| | 3 | Operating Temperature : | °C | Normal : 20 | Maximum : 30 | Design : 30 | 7 |
| | 4 | Operating Pressure : | kg/sq.cm.-g/a | Suction : Atm. | Discharge : 3.0 | | 8 |
| | 5 | Density at 30°C | kg/cu.m. | 1000 | | | 9 |
| | 6 | Viscosity at 30 | cP | - | | | 10 |
| | 7 | Vapour Pressure at °C - | mm Hg | - | | | 11 |
| | 8 | Nature of Fluid : | - | | | 12 | |
| | 9 | pH | | | | 13 | |
| | 10 | Suspended Solids : | Type : - | % wt / Vol. : - | Avg. particle size:mic.: - | 14 | |
| | 11 | Dissolved Gases : | - | | | 15 | |
| | 12 | Hazard Condition : | | | | 16 | |
| CONSTRUCTION DATA | 1 | Suction Details : | Condition : Flooded | | | 17 | |
| | 2 | Discharge Details : | Condition : Discharge to Fi-202 a,b at Atm. Pressure | | | 18 | |
| | 3 | Total Discharge Pressure : | kg/sq.cm.-g/a = | 3.0 | | 21 | |
| | 4 | NPSH Available : | m of W.C. | VTS | | 22 | |
| | 5 | Material Of Construction | Casing : | SS 316 | Seal : - | 23 | |
| | 6 | | Gears : | - | Gasket : PTFE | 24 | |
| | 7 | | Shaft : | SS 316 | Others : | 25 | |
| | 8 | | Bolting : | SS 316 | All contact parts : SS 316 | 26 | |
| | 6 | Nozzles | Suction | End Connection : Flanged | Size NB (mm) : 50 | 27 | |
| | 7 | | Pressure Rating : 150# | Standard : ANSI, B16.5 | 28 | | |
| | 6 | Nozzles | Discharge | End Connection : Flanged | Size NB (mm) : 50 | 29 | |
| | 7 | | Pressure Rating : 150# | Standard : ANSI, B16.5 | 30 | | |
| 7 | Drive Details : | Motor : | Electric | H.P. : 1.0 | 31 | | |
| 8 | | Power Supply : | VTS | | 32 | | |
| 9 | | R.P.M. : | 1440 | | 33 | | |
| 8 | Seal : | Type : | Stuffing Box | Seal Fluid : VTS | 34 | | |
| NOTES | 1 | Vendor shall supply 2 sets of all relevant catalogues, performance curves, dimensioned drawings and maintenance manuals and shall guarantee mechanical performance. | | | | 35 | |
| | 2 | Vendor to indicate a list of recommended spare parts. | | | | 36 | |
| | 3 | Scope of supply shall include Pump, Motor, coupling & guard common base plate and foundation details. | | | | 37 | |
| | 4 | VTS : Vendor to specify. | | | | 38 | |
| | 5 | Stroke length to be adjustable through flow range. | | | | 39 | |
| | 6 | Pump shall operate at +/- 1% accuracy. | | | | 40 | |
| | 7 | All non contact parts should be coated with corrosion acid resistant paint. | | | | 41 | |
| | 8 | Vendor shall indicate whether the suction conditions meet NPSH requirements. | | | | 42 | |
| | | | | | 43 | | |
| | | | | | 44 | | |
| | | | | | 45 | | |
| | | | | | 46 | | |

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| | | | | | | | | | | | | | | | | |
|--|------------|---------------|------------|------------|----------------|------------|------------|---------|----------|---|---|-------|---|---|---|---|
| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| ISSUES / DISTRIBUTION / COPIES | | | | | | | | | | | | | | | | |
| All dimensions in mm, unless specified | | | | | | | | | | | | | | | | |
| DO NOT SCALE | | | | | | | | | | | | | | | | |
| CLEARANCES | | | | | | | | | | | | | | | | |
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR | | | | | | | | | |
| MR | - | MR | 19.07.23 | MR/SAK | - | TPK/MR/SAK | - | | | | | | | | | |
| DESIGN | | | PREPARED | | | VER/CHD | | | APPROVED | | | | | | | |
| SCALE | REFERENCES | SOFT COPY REF | | | DWG/DOC/SK No. | | | SHEET | | | | REV 0 | | | | |
| | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED | | | 1 of 1 | | | | | | | | |



CENTRIFUGAL PUMP SPECIFICATION DATA SHEET

Page
- of -

| | |
|--|----------------------|
| PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 1) | PROJECT CODE : - |
| CLIENT : - | CAPACITY : 0.125 TPD |
| LOCATION : - | R |

| | | | | | | | |
|--------------------------|-----------------|---|--|-------------------|-----------------------------|------------------------|----|
| GEN. | 1 | Unit No. : P-205 | Dwg. No. : - | Code : - | 1 | | |
| | 2 | Title : C3 Transfer Pump | Type : Centrifugal | | 2 | | |
| | 3 | Service : To Transfer Filtrate from ST-204 to ST-205 a,b, ST-203 and Recirculation | | | | 3 | |
| | 4 | Normal Capacity : 3000 LPH | Nos. required (Total) : 1 | Working : 1 | Stand By : 0 | 4 | |
| PROCESS DATA | 1 | Fluid Handled : | C3 | | | 5 | |
| | 2 | Capacity : | lpm | Normal : 35 | Maximum : 50 | Design : 50 | 6 |
| | 3 | Operating Temperature : | °C | Normal : 20 | Maximum : 30 | Design : 30 | 7 |
| | 4 | Operating Pressure : | kg/sq.cm.-g/a | Suction : Atm. | Discharge : 3.0 | | 8 |
| | 5 | Density at 30°C | kg/cu.m. | 1000 | | | 9 |
| | 6 | Viscosity at 30 | cP | - | | | 10 |
| | 7 | Vapour Pressure at °C - | mm Hg | - | | | 11 |
| | 8 | Nature of Fluid : | - | | | 12 | |
| | 9 | pH | | | | 13 | |
| | 10 | Suspended Solids : | Type : - | % wt / Vol. : - | Avge. particle size:mic.: - | | 14 |
| | 11 | Dissolved Gases : | - | | | 15 | |
| | 12 | Hazard Condition : | | | | 16 | |
| CONSTRUCTION DATA | 1 | Suction Details : | Condition : Flooded | | | 17 | |
| | 2 | Discharge Details : | Condition : Discharge to ST-202 a,b at Atm. Pressure | | | 18 | |
| | | | m of water | Head : 30.0 m | | 19 | |
| | 3 | Total Discharge Pressure : | kg/sq.cm.-g/a | = 3.0 | | 20 | |
| | 4 | NPSH Available : | m of W.C. | VTS | | 21 | |
| | 5 | Material Of Construction | Casing : | SS 316 | | 22 | |
| | | | Gears : | - | | 23 | |
| | | | Shaft : | SS 316 | | 24 | |
| | | | Bolting : | SS 316 | | 25 | |
| | 6 | Nozzles | Suction | End Connection : | Flanged | Size NB (mm) : 50 | 26 |
| | | | | Pressure Rating : | 150# | Standard : ANSI, B16.5 | 27 |
| | | | Discharge | End Connection : | Flanged | Size NB (mm) : 50 | 28 |
| Pressure Rating : | | | | 150# | Standard : ANSI, B16.5 | 29 | |
| 7 | Drive Details : | Motor : | Electric | | 30 | | |
| | | Power Supply : | VTS | | 31 | | |
| | | R.P.M. : | 1440 | | 32 | | |
| 8 | Seal : | Type : | Stuffing Box | Seal Fluid : VTS | 33 | | |
| NOTES | 1 | Vendor shall supply 2 sets of all relevant catalogues, performance curves, dimensioned drawings and maintenance manuals and shall guarantee mechanical performance. | | | | 34 | |
| | 2 | Vendor to indicate a list of recommended spare parts. | | | | 35 | |
| | 3 | Scope of supply shall include Pump, Motor, coupling & guard common base plate and foundation details. | | | | 36 | |
| | 4 | VTS : Vendor to specify. | | | | 37 | |
| | 5 | Stroke length to be adjustable through flow range. | | | | 38 | |
| | 6 | Pump shall operate at +/- 1% accuracy. | | | | 39 | |
| | 7 | All non contact parts should be coated with corrosion acid resistant paint. | | | | 40 | |
| | 8 | Vendor shall indicate whether the suction conditions meet NPSH requirements. | | | | 41 | |

| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------|--------|-------------|----|-----|-----|------|------|--------------------------------|---|---|---|---|---|---|---|---|
| | | | | | | | | ISSUES / DISTRIBUTION / COPIES | | | | | | | | |

| | | | | | | | |
|--|------------|---------------|------------|----------------|---------------|------------|------------|
| All dimensions in mm, unless specified | | DO NOT SCALE | | | | | |
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR |
| CLEARANCES | | | | | | | |
| MR | - | MR | 19.07.23 | MR/SAK | - | TPK/MR/SAK | - |
| DESIGN | | PREPARED | | VER/CHD | | APPROVED | |
| SCALE | REFERENCES | SOFT COPY REF | | DWG/DOC/SK No. | | SHEET | REV |
| | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED | 1 of 1 | 0 |

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METERING PUMP SPECIFICATION DATA SHEET

Page
- of -

| | |
|--|----------------------|
| PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 1) | PROJECT CODE : - |
| CLIENT : - | CAPACITY : 0.125 TPD |
| LOCATION : - | R |

| | | | | | | | |
|--------------------------|-----------------|---|--|--------------------------|-----------------------------|--------------|----|
| GEN. | 1 | Unit No. : P-206 a,b | Dwg. No.: - | Code : - | 1 | | |
| | 2 | Title : C3 Metering Pumps | Type : Metering Pump | | 2 | | |
| | 3 | Service : To Transfer C3 from ST-205 a,b to R-301a and Recirculation | | | | 3 | |
| | 4 | Normal Capacity : lph : 300 LPH | Nos. required (Total) : 2 | Working : 1 | Stand By : 1 | 4 | |
| PROCESS DATA | 1 | Fluid Handled : | C3 | | | 5 | |
| | 2 | Capacity : | lpm | Normal : 2 | Maximum : 5 | Design : 5 | 6 |
| | 3 | Operating Temperature : | °C | Normal : 20 | Maximum : 30 | Design : 30 | 7 |
| | 4 | Operating Pressure : | kg/sq.cm.-g/a | Suction : Atm. | Discharge : 3.0 | | 8 |
| | 5 | Density at 30°C | kg/cu.m. | 1000 | | | 9 |
| | 6 | Viscosity at 30 | cP | - | | | 10 |
| | 7 | Vapour Pressure at °C - | mm Hg | - | | | 11 |
| | 8 | Nature of Fluid : | - | | | 12 | |
| | 9 | pH | - | | | 13 | |
| | 10 | Suspended Solids : | Type : | % wt / Vol. : - | Avge. particle size:mic.: - | | 14 |
| | 11 | Dissolved Gases : | - | | | 15 | |
| | 12 | Hazard Condition : | - | | | 16 | |
| CONSTRUCTION DATA | 1 | Suction Details : | Condition : Flooded | | | 17 | |
| | 2 | Discharge Details : | Condition : Discharge to R-301a at Atm. Pressure | | | 18 | |
| | 3 | Total Discharge Pressure : | kg/sq.cm.-g/a | 3.0 | | | 19 |
| | 4 | NPSH Available : | m of W.C. | VTS | | | 20 |
| | 5 | Material Of Construction | Casing : | SS 316 | Seal : | SS 316 | 21 |
| | | | Gears : | SS 316 | Gasket : | PTFE | 22 |
| | | | Shaft : | SS 316 | Others : | | 23 |
| | | | Bolting : | SS 316 | All contact parts : | SS 316 | 24 |
| | 6 | Nozzles | Suction | End Connection : Flanged | Size NB (mm) : | 25 | 25 |
| | | | | Pressure Rating : 150# | Standard : | ANSI, B 16.5 | 26 |
| | | Discharge | End Connection : Flanged | Size NB (mm) : | 25 | 27 | |
| | | | Pressure Rating : 150# | Standard : | ANSI, B 16.5 | 28 | |
| 7 | Drive Details : | Motor : | Electric | H.P. : | 1.0 | 29 | |
| | | Power Supply : | VTS | | | 30 | |
| | | R.P.M. : | 1440 | | | 31 | |
| 8 | Seal : | Type : | Stuffing Box | Seal Fluid : | VTS | 32 | |
| NOTES | 1 | Vendor shall supply 2 sets of all relevant catalogues, performance curves, dimensioned drawings and maintenance manuals and shall guarantee mechanical performance. | | | | 33 | |
| | 2 | Vendor to indicate a list of recommended spare parts. | | | | 34 | |
| | 3 | Scope of supply shall include Pump, Motor, coupling & guard common base plate and foundation details. | | | | 35 | |
| | 4 | VTS : Vendor to specify. | | | | 36 | |
| | 5 | Stroke length to be adjustable through flow range. | | | | 37 | |
| | 6 | Pump shall operate at +/- 1% accuracy. | | | | 38 | |
| | 7 | All non contact parts should be coated with corrosion acid resistant paint. | | | | 39 | |
| | 8 | Vendor shall indicate whether the suction conditions meet NPSH requirements. | | | | 40 | |

| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--------------------------------|--------|-------------|----|-----|-----|------|------|---------|---|---|---|---|---|---|---|---|
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| | | | | | | | | | | | | | | | | | |
|--|--|------------|--|---------------|--|------------|--|----------------|--|---------------|--|------------|--|------------|--|--------------|--|
| All dimensions in mm, unless specified | | | | | | | | | | | | | | | | DO NOT SCALE | |
| MECH ENGR | | PRCS ENGR | | INST ENGR | | ELECT ENGR | | CIVIL ENGR | | CLIENT | | CONSULTANT | | CONTRACTOR | | | |
| CLEARANCES | | | | | | | | | | | | | | | | | |
| SAK | | - | | SAK | | 07.04.15 | | TPK/MR/SAK | | - | | SAK/MR/TPK | | - | | | |
| DESIGN | | | | PREPARED | | | | VER/CHD | | | | APPROVED | | | | | |
| SCALE | | REFERENCES | | SOFT COPY REF | | | | DWG/DOC/SK No. | | | | SHEET | | REV 0 | | | |
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REACTOR SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 1)

PROJECT CODE : -

CLIENT : -

CAPACITY : 0.125 TPD

LOCATION : -

-

| GEN. | | | | R | |
|------|---|--|---------------------|--|---|
| | 1 | Unit No. : R-201 | Dwg. No.: - | Code : ASME Sec. VIII Div. I | 1 |
| | 2 | Title : Hydrolysis Reactors | Nos. required : One | Type : Vertical, Cylindrical & Flanged | 2 |
| | 3 | Service : To Carry out Hydrolysis Reaction | | | 3 |
| | 4 | Nominal Capacity : lit. : 1600 lit. | | | 4 |
| | | | | 5 | |

| PROCESS DATA | 1 | | Batch / Continuous | Batch Time : hrs :12 hrs | Working Hours/Day : - | | |
|--------------|----|-----------------------------|--------------------|--------------------------|-----------------------|----|--|
| | | | SHELL | JACKET | DOUBLE COIL | | |
| | 2 | Material Handled : | | W, C1+CO2 | Chilled Water | | |
| | 3 | Operation : | | Batch | Batch | | |
| | 4 | Feed Quantity Total : | kg | 1407 | 10480 | | |
| | 5 | Solid/Liquid/Gas: | kg | 295/1072/40 | -/10480/- | | |
| | 6 | Discharge Quantity Total : | kg | 1407 | 10480 | | |
| | 7 | Solid/Liquid/Gas: | kg | -/581/24 | -/10480/- | | |
| | 8 | Operating Temp.:Nor./Max.: | °C | 10 | 7/10 | | |
| | 9 | Operating Press.:Nor./Max.: | kg/sq.cm.-g/¢ | Atm. | 3.0 | | |
| | 10 | Density : at 30 °C | kg/cu.m. | 1169 | 1000 | | |
| | 11 | Viscosity : at 25 °C | cP | - | 1 | | |
| | 12 | pH : | | - | - | | |
| | 13 | Pressure Drop : | kg/sq.cm. | - | - | | |
| | 14 | Hazard Condition : | | - | | | |
| | | | | | | 21 | |

| INTERALS | 1 | Agitator Type : | Anchor/Flat Blade | | Shaft Dia : | 50 mm |
|----------|----------|--------------------|-----------------------|------------------------|------------------------|------------|
| | 2 | | mm | Impeller Dia. : 1000 | No. of Impellers : | One |
| | 3 | | mm | Height from bottom: 50 | Speed : RPM : | 50 |
| | 4 | Coil : 2 Nos. | mm | Tube Dia. : - | BWG / Sch. : - | |
| | 5 | | mm | Pitch : - | No. of Turns : - | |
| | 6 | | mm | Coil Helix Dia. : - | Height from bottom : - | |
| | 7 | Baffles : | mm | Nos. : - | Type : - | |
| | 8 | | mm | Height : - | Width : - | |
| | 9 | | mm | Thk. : - | | |
| | 10 | Feed Arrangement : | Type : - | | Dia. : - | Length : - |
| | | | Spray Nozzle Dia. : - | | Pitch : - | Others : - |
| | 11 | Shaft : | Dia. : 50 mm | | Length : VTS | |
| 12 | Others : | - | | | | |
| | | | | | | 34 |

| CONSTRUCTION | | | SHELL | | JACKET | | COIL | | |
|--------------|--------------|-------------------|---------------|--------------------|----------------|------------|------------|-------|---------|
| | 1 | Temperature : | °C | Dgn: 50 | Test: Amb. | Dgn: 40 | Test: Amb. | Dgn: | Test: |
| | 2 | Pressure : | kg/sq.cm.-g/¢ | Dgn: 1.1/3.3(Ext.) | Test: 4.5 ext. | Dgn: 3.3 | Test: 4.5 | Dgn: | Test: |
| | 3 | Diameter : | mm | O.D.: - | I.D.: 1100 | O.D.: - | I.D.: 1200 | O.D.: | H.Dia.: |
| | 4 | Straight Length : | mm | 1475 | | 1180 | | - | |
| | 5 | Thk. : | mm | 6 MM | | 6 MM | | | |
| | 6 | Shell Ends : | Top | Type : Tori. | Thk. : 6 MM | K.R. : 10% | SF : 50 | | |
| | | | Bottom | Type : Tori. | Thk. : 6 MM | K.R. : 10% | SF : 50 | | |
| 7 | Jacket end : | Bottom | Type : - | Thk. : 6 MM | K.R. : - | SF : - | | | |
| | | | | | | | | | 43 |

| | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | | | | | | | | | | | |
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| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------|--------|-------------|----|-----|-----|------|------|--------------------------------|---|---|---|---|---|---|---|---|
| | | | | | | | | ISSUES / DISTRIBUTION / COPIES | | | | | | | | |

All dimensions in mm, unless specified **DO NOT SCALE**

| | | | | | | | |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|

CLEARANCES

| | | | | |
|--------|------------|-------------------|----------------------------|------------|
| MR | MR | 19.07.23 | MR/SAK | TPK/MR/SAK |
| DESIGN | PREPARED | VER/CHD | APPROVED | |
| SCALE | REFERENCES | SOFT COPY REF | DWG/DOC/SK- No. | SHEET |
| | | CD/FP FOLDER FILE | DE-XXX-XXX-ED-01-07 00 XXX | 1 OF 3 |
| | | | | REV 1 |

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REACTOR SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 1)

PROJECT CODE : -

CLIENT : -

CAPACITY : 0.125 TPD

LOCATION : -

-

| | | | | | | | | |
|----|--------------------------------|---|--------|----------------------------------|-------------|-------|------|---|
| 1 | Unit No. : R-201 | Title : Hydrolysis Reactors | | | | | R | 1 |
| | | | | | | | 2 | |
| | | SHELL | JACKET | COIL | | | 3 | |
| 8 | Corrosion Allowance : | - | | - | | | 4 | |
| 9 | Supports : | Type: - | No.: - | Type: LEG | No.: 4 Nos. | Type: | No.: | |
| | Material Of Construction | Shell : SA-240 SS 316 | | Jacket : CS A 285 Gr. C | | | 6 | |
| | | Shell Ends : SA-240 SS 316 | | Jacket Ends : CS A 285 Gr. C | | | 7 | |
| | | Coil : - | | Supports : CS A-75/IS:226 | | | 8 | |
| | | Shaft : SA-479 SS 316 | | Feed Arrangement : SS 316 | | | 9 | |
| | | Agitator : SA-240 SS 316 | | External Bolting : CS to IS 1364 | | | 10 | |
| | | Baffle : SS 316 | | Internal Bolting : SS 316 | | | 11 | |
| | | Dip Pipe : SA-312 TP 316 | | Gaskets : PTFE | | | 12 | |
| | | Shell Flanges : CS A 285 Gr. C with 3 thk. SS316 lining | | Sparger : - | | | 13 | |
| 11 | Heat Treatment : | Stress Relieving : - | | Others : - | | | 15 | |
| 12 | Tests : | Hydraulic / Pneumatic : Yes | | Dye-Penetrant : - | | | 16 | |
| | | Radiograph : - | | Others : - | | | 17 | |
| 13 | Insulation : | Type : - | | Thk. : - | | | 18 | |
| 14 | Painting / Finish : | All CS parts to be painted with two coats of red oxide primer | | | | | 19 | |
| 15 | Weight : kg | Empty : 865 | | Full of Water : 3000 | | | 20 | |
| 16 | Drive Details : | Motor : Electric, VFD | | | | | 21 | |
| | | Power Supply : VTS | | H.P. : 5.0 | | | 22 | |
| | | R.P.M. : Shaft RPM is 300, Motor RPM is VTS | | | | | 23 | |
| 17 | Shaft Seal : | Stuffing Box | | | | | 24 | |
| 18 | Inspection By : | IICT / CLIENT / Third Party - | | Others : - | | | 25 | |
| | | | | | | | 26 | |
| | | | | | | | 27 | |
| | | | | | | | 28 | |
| | | | | | | | 29 | |

CONSTRUCTION DATA

NOTES

| | | |
|----|--|----|
| 1 | All dimensions are in mm | 30 |
| 2 | VTS – Vendor to specify. | 31 |
| 3 | Nozzles shall be provided with companion flange, gaskets, nuts, and washers shall be suitably blanked off before dispatch. | 32 |
| 4 | All nozzle – top, side and bottom shall be 150 mm in length unless otherwise specified. | 33 |
| 5 | Nozzle orientation and support height shall be provided by vendor. | 34 |
| 6 | Vendor shall provide detailed drawing for approval from CSIR-IICT and shall guarantee the mechanical performance. | 35 |
| 7 | Suitable stiffeners to be provided for all the nozzles. | 36 |
| 8 | Dimensions are based on IS 4179. Vendor to specify the equivalent. | 37 |
| 9 | Lifting lugs, earthing boss(SS 316) and name plate are to be provided. | 38 |
| 10 | Dip leg to be provided with 3Ø antisiphon holes and suitable supporting arrangement. | 39 |
| 11 | Dished ends shall conform to IS 4179. | 40 |
| | | 41 |
| | | 42 |
| | | 43 |

ISSUE STATUS KEY : P- PRELIMINARY ; R- REVISION ; I- INFORMATION ; C- COMMENTS ; CH- CHECKING ; A- APPROVAL ; E- ENGINEERING ;

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|--|------------|---------------------|------------|------------|----------------------------|------------|--------------------------------|------------|---|---|---|-----|---|---|---|---|--|
| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| | | | | | | | ISSUES / DISTRIBUTION / COPIES | | | | | | | | | | |
| All dimensions in mm, unless specified | | DO NOT SCALE | | | | | | | | | | | | | | | |
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR | | | | | | | | | | |
| CLEARANCES | | | | | | | | | | | | | | | | | |
| MR | | MR | | 19.07.23 | | MR/SAK | | TPK/MR/SAK | | | | | | | | | |
| DESIGN | | PREPARED | | VER/CHD | | APPROVED | | | | | | | | | | | |
| SCALE | REFERENCES | SOFT COPY REF | | | DWG/DOC/SK- No. | | | SHEET | | | | REV | | | | | |
| | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED-01-07 00 XXX | | | 2 OF 3 | | | | 1 | | | | | |



REACTOR SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 1)

PROJECT CODE : -

CLIENT : -

CAPACITY : 0.125 TPD

LOCATION : -

1 Unit No. : R-201

Title : Hydrolysis Reactors

Top Impeller Details

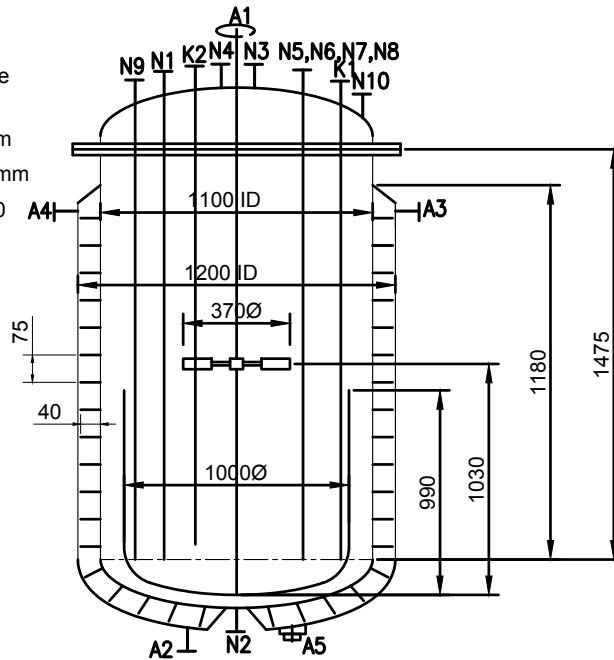
No. of impellers = One
Type = Flat Blade
Impeller Dia = 370 mm
Ht. from Bot. = 1030 mm
Blade L x W = 90 x 70

Bottom Impeller Details

No. of impellers = One
Type of impeller = Anchor
Impeller Dia. = 1000 mm
Impeller Ht. = 990 mm
Blade Width x Thk = 110 mm x 10 mm
Ht. from Bot. Vessel to Anchor = 50 mm

Spiral Jacker Details

Baffle Pitch = 50 mm



NOZZLE SCHEDULE

| NOZZLE MARK | SERVICE | NOZZLE DETAILS | | | | FLANGE DETAILS | | | | REMARKS | R |
|-------------|-------------------------|----------------|------|-----------|--------|----------------|--------|-------|--------|--------------------|----|
| | | SIZE NB(mm) | Sch. | Length mm | M.O.C. | STANDARD | RATING | TYPE | M.O.C. | | |
| N1 | Inlet for W | 50 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | Dipleg | 1 |
| N2 | Bottom Outlet | 100 | 10s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | Flush Bottom Valve | 2 |
| N3 | Vent | 25 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 3 |
| N4 | Inlet from SB-201 | 50 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | Hopper | 4 |
| N5-N8 | CO2 Inlet | 15 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | Dipleg Four Sides | 5 |
| N9 | Inlet for RF from P-306 | 50 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | Dipleg | 6 |
| N10 | Spare | 25 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 7 |
| | | | | | | | | | | | 8 |
| K1 | Thermowell | 20 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | Dipleg | 9 |
| K2 | pH Indicator | 20 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 10 |
| | | | | | | | | | | | 11 |
| A1 | Stirrer | VTS | - | - | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 12 |
| A2 | Chilled Water Inlet | 100 | 10 | 150 | CS | ANSI, B16.5 | #150 | SO,RF | CS | - | 13 |
| A3 | Chilled Water Outlet | 100 | 10 | 100 | CS | ANSI, B16.5 | #150 | SO,RF | CS | - | 14 |
| A4 | Jacket Vent | 25 | 40 | 100 | CS | ANSI, B16.5 | #150 | SO,RF | CS | - | 15 |
| A5 | Jacket Drain (Plug) | 3/4" | - | - | CS | - | #3000 | - | - | Plug | 16 |
| | | | | | | | | | | | 17 |

| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------|--------|-------------|----|-----|-----|------|--------------------------------|---------|---|---|---|---|---|---|---|---|
| | | | | | | | ISSUES / DISTRIBUTION / COPIES | | | | | | | | | |

All dimensions in mm, unless specified

DO NOT SCALE

MECH ENGR PRCS ENGR INST ENGR ELECT ENGR CIVIL ENGR CLIENT CONSULTANT CONTRACTOR

CLEARANCES

DESIGN

PREPARED

VER/CHD

APPROVED

SCALE

REFERENCES

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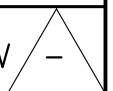
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3 OF 3



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STORAGE BIN SPECIFICATION DATA SHEET

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 1)

PROJECT CODE : -

CLIENT : -

CAPACITY : 0.125 TPD

LOCATION : -

-

| GEN. | | | | R |
|------|-------------------------------------|---|------------------------------|---|
| | 1 | Unit No. : SB-201 | Dwg. No.: | |
| 2 | Title : C1 Storage Bin | Nos. required : One | Type : Vertical, Cylindrical | 2 |
| 3 | Service : To Store C1 | | | 3 |
| 4 | Nominal Capacity : Kg/h. : 25 Kg/hr | Nominal Capacity : Kg. : 300 Kg (12 h Capacity) | | 4 |
| | | | | 5 |

| PROCESS DATA | | | | |
|--------------|------------------------------------|---------------|---------------|----|
| | 1 | Fluid | C1 | |
| 2 | Operating Temperature : °C | Normal : 30 | Maximum : 40 | 8 |
| 3 | Operating Pressure : kg/sq.cm.-g/a | Normal : Atm. | Maximum : 1.1 | 9 |
| 4 | Density : at 20°C kg/L | 1.1 | | 10 |
| 5 | Hazard Condition : | | | 11 |
| | | | | 12 |

| CONSTRUCTION DATA | | | | |
|-------------------|--------------------------|---|----------------------------------|----|
| | 1 | Temperature : °C | Design : 50 | |
| 2 | Pressure : kg/sq.cm.-g/a | Design : 1.1 | Test : Full with Water | 15 |
| 3 | Corrosion Allowance | - | | 16 |
| 4 | Shell | ØD/ID : 800 mm | St. Length : 530 mm | 17 |
| | | Thk. : 4 MM | | 18 |
| 5 | Top | Type : Dish, Flat | Thk. : 4 MM | 19 |
| | Bottom | Type : Dish, Conical | Thk. : 4 MM | 20 |
| 6 | Supports | Type : LUG | Nos. : 4 Nos. | 21 |
| 7 | Material Of Construction | Shell : SA 240 SS 316 | Heads : SA 240 SS 316 | 22 |
| | | Supports : CS to IS 226 | Bolting : SS 316 | 23 |
| | | Gaskets : PTFE | Jacket / Internals CS to IS 1364 | 24 |
| | | Shell Flanges : - | Other wetted parts : SS 316 | 25 |
| 8 | Heat Treatment | Stress Relieving : SS 316 | Others : SS 316 | 26 |
| 9 | Tests | Hydraulic / Pneumatic : Yes | Dye-Penetrant : | 27 |
| | | Radiographic : - | Others : - | 28 |
| 10 | Insulation | Type : HCl / CCl / PPI - | Thk. : - | 29 |
| 11 | Painting / Finish | All CS parts to be painted with two coats of red oxide primer | | 30 |
| 12 | Weight : kg | Empty : 160 | Full of water : 560 | 31 |
| 13 | Inspection By | IICT / Client / Third Party | Others : | 32 |
| | | | | 33 |
| | | | | 34 |

| NOTES | | | | |
|-------|--|--|--|----|
| | 1 | Nozzles marked "spare" shall be provided with matching blind flange, gaskets, bolts, nuts and washers. | | |
| 2 | All other nozzles shall be provided with companion flange, gaskets, bolts, nuts and washers and shall be suitably blanked off before despatch. | | | 36 |
| 3 | All nozzles - Top, Side and Bottom shall be 150 mm in length unless otherwise specified. | | | 37 |
| 4 | Dipleg shall be provided with suitable support. | | | 38 |
| 5 | 3mm antisiphon holes shall be provided to the dipleg pipe at top. | | | 39 |
| 6 | Dished end heights shall conform to IS 4179. | | | 40 |
| 7 | Nozzles orientation shall be provided after pipe routing is finalised. | | | 41 |
| 8 | Vendor shall provide detailed fabrication drawing for approval from IICT and shall guarantee mechanical performance of the equipment. | | | 42 |
| | | | | 43 |

| 1 | E | For Engineering | | | | | | | | | | | | | | | | | |
|-------|--------|-----------------|----|-----|-----|------|------|---------|---|---|---|---|---|---|---|---|--------------------------------|--|--|
| 0 | C | Preliminary | | | | | | | | | | | | | | | | | |
| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | ISSUES / DISTRIBUTION / COPIES | | |

All dimensions in mm, unless specified **DO NOT SCALE**

| | | | | | | | |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|

CLEARANCES

| | | | | | | |
|----|------------|--------|------------|--|------------|------------|
| MR | 04.08.2015 | SAK/BS | 04.08.2015 | | SAK/MR/TPK | 04.08.2015 |
|----|------------|--------|------------|--|------------|------------|

| | | | | | | | |
|--------|--|----------|--|---------|--|----------|--|
| DESIGN | | PREPARED | | VER/CHD | | APPROVED | |
|--------|--|----------|--|---------|--|----------|--|

| | | | | | | | | | |
|-------|------------|---------------|--------|------|--------------------|--|--------|--|-------|
| SCALE | REFERENCES | SOFT COPY REF | | | DWG/DOC/SK No. | | SHEET | | REV 0 |
| - | - | CD/FP | FOLDER | FILE | DE-SP-172-06-11009 | | 1 OF 2 | | |

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STORAGE BIN SPECIFICATION DATA SHEET

PROJECT : Pilot Plant Facility For Bulk Chemicals

PROJECT CODE : -

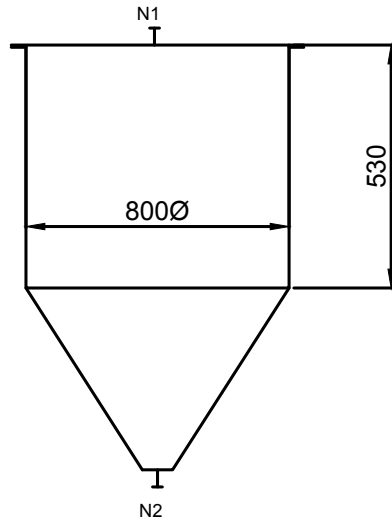
CLIENT : -

CAPACITY : 0.125 TPD

LOCATION : -

1 Unit No. : SB-201

Title : C1 Storage Bin



All Dimensions are in mm

NOZZLE SCHEDULE

| NOZZLE MARK | SERVICE | NOZZLE DETAILS | | | | FLANGE DETAILS | | | | REMARKS | R |
|-------------|---------|----------------|------|-----------|---------|----------------|--------|-------|---------|----------------------------|---|
| | | SIZE NB(mm) | Sch. | Length mm | M.O.C. | STANDARD | RATING | TYPE | M.O.C. | | |
| N1 | Inlet | 800 | 10s | 100 | Note 10 | ANSI B16.5 | 150# | SO/RF | Note 11 | Blind Flange with 5mm Thk. | |
| N2 | Outlet | 250 | 10s | 150 | Note 10 | ANSI B16.5 | 150# | SO/RF | Note 11 | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| NOTES | DESCRIPTION |
|-------|--|
| 9 | Lifting lugs, Nameplate and Earthing boss shall be provided conforming to good engineering practices. |
| 10 | MOC : SA312 TP 316 |
| 11 | Flanges 50 mm NB and below shall be of SA182 F 316 and above 50 mm NB shall be IS:2062 Gr.A plus 3 mm thick SA240 Gr. 316 liner. |

| 1 | E | For Engineering | | | | | | | | | | | | | | | | | |
|--|------------|-----------------|--------------|-----------|--------------------|-----------------|------|------------|----------|--------|---|------------|---|------------|------------|---|--------------------------------|---|---|
| 0 | C | Preliminary | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | ISSUES / DISTRIBUTION / COPIES | | |
| All dimensions in mm, unless specified | | | DO NOT SCALE | | | | | | | | | | | | | | | | |
| MECH ENGR | | PRCS ENGR | | INST ENGR | | ELECT ENGR | | CIVIL ENGR | | CLIENT | | CONSULTANT | | CONTRACTOR | | | | | |
| CLEARANCES | | | | | | | | | | | | | | | | | | | |
| MR | 04.08.2015 | SAK/BS | 04.08.2015 | | | | | | | | | | | SAK/MR/TPK | 04.08.2015 | | | | |
| DESIGN | | | PREPARED | | | VER/CHD | | | APPROVED | | | | | | | | | | |
| SCALE | REFERENCES | SOFT COPY REF | | | | DWG/DOC/CHK No. | | | | SHEET | | REV 0 | | | | | | | |
| | | CD/FP | FOLDER | FILE | DE-SP-172-06-11009 | | | | 2 OF 2 | | | | | | | | | | |

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STORAGE SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 1)

PROJECT CODE : -

CLIENT : -

CAPACITY : 0.125 TPD

LOCATION : -

-

| | | | | | | | |
|-------------|---|--|---------------------|------------------------------|---|---|---|
| GEN. | 1 | Unit No. : ST-201 | Dwg. No.: | Code : ASME Sec. VIII Div. I | R | 1 | |
| | 2 | Title : W Storage tank | Nos. required : One | Type : Vertical, Cylindrical | | 2 | |
| | 3 | Service : To Store Distilled Water for Hydrolysis Reaction | | | | | 3 |
| | 4 | Nominal Capacity : lit. : 1250 lit. | | | | 4 | |
| | | | | | | 5 | |

| | | | | | | | |
|---------------------|---|------------------------------------|-----------------|---------------|----|----|---|
| PROCESS DATA | 1 | Fluid | Distilled Water | | | | 6 |
| | 2 | Operating Temperature : °C | Normal : 30 | Maximum : 50 | | 8 | |
| | 3 | Operating Pressure : kg/sq.cm.-g/ø | Normal : Atm. | Maximum : 1.1 | | 9 | |
| | 4 | Density : at 30 °C kg/cu.m. | 1000 | | | 10 | |
| | 5 | Hazard Condition : - | - | | | 11 | |
| | | | | | 12 | | |

| | | | | | | | |
|--------------------------|-------------------|---|-------------------------|----------------------------|----------------------------------|----|----|
| CONSTRUCTION DATA | 1 | Temperature : °C | Design : 60 | Test : Amb. | | 14 | |
| | 2 | Pressure : kg/sq.cm.-g/ø | Design : 1.2 | Test : Full with Water | | 15 | |
| | 3 | Corrosion Allowance | | | | | 16 |
| | 4 | Shell | ØD/ID : 1000 mm | | St. Length : 1400 mm | | 17 |
| | | | Thk. : 5 MM | | | | 18 |
| | 5 | Ends | Top | Type : Dish, Torispherical | KR : 10% Thk. : 5 MM SF : 50 mm | | 19 |
| | | | Bottom | Type : Dish, Torispherical | KR : 10% Thk. : 5 MM SF : 50 mm | | 20 |
| | 6 | Supports | Type : LEG | Nos. : 4 Nos. | | | 21 |
| | 7 | Material Of Construction | Shell : SA 240 SS 316 | | Heads : SA 240 SS 316 | | 22 |
| | | | Supports : CS to IS 226 | | Internal Bolting : SS 316 | | 23 |
| | | | Gaskets : PTFE | | External Bolting : CS to IS 1364 | | 24 |
| | | | Shell Flanges : - | | Jacket / Internals : SS 316 | | 25 |
| | | | Nozzles : SS 316 | | Other wetted parts : SS 316 | | 26 |
| 8 | Heat Treatment | Stress Relieving : - | | Others : - | | 27 | |
| 9 | Tests | Hydraulic / Pneumatic : Yes | | Dye-Penetrant : - | | 28 | |
| | | Radiographic : - | | Others : - | | 30 | |
| 10 | Insulation | Type : HCI / CCI / PPI - | | Thk. : - | | 31 | |
| 11 | Painting / Finish | All CS parts to be painted with two coats of red oxide primer | | | | 32 | |
| 12 | Weight : kg | Empty : 355 | | Full of water : 1675 | | 33 | |
| 13 | Inspection By | IICT / Client / Third Party - | | Others : - | | 34 | |

| | | | | | | | |
|--------------|----------------|--|--|--|--|--|----|
| NOTES | GENERAL NOTES. | | | | | | 35 |
| | 1 | All dimensions are in mm | | | | | 36 |
| | 2 | VTS - Vendor to specify. | | | | | 37 |
| | 3 | Nozzles shall be provided with companion flange, gaskets, nuts, and washers shall be suitably blanked off before dispatch. | | | | | 38 |
| | 4 | All nozzle - top, side and bottom shall be 150 mm in length unless otherwise specified. | | | | | 39 |
| | 5 | Nozzle orientation and support height shall be provided by vendor. | | | | | 40 |
| | 6 | Vendor shall provide detailed drawing for approval from CSIR-IICT and shall guarantee the mechanical performance. | | | | | 41 |
| | 7 | Suitable stiffeners to be provided for all the nozzles. | | | | | 42 |
| | 8 | Dimensions are based on IS 4179. Vendor to specify the equivalent. | | | | | 43 |

| | | | | | | | | | | | | | | | | |
|-------|--------|-------------|----|-----|-----|------|------|---------|---|---|---|---|---|---|---|---|
| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------|--------|-------------|----|-----|-----|------|------|---------|---|---|---|---|---|---|---|---|

ISSUES / DISTRIBUTION / COPIES

All dimensions in mm, unless specified **DO NOT SCALE**

| | | | | | | | |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|

| | | | | | | | |
|-------------------|------------|---------------|----------|----------------|----------------------------|------------|-----|
| CLEARANCES | | | | | | | |
| MR | - | MR | 19.07.23 | MR/SAK | - | TPK/MR/SAK | |
| DESIGN | | PREPARED | | VER/CHD | | APPROVED | |
| SCALE | REFERENCES | SOFT COPY REF | | DWG/DOC/SK/No. | | SHEET | REV |
| | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED-01-01 00 XXX | 1 OF 2 | - |

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STORAGE SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 1)

PROJECT CODE : -

CLIENT : -

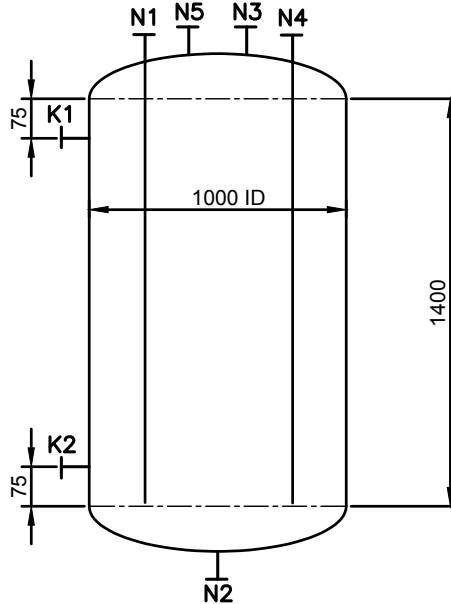
CAPACITY : 0.125 TPD

LOCATION : -

-

1 Unit No. : ST-201

Title : W Storage tank



NOZZLE SCHEDULE

| NOZZLE MARK | SERVICE | NOZZLE DETAILS | | | | FLANGE DETAILS | | | | REMARKS | R |
|-------------|---------------------|----------------|------|-----------|--------|----------------|--------|-------|--------|---------|----|
| | | SIZE NB(mm) | Sch. | Length mm | M.O.C. | STANDARD | RATING | TYPE | M.O.C. | | |
| N1 | Inlet from Tankfarm | 50 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | Dipleg | 1 |
| N2 | Outlet to P-201 | 50 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 2 |
| N3 | Vent | 25 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 3 |
| N4 | Recirculation | 50 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | Dipleg | 4 |
| N5 | Spare | 25 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 5 |
| | | | | | | | | | | | 6 |
| K1 | Level Gauge | 20 | 40s | 100 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 7 |
| K2 | Level Gauge | 20 | 40s | 100 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 8 |
| | | | | | | | | | | | 9 |
| | | | | | | | | | | | 10 |
| | | | | | | | | | | | 11 |
| | | | | | | | | | | | 12 |

| NOTES | DESCRIPTION | NO. |
|-------|--|-----|
| 9 | Lifting lugs, earthing boss(SS 316) and name plate are to be provided. | 13 |
| 10 | Dip leg to be provided with 3Ø antisiphon holes and suitable supporting arrangement. | 14 |
| 11 | Dished ends shall conform to IS 4179. | |

| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------|--------|-------------|----|-----|-----|------|--------------------------------|---------|---|---|---|---|---|---|---|---|
| | | | | | | | ISSUES / DISTRIBUTION / COPIES | | | | | | | | | |

All dimensions in mm, unless specified

DO NOT SCALE

MECH ENGR PRCS ENGR INST ENGR ELECT ENGR CIVIL ENGR CLIENT CONSULTANT CONTRACTOR

CLEARANCES

MR MR 19.07.23 MR/SAK - TPK/MR/SAK

DESIGN PREPARED VER/CHD APPROVED

| SCALE | REFERENCES | SOFT COPY REF | | | DWG/DOC/SK No. | SHEET | REV |
|-------|------------|---------------|--------|------|----------------------------|--------|-----|
| | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED-01-01 00 XXX | 2 OF 2 | - |

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STORAGE TANK(JACKETED) SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 1)

PROJECT CODE : -

CLIENT : -

CAPACITY : 0.125 TPD

LOCATION : -

- -

| GEN. | | | | R | | |
|------|---|------------------------------------|---------------------|---|------------------------------|---|
| | 1 | Unit No. : ST-202 | Dwg. No.: - | | Code : ASME Sec. VIII Div. I | 1 |
| | 2 | Title : WC | Nos. required : One | | Type : Vertical, Cylindrical | 2 |
| | 3 | Service : To Cool W to 5°C | | | | 3 |
| | 4 | Nominal Capacity : lit. : 400 lit. | | | | 4 |
| | | | | 5 | | |

| PROCESS DATA | | | | | | | | |
|--------------|----------------------|------------------------------------|---------------|--|------------------------------|--------------|---------------|---|
| | 1 | Fluid | Shell : WC | | Jacket : 10% Ethylene Glycol | 6 | | |
| | 2 | Operating Temperature : °C | Normal : 5 | | Maximum : 10 | Normal : -3 | Maximum : 2 | 7 |
| | 3 | Operating Pressure : kg/sq.cm.-g/¢ | Normal : Atm. | | Maximum : 1.1 | Normal : 2.0 | Maximum : 3.0 | 8 |
| | 4 | Density : at 30 °C kg/cu.m. | 1050 | | | | | 9 |
| 5 | Hazard Condition : - | | | | | 10 | | |
| | | | | | | 11 | | |
| | | | | | | 12 | | |

| CONSTRUCTION DATA | | | | SHELL | | JACKET | | | | |
|-------------------|-------------------|--------------------------|---|-------------------------------|--------------------------------|---------------------------------------|-------------|----|-------------|----|
| | 1 | Temperature : | °C | Design : 40 | Test : Amb. | Design : 40 | Test : Amb. | | 13 | |
| | 2 | Pressure : | kg/sq.cm.-g/¢ | Design : 1.2/3.3 ext | Test : 4.5 ext | Design : 3.3 | Test : 4.5 | | 14 | |
| | 3 | Corrosion Allowance | | - | | | | | 15 | |
| | 4 | Diameter | mm | OD :- | ID : 700 | OD :- | ID : 800 | | 16 | |
| | 5 | Straight Length | mm | 910 | | 725 | | | 17 | |
| | 6 | Thickness | mm | 5 MM | | VTS | | | 18 | |
| | 7 | Ends | Shell | Top | Type : Dish, Torrispherical | K.R. : 10% | Thk.: 5 MM | | S.F.: 50 mm | 19 |
| | | | Bottom | Type : Dish, Torrispherical | K.R. : 10% | Thk.: 5 MM | S.F.: 50 mm | | 20 | |
| | | | Jacket | Bottom | Type : Dish, Torrispherical | K.R. : 10% | Thk.: 5 MM | | S.F.: 50 mm | 21 |
| | 8 | Supports | | Type : VTS | | Nos. : - | | | 22 | |
| | 7 | Material Of Construction | | Shell : SA 240 SS 316 | | Heads : SA 240 SS 316 | | | 23 | |
| | | | | Jacket Shell : CS A 285 Gr. C | | Jacket Head : CS A 285 Gr. C | | | 24 | |
| | | | | Supports : CS to IS 226 | | Internal/External Bolting : SS 316/CS | | | 25 | |
| | | | Gaskets : PTFE | | Jacket / Internals : CS/SS 316 | | 26 | | | |
| 9 | Heat Treatment | | Stress Relieving : - | | Others : - | | 27 | | | |
| 10 | Tests | | Hydraulic / Pneumatic : YES | | Dye-Penetrant : - | | 28 | | | |
| | | | Radiographic : - | | Others : - | | 29 | | | |
| 11 | Insulation | | Type : HCl / CCl / PPI - | | Thk. : - | | 30 | | | |
| 12 | Painting / Finish | | All CS parts to be painted with two coats of red oxide primer | | | | | 31 | | |
| 13 | Weight : | kg | Empty : 630 | | Full of water : 2285 | | 32 | | | |
| 14 | Inspection By | | IICT / Client / Third Party | | Others : - | | 33 | | | |

| NOTES | GENERAL NOTES. | | | | | | | | |
|-------|----------------|--|--|--|--|--|--|--|----|
| | 1 | All dimensions are in mm | | | | | | | 36 |
| | 2 | VTS - Vendor to specify. | | | | | | | 37 |
| | 3 | Nozzles shall be provided with companion flange, gaskets, nuts, and washers shall be suitably blanked off before dispatch. | | | | | | | 38 |
| | 4 | All nozzle - top, side and bottom shall be 150 mm in length unless otherwise specified. | | | | | | | 39 |
| | 5 | Nozzle orientation and support height shall be provided by vendor | | | | | | | 40 |
| | 6 | Vendor shall provide detailed drawing for approval from CSIR-IICT and shall guarantee the mechanical performance. | | | | | | | 41 |
| | 7 | Suitable stiffeners to be provided for all the nozzles. | | | | | | | 42 |
| | 8 | Dimensions are based on IS 4179. Vendor to specify the equivalent. | | | | | | | 43 |

| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------|--------|-------------|----|-----|-----|------|------|---------|--------------------------------|---|---|---|---|---|---|---|
| | | | | | | | | | ISSUES / DISTRIBUTION / COPIES | | | | | | | |

All dimensions in mm, unless specified **DO NOT SCALE**

| | | | | | | | |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|

| CLEARANCES | | | | | | | |
|------------|------------|---------------|----------|----------------|----------------------------|------------|-----|
| MR | - | MR | 19.07.23 | MR/SAK | - | TPK/MR/SAK | |
| DESIGN | | PREPARED | | VER/CHD | | APPROVED | |
| SCALE | REFERENCES | SOFT COPY REF | | DWG/DOC/SK/No. | | SHEET | REV |
| | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED-01-06 00 XXX | 1 OF 2 | |

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STORAGE SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 1)

PROJECT CODE : -

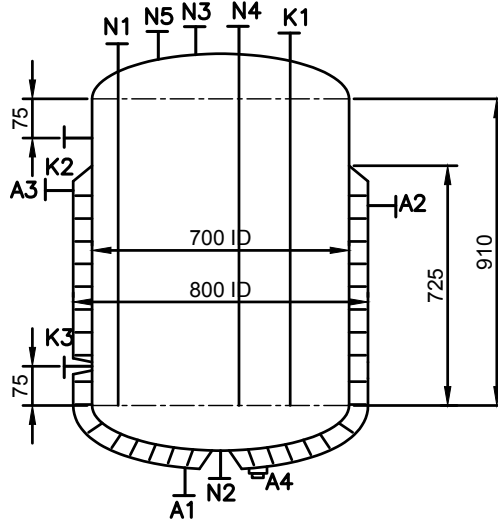
CLIENT : -

CAPACITY : 0.125 TPD

LOCATION : -

1 Unit No. : ST-202

Title : WC



NOZZLE SCHEDULE

| NOZZLE MARK | SERVICE | NOZZLE DETAILS | | | | FLANGE DETAILS | | | | REMARKS | R |
|-------------|------------------------|----------------|------|-----------|--------|----------------|--------|-------|--------|---------|----|
| | | SIZE NB(mm) | Sch. | Length mm | M.O.C. | STANDARD | RATING | TYPE | M.O.C. | | |
| N1 | Inlet from P-201 | 50 | 10s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | Dipleg | 1 |
| N2 | Outlet to P-202 | 25 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 2 |
| N3 | Vent | 25 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 3 |
| N4 | Recirculation | 25 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | Dipleg | 4 |
| N5 | Spare | 25 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 5 |
| | | | | | | | | | | | 6 |
| K1 | Thermowell | 20 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | Dipleg | 7 |
| K2 | Level Gauge | 20 | 40s | 100 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 8 |
| K3 | Level Gauge | 20 | 40s | 100 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 9 |
| | | | | | | | | | | | 10 |
| A1 | Ethylene Glycol Inlet | 50 | 40 | 150 | CS | ANSI, B16.5 | #150 | SO,RF | CS | - | 11 |
| A2 | Ethylene Glycol Outlet | 50 | 40 | 100 | CS | ANSI, B16.5 | #150 | SO,RF | CS | - | 12 |
| A3 | Jacket Vent | 25 | 40 | 100 | CS | ANSI, B16.5 | #150 | SO,RF | CS | - | 13 |
| A4 | Jacket Drain (Plug) | 3/4" | - | - | CS | - | #3000 | - | - | Plug | 14 |
| | | | | | | | | | | | 15 |

| | | |
|----|--|----|
| 9 | Lifting lugs, earthing boss(SS316) and name plate are to be provided. | 16 |
| 10 | Dip leg to be provided with 3Ø antisiphon holes and suitable supporting arrangement. | |
| 11 | Dished ends shall conform to IS 4179. | |

| | | | | | | | | | | | | | | | | |
|-------|--------|-------------|----|-----|-----|------|------|---------|---|---|---|---|---|---|---|---|
| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------|--------|-------------|----|-----|-----|------|------|---------|---|---|---|---|---|---|---|---|

All dimensions in mm, unless specified **DO NOT SCALE**

| | | | | | | | |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|

CLEARANCES

| | | | | | | |
|----|---|----|----------|--------|---|------------|
| MR | - | MR | 19.07.23 | MR/SAK | - | TPK/MR/SAK |
|----|---|----|----------|--------|---|------------|

| | | | |
|--------|------------|-------------------|----------|
| DESIGN | PREPARED | VER/CHD | APPROVED |
| SCALE | REFERENCES | SOFT COPY REF | SHEET |
| | | CD/FP FOLDER FILE | 2 OF 2 |

DE-XXX-XXX-ED-01-01 00 XXX

REV -

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STORAGE SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 1)

PROJECT CODE : -

CLIENT : -

CAPACITY : 0.125 TPD

LOCATION : -

-

| GEN. | | | | R | |
|-------------------|--|--|---|--|------------------------------|
| | 1 | Unit No. : ST-203 | Dwg. No.: | | Code : ASME Sec. VIII Div. I |
| 2 | Title : C3 Collection Tank | Nos. required : One | Type : Vertical, Cylindrical | 2 | |
| 3 | Service : To Collect the C3 | | | 3 | |
| 4 | Nominal Capacity : lit. : 1250 lit. | | | 4 | |
| | | | | 5 | |
| | | | | 6 | |
| PROCESS DATA | 1 | Fluid | C3 | 7 | |
| | 2 | Operating Temperature : °C | Normal : 10 | Maximum : 30 | 8 |
| | 3 | Operating Pressure : kg/sq.cm.-g/ø | Normal : Atm. | Maximum : 1.1 | 9 |
| | 4 | Density : at 30 °C kg/cu.m. | 1051 | | 10 |
| | 5 | Hazard Condition : - | - | | 11 |
| | | | | 12 | |
| CONSTRUCTION DATA | 1 | Temperature : °C | Design : 50 | Test : Amb. | 14 |
| | 2 | Pressure : kg/sq.cm.-g/ø | Design : 1.2 | Test : Full with Water | 15 |
| | 3 | Corrosion Allowance | | | 16 |
| | 4 | Shell | ØD/ID : 1000 mm Thk. : 5 MM | St. Length : 1400 mm | 17 18 |
| | 5 | Ends | Top Type : Dish, Torispherical Bottom Type : Dish, Torispherical | KR : 10% Thk. : 5 MM SF : 50 mm KR : 10% Thk. : 5 MM SF : 50 mm | 19 20 |
| | 6 | Supports | Type : LEG | Nos. : 4 Nos. | 21 |
| | 7 | Material Of Construction | Shell : SA 240 SS 316 | Heads : SA 240 SS 316 | 22 |
| | | | Supports : CS to IS 226 | Internal Bolting : SS 316 | 23 |
| | | | Gaskets : PTFE | External Bolting : CS to IS 1364 | 24 |
| | | | Shell Flanges : - | Jacket / Internals : SS 316 | 25 |
| | | | Nozzles : SS 316 | Other wetted parts : SS 316 | 26 |
| | 8 | Heat Treatment | Flanges : - | Others : - | 27 |
| | 9 | Tests | Stress Relieving : - | Others : - | 28 |
| | | Hydraulic / Pneumatic : Yes | Dye-Penetrant : - | 29 | |
| | | Radiographic : - | Others : - | 30 | |
| 10 | Insulation | Type : HCl / CCl / PPI - | Thk. : - | 31 | |
| 11 | Painting / Finish | All CS parts to be painted with two coats of red oxide primer | | 32 | |
| 12 | Weight : kg | Empty : 355 | Full of water : 1675 | 33 | |
| 13 | Inspection By | IICT / Client / Third Party - | Others : - | 34 | |
| NOTES | GENERAL NOTES. | | | | 35 |
| | 1 | All dimensions are in mm | | | 36 |
| | 2 | VTS - Vendor to specify. | | | 37 |
| | 3 | Nozzles shall be provided with companion flange, gaskets, nuts, and washers shall be suitably blanked off before dispatch. | | | 38 |
| | 4 | All nozzle - top, side and bottom shall be 150 mm in length unless otherwise specified. | | | 39 |
| | 5 | Nozzle orientation and support height shall be provided by vendor | | | 40 |
| | 6 | Vendor shall provide detailed drawing for approval from CSIR-IICT and shall guarantee the mechanical performance. | | | 41 |
| | 7 | Suitable stiffeners to be provided for all the nozzles. | | | 42 |
| 8 | Dimensions are based on IS 4179. Vendor to specify the equivalent. | | | 43 | |

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| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--|------------|---------------|---------------------|------------|----------------------------|------------|------------|--------------------------------|---|-----|---|---|---|---|---|---|
| | | | | | | | | ISSUES / DISTRIBUTION / COPIES | | | | | | | | |
| All dimensions in mm, unless specified | | | DO NOT SCALE | | | | | | | | | | | | | |
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR | | | | | | | | | |
| CLEARANCES | | | | | | | | | | | | | | | | |
| MR | - | MR | 19.07.23 | MR/SAK | - | TPK/MR/SAK | | | | | | | | | | |
| DESIGN | | | PREPARED | | VER/CHD | | APPROVED | | | | | | | | | |
| SCALE | REFERENCES | SOFT COPY REF | | | DWG/DOC/SK/No. | | SHEET | | | REV | | | | | | |
| | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED-01-01 00 XXX | | | 1 OF 2 | | | - | | | | | |



STORAGE SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 1)

PROJECT CODE : -

CLIENT : -

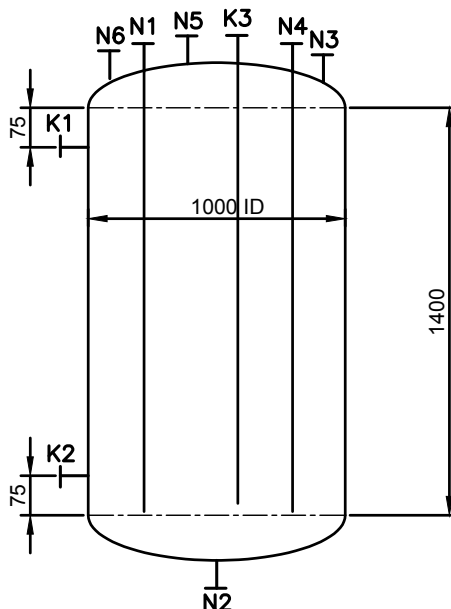
CAPACITY : 0.125 TPD

LOCATION : -

-

1 Unit No. : ST-203

Title : C3 Collection Tank



NOZZLE SCHEDULE

| NOZZLE MARK | SERVICE | NOZZLE DETAILS | | | | FLANGE DETAILS | | | | REMARKS | R |
|-------------|--------------------------|----------------|------|-----------|--------|----------------|--------|-------|--------|---------|----|
| | | SIZE NB(mm) | Sch. | Length mm | M.O.C. | STANDARD | RATING | TYPE | M.O.C. | | |
| N1 | Inlet from P-203 | 100 | 10s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | Dipleg | 1 |
| N2 | Outlet to P-204 | 50 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 2 |
| N3 | Vent | 25 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 3 |
| N4 | Recirculation | 50 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | Dipleg | 4 |
| N5 | Recirculation from P-204 | 50 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 5 |
| N6 | Spare | 25 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 6 |
| K1 | Level Gauge | 20 | 40s | 100 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 8 |
| K2 | Level Gauge | 20 | 40s | 100 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 9 |
| K3 | pH Indicator | 20 | 40s | 100 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | Dipleg | 10 |
| | | | | | | | | | | | 11 |
| | | | | | | | | | | | 12 |

| NOTES | DESCRIPTION | NO. |
|-------|--|-----|
| 9 | Lifting lugs, earthing boss(SS 316) and name plate are to be provided. | 13 |
| 10 | Dip leg to be provided with 3ø antisiphon holes and suitable supporting arrangement. | 14 |
| 11 | Dished ends shall conform to IS 4179. | |

| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--|--------|-------------|----|-----|-----|------|--------------------------------|---------|---|---|---|---|---|---|---|---|
| | | | | | | | ISSUES / DISTRIBUTION / COPIES | | | | | | | | | |
| All dimensions in mm, unless specified | | | | | | | | | | | | | | | | |

DO NOT SCALE

| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR |
|-------------------|------------|---------------|-----------------|----------------|-----------------------------------|-------------------|---|
| CLEARANCES | | | | | | | |
| MR | | MR | 19.07.23 | MR/SAK | - | TPK/MR/SAK | |
| DESIGN | | PREPARED | | VER/CHD | | APPROVED | |
| SCALE | REFERENCES | SOFT COPY REF | | DWG/DOC/SK-No. | | SHEET | REV - |
| | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED-01-01 00 XXX | 2 OF 2 | |

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STORAGE SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 1)

PROJECT CODE : -

CLIENT : -

CAPACITY : 0.125 TPD

LOCATION : -

-

| | | | | | | |
|-------------|---|--------------------------------------|---------------------|------------------------------|---|---|
| GEN. | 1 | Unit No. : ST-204 | Dwg. No.: | Code : ASME Sec. VIII Div. I | R | 1 |
| | 2 | Title : C3 Preparation Vessel | Nos. required : One | Type : Vertical, Cylindrical | | 2 |
| | 3 | Service : To Store the L from FI-301 | | | | 3 |
| | 4 | Nominal Capacity : lit. : 1250 lit. | | | | 4 |
| | | | | | | 5 |

| | | | | | | |
|---------------------|---|------------------------------------|---------------|---------------|----|----|
| PROCESS DATA | 1 | Fluid | L | | | 6 |
| | 2 | Operating Temperature : °C | Normal : 20 | Maximum : 25 | | 7 |
| | 3 | Operating Pressure : kg/sq.cm.-g/¢ | Normal : Atm. | Maximum : 1.1 | | 8 |
| | 4 | Density : at 30 °C kg/cu.m. | 1051 | | | 9 |
| | 5 | Hazard Condition : - | - | | | 10 |
| | | | | | 11 | |
| | | | | | 12 | |

| | | | | | | | |
|--------------------------|-------------------|---|----------------------|----------------------------|----------------------------------|---------------|----|
| CONSTRUCTION DATA | 1 | Temperature : °C | Design : 50 | Test : Amb. | | 13 | |
| | 2 | Pressure : kg/sq.cm.-g/¢ | Design : 1.2 | Test : Full with Water | | 14 | |
| | 3 | Corrosion Allowance | | | | 15 | |
| | 4 | Shell | | ØD/ID : 1000 mm | St. Length : 1400 mm | | 16 |
| | | | | Thk. : 5 MM | | | 17 |
| | 5 | Ends | Top | Type : Dish, Torispherical | KR : 10% Thk. : 5 MM SF : 50 mm | | 18 |
| | | | Bottom | Type : Dish, Torispherical | KR : 10% Thk. : 5 MM SF : 50 mm | | 19 |
| | 7 | Material Of Construction | 6 | Supports | Type : LEG | Nos. : 4 Nos. | 20 |
| | | | | Shell : SA 240 SS 316 | Heads : SA 240 SS 316 | | 21 |
| | | | | Supports : CS to IS 226 | Internal Bolting : SS 316 | | 22 |
| | | | | Gaskets : PTFE | External Bolting : CS to IS 1364 | | 23 |
| | | | | Shell Flanges : NA | Jacket / Internals : SS 316 | | 24 |
| | | | | Nozzles : SS 316 | Other wetted parts : SS 316 | | 25 |
| 8 | Heat Treatment | Stress Relieving : - | Others : - | | 26 | | |
| 9 | Tests | Flanges : - | Others : - | | 27 | | |
| | | Hydraulic / Pneumatic : Yes | Dye-Penetrant : - | | 28 | | |
| | | Radiographic : - | Others : - | | 29 | | |
| 10 | Insulation | Type : HCI / CCI / PPI - | Thk. : - | | 30 | | |
| 11 | Painting / Finish | All CS parts to be painted with two coats of red oxide primer | | | 31 | | |
| 12 | Weight : kg | Empty : 355 | Full of water : 1675 | | 32 | | |
| 13 | Inspection By | IICT / Client / Third Party - | Others : - | | 33 | | |

| | | | | | | | |
|--------------|----------------|--|--|--|--|----|----|
| NOTES | GENERAL NOTES. | | | | | | 34 |
| | 1 | All dimensions are in mm | | | | | 35 |
| | 2 | VTS - Vendor to specify. | | | | | 36 |
| | 3 | Nozzles shall be provided with companion flange, gaskets, nuts, and washers shall be suitably blanked off before dispatch. | | | | | 37 |
| | 4 | All nozzle - top, side and bottom shall be 150 mm in length unless otherwise specified. | | | | | 38 |
| | 5 | Nozzle orientation and support height shall be provided by vendor | | | | | 39 |
| | 6 | Vendor shall provide detailed drawing for approval from CSIR-IICT and shall guarantee the mechanical performance. | | | | | 40 |
| | 7 | Suitable stiffeners to be provided for all the nozzles. | | | | | 41 |
| | 8 | Dimensions are based on IS 4179. Vendor to specify the equivalent. | | | | | 42 |
| | | | | | | 43 | |

| | | | | | | | | | | | | | | | | |
|-------|--------|-------------|----|-----|-----|------|------|---------|---|---|---|---|---|---|---|---|
| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------|--------|-------------|----|-----|-----|------|------|---------|---|---|---|---|---|---|---|---|

ISSUES / DISTRIBUTION / COPIES

All dimensions in mm, unless specified **DO NOT SCALE**

| | | | | | | | |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|

CLEARANCES

| | | | | | | |
|--------|---|----------|----------|---------|---|------------|
| MR | - | MR | 19.07.23 | MR/SAK | - | TPK/MR/SAK |
| DESIGN | | PREPARED | | VER/CHD | | APPROVED |

| | | | | | | | |
|-------|------------|---------------|--------|------|----------------------------|--------|-----|
| SCALE | REFERENCES | SOFT COPY REF | | | DWG/DOC/SK/No. | SHEET | REV |
| | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED-01-01 00 XXX | 1 OF 2 | |

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STORAGE SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 1)

PROJECT CODE : -

CLIENT : -

CAPACITY : 0.125 TPD

LOCATION : -

-

1 Unit No. : ST-204

Title : C3 Preparation Vessel

Sparger Details

Sparger Dia = 530 mm

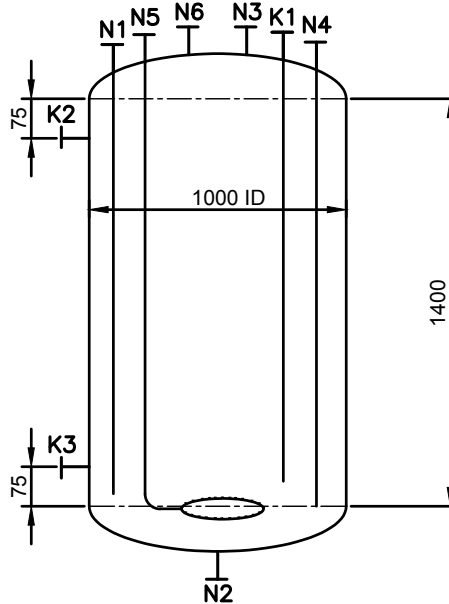
HT. from Bot. = 250 mm

Sparger Pipe Dia = 15NB

Hole size = 2 Ø mm

No. of Holes = 10 Nos.

Dist between Holes = 60 mm



NOZZLE SCHEDULE

| NOZZLE MARK | SERVICE | NOZZLE DETAILS | | | | FLANGE DETAILS | | | | REMARKS | R |
|-------------|-------------------|----------------|------|-----------|--------|----------------|--------|-------|--------|---------|----|
| | | SIZE NB(mm) | Sch. | Length mm | M.O.C. | STANDARD | RATING | TYPE | M.O.C. | | |
| N1 | Inlet from Fi-202 | 100 | 10s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | Dipleg | 1 |
| N2 | Outlet to P-205 | 50 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 2 |
| N3 | Vent | 25 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 3 |
| N4 | Recirculation | 50 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | Dipleg | 4 |
| N5 | CO2 Inlet | 15 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | Sparger | 5 |
| N6 | Spare | 25 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 6 |
| | | | | | | | | | | | 7 |
| K1 | pH Indicator | 20 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | Dipleg | 8 |
| K2 | Level Gauge | 20 | 40s | 100 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 9 |
| K3 | Level Gauge | 20 | 40s | 100 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 10 |
| | | | | | | | | | | | 11 |
| | | | | | | | | | | | 12 |

| NOTES | DESCRIPTION | R |
|-------|--|----|
| 9 | Lifting lugs, earthing boss(SS 316) and name plate are to be provided. | 13 |
| 10 | Dip leg to be provided with 3Ø antisiphon holes and suitable supporting arrangement. | 14 |
| 11 | Dished ends shall conform to IS 4179. | |

| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--|--------|-------------|----|-----|-----|------|--------------------------------|---------|---|---|---|---|---|---|---|---|
| | | | | | | | ISSUES / DISTRIBUTION / COPIES | | | | | | | | | |
| All dimensions in mm, unless specified DO NOT SCALE | | | | | | | | | | | | | | | | |

| | | | | | | | |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|

| CLEARANCES | | | |
|------------|------------|----------------------------|---|
| MR | MR | 19.07.23 | MR/SAK |
| DESIGN | PREPARED | VER/CHD | APPROVED |
| SCALE | REFERENCES | SOFT COPY REF | TPK/MR/SAK |
| | | CD/FP FOLDER FILE | |
| | | DE-XXX-XXX-ED-01-01 00 XXX | SHEET 2 OF 2 |
| | | | REV - |

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**INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDERABAD – 500 007**



STORAGE SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 1)

PROJECT CODE : -

CLIENT : -

CAPACITY : 0.125 TPD

LOCATION : -

-

| GEN. | | | | | | | | | | R | | | | | | | | | |
|--|--|---|-----------------|----------------------------------|----------------------------|---------------------------------|---------------------------------|----------------|------|--------------------------------|---------|---------------------|---|-----|---|---|---|---|---|
| 1 | Unit No. : ST-205 a,b | Dwg. No.: | | Code : ASME Sec. VIII Div. I | | | | | | 1 | | | | | | | | | |
| 2 | Title : C3 Feed Tanks | Nos. required : Two | | Type : Vertical, Cylindrical | | | | | | 2 | | | | | | | | | |
| 3 | Service : To Collect the C3 | | | | | | | | | | | | | | | | | | |
| 4 | Nominal Capacity : lit. : 1250 lit. | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| PROCESS DATA | | | | | | | | | | | | | | | | | | | |
| 1 | Fluid | | C3 | | | | | | | | 6 | | | | | | | | |
| 2 | Operating Temperature : °C | | Normal : 10 | | Maximum : 30 | | | | | | 7 | | | | | | | | |
| 3 | Operating Pressure : kg/sq.cm.-g/¢ | | Normal : Atm. | | Maximum : 1.1 | | | | | | 8 | | | | | | | | |
| 4 | Density : at 30 °C kg/cu.m. | | 1051 | | | | | | | | 9 | | | | | | | | |
| 5 | Hazard Condition : - | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| CONSTRUCTION DATA | | | | | | | | | | | | | | | | | | | |
| 1 | Temperature : °C | | Design : 50 | | Test : Amb. | | | | | | 13 | | | | | | | | |
| 2 | Pressure : kg/sq.cm.-g/¢ | | Design : 1.2 | | Test : Full with Water | | | | | | 14 | | | | | | | | |
| 3 | Corrosion Allowance | | | | | | | | | | | | | | | | | | |
| 4 | Shell | | ØD/ID : 1000 mm | | St. Length : 1400 mm | | | | | | 15 | | | | | | | | |
| | | Thk. : 5 MM | | | | | | | | | | | | | | | | | |
| 5 | Ends | | Top | | Type : Dish, Torispherical | | KR : 10% Thk. : 5 MM SF : 50 mm | | | | 16 | | | | | | | | |
| | | Bottom | | Type : Dish, Torispherical | | KR : 10% Thk. : 5 MM SF : 50 mm | | | | | | | | | | | | | |
| 6 | Supports | | | | | | | | | | | | | | | | | | |
| | | Type : LEG | | Nos. : 4 Nos. | | | | | | | | | | | | | | | |
| | | Shell : SA 240 SS 316 | | Heads : SA 240 SS 316 | | | | | | | | | | | | | | | |
| | | Supports : CS to IS 226 | | Internal Bolting : SS 316 | | | | | | | | | | | | | | | |
| | | Gaskets : PTFE | | External Bolting : CS to IS 1364 | | | | | | | | | | | | | | | |
| | | Shell Flanges : NA | | Jacket / Internals : SS 316 | | | | | | | | | | | | | | | |
| | | Nozzles : SS 316 | | Other wetted parts : SS 316 | | | | | | | | | | | | | | | |
| | | Flanges : - | | Others : - | | | | | | | | | | | | | | | |
| 8 | Heat Treatment | | | | | | | | | | | | | | | | | | |
| | | Stress Relieving : - | | Others : - | | | | | | | | | | | | | | | |
| 9 | Tests | | | | | | | | | | | | | | | | | | |
| | | Hydraulic / Pneumatic : Yes | | Dye-Penetrant : - | | | | | | | | | | | | | | | |
| | | Radiographic : - | | Others : - | | | | | | | | | | | | | | | |
| 10 | Insulation | | | | | | | | | | | | | | | | | | |
| | | Type : HCI / CCI / PPI - | | Thk. : - | | | | | | | | | | | | | | | |
| 11 | Painting / Finish | | | | | | | | | | | | | | | | | | |
| | | All CS parts to be painted with two coats of red oxide primer | | | | | | | | | | | | | | | | | |
| 12 | Weight : kg | | Empty : 355 | | Full of water : 1675 | | | | | | | | | | | | | | |
| 13 | Inspection By | | | | | | | | | | | | | | | | | | |
| | | IICT / Client / Third Party - | | Others : - | | | | | | | | | | | | | | | |
| NOTES | | | | | | | | | | | | | | | | | | | |
| GENERAL NOTES. | | | | | | | | | | | | | | | | | | | |
| 1 | All dimensions are in mm | | | | | | | | | | | | | | | | | | |
| 2 | VTS - Vendor to specify. | | | | | | | | | | | | | | | | | | |
| 3 | Nozzles shall be provided with companion flange, gaskets, nuts, and washers shall be suitably blanked off before dispatch. | | | | | | | | | | | | | | | | | | |
| 4 | All nozzle - top, side and bottom shall be 150 mm in length unless otherwise specified. | | | | | | | | | | | | | | | | | | |
| 5 | Nozzle orientation and support height shall be provided by vendor | | | | | | | | | | | | | | | | | | |
| 6 | Vendor shall provide detailed drawing for approval from CSIR-IICT and shall guarantee the mechanical performance. | | | | | | | | | | | | | | | | | | |
| 7 | Suitable stiffeners to be provided for all the nozzles. | | | | | | | | | | | | | | | | | | |
| 8 | Dimensions are based on IS 4179. Vendor to specify the equivalent. | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| S.No. | STATUS | | DESCRIPTION | | | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| | | | | | | | | | | ISSUES / DISTRIBUTION / COPIES | | | | | | | | | |
| All dimensions in mm, unless specified | | | | | | | | | | | | DO NOT SCALE | | | | | | | |
| MECH ENGR | | | | | | | | | | | | PRCS ENGR | | | | | | | |
| INST ENGR | | | | | | | | | | | | ELECT ENGR | | | | | | | |
| CIVIL ENGR | | | | | | | | | | | | CLIENT | | | | | | | |
| CONSULTANT | | | | | | | | | | | | CONTRACTOR | | | | | | | |
| CLEARANCES | | | | | | | | | | | | | | | | | | | |
| MR | | - | | MR | | 19.07.23 | | MR/SAK | | - | | TPK/MR/SAK | | | | | | | |
| DESIGN | | | | PREPARED | | | | VER/CHD | | | | APPROVED | | | | | | | |
| SCALE | | REFERENCES | | SOFT COPY REF | | | | DWG/DOC/SK/No. | | | | SHEET | | REV | | | | | |
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STORAGE SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 1)

PROJECT CODE : -

CLIENT : -

CAPACITY : 0.125 TPD

LOCATION : -

-

1 Unit No. : ST-205 a,b

Title : C3 Feed Tanks

Sparger Details

Sparger Dia = 530 mm

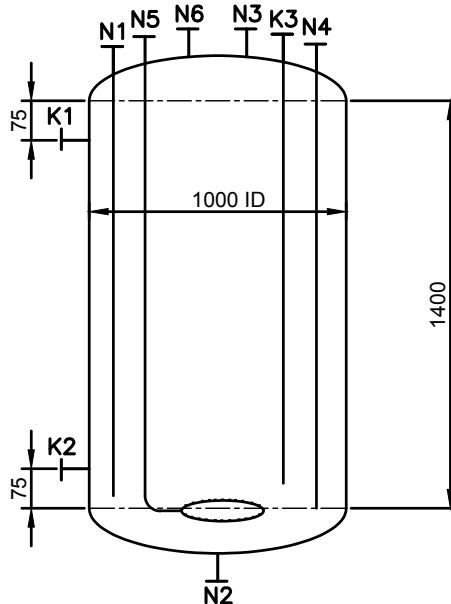
HT. from Bot. = 250 mm

Sparger Pipe Dia = 15NB

Hole size = 2 Ø mm

No. of Holes = 10 Nos.

Dist between Holes = 60 mm



NOZZLE SCHEDULE

| NOZZLE MARK | SERVICE | NOZZLE DETAILS | | | | FLANGE DETAILS | | | | REMARKS | R |
|-------------|---------------------|----------------|------|-----------|--------|----------------|--------|-------|--------|---------|----|
| | | SIZE NB(mm) | Sch. | Length mm | M.O.C. | STANDARD | RATING | TYPE | M.O.C. | | |
| N1 | Inlet from P-205 | 50 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | Dipleg | 1 |
| N2 | Outlet to P-206 a,b | 25 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 2 |
| N3 | Vent | 25 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 3 |
| N4 | Recirculation | 25 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | Dipleg | 4 |
| N5 | CO2 Inlet | 15 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | Sparger | 5 |
| N6 | Spare | 25 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 6 |
| | | | | | | | | | | | 7 |
| K1 | Level Gauge | 20 | 40s | 100 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 8 |
| K2 | Level Gauge | 20 | 40s | 100 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 9 |
| K3 | pH Indicator | 20 | 40s | 100 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | Dipleg | 10 |
| | | | | | | | | | | | 11 |
| | | | | | | | | | | | 12 |

| NOTES | DESCRIPTION | NO. |
|-------|--|-----|
| 9 | Lifting lugs, earthing boss(SS 316) and name plate are to be provided. | 13 |
| 10 | Dip leg to be provided with 3Ø antisiphon holes and suitable supporting arrangement. | 14 |
| 11 | Dished ends shall conform to IS 4179. | |

| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------|--------|-------------|----|-----|-----|------|--------------------------------|---------|---|---|---|---|---|---|---|---|
| | | | | | | | ISSUES / DISTRIBUTION / COPIES | | | | | | | | | |

All dimensions in mm, unless specified

DO NOT SCALE

MECH ENGR PRCS ENGR INST ENGR ELECT ENGR CIVIL ENGR CLIENT CONSULTANT CONTRACTOR

CLEARANCES

MR MR 19.07.23 MR/SAK - TPK/MR/SAK

DESIGN PREPARED VER/CHD APPROVED

| SCALE | REFERENCES | SOFT COPY REF | | | ENC/DOC/SK-No. | SHEET | REV |
|-------|------------|---------------|--------|------|----------------------------|--------|-----|
| | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED-01-01 00 XXX | 2 OF 2 | - |

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INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDERABAD – 500 007



TRAY SPECIFICATION DATA SHEET

Page
1 OF 2

| | |
|---|----------------------|
| PROJECT : Pilot Plant Facility For Bulk Chemicals | PROJECT CODE : - |
| CLIENT : - | CAPACITY : 0.125 TPD |
| LOCATION : - | - |

| GEN. | Unit No. : Tray-201 | Dwg. No.: | Code : ASME Sec. VIII Div. I | R |
|------|----------------------------------|----------------------|------------------------------|---|
| 1 | Title :Tray | Nos. required : FIVE | Type : Vertical, Cylindrical | 1 |
| 2 | Service : To Collect C2 | | | 2 |
| 3 | Nominal Capacity : Kg/h. :100 Kg | | | 3 |
| 4 | | | | 4 |
| | | | | 5 |
| | | | | 6 |

| PROCESS DATA | Fluid | C2 | R |
|--------------|------------------------------------|--------------------------------|----|
| 1 | Operating Temperature : °C | Normal : 30 Maximum : 40 | 7 |
| 2 | Operating Pressure : kg/sq.cm.-g/a | Normal : Atm. Maximum : 1.1 | 8 |
| 3 | Density : at 20°C kg/L | 1.1 | 9 |
| 4 | Hazard Condition : | | 10 |
| | | | 11 |
| | | | 12 |

| CONSTRUCTION DATA | Temperature : °C | Design : 50 | R |
|-------------------|---|--|----|
| 1 | Pressure : kg/sq.cm.-g/a <td>Design : 1.1 <td>14</td> </td> | Design : 1.1 <td>14</td> | 14 |
| 2 | Corrosion Allowance | - <td>15</td> | 15 |
| 3 | Shell | ØD/ID : - Thk. : - <td>16</td> | 16 |
| 4 | Ends | Top Type : - Bottom Type : - <td>17</td> | 17 |
| 5 | Supports | Type : - <td>18</td> | 18 |
| 6 | Material Of Construction | Shell : SA 240 SS 316 Supports : CS to IS 226 Gaskets : PTFE Shell Flanges : NA <td>19</td> | 19 |
| 7 | Heat Treatment | Stress Relieving : SS 316 <td>20</td> | 20 |
| 8 | Tests | Hydraulic / Pneumatic : Yes Radiographic : - <td>21</td> | 21 |
| 9 | Insulation | Type : HCl / CCl / PPI - <td>22</td> | 22 |
| 10 | Painting / Finish | All CS parts to be painted with two coats of red oxide primer <td>23</td> | 23 |
| 11 | Weight : kg | Empty : - Full of water : - <td>24</td> | 24 |
| 12 | Inspection By | IICT / Client / Third Party <td>25</td> | 25 |
| 13 | | | 26 |
| | | | 27 |
| | | | 28 |
| | | | 29 |
| | | | 30 |
| | | | 31 |
| | | | 32 |
| | | | 33 |

| NOTES | Description | R |
|-------|---|----|
| 1 | Vendor shall provide detailed fabrication drawing for approval from IICT and shall guarantee mechanical performance of the equipment. | 34 |
| 2 | 100 kg Capacity Tray of 5 Nos. with Wheels and handles to be supply by the vendor. | 35 |
| 3 | | 36 |
| 4 | | 37 |
| 5 | | 38 |
| 6 | | 39 |
| 7 | | 40 |
| 8 | | 41 |
| 9 | | 42 |
| | | 43 |

VTS – Vendor to Specify

| 1 | E | For Engineering | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
|-------|--------|-----------------|----|-----|-----|------|------|---------|---|---|---|---|---|---|---|---|---|
| 0 | C | Preliminary | | | | | | | | | | | | | | | |
| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |

| | | | | | | | |
|--|-----------|-----------|---------------------|------------|--------|------------|------------|
| All dimensions in mm, unless specified | | | DO NOT SCALE | | | | |
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR |

| CLEARANCES | | | | | | | |
|------------|------------|----------|------------|---------|--------|------------|--|
| MR | 04.08.2015 | SAK/TPK | 04.08.2015 | | MR/TPK | 04.08.2015 | |
| DESIGN | | PREPARED | | VER/CHD | | APPROVED | |

| | | | | | | | |
|-------|------------|---------------|--------|------|--------------------|--------|----------|
| SCALE | REFERENCES | SOFT COPY REF | | | DWG/DOC/SK No. | SHEET | REV 0 |
| — | — | CD/FP | FOLDER | FILE | DE-SP-172-06-11009 | 1 OF 2 | |

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TRAY SPECIFICATION DATA SHEET

PROJECT : Pilot Plant Facility For Bulk Chemicals

PROJECT CODE : -

CLIENT : -

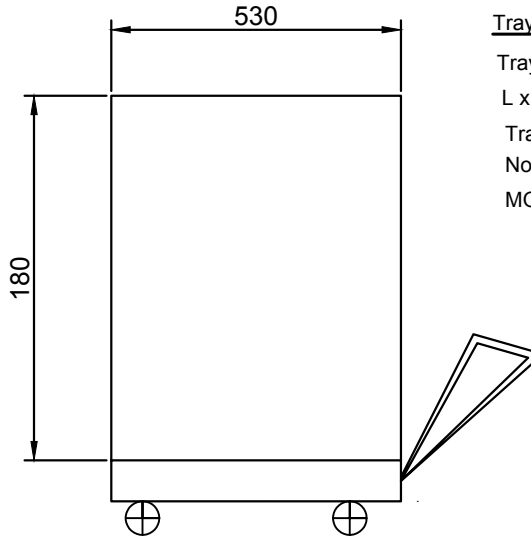
CAPACITY : 0.125 TPD

LOCATION : -

-

1 Unit No. : Tray-201

Title : Tray



Tray Details:

Tray with wheels and handles as per the given dimensions.

L x B x H = 1000 mm x 530 mm x 180 mm

Tray Thickness : 5 MM

No. of trays : 5 Nos.

MOC : SS 316

All Dimensions are in mm

NOZZLE SCHEDULE

| NOZZLE MARK | SERVICE | NOZZLE DETAILS | | | | FLANGE DETAILS | | | | REMARKS | R |
|-------------|---------|----------------|------|--------|--------|----------------|--------|------|--------|---------|---|
| | | SIZE NB(mm) | Sch. | Length | M.O.C. | STANDARD | RATING | TYPE | M.O.C. | | |
| | | | | | | | | | | | |
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NOTES
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13
14
15

| 1 | E | For Engineering | | | | | | | | | | | | | | | | | |
|-------|--------|-----------------|----|-----|-----|------|--------------------------------|---------|---|---|---|---|---|---|---|---|--|--|--|
| 0 | C | Preliminary | - | - | - | - | | | | | | | | | | | | | |
| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | |
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All dimensions in mm, unless specified **DO NOT SCALE**

| | | | | | | | |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|

CLEARANCES

| | | | | | | |
|--------|------------|----------|------------|---------|--------|------------|
| MR | 04.08.2015 | SAK/TPK | 04.08.2015 | | MR/TPK | 04.08.2015 |
| DESIGN | | PREPARED | | VER/CHD | | APPROVED |

| | | | | | | | |
|-------|------------|---------------|--------|------|---------------------------|--------|-------|
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| - | | CD/FP | FOLDER | FILE | DE-SP-172-06-11009 | 2 OF 2 | |

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Project:
Client:
Location:
Unit: Section-200

Instrument Index

Prepared By: GSS Checked By: KK & Approved By:

Date:
Doc. No.:
Revision No.: Rev. 0



| S.No | Tag No. | Equipment Name | Service | Location | Range | Units | Description | Type | Remarks |
|------|------------|----------------|--|------------------|------------|--------|-----------------------|---------------|---------|
| 1 | TE-201 | ST-202 | ST-202 Temp | ST-202 | 0-100 | deg. C | Temp. elemnt | RTD | |
| | TI-201 | ST-202 | Temp. Indicator | ST-202 | | deg. C | Indicator | Ctrl. Panel | |
| 2 | TE-202 | ST-202 | ST-202 EG-Mix Return LineTemp | ST-202 | `-10 to 50 | deg. C | Temp. elemnt | RTD | |
| | TI-202 | ST-202 | Temp. Indicator | ST-202 | | deg. C | Indicator | Ctrl. Panel | |
| 3 | TE-203 | R-201 | R-201 CHW Supply Temp. | R-201 | `-10 to 50 | deg. C | Temp. element | RTD | |
| | TI-203 | R-201 | Temp. Indicator | R-201 | | deg. C | Indicator | Ctrl. Panel | |
| 4 | TE-204 | R-201 | R-201 CHW Return Temp. | R-201 | `-10 to 50 | deg. C | Temp. element | RTD | |
| | TI-204 | R-201 | Temp. Indicator | R-201 | | deg. C | Indicator | Ctrl. Panel | |
| 5 | TE-205 | R-201 | R-201 Temp. | R-201 | 0-150 | deg. C | Temp. element | RTD | |
| | TI-205 | R-201 | Temp. Indicator | R-201 | | deg. C | Temp. Ind. Controller | Ctrl. Panel | |
| 1 | PG-201 | ST-201 | Pump P-201 Outlet pressure | P-201 Outlet | 0-6 | Bar | Pressure Gauge | Diaphragm | |
| 2 | PG-202 | ST-202 | Pump P-202 Outlet pressure | P-202 Outlet | 0-6 | Bar | Pressure Gauge | Diaphragm | |
| 3 | PG-203 | R-201 | R-201 CHW Supply Line Pressure | R-201 CHWS | 0-6 | Bar | Pressure Gauge | Bourdon | |
| 4 | PG-204 | Fi-201 | Pump P-203 Outlet pressure | P-203 Outlet | 0-6 | Bar | Pressure Gauge | Diaphragm | |
| 5 | PG-205 | ST-203 | Pump P-204 Outlet pressure | P-204 Outlet | 0-6 | Bar | Pressure Gauge | Diaphragm | |
| 6 | PG-206 | CY-201 | CY-201 Header Pressure | CY-201 Header | 0-6 | Bar | Pressure Gauge | Bourdon | |
| 7 | PG-207 | ST-204 | Pump-205 Outlet Pressure | P-205 Outlet | 0-6 | Bar | Pressure Gauge | Diaphragm | |
| 8 | PG-208 a,b | ST-205 a,b | Pump P-206 a,b Outlet pressure | P-206 a,b Outlet | 0-6 | Bar | Pressure Gauge | Diaphragm | |
| 1 | PSV-201 | ST-202 | ST-202 Jacket pressure safety valve | ST-202 Jacket | 0-6 | Bar | Pressure safety valve | Spring Loaded | |
| 2 | PSV-202 | R-201 | R-201 Jacket pressure safety valve | R-201 Jacket | 0-6 | Bar | Pressure safety valve | Spring Loaded | |
| 1 | LG-201 | ST-201 | ST-201 level | ST-201 | *1400 | mm | Level Gauge | Glass Tube | *Note-1 |
| 2 | LG-202 | ST-202 | ST-202 level | ST-202 | *910 | mm | Level Gauge | Glass Tube | *Note-1 |
| 3 | LG-203 | ST-203 | ST-203 Level | ST-203 | *1400 | mm | Level Gauge | Glass Tube | *Note-1 |
| 4 | LG-204 | ST-204 | ST-204 Level | ST-204 | *1400 | mm | Level Gauge | Glass Tube | *Note-1 |
| 5 | LG-205 a,b | ST-205 a,b | ST-205 a,b Level | ST-205 a,b | *1400 | mm | Level Gauge | Glass Tube | *Note-1 |
| 1 | FT-201 | CY-201 | Flow Transmitter in Co2 to R-201 a,b Line | CY-201 Header | 0-50 | Kg/Hr | Mass flow transmitter | Ctrl. Panel | |
| | FIC-201 | CY-201 | Flow Indicating Controller for CY-201 | CY-201 Header | | Kg/Hr | flow Ind. controller | pneumatic | |
| | FCV-201 | CY-201 | Co2 Flow Control Valve to R-201 a,b | CY-201 Header | 0 - 100 | % | Control Valve | | |
| 2 | FT-202 | ST-205 a,b | Flow Transmitter for Filtrate to R-301a Line | P-206 a,b | 0-500 | Kg/Hr | Mass flow transmitter | | |
| | FIC-202 | ST-205 a,b | Flow Indicating Controller for P-206 a,b Outlet Line | P-206 a,b | | Kg/Hr | flow Ind. controller | Ctrl. Panel | |
| | FCV-202 | ST-205 a,b | Filtrate Flow Control Valve to R-301a | P-206 a,b | 0 - 100 | % | Control Valve | pneumatic | |



Project:
Client:
Location:
Unit: Section-200

Instrument Index

Prepared By: GSS Checked By: KK & Approved By:

Date:
Doc. No.:
Revision No.: Rev. 0



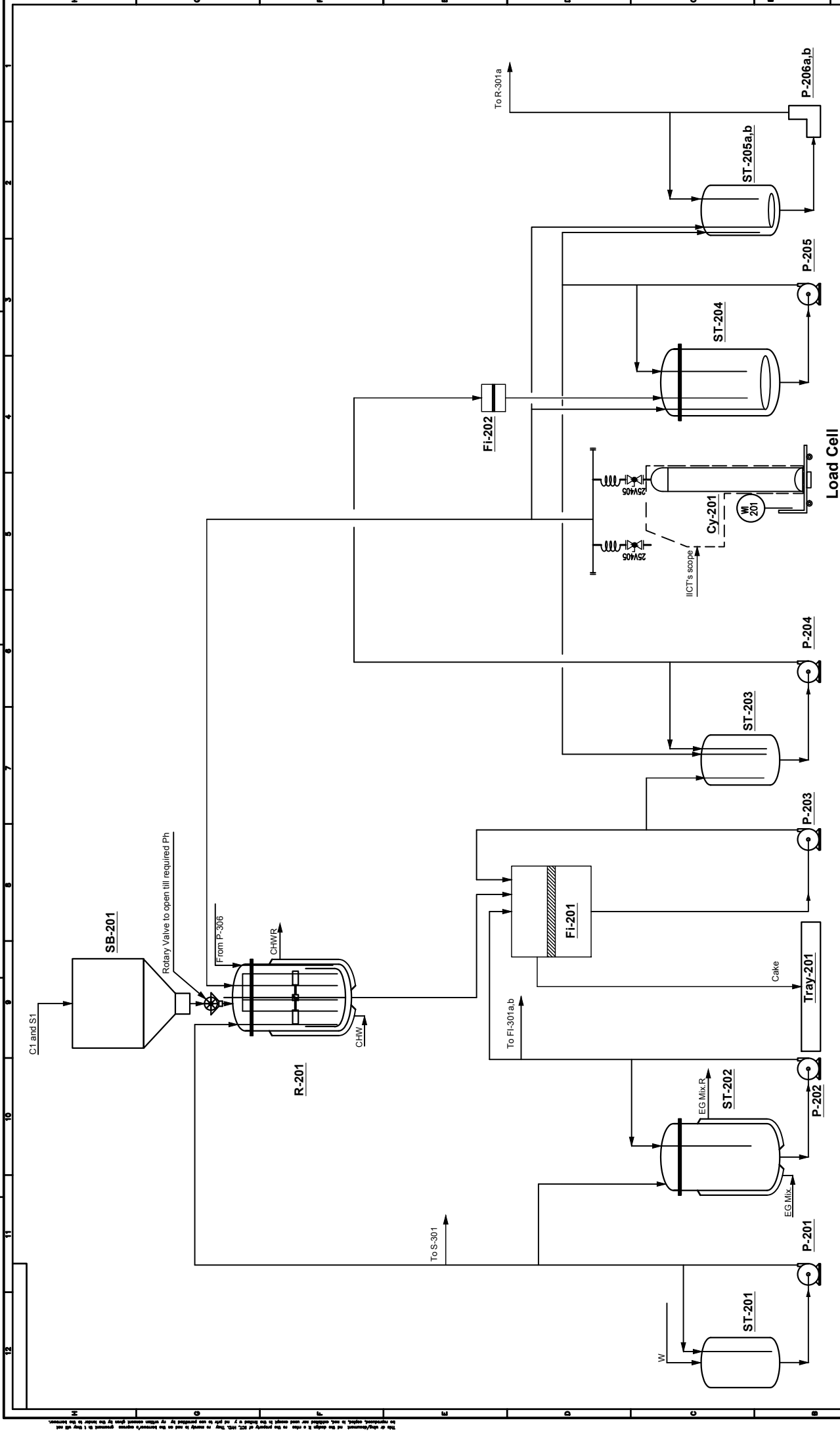
| S.No | Tag No. | Equipment Name | Service | Location | Range | Units | Description | Type | Remarks |
|------|-------------|----------------|--------------------------------|------------|-------|-------|----------------------|-------------|----------|
| 1 | VFD-201 | R-201 | R-201 RPM controller | R-201 | 0-100 | % | Variable freq. Drive | Electronic | * Note-2 |
| 1 | pHE-201 | R-201 | R-201 pH Element/Sensor | R-201 | 1-14 | | pH Element/Sensor | | |
| | pHI-201 | R-201 | R-201 pH Indicating Controller | R-201 | 1-14 | | pH ind. Controller | Ctrl. Panel | |
| 2 | pHE-202 | ST-203 | ST-203 pH Element/Sensor | ST-203 | 1-14 | | pH Element/Sensor | | |
| | pHI-202 | ST-203 | ST-203 pH indicator | ST-203 | 1-14 | | pH indicator | Ctrl. Panel | |
| 3 | pHE-203 | ST-204 | ST-204 pH Element/Sensor | ST-204 | 1-14 | | pH Element/Sensor | | |
| | pHI-203 | ST-204 | ST-204 pH indicator | ST-204 | 1-14 | | pH indicator | Ctrl. Panel | |
| 4 | pHE-204 a,b | ST-205 a,b | ST-205 a,b pH Element/Sensor | ST-205 a,b | 1-14 | | pH Element/Sensor | | |
| | pHI-204 a,b | ST-205 a,b | ST-205 a,b pH indicator | ST-205 a,b | 1-14 | | pH indicator | Ctrl. Panel | |
| 1 | P-201 | ST-201 | Transfer Pump | ST-201 | 100 | LPM | Transfer Pump | | |
| 2 | P-202 | ST-202 | Transfer Pump | ST-202 | 50 | LPM | Transfer Pump | | |
| 3 | P-203 | Fi-201 | Transfer Pump | Fi-201 | 100 | LPM | Transfer Pump | | |
| 4 | P-204 | ST-203 | Transfer Pump | ST-203 | 100 | LPM | Transfer Pump | | |
| 5 | P-205 | ST-204 | Transfer Pump | ST-204 | 100 | LPM | Transfer Pump | | |
| 6 | P-206 a,b | ST-205 a,b | Metering Pump | ST-205 a,b | 50 | LPM | Metering Pump | | |
| 1 | WI-201 | CY-201 | Weight Indicator | CY-201 | | kg | Indicator | Ctrl. Panel | |

*Note-1: Vendor has To be verified with equipment fabrication drawing.

*Note-2: Required RPM Display at Control Panel for VFDs.

Annexure II

PFDs AND P & I DRAWINGS



DO NOT SCALE

DESIGN & ENGINEERING DIVISION
CSIR-INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDRABAD - 500 007

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 1)
 CLIENT : In-House
 LOCATION : IIC Hyderabad
 All dimensions in mm unless specified

PROJECT CODE : --
 CAPACITY : 125 Kg/Day

PROCESS FLOW DIAGRAM
 (Section - 200)

| DESIGN | PREP. RED. | VER./CHD. |
|--------|----------------|-------------------|
| SC. LE | SOFT COPY REF. | DWG./DOC./SK. No. |
| NTS | CD/FP FOLDER | FILE |
| | 3 | |

APPROVED
 SHEET
 1 of 2
 REV 0

LEGEND

| S/No | EQPT. No. | Description | S/No | EQPT. No. | Description | S/No | EQPT. No. | Description |
|------|-----------|-------------------|------|-----------|-----------------------|------|-----------|---------------|
| 01 | ST-201 | Centrifuge | 13 | ST-203 | Wt. Collection Tank | 25 | FI-201 | Filter |
| 02 | FI-201 | Filter | 14 | ST-202 | EG Preparation Tank | 26 | ST-203 | Storage Tank |
| 03 | P-201 | V. Transfer Pump | 15 | ST-204 | EG Preparation Vessel | 27 | ST-204 | Storage Tank |
| 04 | P-202 | EG Mixer | 16 | ST-205a | EG Preparation Tank | 28 | ST-205a,b | Storage Tanks |
| 05 | P-203 | Wt. Transfer Pump | 17 | ST-205b | EG Preparation Tank | 29 | ST-205a,b | Storage Tanks |
| 06 | P-204 | Wt. Transfer Pump | 18 | ST-205a | EG Preparation Tank | 30 | ST-205a,b | Storage Tanks |
| 07 | P-205 | Wt. Transfer Pump | 19 | ST-205b | EG Preparation Tank | 31 | ST-205a,b | Storage Tanks |
| 08 | P-206a | Wt. Transfer Pump | 20 | ST-205a | EG Preparation Tank | 32 | ST-205a,b | Storage Tanks |
| 09 | P-206b | Wt. Transfer Pump | 21 | ST-205b | EG Preparation Tank | 33 | ST-205a,b | Storage Tanks |
| 10 | RV-201 | Rotary Valve | 22 | ST-205a | EG Preparation Tank | 34 | ST-205a,b | Storage Tanks |
| 11 | ST-201 | Storage Tank | 23 | ST-205b | EG Preparation Tank | 35 | ST-205a,b | Storage Tanks |
| 12 | ST-201 | Storage Tank | 24 | ST-205a | EG Preparation Tank | 36 | ST-205a,b | Storage Tanks |

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DRG. NO. : - : -

Note:-

* II solids discharging to be provided with motorised Rotary valves system
** II solids are transferred through conveyor systems from inlet materi to product materi
*** approximate level of the equipment bottom given from structure estimation
**** dead weight of 1 ton per sq.m can be assumed apart from the equipments while design platforms, staircase etc.

Valve Coding considered:-
25V405 - 25 is Line Siz. V Valve and 405 is ss316 ball Valve (flanged).
25V407 - 25 is Line Siz. V Valve and 407 is ss316 flush bottom Valve.
25V426 - 25 is Line Siz. V Valve and 426 is ss316 ball Valve (screwed).
25V402 - 25 is Line Siz. V Valve and 402 is ss316 non return Valve (flanged).
25V215 - 25 is Line Siz. V Valve and 215 is cs ball Valve (flanged).
25V216 - 25 is Line Siz. V Valve and 216 is cs ball Valve (screwed).
25V203 - 25 is Line Siz. V Valve and 203 is cs g te Valve (flanged).

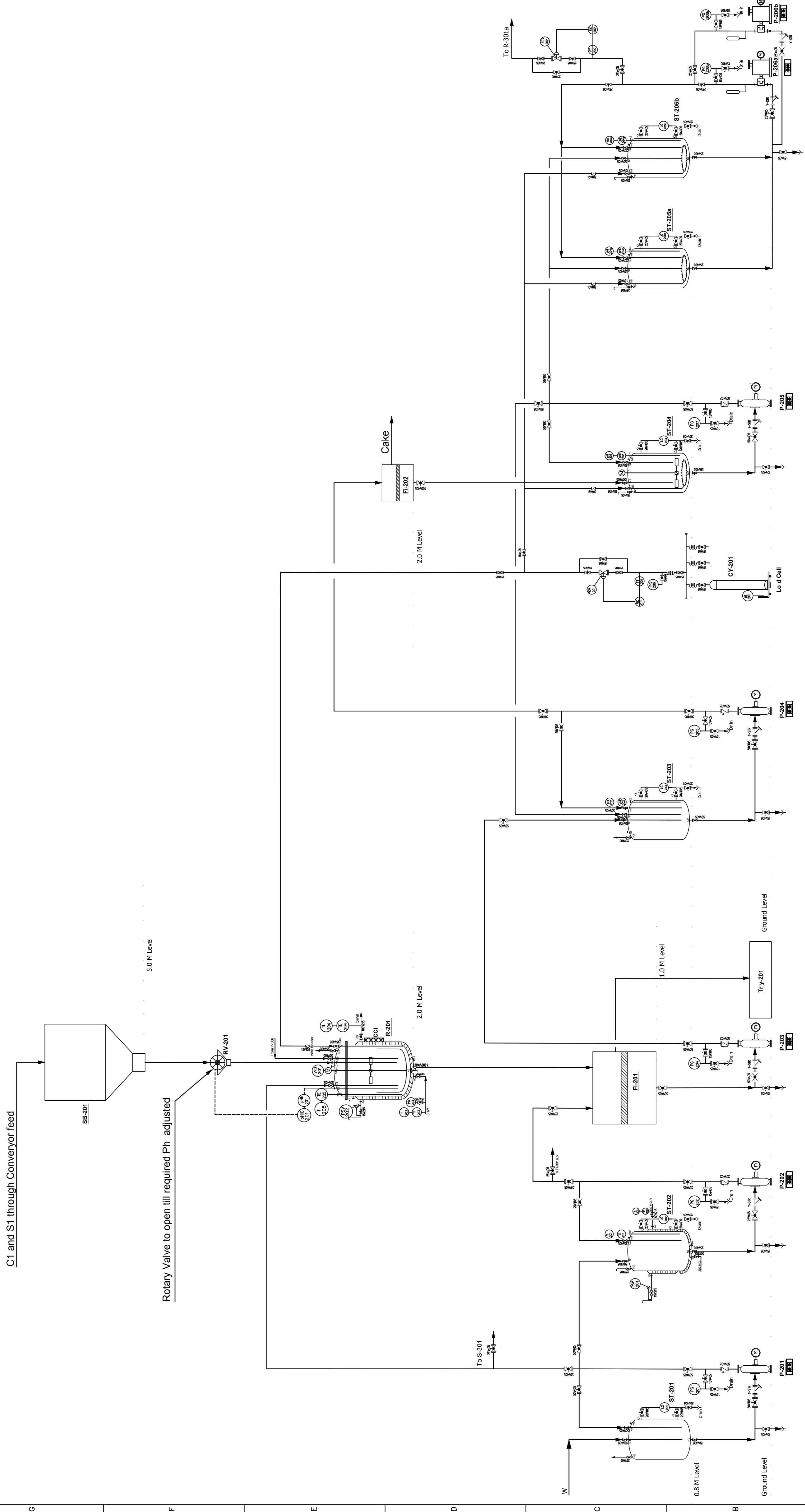


Table with 4 columns: INSTRUMENTS, PIPING SYMBOLS (VALVES), CONTROL VALVES, and LEGEND. It lists symbols and their corresponding descriptions for various process parameters and equipment types.

Table with 5 columns: S.No., Equipment No., Description, and S.No., Equipment No., Description. It provides a detailed list of equipment used in the process, including pumps, tanks, vessels, and instruments.

DO NOT SCALE
DESIGN & ENGINEERING DIVISION
CSIR-INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDERABAD - 500 007
PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 1)
CLIENT : In-House
LOC. TION : IIC T, Hyderabad
UNLESS SPECIFIED
P&ID DIAGRAM
(Section - 200)

Table with 3 columns: APPROVED, SHEET, and REV. It includes fields for 'PREP RED', 'SOFT COPY REF', 'CD/PP FOLDER', and 'FILE', along with 'SC LE', 'DESIGN', 'REFERENCES', 'NTS', and 'REV' information.

TENDER DOCUMENT

For

Pilot Plant Facility for Bulk Chemical of 5Kg/h Capacity- Step II



Prepared by

CSIR- INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY

(Council of Scientific & Industrial Research)

HYDERABAD - 500 007

October 2023

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1.0 BID INVITATION

CSIR-Indian Institute of Chemical Technology (IICT), Hyderabad has taken up a project to set-up **Pilot plant facility for bulk chemical of 5 kg/h capacity-Step II**. This facility is intended for R & D studies at CSIR-IICT, Hyderabad.

The information on general features of Pilot plant facility, its location, time frame and scope of contract is appended herewith.

CSIR-IICT invites bids from reputed turnkey contractors for procurement, fabrication, erection, testing and mechanical commissioning of the Continuous Pilot plant facility consisting mainly of the following type of equipment: Reactors, Stirred Vessels, Storage Tanks, Separators, Condensers, Pumps along with interconnecting Tubing / Piping / associated Instrumentation and Electricals etc. This step shall be mounted / assembled on separate skids. The facility will be located in IICT-Moulaali premises, Hyderabad.

GENERAL FEATURES OF THE PILOT PLANT FACILITY

The Pilot plant facility is designed for Semi-Continuous operation. The process equipment are reactors, stirred vessels, storages, separators, filters, condensers etc. with required utilities. Necessary instrumentation to measure and control the process parameters like temperature, pressure, pH and level are to be provided as shown in P&IDs, Instruments list.

PILOT PLANT FACILITY LOCATION

The Pilot plant facility will be located at PPC, Moulaali, CSIR-IICT, Hyderabad (Telangana).

CIVIL AND STRUCTURAL WORKS

The facility shall be housed in a shed. The equipments are to be supported on separate steel structure/ skids with operating platforms wherever necessary. The contractor shall provide the civil foundations for equipment and structure if required. Turnkey contractor shall provide equipment arrangement drawings (plan and elevation) and skid details for approval prior to assembly.

ELECTRICALS / INSTRUMENTATION

CSIR-IICT will provide power supply at 440 V (3-phase) and 230 V (single-phase), 50 Hz. The MCC Panel, wiring from the MCC Panel to the individual consumer units is under the scope of the Turnkey Contractor. Earthing of equipments, earth pit, cabling for instrumentation / panel mounted instruments and the electrical and instrument panels are in the scope of Turnkey contractor and to be suitably located near the skid.

TIME FRAME / DELIVERY PERIOD

The turnkey job is to be executed by the contractor in a period of 8-12 weeks from the date of award of the contract (contractor should submit time schedule for execution of the project along with the offer).

SUBMISSION OF TENDERS

The bid is invited for single contract for the entire Pilot plant facility comprising procurement, fabrication, erection, testing and mechanical commissioning as a turnkey job as per the scope of work given in Annexure I and II.

You are requested to send your offer in two parts. Part - 1 consisting of technical offer and Part - 2 consisting of financial offer along with terms and conditions including validity. You are also requested to provide the following additional particulars along with the offer.

Part - 1:

- a) The infrastructure available with your company in terms of trained manpower for procurement, inspection, installation etc.
- b) The list of such jobs executed during the last five years with the addresses of locations and the value of contract.
- c) Profile of your company with annual turnover, number of employees, number of projects executed etc.
- d) Details of time schedule to complete the job in 12-16 weeks.

Part - 2:

The financial offer for the turnkey contract should be given for the Turnkey pilot plant facility which includes the following:

- i) Fabricated equipment and vendor equipment
- ii) Instrumentation
- iii) Tubing/ piping and valves, fittings
- iv) Electrical
- v) Erection
- vi) Commissioning and service charges

2.0 GENERAL TERMS AND REQUIREMENTS FOR TURNKEY PROJECT BID

Unless modified or cancelled in writing by a Purchase Order Amendment the following conditions will govern the purchase order.

OBLIGATION

The obligation under this agreement as per the scope of work is to be fulfilled entirely by the Turnkey Contractor. All the information provided is confidential and all the bidders shall enter into a secrecy agreement with IICT.

CONTRACTUAL DELIVERY DATE

Contractual delivery date for completion of the Turnkey Project is 12-16 weeks from the date of award of Purchase Order.

WORKMANSHIP

It is a condition of the agreement (in addition to all conditions and warranties, implied by law) that the said Turnkey project shall conform to the description and specifications here in provided, shall be now, of good workmanship, merchantable and adaptable for the purpose to which they are intended and free from any defects and that their sale or use does not infringe any Indian patent, registered design, trade-mark or trade name.

ACTIVITY SCHEDULE

The Turnkey Contractor shall submit to Purchaser in the bid an activity schedule for execution of the order identifying delivery dates. Such scheduling shall in no way relieve the Turnkey Contractor of the time and delivery obligations under the terms of the order.

INSPECTION

All equipment, materials covered by the Purchase Order shall be subject to inspection and testing prior to dispatch by IICT, without which no equipment shall be dispatched to site by the Turnkey Contractor. IICT will make final inspection after arrival at the place of delivery, for quality workmanship and specifications according to methods devised. At all reasonable times and places before, during and after manufacture, the Turnkey Contractor on prior notice shall grant free access to Purchaser all parts of vendor's and his sub-vendor's works involved in the manufacturing and processing of Turnkey Project under this Purchase Order. (Turnkey Contractor to physically visit the site before proceeding and to take care of road permits etc.)

The Turnkey Contractor shall give the Purchaser at least 3 days notice of the availability of equipment/Material for inspection of quantity/quality/specifications so as to enable the Purchaser, if he so chooses, to inspect the same before dispatch and shall specify the place and period during which inspection can be made. Within 2 days of receipt of notice mentioned here in above, the Purchaser shall inform the Turnkey Contractor whether or

not it shall inspect the Turnkey Project. Local hospitality to be provided by Turnkey contractor for the IICT team visiting works for inspection.

- a) All tests mechanical and others and particularly those required by codes shall be performed at the Turnkey Contractor's expenses when such tests are performed.
- b) The Turnkey Contractor shall bear the expenses concerning tests required by all statutory agencies.

Before dispatch, the equipment/material shall be checked and stamped by Purchaser/Inspector/Inspector of Turnkey Contractor.

Even if the inspections and tests are fully carried out, Turnkey Contractor would not be absolved from his responsibility in ensuring that all equipments and materials supplied comply strictly with requirements as per agreement during manufacture, at the time of delivery and inspection, on arrival at site and after its erection or start up and Warranty period as stipulated in the Purchase Order.

ENGINEERING FACILITIES

Tools and tackles for erection is the responsibility of the Turnkey Contractor. Turnkey Contractor is also responsible for receipt, storage and issue of all materials.

INDEMINITY

The Turnkey Contractor shall indemnify, protect, defend and hold the Purchaser harmless from any and all claims, actions and proceedings arising from any right or title pertaining to the Turnkey Project supplied by the Turnkey Contractor.

WARRANTY

- a) The Turnkey Contractor shall Warranty that all items supplied under the Purchase Order strictly comply with characteristics, requirements and specifications referred to there in, that the materials used are new and free from latent/patent defects, and that fabrication is carried out in accordance with best engineering practice and with most up to date techniques.
- b) In the event any defects or deficiencies are found in the Turnkey Project, which are ascribable to the non-compliance with characteristics, specifications and requirements stated in the Purchase Order shall be conveyed, **within 12 months from the date of mechanical commissioning**. The Turnkey Contractor shall provide at his cost, expense and care for any repairs/replacement of such defective or deficient Turnkey project in the shortest possible time.
- c) In case of modification and/or repairs, the Turnkey Contractor shall obtain the Purchaser's prior approval before carrying them out. The Warranty for the part replaced shall be for 12 months starting from the date of replacement. Should the Turnkey project notwithstanding such modification and/or repairs, still fail to

comply with requirements they shall be replaced at the suppliers/vendors cost/expense and care in accordance with the schedule to be agreed upon.

- d) If defects are found and the Turnkey Contractor fails to replace, modify or repair the defective Turnkey project within the time required by the Purchaser, the Purchaser shall effect such modifications, replacement and repairs and all expenses for such modifications/repairs will be charged to the Turnkey Contractor. Notwithstanding such modifications/repairs, the Turnkey Contractor shall remain responsible for the Warranty under the Purchase Order.
- e) The Turnkey Contractor shall provide catalogues, installation, operation and maintenance manuals and any other technical information for all the bought out / vendor items.
- f) The Turnkey Contractor can take any counter Warranty from vendors of bought out items. However, it is the responsibility of Turnkey Contractor to provide Warranty to IICT for all bought out items on his own.

LIABILITY AGREEMENT

The Turnkey Contractor shall indemnify the Purchaser from all claims for injury that may be caused to any person by an act of the Turnkey Contractor or his agents or servants, whether employed by him or not while in or upon the Purchaser's premises and in respect of any other damages that may be caused to any plant, machinery or property of the Purchaser in the course of deliver of the materials and/or works.

TURNKEY CONTRACTOR'S SPECIALIST

The Turnkey Contractor shall provide the services of the specialists for erection/testing and commissioning of Turnkey project supplied by the Turnkey Contractor at the terms and conditions stated in the Purchase Order.

SUPPLIER'S LIABILITY

The receipt of the equipment/material within Purchaser's premises shall not discharge the Turnkey Contractor from liability for damages or other legal remedy for any breach of any conditions or warranty contained herein or implied by law, if after receiving equipment/material any discrepancies or defects therein, either in material, workmanship, or otherwise become known to the Purchaser and such defects amount to a breach of any condition or warranty here under are implied by law. The Purchaser shall as soon as it comes within his knowledge, notify the Turnkey Contractor of such defects and shall, in addition to any other rights or remedies that the Purchaser may possess by entitled to reject the defective materials and/or work.

SUPPLIER'S/VENDER'S DRAWINGS AND DATA REQUIREMENTS

The submission of drawing data and documentation by the Turnkey Contractor to the Purchaser is an integral part of the order. The quantities and the time limits for

submitting the documentation by the Turnkey Contractor shall be specified in the attachment to the Purchase Order. These quantities and time limits must be adhered to failing which the order will not be deemed to have been duly executed for all purposes and the Purchaser reserves the right to hold and/or deduct a suitable amount from payments due to the Turnkey Contractor.

TECHNICAL INFORMATION & CONFIDENTIALITY

- a) Drawings specifications and details given by the Purchaser shall be the property of the Purchaser and shall be returned by the Turnkey Contractor on demand. The Turnkey Contractor shall not make use of drawing and specifications for any other purposes at any time save and except for the purpose of the Purchaser.
- b) The Turnkey Contractor shall furnish to the Purchaser free of charge at the time of deliver, documentation which contains all necessary information as to the operation and maintenance of the equipment/material under the normal conditions. Such documentation shall be in English language and shall remain the exclusive property of the Turnkey Contractor and would not be used by the Purchaser for any other purpose than for which it was handed over to it nor shall it become the property of the Purchaser.
- c) It is here by agreed that the Purchaser and Turnkey Contractor respectively shall keep confidential all information, specifications drawings and shall not disclose such information unless when required statutorily and/or to any third party specifically permitted with assent of both parties subject always to the signing of essentially similar secrecy and non-use undertaking by such third party.
- d) Further the Purchaser and Turnkey Contractor shall also ensure that its employees shall comply with such confidentiality undertaking.

Annexure I

EQUIPMENT SUMMARY SHEET, EQUIPMENT SPECIFICATIONS AND INSTRUMENTS SUMMARY SHEET


EQUIPMENT SUMMARY SHEET

| S.No. | UNIT No. | No. Req. | DESIGNATION | OPERATING CONDITIONS | | CAPACITY | | HEAT TRANSFER AREA (sq. cm.) | MAJOR DIMENSIONS (mm) | M.O.C. | RATING HP | INSULATION | REMARKS | R |
|-------|------------------------------------|----------|-------------------------|----------------------|-------------------|-------------|-----------|------------------------------|---------------------------------|----------|-----------|------------|--|----|
| | | | | TEMP. °C | PRESSURE kg/sq.cm | VESSLS Lit. | PUMPS lpm | | | | | | | |
| 01 | Cr-301 a,b | 2 | Crystallisers | 5 | Atm. | 400 | - | - | 700 DIA X 910/800 DIA X 725 | SS316/CS | 1.0 | CCI | | 1 |
| 02 | D-301 | 1 | Tray Dryer | 100 | 100 mm Hg | - | - | - | - | CS/SS316 | - | - | No. of trays 12, Tray Capacity 10 Lit. Dimensions (lxbxh)=620x520x35 | 2 |
| 03 | Fi-301 a,b | 2 | Centrifuge | 5-25 | Atm. | 25 kg | - | - | - | SS 316 | - | - | Pore Size 80 microns Feed Composition 7% Solid and 93% Liquid. | 3 |
| 04 | Fi-302 | 1 | Centrifuge | 25-30 | Atm. | 10 kgs | - | - | - | SS 316 | - | - | Pore Size 2 microns Feed Composition 1% Solid and 99% Liquid. | 4 |
| 05 | P-301 a,b | 2 | Crystalliser Feed Pumps | 40-60 | Atm. | - | 180 LPH | - | - | SS 316 | 1.0 | - | | 5 |
| 06 | P-302 a,b | 2 | L Transfer Pumps | 20-30 | Atm. | - | 3000 LPH | - | - | SS 316 | 1.0 | - | | 6 |
| 07 | P-303 | 1 | L Transfer Pump | 20-30 | Atm. | - | 3000 LPH | - | - | SS 316 | 1.0 | - | | 7 |
| 08 | P-304 | 1 | L Transfer Pump | 20-30 | Atm. | - | 3000 LPH | - | - | SS 316 | 1.0 | - | | 8 |
| 09 | P-305 | 1 | CL Transfer Pump | 20-30 | Atm. | - | 3000 LPH | - | - | SS 316 | 1.0 | - | | 9 |
| 10 | P-306 | 1 | RF Transfer Pump | 20-30 | Atm. | - | 3000 LPH | - | - | SS 316 | 1.0 | - | | 10 |
| 11 | R-301 a,b,c | 3 | DP Reactor | 70-75 | Atm. | 160 | - | - | 500 DIA X 725/600 DIA X 580 | SS316/CS | 1.0 | HCI | pH - 7.5 to 8.5 | 11 |
| 12 | S-301 | 1 | Settling Tank | 25-30 | Atm. | 1250 | - | - | 800 DIA X 2350 | SS316 | - | - | | 12 |
| 13 | ST-301 a,b | 2 | DP Collection Tanks | 50-70 | Atm. | 1250 | - | - | 1000 DIA X 1400/1100 DIA X 1120 | SS316/CS | - | - | pH - 7.5 to 8.5 | 13 |
| 14 | ST-302 | 1 | L Preparation Vessel | 20-25 | Atm. | 1250 | - | - | 1000 DIA X 1400 | SS316 | - | - | pH - 7.5 to 8.5 | 14 |
| 15 | ST-303 | 1 | L Collection Tank | 20-30 | Atm. | 1250 | - | - | 1000 DIA X 1400 | SS316 | - | - | | 15 |
| 16 | ST-304 | 1 | P Collection Tank | 20-30 | Atm. | 160 | - | - | 500 DIA X 725 | SS316 | - | - | | 16 |
| 17 | ST-305 | 1 | RF Collection Tank | 20-30 | Atm. | 1250 | - | - | 1000 DIA X 1400 | SS316 | - | - | | 17 |
| 18 | | | | | | | | | | | | | | 18 |
| 19 | | | | | | | | | | | | | | 19 |
| 20 | | | | | | | | | | | | | | 20 |
| 21 | Notes : 1. VTS = Vendor to Specify | | | | | | | | | | | | | 21 |
| 22 | | | | | | | | | | | | | | 22 |
| 23 | | | | | | | | | | | | | | 23 |

VTS = Vendor to Specify

NOTES : HCI = HEAT CONSERVATIVE INSULATION ; CCI = COLD CONSERVATIVE INSULATION ; PPI = PERSONEL PROTECTION INSULATION ;

VTS = Vendor to Specify



DESIGN & ENGINEERING DIVISION
CSIR-INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDERABAD - 500 007

| | | | |
|--|------------|----------------------|----------------|
| PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 2) | | CLIENT : - | |
| LOCATION : - | | CAPACITY : 0.125 TPD | |
| TITLE: EQUIPMENT LIST - (SECTION 300) | | | |
| MR/SAK | - | PREPARED | VER/CHD |
| DESIGN | REFERENCES | SOFT COPY REF | DWG/DOC/SK No. |
| SCALE | | CD/FP | FILE |
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CRYSTALLIZER SPECIFICATION DATA SHEET

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- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 2)

PROJECT CODE : -

CLIENT : -

CAPACITY : 0.125 TPD

LOCATION : -

-

| | | | | | | |
|------|---|--------------------------------------|---------------------|--|---|---|
| GEN. | 1 | Unit No. : Cr-301 a,b | Dwg. No.: - | Code : ASME Sec. VIII Div. I | R | 1 |
| | 2 | Title : Crystalliser | Nos. required : Two | Type : Vertical, Cylindrical & Flanged | | 2 |
| | 3 | Service : To Crystallise C5 Solution | | | | 3 |
| | 4 | Nominal Capacity : lit. : 400 lit. | | | | 4 |
| | | | | | | 5 |

| | | | | | | |
|--------------|--------------------|-----------------------------|--------------------|----------------------|-----------------------|----|
| PROCESS DATA | 1 | OPERATION : | Batch / Continuous | Batch Time : hrs :- | Working Hours/Day : - | 6 |
| | | | SHELL | JACKET | DOUBLE COIL | 7 |
| | 2 | Material Handled : | Water + C5 | Ethylene Glycol Mix. | | 8 |
| | 3 | Operation : | Continuous | Continuous | | 9 |
| | 4 | Feed Quantity Total : | kg/hr | 87.074 | 1670 | 10 |
| | 5 | Solid/Liquid/Gas: | kg/hr | -/87.074/- | -/-/- | 11 |
| | 6 | Discharge Quantity Total : | kg/hr | 87.074 | 1670 | 12 |
| | 7 | Solid/Liquid/Gas: | kg/hr | 58/81/- | -/-/- | 13 |
| | 8 | Operating Temp.:Nor./Max.: | °C | 4/5 | -3/2 | 14 |
| | 9 | Operating Press.:Nor./Max.: | kg/sq.cm.-g/¢ | Atm. | 4.0 | 15 |
| | 10 | Density : at 25 °C | kg/cu.m. | 1050 | 1000 | 16 |
| | 11 | Viscosity : at 25 °C | cP | 1 | 1 | 17 |
| | 12 | pH : | | 8 | - | 18 |
| | 13 | Pressure Drop : | kg/sq.cm. | - | - | 19 |
| 14 | Hazard Condition : | | - | | 20 | |
| | | | | | | 21 |

| | | | | | | | |
|----------|----------|--------------------|--------|-----------------------|--------------|------------------------|----|
| INTERALS | 1 | Agitator Type : | Anchor | Shaft Dia : | 25 mm | 22 | |
| | 2 | | mm | Impeller Dia. : | 600 | No. of Impellers : One | 23 |
| | 3 | | mm | Height from bottom: | 50 | Speed : RPM : 50 | 24 |
| | 4 | Coil : 2 Nos. | mm | Tube Dia. : | - | BWG / Sch. : - | 25 |
| | 5 | | mm | Pitch : - | | No. of Turns : - | 26 |
| | 6 | | mm | Coil Helix Dia. : | - | Height from bottom : - | 27 |
| | 7 | Baffles : | mm | Nos. : - | | Type : - | 28 |
| | 8 | | mm | Height : - | | Width : - | 29 |
| | 9 | | mm | Thk. : - | | | 30 |
| | 10 | Feed Arrangement : | | Type : - | Dia. : - | Length : - | 31 |
| | | | | Spray Nozzle Dia. : - | Pitch : - | Others : - | 32 |
| | 11 | Shaft : | | Dia. : 25 mm | Length : VTS | | 33 |
| 12 | Others : | | - | | | 34 | |

| | | | | | | | | | | |
|--------------|--------------|-------------------|---------------|--------------|----------------|------------|------------|-------|---------|----|
| CONSTRUCTION | | | SHELL | | JACKET | | COIL | | 35 | |
| | 1 | Temperature : | °C | Dgn: 30 | Test: Amb. | Dgn: 15 | Test: Amb. | Dgn: | Test: | 36 |
| | 2 | Pressure : | kg/sq.cm.-g/¢ | Dgn: 1.2 | Test: 6.0 ext. | Dgn: 4.4 | Test: 6.0 | Dgn: | Test: | 37 |
| | 3 | Diameter : | mm | 14.4 ext. | I.D.: 700 | O.D.: - | I.D.: 800 | O.D.: | H.Dia.: | 38 |
| | 4 | Straight Length : | mm | 910 | | 725 | | | | 39 |
| | 5 | Thk. : | mm | 6 MM | | 6 MM | | | | 40 |
| | 6 | Shell Ends : | Top | Type : Tori. | Thk. : 6 MM | K.R. : 10% | SF : 50 | | | 41 |
| | | Bottom | Type : Tori. | Thk. : 6 MM | K.R. : 10% | SF : 50 | | | 42 | |
| 7 | Jacket end : | Bottom | Type : Tori. | Thk. : 6 MM | K.R. : 10% | SF : 50 | | | 43 | |

| | | | | | | | | | | | | | | | | |
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| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
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| | | | | | | | |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|

| | | | | | | | |
|------------|------------|---------------|----------------------------|------------|----------------------------|--------|-------|
| CLEARANCES | | | | | | | |
| MR | MR | 19.07.23 | MR/SAK | TPK/MR/SAK | | | |
| DESIGN | PREPARED | VER/CHD | APPROVED | | | | |
| SCALE | REFERENCES | SOFT COPY REF | DWG/DOC/SK- No. | SHEET | | | |
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CRYSTALLIZER SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 2)

PROJECT CODE : -

CLIENT : -

CAPACITY : 0.125 TPD

LOCATION : -

-

| | | Unit No. : Cr-301 a,b | | | | | Title : Crystalliser | | | R |
|----|--------------------------------|---|--------|-----------|--|-------|----------------------|----|----|---|
| | | SHELL | | JACKET | | COIL | | | 1 | |
| 8 | Corrosion Allowance : | - | | - | | | | | 2 | |
| 9 | Supports : | Type: - | No.: - | Type: LEG | No.: 4 Nos. | Type: | No.: | 3 | | |
| 10 | Material Of Construction | Shell : SA-240 SS 316 | | | Jacket : CS A 285 Gr. C | | | 4 | | |
| | | Shell Ends : SA-240 SS 316 | | | Jacket Ends : CS A 285 Gr. C | | | 5 | | |
| | | Coil : - | | | Supports : CS A-75/IS:226 | | | 6 | | |
| | | Shaft : SA-479 SS 316 | | | Feed Arrangement : SS 316 | | | 7 | | |
| | | Agitator : SA 240 SS 316 | | | External Bolting : CS to IS 1364 | | | 8 | | |
| | | Baffle :- | | | Internal Bolting : SS 316 | | | 9 | | |
| | | Dip Pipe : SA-312 TP 316 | | | Gaskets : PTFE | | | 10 | | |
| | | Shell Flanges : - | | | Sparger : - | | | 11 | | |
| 11 | Heat Treatment : | Insulation : HCl / CCl / PPI - CCl | | | Thk. : 100 mm (Mineral Wool) | | | 12 | | |
| 12 | Tests : | Stress Relieving : - | | | Others : - | | | 13 | | |
| 13 | Insulation : | Hydraulic / Pneumatic : | | | Dye-Penetrant : - | | | 14 | | |
| 14 | Painting / Finish : | Radiograph : - | | | Others : - | | | 15 | | |
| 15 | Weight : kg | Type : Mineral Wool | | | Thk. : 100 mm | | | 16 | | |
| 16 | Drive Details : | All CS parts to be painted with two coats of red oxide primer | | | | | | 17 | | |
| 17 | Shaft Seal : | Empty : 360 | | | Full of Water : 930 | | | 18 | | |
| | | Motor : Electric, VFD | | | H.P. : 1.0 | | | 19 | | |
| | | Power Supply : VTS | | | R.P.M. : Shaft RPM is 90, Motor RPM is VTS | | | 20 | | |
| 18 | Inspection By : | IICT / CLIENT / Third Party - | | | Others : - | | | 21 | | |
| | | | | | | | | | 22 | |
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CONSTRUCTION DATA

NOTES

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| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------------------|------------|--|---------------------|-----------------|----------------------------|----------------------------|--------|-------------------|------------|----------|---|---|---|-------|---|---|
| | | All dimensions in mm, unless specified | DO NOT SCALE | | | | | | | | | | | | | |
| | | MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR | | | | | | | |
| CLEARANCES | | | | | | | | | | | | | | | | |
| MR | | MR | | 19.07.23 | | MR/SAK | | TPK/MR/SAK | | | | | | | | |
| DESIGN | | PREPARED | | | | VER/CHD | | | | APPROVED | | | | | | |
| SCALE | REFERENCES | SOFT COPY REF | | | | DWG/DOC/SK- No. | | | | SHEET | | | | REV 1 | | |
| | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED-01-07 00 XXX | | | | 2 OF 3 | | | | | | | |



CRYSTALLIZER SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 2)

PROJECT CODE : -

CLIENT : -

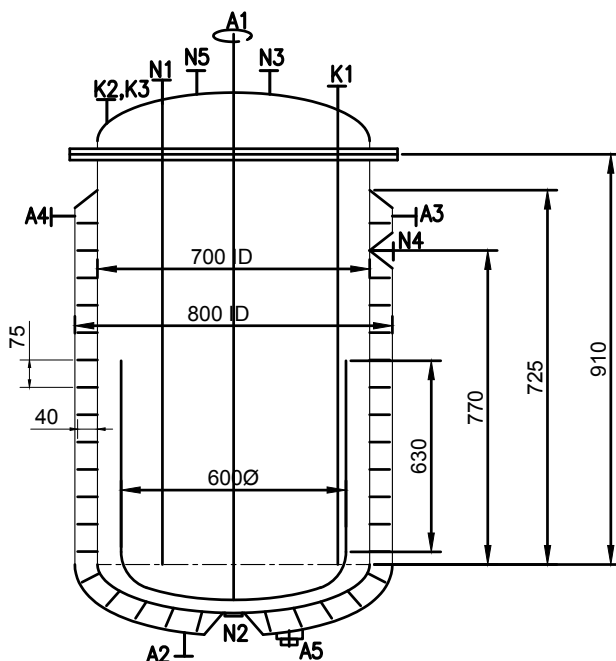
CAPACITY : 0.125 TPD

LOCATION : -

-

1 Unit No. : Cr-301 a,b

Title : Crystalliser



Spiral Jacker Details
Baffle Pitch = 50 mm

Impeller Details

No. of impellers = One
Type of impeller = Anchor
Impeller Dia. = 600 mm
Impeller Ht. = 630 mm
Blade Width x Thk = 630 mm x 70 mm
Ht. from Bot. Vessel to
Anchor = 50 mm

NOZZLE SCHEDULE

| NOZZLE MARK | SERVICE | NOZZLE DETAILS | | | | FLANGE DETAILS | | | | REMARKS | R |
|-------------|-------------------------|----------------|------|-----------|--------|----------------|--------|-------|--------|--------------------|----|
| | | SIZE NB(mm) | Sch. | Length mm | M.O.C. | STANDARD | RATING | TYPE | M.O.C. | | |
| N1 | Inlet from P-301 a,b | 50 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | Dipleg | 1 |
| N2 | Bottom Outlet | 50 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | Flush Bottom Valve | 2 |
| N3 | Vent | 25 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 3 |
| N4 | Overflow to Cr-301b | 80 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 4 |
| N5 | Spare | 25 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 5 |
| | | | | | | | | | | - | 6 |
| K1 | Thermowell | 20 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | Dipleg | 7 |
| K2, K3 | Light and Sight Glasses | 100 | VTS | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 8 |
| | | | | | | | | | | - | 9 |
| A1 | Stirrer | VTS | - | - | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 10 |
| A2 | Ethylene Glycol Inlet | 50 | 40 | 150 | CS | ANSI, B16.5 | #150 | SO,RF | CS | - | 11 |
| A3 | Ethylene Glycol Outlet | 50 | 40 | 100 | CS | ANSI, B16.5 | #150 | SO,RF | CS | - | 12 |
| A4 | Jacket Vent | 25 | 40 | 100 | CS | ANSI, B16.5 | #150 | SO,RF | CS | - | 13 |
| A5 | Jacket Drain (Plug) | 3/4" | - | - | CS | - | #3000 | - | - | Plug | 14 |
| | | | | | | | | | | - | 15 |
| | | | | | | | | | | - | 16 |
| | | | | | | | | | | - | 17 |

| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------|--------|-------------|----|-----|-----|------|------|--------------------------------|---|---|---|---|---|---|---|---|
| | | | | | | | | ISSUES / DISTRIBUTION / COPIES | | | | | | | | |

All dimensions in mm, unless specified

DO NOT SCALE

MECH ENGR PRCS ENGR INST ENGR ELECT ENGR CIVIL ENGR CLIENT CONSULTANT CONTRACTOR

CLEARANCES

DESIGN

PREPARED

VER/CHD

APPROVED

| SCALE | REFERENCES | SOFT COPY REF | | | DWG/DOC/SK-NO. | SHEET | REV |
|-------|------------|---------------|--------|------|----------------------------|--------|-----|
| | | CD/FP | FOLDER | FILE | | | |
| | | | | | DE-XXX-XXX-ED-01-07 00 XXX | 3 OF 3 | - |

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METERING PUMP SPECIFICATION DATA SHEET

Page
- of -

| | |
|--|----------------------|
| PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 2) | PROJECT CODE : - |
| CLIENT : - | CAPACITY : 0.125 TPD |
| LOCATION : - | R |

| | | | | | | | |
|--------------------------|--|---|---|-------------------|--------------------------|----------------------------|----|
| GEN. | 1 | Unit No. : P-301 a,b | Dwg. No.: - | Code : - | 1 | | |
| | 2 | Title : Crystalliser Feed Pumps | Type : Metering Pump | | 2 | | |
| | 3 | Service : To Transfer DP from ST-301 a,b to Cr-301a and Recirculation | | | | 3 | |
| | 4 | Normal Capacity : lph : 180 LPH | Nos. required (Total) : 2 | Working : 1 | Stand By : 1 | 4 | |
| PROCESS DATA | 1 | Fluid Handled : | DP | | | 5 | |
| | 2 | Capacity : | lpm | Normal : 2 | Maximum : 5 | Design : 5 | 6 |
| | 3 | Operating Temperature : | °C | Normal : 40 | Maximum : 60 | Design : 60 | 7 |
| | 4 | Operating Pressure : | kg/sq.cm.-g/a | Suction : Atm. | Discharge : 3.0 | | 8 |
| | 5 | Density at 30°C | kg/cu.m. | 1000 | | | 9 |
| | 6 | Viscosity at 30 | cP | - | | | 10 |
| | 7 | Vapour Pressure at °C - | mm Hg | - | | | 11 |
| | 8 | Nature of Fluid : | - | | | 12 | |
| | 9 | pH | | | | 13 | |
| | 10 | Suspended Solids : | Type : | % wt / Vol. : - | Avg. particle size:mic.: | - | 14 |
| | 11 | Dissolved Gases : | | | | 15 | |
| | 12 | Hazard Condition : | | | | 16 | |
| CONSTRUCTION DATA | 1 | Suction Details : | Condition : Flooded | | | 17 | |
| | | | - | | | 18 | |
| | 2 | Discharge Details : | Condition : Discharge to Cr-201a at Atm. Pressure | | | 19 | |
| | | | m of water | Head : 30.0 m | | 20 | |
| | 3 | Total Discharge Pressure : | kg/sq.cm.-g/a | 3.0 | | | 21 |
| | 4 | NPSH Available : | m of W.C. | VTS | | | 22 |
| | 5 | Material Of Construction | Casing : | SS 316 | | Seal : SS 316 | 23 |
| | | | Gears : | SS 316 | | Gasket : PTFE | 24 |
| | | | Shaft : | SS 316 | | Others : | 25 |
| | | | Bolting : | SS 316 | | All contact parts : SS 316 | 26 |
| | 6 | Nozzles | Suction | End Connection : | Flanged | Size NB (mm) : 50 | 27 |
| | | | | Pressure Rating : | 150# | Standard : ANSI, B 16.5 | 28 |
| Discharge | | | End Connection : | Flanged | Size NB (mm) : 50 | 29 | |
| | | | Pressure Rating : | 150# | Standard : ANSI, B 16.5 | 30 | |
| 7 | Drive Details : | Motor : | Electric | | H.P. : 1.0 | 31 | |
| | | Power Supply : | VTS | | | 32 | |
| | | R.P.M. : | 1440 | | | 33 | |
| 8 | Seal : | Type : | Stuffing Box | Seal Fluid : | VTS | 34 | |
| NOTES | 1 | Vendor shall supply 2 sets of all relevant catalogues, performance curves, dimensioned drawings and maintenance manuals and shall guarantee mechanical performance. | | | | 35 | |
| | | | | | | 36 | |
| | 2 | Vendor to indicate a list of recommended spare parts. | | | | 37 | |
| | 3 | Scope of supply shall include Pump, Motor, coupling & guard common base plate and foundation details. | | | | 38 | |
| | 4 | VTS : Vendor to specify. | | | | 39 | |
| | 5 | Stroke length to be adjustable through flow range. | | | | 40 | |
| | 6 | Pump shall operate at +/- 1% accuracy. | | | | 41 | |
| | 7 | All non contact parts should be coated with corrosion acid resistant paint. | | | | 42 | |
| 8 | Vendor shall indicate whether the suction conditions meet NPSH requirements. | | | | 43 | | |
| | | | | | 44 | | |
| | | | | | 45 | | |
| | | | | | 46 | | |

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| | | | | | | | | | | | | | | | | |
|--|------------|---------------|---------------------|------------|----------------|------------|------------|--------------------------------|----------|---|-------|---|---|---|---|---|
| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| | | | | | | | | ISSUES / DISTRIBUTION / COPIES | | | | | | | | |
| All dimensions in mm, unless specified | | | DO NOT SCALE | | | | | | | | | | | | | |
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR | | | | | | | | | |
| CLEARANCES | | | | | | | | | | | | | | | | |
| SAK | - | SAK | 07.04.15 | TPK/MR/SAK | - | SAK/MR/TPK | - | | | | | | | | | |
| DESIGN | | | PREPARED | | | VER/CHD | | | APPROVED | | | | | | | |
| SCALE | REFERENCES | SOFT COPY REF | | | DWG/DOC/SK No. | | | SHEET | | | REV 0 | | | | | |
| | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED | | | 1 of 1 | | | | | | | | |



CENTRIFUGAL PUMP SPECIFICATION DATA SHEET

Page
of

| | |
|--|----------------------|
| PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 2) | PROJECT CODE : - |
| CLIENT : - | CAPACITY : 0.125 TPD |
| LOCATION : - | R |

| | | | | | | | |
|-------------------|----|---|--|-------------------|-----------------------------|----------------------------|----|
| GEN. | 1 | Unit No. : P-302 a,b | Dwg. No. : - | Code : - | 1 | | |
| | 2 | Title : L Transfer Pump | Type : Centrifugal | | 2 | | |
| | 3 | Service : To Transfer Filtrate from Fi-301a,b to ST-302 and Recirculation | | | 3 | | |
| | 4 | Normal Capacity : 3000 LPH | Nos. required (Total) : 2 | Working : 1 | Stand By : 1 | 4 | |
| PROCESS DATA | 1 | Fluid Handled : | L | | | 5 | |
| | 2 | Capacity : | lpm | Normal : 35 | Maximum : 50 | Design : 50 | 6 |
| | 3 | Operating Temperature : | °C | Normal : 20 | Maximum : 30 | Design : 30 | 7 |
| | 4 | Operating Pressure : | kg/sq.cm.-g/a | Suction : Atm. | Discharge : 3.0 | | 8 |
| | 5 | Density at 30°C | kg/cu.m. | 1000 | | | 9 |
| | 6 | Viscosity at 30 | cP | - | | | 10 |
| | 7 | Vapour Pressure at °C - | mm Hg | - | | | 11 |
| | 8 | Nature of Fluid : | - | | | 12 | |
| | 9 | pH | - | | | 13 | |
| | 10 | Suspended Solids : | Type : - | % wt / Vol. : - | Avge. particle size:mic.: - | | 14 |
| | 11 | Dissolved Gases : | - | | | 15 | |
| | 12 | Hazard Condition : | - | | | 16 | |
| CONSTRUCTION DATA | 1 | Suction Details : | Condition : Flooded | | | 17 | |
| | 2 | Discharge Details : | Condition : Discharge to ST-205 at Atm. Pressure | | | 18 | |
| | 3 | Total Discharge Pressure : | kg/sq.cm.-g/a | = 3.0 | | 21 | |
| | 4 | NPSH Available : | m of W.C. | VTS | | 22 | |
| | 5 | Material Of Construction | Casing : | SS 316 | | Seal : - | 23 |
| | | | Gears : | - | | Gasket : PTFE | 24 |
| | | | Shaft : | SS 316 | | Others : | 25 |
| | | | Bolting : | SS 316 | | All contact parts : SS 316 | 26 |
| | 6 | Nozzles | Suction | End Connection : | Flanged | Size NB (mm) : 50 | 27 |
| | | | | Pressure Rating : | 150# | Standard : ANSI, B16.5 | 28 |
| | | | Discharge | End Connection : | Flanged | Size NB (mm) : 50 | 29 |
| | | | | Pressure Rating : | 150# | Standard : ANSI, B16.5 | 30 |
| | 7 | Drive Details : | Motor : | Electric | | H.P. : 1.0 | 31 |
| | | | Power Supply : | VTS | | | 32 |
| | | | R.P.M. : | 1440 | | | 33 |
| | 8 | Seal : | Type : | Stuffing Box | | Seal Fluid : VTS | 34 |
| NOTES | 1 | Vendor shall supply 2 sets of all relevant catalogues, performance curves, dimensioned drawings and maintenance manuals and shall guarantee mechanical performance. | | | | 35 | |
| | 2 | Vendor to indicate a list of recommended spare parts. | | | | 36 | |
| | 3 | Scope of supply shall include Pump, Motor, coupling & guard common base plate and foundation details. | | | | 37 | |
| | 4 | VTS : Vendor to specify. | | | | 38 | |
| | 5 | Stroke length to be adjustable through flow range. | | | | 39 | |
| | 6 | Pump shall operate at +/- 1% accuracy. | | | | 40 | |
| | 7 | All non contact parts should be coated with corrosion acid resistant paint. | | | | 41 | |
| | 8 | Vendor shall indicate whether the suction conditions meet NPSH requirements. | | | | 42 | |
| | | | | | | 43 | |
| | | | | | | 44 | |
| | | | | | | 45 | |
| | | | | | | 46 | |

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| | | | | | | | | | | | | | | | | | |
|--|------------|---------------|---------------------|------------|----------------|------------|------------|--------------------------------|----------|-------|---|---|---|---|---|---|--|
| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| | | | | | | | | ISSUES / DISTRIBUTION / COPIES | | | | | | | | | |
| All dimensions in mm, unless specified | | | DO NOT SCALE | | | | | | | | | | | | | | |
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR | | | | | | | | | | |
| CLEARANCES | | | | | | | | | | | | | | | | | |
| MR | - | MR | 19.07.23 | MR/SAK | - | TPK/MR/SAK | - | | | | | | | | | | |
| DESIGN | | | PREPARED | | | VER/CHD | | | APPROVED | | | | | | | | |
| SCALE | REFERENCES | SOFT COPY REF | | | DWG/DOC/SK No. | | | SHEET | | REV 0 | | | | | | | |
| | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED | | | 1 of 1 | | | | | | | | | |



CENTRIFUGAL PUMP SPECIFICATION DATA SHEET

Page
- of -

| | |
|--|----------------------|
| PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 2) | PROJECT CODE : - |
| CLIENT : - | CAPACITY : 0.125 TPD |
| LOCATION : - | R |

| | | | | | | |
|--------------------------|-----------------|---|--|--------------------------|----------------------------|----|
| GEN. | 1 | Unit No. : P-303 | Dwg. No. : - | Code : - | 1 | |
| | 2 | Title : L Transfer Pump | Type : Centrifugal | | 2 | |
| | 3 | Service : To Transfer Filtrate from ST-302 to ST-303 and Recirculation | | | | 3 |
| | 4 | Normal Capacity : 3000 LPH | Nos. required (Total) : 1 | Working : 1 | Stand By : 0 | 4 |
| PROCESS DATA | 1 | Fluid Handled : L | | | 5 | |
| | 2 | Capacity : lpm | Normal : 35 | Maximum : 50 | Design : 50 | 6 |
| | 3 | Operating Temperature : °C | Normal : 20 | Maximum : 30 | Design : 30 | 7 |
| | 4 | Operating Pressure : kg/sq.cm.-g/a | Suction : Atm. | Discharge : 3.0 | | 8 |
| | 5 | Density at 30°C : kg/cu.m. | 1000 | | | 9 |
| | 6 | Viscosity at 30 : cP | - | | | 10 |
| | 7 | Vapour Pressure at °C - : mm Hg | - | | | 11 |
| | 8 | Nature of Fluid : | - | | | 12 |
| | 9 | pH | | | | 13 |
| | 10 | Suspended Solids : | Type : - | % wt / Vol. : - | Avg. particle size:mic.: - | 14 |
| | 11 | Dissolved Gases : | - | | | 15 |
| | 12 | Hazard Condition : | | | | 16 |
| CONSTRUCTION DATA | 1 | Suction Details : | Condition : Flooded | | 17 | |
| | 2 | Discharge Details : | Condition : Discharge to ST-205 at Atm. Pressure | | 18 | |
| | | | m of water | Head : 30.0 m | 19 | |
| | 3 | Total Discharge Pressure : | kg/sq.cm.-g/a = | 3.0 | 20 | |
| | 4 | NPSH Available : | m of W.C. | VTS | 21 | |
| | 5 | Material Of Construction | Casing : | SS 316 | Seal : - | 22 |
| | | | Gears : | - | Gasket : PTFE | 23 |
| | | | Shaft : | SS 316 | Others : | 24 |
| | | | Bolting : | SS 316 | All contact parts : SS 316 | 25 |
| | 6 | Nozzles | Suction | End Connection : Flanged | Size NB (mm) : 50 | 26 |
| | | | | Pressure Rating : 150# | Standard : ANSI, B16.5 | 27 |
| | | | Discharge | End Connection : Flanged | Size NB (mm) : 50 | 28 |
| Pressure Rating : 150# | | | | Standard : ANSI, B16.5 | 29 | |
| 7 | Drive Details : | Motor : Electric | H.P. : 1.0 | 30 | | |
| | | Power Supply : VTS | | 31 | | |
| | | R.P.M. : 1440 | | 32 | | |
| 8 | Seal : | Type : Stuffing Box | Seal Fluid : VTS | 33 | | |
| NOTES | 1 | Vendor shall supply 2 sets of all relevant catalogues, performance curves, dimensioned drawings and maintenance manuals and shall guarantee mechanical performance. | | | | 34 |
| | 2 | Vendor to indicate a list of recommended spare parts. | | | | 35 |
| | 3 | Scope of supply shall include Pump, Motor, coupling & guard common base plate and foundation details. | | | | 36 |
| | 4 | VTS : Vendor to specify. | | | | 37 |
| | 5 | Stroke length to be adjustable through flow range. | | | | 38 |
| | 6 | Pump shall operate at +/- 1% accuracy. | | | | 39 |
| | 7 | All non contact parts should be coated with corrosion acid resistant paint. | | | | 40 |
| | 8 | Vendor shall indicate whether the suction conditions meet NPSH requirements. | | | | 41 |

| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------|--------|-------------|----|-----|-----|------|------|--------------------------------|---|---|---|---|---|---|---|---|
| | | | | | | | | ISSUES / DISTRIBUTION / COPIES | | | | | | | | |

| | | | | | | | |
|--|------------|---------------|------------|----------------|---------------|------------|------------|
| All dimensions in mm, unless specified | | DO NOT SCALE | | | | | |
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR |
| CLEARANCES | | | | | | | |
| MR | - | MR | 19.07.23 | MR/SAK | - | TPK/MR/SAK | - |
| DESIGN | | PREPARED | | VER/CHD | | APPROVED | |
| SCALE | REFERENCES | SOFT COPY REF | | DWG/DOC/SK No. | | SHEET | REV 0 |
| | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED | 1 of 1 | |

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CENTRIFUGAL PUMP SPECIFICATION DATA SHEET

Page
- of -

| | |
|--|----------------------|
| PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 2) | PROJECT CODE : - |
| CLIENT : - | CAPACITY : 0.125 TPD |
| LOCATION : - | R |

| | | | | | | |
|--------------------------|-----------------|---|---|--------------------------|----------------------------|----|
| GEN. | 1 | Unit No. : P-304 | Dwg. No. : - | Code : - | 1 | |
| | 2 | Title : L Transfer Pump | Type : Centrifugal | | 2 | |
| | 3 | Service : To Transfer Filtrate from ST-303 to S-301 and Recirculation | | | | 3 |
| | 4 | Normal Capacity : 3000 LPH | Nos. required (Total) : 1 | Working : 1 | Stand By : 0 | 4 |
| PROCESS DATA | 1 | Fluid Handled : L | | | | 5 |
| | 2 | Capacity : lpm | Normal : 35 | Maximum : 50 | Design : 50 | 6 |
| | 3 | Operating Temperature : °C | Normal : 20 | Maximum : 30 | Design : 30 | 7 |
| | 4 | Operating Pressure : kg/sq.cm.-g/a | Suction : Atm. | Discharge : 3.0 | | 8 |
| | 5 | Density at 30°C : kg/cu.m. | 1000 | | | 9 |
| | 6 | Viscosity at 30 : cP | - | | | 10 |
| | 7 | Vapour Pressure at °C - : mm Hg | - | | | 11 |
| | 8 | Nature of Fluid : | - | | | 12 |
| | 9 | pH | | | | 13 |
| | 10 | Suspended Solids : | Type : - | % wt / Vol. : - | Avg. particle size:mic.: - | 14 |
| | 11 | Dissolved Gases : | - | | | 15 |
| | 12 | Hazard Condition : | | | | 16 |
| CONSTRUCTION DATA | 1 | Suction Details : | Condition : Flooded | | | 17 |
| | 2 | Discharge Details : | Condition : Discharge to S-201 at Atm. Pressure | | | 18 |
| | | | m of water | Head : 30.0 m | | 19 |
| | 3 | Total Discharge Pressure : | kg/sq.cm.-g/a = | 3.0 | | 20 |
| | 4 | NPSH Available : | m of W.C. | VTS | | 21 |
| | 5 | Material Of Construction | Casing : | SS 316 | | 22 |
| | | | Gears : | - | | 23 |
| | | | Shaft : | SS 316 | | 24 |
| | | | Bolting : | SS 316 | | 25 |
| | 6 | Nozzles | Suction | End Connection : Flanged | Size NB (mm) : 50 | 26 |
| | | | | Pressure Rating : 150# | Standard : ANSI, B16.5 | 27 |
| | | | Discharge | End Connection : Flanged | Size NB (mm) : 50 | 28 |
| | | | Pressure Rating : 150# | Standard : ANSI, B16.5 | 29 | |
| 7 | Drive Details : | Motor : | Electric | | 30 | |
| | | Power Supply : | VTS | | 31 | |
| | | R.P.M. : | 1440 | | 32 | |
| 8 | Seal : | Type : Stuffing Box | H.P. : 1.0 | Seal Fluid : VTS | 33 | |
| NOTES | 1 | Vendor shall supply 2 sets of all relevant catalogues, performance curves, dimensioned drawings and maintenance manuals and shall guarantee mechanical performance. | | | | 34 |
| | 2 | Vendor to indicate a list of recommended spare parts. | | | | 35 |
| | 3 | Scope of supply shall include Pump, Motor, coupling & guard common base plate and foundation details. | | | | 36 |
| | 4 | VTS : Vendor to specify. | | | | 37 |
| | 5 | Stroke length to be adjustable through flow range. | | | | 38 |
| | 6 | Pump shall operate at +/- 1% accuracy. | | | | 39 |
| | 7 | All non contact parts should be coated with corrosion acid resistant paint. | | | | 40 |
| | 8 | Vendor shall indicate whether the suction conditions meet NPSH requirements. | | | | 41 |
| | | | | | 42 | |
| | | | | | 43 | |
| | | | | | 44 | |
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| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
|-------------------|--------|--|----|---------------------|-----|------------|------|--------------------------------|---|---------------|---|------------|---|------------|---|---|--|
| | | | | | | | | ISSUES / DISTRIBUTION / COPIES | | | | | | | | | |
| | | All dimensions in mm, unless specified | | DO NOT SCALE | | | | | | | | | | | | | |
| MECH ENGR | | PRCS ENGR | | INST ENGR | | ELECT ENGR | | CIVIL ENGR | | CLIENT | | CONSULTANT | | CONTRACTOR | | | |
| CLEARANCES | | | | | | | | | | | | | | | | | |
| MR | | - | | MR | | 19.07.23 | | MR/SAK | | - | | TPK/MR/SAK | | - | | | |
| DESIGN | | | | PREPARED | | | | VER/CHD | | | | APPROVED | | | | | |
| SCALE | | REFERENCES | | SOFT COPY REF | | | | DWG/DOC/SK No. | | | | SHEET | | REV 0 | | | |
| | | | | CD/FP | | FOLDER | | FILE | | DE-XXX-XXX-ED | | 1 of 1 | | | | | |



CENTRIFUGAL PUMP SPECIFICATION DATA SHEET

Page
- of -

| | |
|--|----------------------|
| PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 2) | PROJECT CODE : - |
| CLIENT : - | CAPACITY : 0.125 TPD |
| LOCATION : - | R |

| | | | | | | | |
|--------------------------|-----------------|---|--|-------------------|-----------------------------|----------------------------|----|
| GEN. | 1 | Unit No. : P-305 | Dwg. No. : - | Code : - | 1 | | |
| | 2 | Title : CL Transfer Pump | Type : Centrifugal | | 2 | | |
| | 3 | Service : To Transfer Filtrate from S-301 to Fi-302 and Recirculation | | | | 3 | |
| | 4 | Normal Capacity : 3000 LPH | Nos. required (Total) : 1 | Working : 1 | Stand By : 0 | 4 | |
| PROCESS DATA | 1 | Fluid Handled : | CL | | | 5 | |
| | 2 | Capacity : | lpm | Normal : 35 | Maximum : 50 | Design : 50 | 6 |
| | 3 | Operating Temperature : | °C | Normal : 20 | Maximum : 30 | Design : 30 | 7 |
| | 4 | Operating Pressure : | kg/sq.cm.-g/a | Suction : Atm. | Discharge : 3.0 | | 8 |
| | 5 | Density at 30°C | kg/cu.m. | 1000 | | | 9 |
| | 6 | Viscosity at 30 | cP | - | | | 10 |
| | 7 | Vapour Pressure at °C - | mm Hg | - | | | 11 |
| | 8 | Nature of Fluid : | - | | | 12 | |
| | 9 | pH | - | | | 13 | |
| | 10 | Suspended Solids : | Type : - | % wt / Vol. : - | Avge. particle size:mic.: - | | 14 |
| | 11 | Dissolved Gases : | - | | | 15 | |
| | 12 | Hazard Condition : | - | | | 16 | |
| CONSTRUCTION DATA | 1 | Suction Details : | Condition : Flooded | | | 17 | |
| | 2 | Discharge Details : | Condition : Discharge to Fi-204 at Atm. Pressure | | | 18 | |
| | 3 | Total Discharge Pressure : | kg/sq.cm.-g/a | = 3.0 | | | 19 |
| | 4 | NPSH Available : | m of W.C. | VTS | | | 20 |
| | 5 | Material Of Construction | Casing : | SS 316 | | Seal : - | 21 |
| | | | Gears : | - | | Gasket : PTFE | 22 |
| | | | Shaft : | SS 316 | | Others : | 23 |
| | | | Bolting : | SS 316 | | All contact parts : SS 316 | 24 |
| | 6 | Nozzles | Suction | End Connection : | Flanged | Size NB (mm) : 50 | 25 |
| | | | | Pressure Rating : | 150# | Standard : ANSI, B16.5 | 26 |
| | | | Discharge | End Connection : | Flanged | Size NB (mm) : 50 | 27 |
| | | | | Pressure Rating : | 150# | Standard : ANSI, B16.5 | 28 |
| 7 | Drive Details : | Motor : | Electric | | H.P. : 1.0 | 29 | |
| | | Power Supply : | VTS | | | 30 | |
| | | R.P.M. : | 1440 | | | 31 | |
| 8 | Seal : | Type : | Stuffing Box | | Seal Fluid : VTS | 32 | |
| NOTES | 1 | Vendor shall supply 2 sets of all relevant catalogues, performance curves, dimensioned drawings and maintenance manuals and shall guarantee mechanical performance. | | | | 33 | |
| | 2 | Vendor to indicate a list of recommended spare parts. | | | | 34 | |
| | 3 | Scope of supply shall include Pump, Motor, coupling & guard common base plate and foundation details. | | | | 35 | |
| | 4 | VTS : Vendor to specify. | | | | 36 | |
| | 5 | Stroke length to be adjustable through flow range. | | | | 37 | |
| | 6 | Pump shall operate at +/- 1% accuracy. | | | | 38 | |
| | 7 | All non contact parts should be coated with corrosion acid resistant paint. | | | | 39 | |
| | 8 | Vendor shall indicate whether the suction conditions meet NPSH requirements. | | | | 40 | |

| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--------------------------------|--------|-------------|----|-----|-----|------|------|---------|---|---|---|---|---|---|---|---|
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|--|------------|---------------|------------|------------|----------------|------------|------------|--------|----------|--|--|-------|--|--|--|--|
| All dimensions in mm, unless specified | | DO NOT SCALE | | | | | | | | | | | | | | |
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR | | | | | | | | | |
| CLEARANCES | | | | | | | | | | | | | | | | |
| MR | - | MR | 19.07.23 | MR/SAK | - | TPK/MR/SAK | - | | | | | | | | | |
| DESIGN | | | PREPARED | | | VER/CHD | | | APPROVED | | | | | | | |
| SCALE | REFERENCES | SOFT COPY REF | | | DWG/DOC/SK No. | | | SHEET | | | | | | | | |
| | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED | | | 1 of 1 | | | | REV 0 | | | | |

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CENTRIFUGAL PUMP SPECIFICATION DATA SHEET

Page
- of -

| | |
|--|----------------------|
| PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 2) | PROJECT CODE : - |
| CLIENT : - | CAPACITY : 0.125 TPD |
| LOCATION : - | R |

| | | | | | | | |
|--------------------------|-----------------|---|---|-------------------|-----------------------------|------------------------|----|
| GEN. | 1 | Unit No. : P-306 | Dwg. No. : - | Code : - | 1 | | |
| | 2 | Title : RF Transfer Pump | Type : Centrifugal | | 2 | | |
| | 3 | Service : To Transfer Filtrate from ST-305 to R-201, Fi-302 and Recirculation | | | | 3 | |
| | 4 | Normal Capacity : 3000 LPH | Nos. required (Total) : 1 | Working : 1 | Stand By : 0 | 4 | |
| PROCESS DATA | 1 | Fluid Handled : | Filtrate | | | 5 | |
| | 2 | Capacity : | lpm | Normal : 35 | Maximum : 50 | Design : 50 | 6 |
| | 3 | Operating Temperature : | °C | Normal : 20 | Maximum : 30 | Design : 30 | 7 |
| | 4 | Operating Pressure : | kg/sq.cm.-g/a | Suction : Atm. | Discharge : 3.0 | | 8 |
| | 5 | Density at 30°C | kg/cu.m. | 1000 | | | 9 |
| | 6 | Viscosity at 30 | cP | - | | | 10 |
| | 7 | Vapour Pressure at °C - | mm Hg | - | | | 11 |
| | 8 | Nature of Fluid : | - | | | 12 | |
| | 9 | pH | | | | 13 | |
| | 10 | Suspended Solids : | Type : - | % wt / Vol. : - | Avge. particle size:mic.: - | | 14 |
| | 11 | Dissolved Gases : | - | | | 15 | |
| | 12 | Hazard Condition : | | | | 16 | |
| CONSTRUCTION DATA | 1 | Suction Details : | Condition : Flooded | | | 17 | |
| | 2 | Discharge Details : | Condition : Discharge to R-201 at Atm. Pressure | | | 18 | |
| | | | m of water | Head : 30.0 m | | 19 | |
| | 3 | Total Discharge Pressure : | kg/sq.cm.-g/a | = 3.0 | | 20 | |
| | 4 | NPSH Available : | m of W.C. | VTS | | 21 | |
| | 5 | Material Of Construction | Casing : | SS 316 | | 22 | |
| | | | Gears : | - | | 23 | |
| | | | Shaft : | SS 316 | | 24 | |
| | | | Bolting : | SS 316 | | 25 | |
| | 6 | Nozzles | Suction | End Connection : | Flanged | Size NB (mm) : 50 | 26 |
| | | | | Pressure Rating : | 150# | Standard : ANSI, B16.5 | 27 |
| | | | Discharge | End Connection : | Flanged | Size NB (mm) : 50 | 28 |
| Pressure Rating : | | | | 150# | Standard : ANSI, B16.5 | 29 | |
| 7 | Drive Details : | Motor : | Electric | | 30 | | |
| | | Power Supply : | VTS | | 31 | | |
| | | R.P.M. : | 1440 | | 32 | | |
| 8 | Seal : | Type : | Stuffing Box | Seal Fluid : VTS | 33 | | |
| NOTES | 1 | Vendor shall supply 2 sets of all relevant catalogues, performance curves, dimensioned drawings and maintenance manuals and shall guarantee mechanical performance. | | | | 34 | |
| | 2 | Vendor to indicate a list of recommended spare parts. | | | | 35 | |
| | 3 | Scope of supply shall include Pump, Motor, coupling & guard common base plate and foundation details. | | | | 36 | |
| | 4 | VTS : Vendor to specify. | | | | 37 | |
| | 5 | Stroke length to be adjustable through flow range. | | | | 38 | |
| | 6 | Pump shall operate at +/- 1% accuracy. | | | | 39 | |
| | 7 | All non contact parts should be coated with corrosion acid resistant paint. | | | | 40 | |
| | 8 | Vendor shall indicate whether the suction conditions meet NPSH requirements. | | | | 41 | |

| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------|--------|-------------|----|-----|-----|------|------|--------------------------------|---|---|---|---|---|---|---|---|
| | | | | | | | | ISSUES / DISTRIBUTION / COPIES | | | | | | | | |

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|--|------------|---------------|------------|----------------|---------------|------------|------------|
| All dimensions in mm, unless specified | | DO NOT SCALE | | | | | |
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR |
| CLEARANCES | | | | | | | |
| MR | - | MR | 19.07.23 | MR/SAK | - | TPK/MR/SAK | - |
| DESIGN | | PREPARED | | VER/CHD | | APPROVED | |
| SCALE | REFERENCES | SOFT COPY REF | | DWG/DOC/SK No. | | SHEET | REV |
| | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED | 1 of 1 | 0 |

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REACTOR SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 2)

PROJECT CODE : -

CLIENT : -

CAPACITY : 0.125 TPD

LOCATION : -

-

| GEN. | | | | R | |
|------|---|------------------------------------|-----------------------|--|---|
| | 1 | Unit No. : R-301 a,b,c | Dwg. No.: - | Code : ASME Sec. VIII Div. I | 1 |
| | 2 | Title : DP Reactors | Nos. required : Three | Type : Vertical, Cylindrical & Flanged | 2 |
| | 3 | Service : To Carry out DP Reaction | | | 3 |
| | 4 | Nominal Capacity : lit. : 160 lit. | | | 4 |
| | | | | 5 | |

| PROCESS DATA | 1 OPERATION : | | Batch / Continuous | Batch Time : hrs :- | Working Hours/Day : - | | |
|--------------|---------------|-----------------------------|--------------------|---------------------|-----------------------|----|----|
| | | | SHELL | JACKET | DOUBLE COIL | | |
| | 2 | Material Handled : | C3 | Hot Oil | | | 7 |
| | 3 | Operation : | Continuous | Continuous | | | 8 |
| | 4 | Feed Quantity Total : | kg/hr | 87 | 3100 | | 10 |
| | 5 | Solid/Liquid/Gas: | kg/hr | -/87/- | -/3100/- | | 11 |
| | 6 | Discharge Quantity Total : | kg/hr | 87 | 3100 | | 12 |
| | 7 | Solid/Liquid/Gas: | kg/hr | -/87/- | -/3100/- | | 13 |
| | 8 | Operating Temp.:Nor./Max.: | °C | 70/75 | 130/140 | | 14 |
| | 9 | Operating Press.:Nor./Max.: | kg/sq.cm.-g/¢ | Atm. | 4.0 | | 15 |
| | 10 | Density : at 30 °C | kg/cu.m. | 1057 | 831.34 | | 16 |
| | 11 | Viscosity : at 25 °C | cP | 1 | 0.497 | | 17 |
| | 12 | pH : | | 8.1 | - | | 18 |
| | 13 | Pressure Drop : | kg/sq.cm. | - | - | | 19 |
| | 14 | Hazard Condition : | | - | - | | 20 |
| | | | | | | 21 | |

| INTERALS | 1 | Agitator Type : | Pitched Blade Turbine | | Shaft Dia : | 65 mm | 22 |
|----------|----------|--------------------|-----------------------|-------------------------|------------------------|------------|----|
| | 2 | | mm | Impeller Dia. : 170 | No. of Impellers : | One | 23 |
| | 3 | | mm | Height from bottom: 170 | Speed : RPM : | 550 | 24 |
| | 4 | Coil : 2 Nos. | mm | Tube Dia. : - | BWG / Sch. : - | | 25 |
| | 5 | | mm | Pitch : - | No. of Turns : - | | 26 |
| | 6 | | mm | Coil Helix Dia. : - | Height from bottom : - | | 27 |
| | 7 | Baffles : | mm | Nos. : 4 Nos. | Type : Flat | | 28 |
| | 8 | | mm | Height : 725 | Width : 50 | | 29 |
| | 9 | | mm | Thk. : 10 | | | 30 |
| | 10 | Feed Arrangement : | | Type : - | Dia. : - | Length : - | 31 |
| | | | | Spray Nozzle Dia. : - | Pitch : - | Others : - | 32 |
| | 11 | Shaft : | | Dia. : 65 mm | Length : VTS | | 33 |
| 12 | Others : | | - | | | 34 | |

| CONSTRUCTION | | | SHELL | | JACKET | | COIL | | | |
|--------------|--------------|-------------------|---------------|--------------------|----------------|------------|------------|-------|---------|----|
| | 1 | Temperature : | °C | Dgn: 80 | Test: Amb. | Dgn: 100 | Test: Amb. | Dgn: | Test: | 36 |
| | 2 | Pressure : | kg/sq.cm.-g/¢ | Dgn: 1.1/3.3(Ext.) | Test: 4.5 ext. | Dgn: 3.3 | Test: 4.5 | Dgn: | Test: | 37 |
| | 3 | Diameter : | mm | O.D.: - | I.D.: 500 | O.D.: - | I.D.: 600 | O.D.: | H.Dia.: | 38 |
| | 4 | Straight Length : | mm | 725 | | 580 | | - | | 39 |
| | 5 | Thk. : | mm | 6 MM | | 6 MM | | | | 40 |
| | 6 | Shell Ends : | Top | Type : Tori. | Thk. : 6 MM | K.R. : 10% | SF : 50 | | | 41 |
| | | | Bottom | Type : Tori. | Thk. : 6 MM | K.R. : 10% | SF : 50 | | | 42 |
| 7 | Jacket end : | Bottom | Type : - | Thk. : 6 MM | K.R. : - | SF : - | | | 43 | |

| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | ISSUES / DISTRIBUTION / COPIES | | | | | | | | | |
|-------|--------|-------------|----|-----|-----|------|------|---------|--------------------------------|---|---|---|---|---|---|---|--|--|
| | | | | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | |
| | | | | | | | | | | | | | | | | | | |

All dimensions in mm, unless specified

DO NOT SCALE

| | | | | | | | |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|

CLEARANCES

| | | | |
|--------|----------|---------|------------|
| MR | MR | MR/SAK | TPK/MR/SAK |
| DESIGN | PREPARED | VER/CHD | APPROVED |

| SCALE | REFERENCES | SOFT COPY REF | | | DWG/DOC/SK- No. | SHEET | REV |
|-------|------------|---------------|--------|------|----------------------------|--------|-----|
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REACTOR SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 2)

PROJECT CODE : -

CLIENT : -

CAPACITY : 0.125 TPD

LOCATION : -

-

| | | Unit No. : R-301 a,b,c | | | | | Title : DP Reactors | | | R |
|----|--------------------------------|---|-------------|-----------|----------------------------------|---------------------|---------------------|----|----|---|
| 1 | Unit No. : | R-301 a,b,c | | | | | Title : DP Reactors | | | 1 |
| | | SHELL | | JACKET | | COIL | | | 2 | |
| 8 | Corrosion Allowance : | - | | - | | | | | 3 | |
| 9 | Supports : | Type: - | No.: - | Type: LEG | No.: 4 Nos. | Type: | No.: | | 4 | |
| 10 | Material Of Construction | Shell : SA-240 SS 316 | | | Jacket : CS A 285 Gr. C | | | | 5 | |
| | | Shell Ends : SA-240 SS 316 | | | Jacket Ends : CS A 285 Gr. C | | | | 6 | |
| | | Coil : - | | | Supports : CS A-75/IS:226 | | | | 7 | |
| | | Shaft : SA-479 SS 316 | | | Feed Arrangement : SS 316 | | | | 8 | |
| | | Agitator : SA-240 SS 316 | | | External Bolting : CS to IS 1364 | | | | 9 | |
| | | Baffle : SS 316 | | | Internal Bolting : SS 316 | | | | 10 | |
| | | Dip Pipe : SA-312 TP 316 | | | Gaskets : PTFE | | | | 11 | |
| | | Shell Flanges : CS A 285 Gr. C with 3 thk. SS316 lining | | | Sparger : - | | | | 12 | |
| 11 | Heat Treatment : | Stress Relieving : - | | | Others : - | | | 13 | | |
| 12 | Tests : | Hydraulic / Pneumatic : Yes | | | Dye-Penetrant : - | | | 14 | | |
| | | Radiograph : - | | | Others : - | | | 15 | | |
| 13 | Insulation : | Type : - | | | Thk. : - | | | 16 | | |
| 14 | Painting / Finish : | All CS parts to be painted with two coats of red oxide primer | | | | | | | 17 | |
| 15 | Weight : | kg | Empty : 210 | | | Full of Water : 450 | | | 18 | |
| 16 | Drive Details : | Motor : Electric, VFD | | | | | | | 19 | |
| | | Power Supply : VTS | | | H.P. : 1.0 | | | | 20 | |
| | | R.P.M. : Shaft RPM is 550, Motor RPM is VTS | | | | | | | 21 | |
| 17 | Shaft Seal : | Stuffing Box | | | | | | | 22 | |
| 18 | Inspection By : | IICT / CLIENT / Third Party - | | | Others : - | | | | 23 | |
| | | | | | | | | | 24 | |
| | | | | | | | | | 25 | |
| | | | | | | | | | 26 | |
| | | | | | | | | | 27 | |
| | | | | | | | | | 28 | |
| | | | | | | | | | 29 | |

| NOTES | | | | | | | | | |
|-------|--|--|--|--|--|--|--|--|--|
| 1 | All dimensions are in mm | | | | | | | | |
| 2 | VTS – Vendor to specify. | | | | | | | | |
| 3 | Nozzles shall be provided with companion flange, gaskets, nuts, and washers shall be suitably blanked off before dispatch. | | | | | | | | |
| 4 | All nozzle – top, side and bottom shall be 150 mm in length unless otherwise specified. | | | | | | | | |
| 5 | Nozzle orientation and support height shall be provided by vendor. | | | | | | | | |
| 6 | Vendor shall provide detailed drawing for approval from CSIR-IICT and shall guarantee the mechanical performance. | | | | | | | | |
| 7 | Suitable stiffeners to be provided for all the nozzles. | | | | | | | | |
| 8 | Dimensions are based on IS 4179. Vendor to specify the equivalent. | | | | | | | | |
| 9 | Lifting lugs, earthing boss(SS 316) and name plate are to be provided. | | | | | | | | |
| 10 | Dip leg to be provided with 3Ø antisiphon holes and suitable supporting arrangement. | | | | | | | | |
| 11 | Dished ends shall conform to IS 4179. | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------|--------|-------------|----|-----|-----|------|------|---------|--------------------------------|---|---|---|---|---|---|---|
| | | | | | | | | | ISSUES / DISTRIBUTION / COPIES | | | | | | | |

| | | | | | | | | | | | | | | | | |
|--|------------|---------------------|------------|-----------------|----------------------------|---------------|------------|-------------------|--|-------|--|----------|--|--|--|--|
| All dimensions in mm, unless specified | | DO NOT SCALE | | | | | | | | | | | | | | |
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR | | | | | | | | | |
| CLEARANCES | | | | | | | | | | | | | | | | |
| MR | | MR | | 19.07.23 | | MR/SAK | | TPK/MR/SAK | | | | | | | | |
| DESIGN | | | | PREPARED | | | | VER/CHD | | | | APPROVED | | | | |
| SCALE | REFERENCES | SOFT COPY REF | | | DWG/DOC/SK- No. | | | SHEET | | REV 1 | | | | | | |
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REACTOR SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 2)

PROJECT CODE : -

CLIENT : -

CAPACITY : 0.125 TPD

LOCATION : -

1 Unit No. : R-301 a,b,c

Title : DP Reactors

Impeller Details

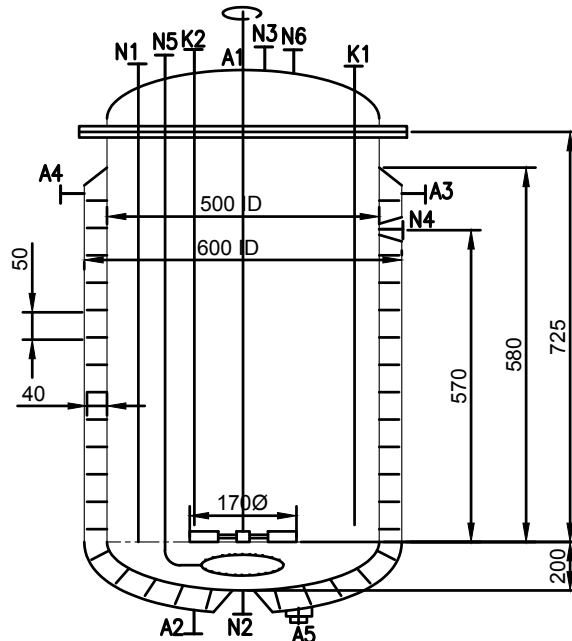
No. of impellers = One
Type = Pitched Blade
Impeller Dia = 170 mm
Ht. from Bot. = 170 mm
Blade L x W = 40 x 35

Spiral Jacket

Spiral Baffle Pitch = 50 mm

Sparger Details

Sparger Dia = 260 mm
HT. from Bot. = 125 mm
Sparger Pipe Dia = 25NB
Hole size = 2 Ø mm
No. of Holes = 140 Nos.
Dist between Holes = 3 mm



NOZZLE SCHEDULE

| NOZZLE MARK | SERVICE | NOZZLE DETAILS | | | | FLANGE DETAILS | | | | REMARKS | R |
|-------------|------------------------|----------------|------|-----------|--------|----------------|--------|-------|--------|--------------------|----|
| | | SIZE NB(mm) | Sch. | Length mm | M.O.C. | STANDARD | RATING | TYPE | M.O.C. | | |
| N1 | Inlet from P-206 a,b | 50 | 40s | 150 | SS316 | ANSI, B16.5 | #150 | SO,RF | SS316 | Dipleg | 1 |
| N2 | Bottom Outlet | 50 | 40s | 150 | SS316 | ANSI, B16.5 | #150 | SO,RF | SS316 | Flush Bottom Valve | 2 |
| N3 | Vent | 25 | 40s | 150 | SS316 | ANSI, B16.5 | #150 | SO,RF | SS316 | - | 3 |
| N4 | Overflow to ST-301 a,b | 50 | 40s | 150 | SS316 | ANSI, B16.5 | #150 | SO,RF | SS316 | - | 4 |
| N5 | CO2 Inlet | 15 | 40s | 150 | SS316 | ANSI, B16.5 | #150 | SO,RF | SS316 | Sparger | 5 |
| N6 | Spare | 25 | 40s | 150 | SS316 | ANSI, B16.5 | #150 | SO,RF | SS316 | - | 6 |
| | | | | | | | | | | | 7 |
| K1 | Thermowell | 20 | 40s | 150 | SS316 | ANSI, B16.5 | #150 | SO,RF | SS316 | Dipleg | 8 |
| K2 | pH Indicator | 20 | 40s | 150 | SS316 | ANSI, B16.5 | #150 | SO,RF | SS316 | Dipleg | 9 |
| | | | | | | | | | | | 10 |
| A1 | Stirrer | VTS | - | - | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 11 |
| A2 | Hot Oil Inlet | 50 | 40 | 150 | CS | ANSI, B16.5 | #150 | SO,RF | CS | - | 12 |
| A3 | Hot Oil Outlet | 50 | 40 | 100 | CS | ANSI, B16.5 | #150 | SO,RF | CS | Plug | 13 |
| A4 | Jacket Vent | 25 | 40 | 100 | CS | ANSI, B16.5 | #150 | SO,RF | CS | - | 14 |
| A5 | Jacket Drain (Plug) | 3/4" | - | - | CS | - | #3000 | - | - | - | 15 |
| | | | | | | | | | | | 16 |
| | | | | | | | | | | | 17 |
| | | | | | | | | | | | 18 |
| | | | | | | | | | | | 19 |

| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------|--------|-------------|----|-----|-----|------|--------------------------------|---------|---|---|---|---|---|---|---|---|
| | | | | | | | ISSUES / DISTRIBUTION / COPIES | | | | | | | | | |

All dimensions in mm, unless specified

DO NOT SCALE

MECH ENGR PRCS ENGR INST ENGR ELECT ENGR CIVIL ENGR CLIENT CONSULTANT CONTRACTOR

CLEARANCES

SAK PVSB 13.12.13 SAK/MR SAK/MR/TPK

DESIGN

PREPARED

VER/CHD

APPROVED

SCALE

REFERENCES

SOFT COPY REF

DWG/DOC/SK No.

SHEET

REV

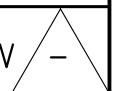
CD/FP

FOLDER

FILE

DE-XXX-XXX-ED-01-07 00 XXX

3 OF 3



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S-101

INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDERABAD – 500 007



SEPARATOR SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 2)

PROJECT CODE : -

CLIENT : -

CAPACITY : 0.125 TPD

LOCATION : -

-

| GEN. | Unit No. : S-301 | Dwg. No.: | Code : ASME Sec. VIII Div. I | R | 1 |
|------|---|---------------------|------------------------------|---|---|
| 2 | Title : Settling Tank | Nos. required : One | Type : Vertical, Cylindrical | | 2 |
| 3 | Service : To settle material from Mixture | | | | 3 |
| 4 | Nominal Capacity : lit. : 1250 lit. | | | | 4 |
| | | | | | 5 |

| PROCESS DATA | 1 Fluid | Mixture | 2 Operating Temperature : °C | Normal : 25 | Maximum : 30 | 3 |
|--------------|--------------------------------------|---------------|------------------------------|-------------|--------------|----|
| | 2 Operating Pressure : kg/sq.cm.-g/¢ | Normal : Atm. | Maximum : 1.1 | | | 8 |
| | 4 Density : at 30 °C kg/cu.m. | 1050 | | | | 9 |
| | 5 Hazard Condition : - | - | | | | 10 |
| | | | | | | 11 |
| | | | | | | 12 |

| CONSTRUCTION DATA | 1 Temperature : °C | Design : 40 | Test : Amb. | 14 | |
|-------------------|----------------------------|-------------------------|---|----------------------------------|----|
| | 2 Pressure : kg/sq.cm.-g/¢ | Design : 1.1 | Test : Full with Water | 15 | |
| | 3 Corrosion Allowance | | | | 16 |
| | 4 Shell | | ØD/ID : 800 mm | St. Length : 2350 mm | 17 |
| | | | Thk. : 5 MM | | 18 |
| | 5 Ends | Top | Type : Dish, Torispherical | KR : 10% Thk. : 5 MM SF : 50 mm | 19 |
| | | Bottom | Type : Dish, Torispherical | KR : 10% Thk. : 5 MM SF : 50 mm | 20 |
| | 6 Supports | | Type : Leg | Nos. : 4 Nos. | 21 |
| | 7 Material Of Construction | Shell : SA 240 SS 316 | | Heads : SA 240 SS 316 | 22 |
| | | Supports : CS to IS 226 | | Internal Bolting : SS 316 | 23 |
| | | Gaskets : PTFE | | External Bolting : CS to IS 1364 | 24 |
| | | Shell Flanges : - | | Jacket / Internals : SS 316 | 25 |
| | | Nozzles : SS 316 | | Other wetted parts : SS 316 | 26 |
| | 8 Heat Treatment | | Stress Relieving : - | Others : - | 27 |
| | 9 Tests | | Hydraulic / Pneumatic : Yes | Dye-Penetrant : - | 28 |
| | | | Radiographic : - | Others : - | 29 |
| | 10 Insulation | | Type : HCl / CCl / PPI - | Thk. : - | 30 |
| | 11 Painting / Finish | | All CS parts to be painted with two coats of red oxide primer | | 31 |
| | 12 Weight : kg | Empty : 390 | Full of water : 1685 | | 32 |
| | 13 Inspection By | | IICT / Client / Third Party - | Others : - | 33 |

| NOTES | GENERAL NOTES. | 35 |
|-------|--|----|
| | 1 All dimensions are in mm | 36 |
| | 2 VTS - Vendor to specify. | 37 |
| | 3 Nozzles shall be provided with companion flange, gaskets, nuts, and washers shall be suitably blanked off before dispatch. | 38 |
| | 4 All nozzle - top, side and bottom shall be 150 mm in length unless otherwise specified. | 39 |
| | 5 Nozzle orientation and support height shall be provided by vendor | 40 |
| | 6 Vendor shall provide detailed drawing for approval from IICT and shall guarantee the mechanical performance. | 41 |
| | 7 Suitable stiffeners to be provided for all the nozzles. | 42 |
| | 8 Dimensions are based on IS 4179. Vendor to specify the equivalent. | 43 |

| | | | | | | | | | | | | | | | | |
|-------|--------|-------------|----|-----|-----|------|------|---------|---|---|---|---|---|---|---|---|
| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------|--------|-------------|----|-----|-----|------|------|---------|---|---|---|---|---|---|---|---|

| | | |
|--|--|--------------|
| All dimensions in mm, unless specified | | DO NOT SCALE |
|--|--|--------------|

| | | | | | | | |
|------------|-----------|-----------|------------|------------|--------|------------|------------|
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR |
| CLEARANCES | | | | | | | |

| | | | | | | |
|--------|------------|---------------|----------|----------------|----------------------------|---|
| MR | - | MR | 19.07.23 | MR/SAK | - | TPK/MR/SAK |
| DESIGN | | PREPARED | | VER/CHD | | APPROVED |
| SCALE | REFERENCES | SOFT COPY REF | | DWG/DOC/SK/No. | | SHEET |
| | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED-01-01 00 XXX | 1 OF 2 |
| | | | | | | REV - |

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SEPARATOR SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 2)

PROJECT CODE : -

CLIENT : -

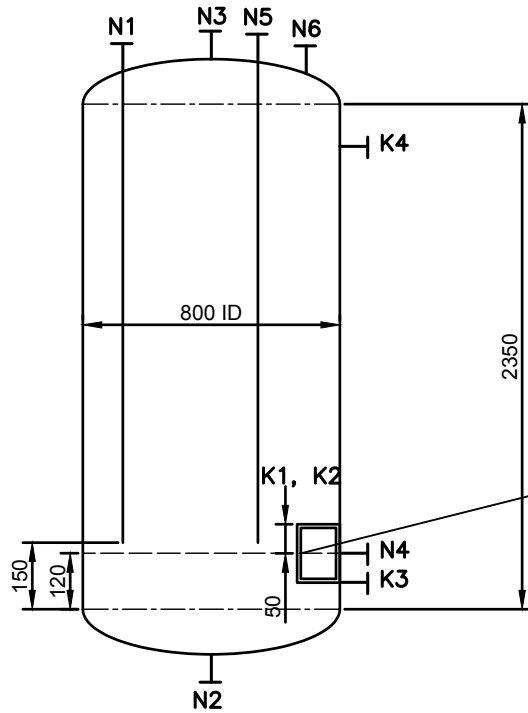
CAPACITY : 0.125 TPD

LOCATION : -

-

1 Unit No. : S-301

Title : Settling Tank



Interface Ht. from BTL = 120 mm
Dipleg from BTL = 150 mm
BTL - Bottom Tangent Line

Light and Sight Glass Dimensions
(l x b) 100 mm x 100 mm

NOZZLE SCHEDULE

| NOZZLE MARK | SERVICE | NOZZLE DETAILS | | | | FLANGE DETAILS | | | | REMARKS | R |
|-------------|-------------------------|----------------|------|-----------|--------|----------------|--------|-------|--------|---------|----|
| | | SIZE NB(mm) | Sch. | Length mm | M.O.C. | STANDARD | RATING | TYPE | M.O.C. | | |
| N1 | Inlet from P-304 | 50 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | Dipleg | 1 |
| N2 | Bottom Outlet to ST-304 | 50 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 2 |
| N3 | Vent | 25 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 3 |
| N4 | Side Outlet to P-305 | 50 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 4 |
| N5 | Inlet from P-201 | 25 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | Dipleg | 5 |
| N6 | Spare | 25 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 6 |
| | | | | | | | | | | | 7 |
| K1,K2 | Light and Sight Glass | 100 x 100 | - | - | SS 316 | - | - | - | - | - | 8 |
| K3 | Level Gauge | 20 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 9 |
| K4 | Level Gauge | 20 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 10 |
| | | | | | | | | | | | 11 |
| | | | | | | | | | | | 12 |

- NOTES**
- Lifting lugs, earthing boss(SS316) and name plate are to be provided.
 - Dip leg to be provided with 3Ø antisiphon holes and suitable supporting arrangement.
 - Dished ends shall conform to IS 4179.

| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------|--------|-------------|----|-----|-----|------|--------------------------------|---------|---|---|---|---|---|---|---|---|
| | | | | | | | ISSUES / DISTRIBUTION / COPIES | | | | | | | | | |

All dimensions in mm, unless specified

DO NOT SCALE

MECH ENGR PRCS ENGR INST ENGR ELECT ENGR CIVIL ENGR CLIENT CONSULTANT CONTRACTOR

CLEARANCES

MR - MR 19.07.23 MR/SAK - TPK/MR/SAK

DESIGN PREPARED VER/CHD APPROVED

| SCALE | REFERENCES | SOFT COPY REF | | | DWG/DOC/SK No. | SHEET | REV |
|-------|------------|---------------|--------|------|----------------------------|--------|-----|
| | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED-01-01 00 XXX | 1 OF 2 | - |

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STORAGE TANK(JACKETED) SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 2)

PROJECT CODE : -

CLIENT : -

CAPACITY : 0.125 TPD

LOCATION : -

- -

| GEN. | | | | R | | |
|------|---|--|---------------------|---|------------------------------|---|
| | 1 | Unit No. : ST-301 a,b | Dwg. No.: - | | Code : ASME Sec. VIII Div. I | 1 |
| | 2 | Title : DP Collection Tanks | Nos. required : Two | | Type : Vertical, Cylindrical | 2 |
| | 3 | Service : To Collect DP Solution from R-202c | | | 3 | |
| | 4 | Nominal Capacity : lit. : 1250 lit. | | | 4 | |
| | | | | 5 | | |

| PROCESS DATA | | | | | | | | |
|--------------|----------------------|------------------------------------|---------------------|--|------------------------|--------------|---------------|---|
| | 1 | Fluid | Shell : DP Solution | | Jacket : Cooling Water | 6 | | |
| | 2 | Operating Temperature : °C | Normal : 30 | | Maximum : 35 | Normal : 20 | Maximum : 30 | 7 |
| | 3 | Operating Pressure : kg/sq.cm.-g/¢ | Normal : Atm. | | Maximum : 1.1 | Normal : 2.0 | Maximum : 3.0 | 8 |
| | 4 | Density : at 30 °C kg/cu.m. | 1050 | | | 9 | | |
| 5 | Hazard Condition : - | | | | 10 | | | |
| | | | | | 11 | | | |
| | | | | | 12 | | | |

| CONSTRUCTION DATA | | | | SHELL | | JACKET | | | | |
|-------------------|-------------------|-----------------------------|--------------------------------|---|-----------------------------|---------------------------------------|-------------|----|-------------|----|
| | 1 | Temperature : | °C | Design : 40 | Test : Amb. | Design : 40 | Test : Amb. | | 13 | |
| | 2 | Pressure : | kg/sq.cm.-g/¢ | Design : 1.2/3.3 ext | Test : 4.5 ext | Design : 3.3 | Test : 4.5 | | 14 | |
| | 3 | Corrosion Allowance | | | - | | | | 15 | |
| | 4 | Diameter | mm | OD :- | ID : 1000 | OD :- | ID : 1100 | | 16 | |
| | 5 | Straight Length | mm | 1400 | | | | | 1120 | 17 |
| | 6 | Thickness | mm | 5 MM | | | | | VTS | 18 |
| | 7 | Ends | Shell | Top | Type : Dish, Torrispherical | K.R. : 10% | Thk.: 5 MM | | S.F.: 50 mm | 19 |
| | | | Shell | Bottom | Type : Dish, Torrispherical | K.R. : 10% | Thk.: 5 MM | | S.F.: 50 mm | 20 |
| | | | Jacket | Bottom | Type : Dish, Torrispherical | K.R. : 10% | Thk.: 5 MM | | S.F.: 50 mm | 21 |
| | 8 | Supports | | | Type : VTS | Nos. : - | | | 22 | |
| | 7 | Material Of Construction | Shell : SA 240 SS 316 | | | Heads : SA 240 SS 316 | | | 23 | |
| | | | Jacket Shell : CS A 285 Gr. C | | | Jacket Head : CS A 285 Gr. C | | | 24 | |
| | | | Supports : CS to IS 226 | | | Internal/External Bolting : SS 316/CS | | | 25 | |
| Gaskets : PTFE | | | Jacket / Internals : CS/SS 316 | | 26 | | | | | |
| 9 | Heat Treatment | | | Stress Relieving : - | | Others : - | 27 | | | |
| 10 | Tests | Hydraulic / Pneumatic : YES | | | Dye-Penetrant : - | | 28 | | | |
| | | Radiographic : - | | | Others : - | | 29 | | | |
| 11 | Insulation | | | Type : HCl / CCl / PPI - | | Thk. : - | 30 | | | |
| 12 | Painting / Finish | | | All CS parts to be painted with two coats of red oxide primer | | | | 31 | | |
| 13 | Weight : | kg | Empty : 630 | | Full of water : 2285 | | 32 | | | |
| 14 | Inspection By | | | IICT / Client / Third Party | | Others : - | 33 | | | |

| NOTES | GENERAL NOTES. | | | | | | | | |
|-------|----------------|--|--|--|--|--|--|--|----|
| | 1 | All dimensions are in mm | | | | | | | 36 |
| | 2 | VTS – Vendor to specify. | | | | | | | 37 |
| | 3 | Nozzles shall be provided with companion flange, gaskets, nuts, and washers shall be suitably blanked off before dispatch. | | | | | | | 38 |
| | 4 | All nozzle – top, side and bottom shall be 150 mm in length unless otherwise specified. | | | | | | | 39 |
| | 5 | Nozzle orientation and support height shall be provided by vendor | | | | | | | 40 |
| | 6 | Vendor shall provide detailed drawing for approval from CSIR-IICT and shall guarantee the mechanical performance. | | | | | | | 41 |
| | 7 | Suitable stiffeners to be provided for all the nozzles. | | | | | | | 42 |
| | 8 | Dimensions are based on IS 4179. Vendor to specify the equivalent. | | | | | | | 43 |

| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------|--------|-------------|----|-----|-----|------|------|--------------------------------|---|---|---|---|---|---|---|---|
| | | | | | | | | ISSUES / DISTRIBUTION / COPIES | | | | | | | | |

All dimensions in mm, unless specified **DO NOT SCALE**

| | | | | | | | |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|

| CLEARANCES | | | | | | | |
|------------|------------|---------------|----------|----------------|----------------------------|------------|-----|
| MR | - | MR | 19.07.23 | MR/SAK | - | TPK/MR/SAK | |
| DESIGN | | PREPARED | | VER/CHD | | APPROVED | |
| SCALE | REFERENCES | SOFT COPY REF | | DWG/DOC/SK/No. | | SHEET | REV |
| | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED-01-06 00 XXX | 1 OF 2 | - |

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STORAGE SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 2)

PROJECT CODE : -

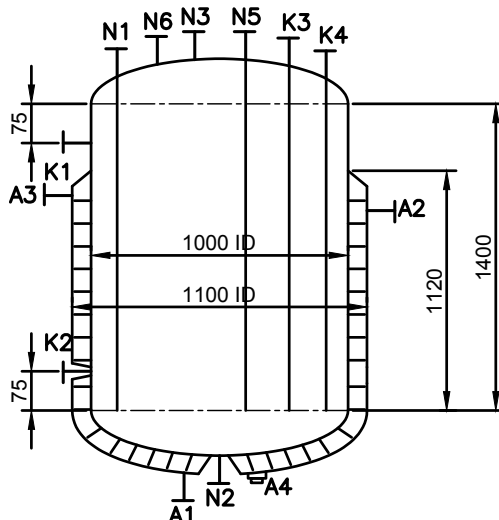
CLIENT : -

CAPACITY : 0.125 TPD

LOCATION : -

1 Unit No. : ST-301 a,b

Title : DP Collection Tanks



NOZZLE SCHEDULE

| NOZZLE MARK | SERVICE | NOZZLE DETAILS | | | | FLANGE DETAILS | | | | REMARKS | R |
|-------------|--|----------------|------|-----------|--------|----------------|--------|-------|--------|---------|----|
| | | SIZE NB(mm) | Sch. | Length mm | M.O.C. | STANDARD | RATING | TYPE | M.O.C. | | |
| N1 | Inlet from R-301c | 50 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | Dipleg | 1 |
| N2 | Outlet to P-301 a,b | 50 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 2 |
| N3 | Vent | 25 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 3 |
| N4 | Recirculation | 50 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | Dipleg | 4 |
| N5 | Spare | 25 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 5 |
| | | | | | | | | | | | 6 |
| K1 | Level Gauge | 20 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 7 |
| K2 | Level Gauge | 20 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 8 |
| K3 | Temperature Indicator | 20 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | Dipleg | 9 |
| K4 | pH Indicator | 20 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | Dipleg | 10 |
| | | | | | | | | | | | 11 |
| A1 | Cooling Water Inlet | 25 | 10 | 100 | CS | ANSI,B16.5 | #150 | SO,RF | CS | | 12 |
| A2 | Cooling Water Outlet | 25 | 10 | 100 | CS | ANSI,B16.5 | #150 | SO,RF | CS | | 13 |
| A3 | Jacket Vent | 25 | 40 | 100 | CS | ANSI,B16.5 | #150 | SO,RF | CS | | 14 |
| A4 | Jacket Drain (Plug) | 3/4" | - | - | CS | - | #3000 | - | - | | 15 |
| 9 | Lifting lugs, earthing boss(SS316) and name plate are to be provided. | | | | | | | | | | 16 |
| 10 | Dip leg to be provided with 3Ø antisiphon holes and suitable supporting arrangement. | | | | | | | | | | |
| 11 | Dished ends shall conform to IS 4179. | | | | | | | | | | |

| | | | | | | | | | | | | | | | |
|--------|-------------|----|-----|-----|------|------|---------|---|---|---|---|---|---|---|---|
| STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--------|-------------|----|-----|-----|------|------|---------|---|---|---|---|---|---|---|---|

All dimensions in mm, unless specified **DO NOT SCALE**

| | | | | | | | |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|
| MECH ENGR | PRCS ENGR | INST ENGR | ELECT ENGR | CIVIL ENGR | CLIENT | CONSULTANT | CONTRACTOR |
|-----------|-----------|-----------|------------|------------|--------|------------|------------|

CLEARANCES

| | | | | | | |
|--------|---|----------|----------|---------|---|------------|
| MR | - | MR | 19.07.23 | MR/SAK | - | TPK/MR/SAK |
| DESIGN | | PREPARED | | VER/CHD | | APPROVED |

| | | | | | | | |
|-------|------------|---------------|--------|------|----------------------------|--------|-----|
| SCALE | REFERENCES | SOFT COPY REF | | | DWG/DOC/SK-No. | SHEET | REV |
| | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED-01-01 00 XXX | 2 OF 2 | |

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STORAGE SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 2)

PROJECT CODE : -

CLIENT : -

CAPACITY : 0.125 TPD

LOCATION : -

-

1 Unit No. : ST-302

Title : L Preparation Vessel

Sparger Details

Sparger Dia = 530 mm

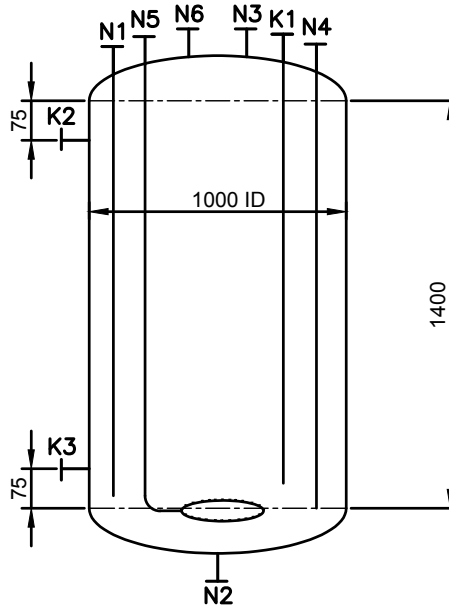
HT. from Bot. = 250 mm

Sparger Pipe Dia = 15NB

Hole size = 2 Ø mm

No. of Holes = 10 Nos.

Dist between Holes = 60 mm



NOZZLE SCHEDULE

| NOZZLE MARK | SERVICE | NOZZLE DETAILS | | | | FLANGE DETAILS | | | | REMARKS | R |
|-------------|----------------------|----------------|------|-----------|--------|----------------|--------|-------|--------|---------|----|
| | | SIZE NB(mm) | Sch. | Length mm | M.O.C. | STANDARD | RATING | TYPE | M.O.C. | | |
| N1 | Inlet from P-302 a,b | 50 | 10s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | Dipleg | 1 |
| N2 | Outlet to P-303 | 50 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 2 |
| N3 | Vent | 25 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 3 |
| N4 | Recirculation | 50 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | Dipleg | 4 |
| N5 | CO2 Inlet | 15 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | Sparger | 5 |
| N6 | Spare | 25 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 6 |
| | | | | | | | | | | | 7 |
| K1 | pH Indicator | 20 | 40s | 150 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | Dipleg | 8 |
| K2 | Level Gauge | 20 | 40s | 100 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 9 |
| K3 | Level Gauge | 20 | 40s | 100 | SS 316 | ANSI, B16.5 | #150 | SO,RF | SS 316 | - | 10 |
| | | | | | | | | | | | 11 |
| | | | | | | | | | | | 12 |

| | | | |
|-------|----|--|----|
| NOTES | 9 | Lifting lugs, earthing boss(SS 316) and name plate are to be provided. | 13 |
| | 10 | Dip leg to be provided with 3Ø antisiphon holes and suitable supporting arrangement. | 14 |
| | 11 | Dished ends shall conform to IS 4179. | |

| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------|--------|-------------|----|-----|-----|------|--------------------------------|---------|---|---|---|---|---|---|---|---|
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All dimensions in mm, unless specified

DO NOT SCALE

MECH ENGR PRCS ENGR INST ENGR ELECT ENGR CIVIL ENGR CLIENT CONSULTANT CONTRACTOR

CLEARANCES

MR MR 19.07.23 MR/SAK - TPK/MR/SAK

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SCALE REFERENCES SOFT COPY REF DWG/DOC/SK-~~No.~~ SHEET

CD/FP FOLDER FILE DE-XXX-XXX-ED-01-01 00 2 OF 2 REV -

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STORAGE SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 2)

PROJECT CODE : -

CLIENT : -

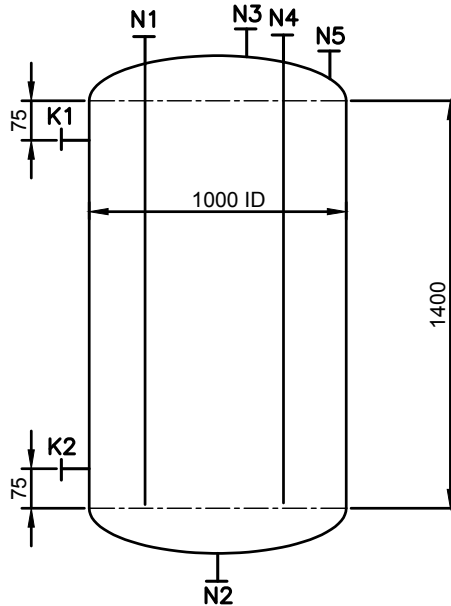
CAPACITY : 0.125 TPD

LOCATION : -

-

1 Unit No. : ST-303

Title : L Collection Tank



NOZZLE SCHEDULE

| NOZZLE MARK | SERVICE | NOZZLE DETAILS | | | | FLANGE DETAILS | | | | REMARKS | R |
|-------------|------------------------|----------------|------|-----------|--------|----------------|--------|-------|--------|---------|----|
| | | SIZE NB(mm) | Sch. | Length mm | M.O.C. | STANDARD | RATING | TYPE | M.O.C. | | |
| N1 | Inlet from P-303 | 50 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | Dipleg | 1 |
| N2 | Bottom Outlet to P-304 | 50 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 2 |
| N3 | Vent | 25 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 3 |
| N4 | Recirculation | 50 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | Dipleg | 4 |
| N5 | Spare | 25 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 5 |
| | | | | | | | | | | | 6 |
| K1 | Level Gauge | 20 | 40s | 100 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 7 |
| K2 | Level Gauge | 20 | 40s | 100 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 8 |
| | | | | | | | | | | | 9 |
| | | | | | | | | | | | 10 |
| | | | | | | | | | | | 11 |
| | | | | | | | | | | | 12 |

| NOTES | DESCRIPTION | NO. |
|-------|--|-----|
| 9 | Lifting lugs, earthing boss(SS 316) and name plate are to be provided. | 13 |
| 10 | Dip leg to be provided with 3Ø antisiphon holes and suitable supporting arrangement. | 14 |
| 11 | Dished ends shall conform to IS 4179. | |

| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------|--------|-------------|----|-----|-----|------|--------------------------------|---------|---|---|---|---|---|---|---|---|
| | | | | | | | ISSUES / DISTRIBUTION / COPIES | | | | | | | | | |

All dimensions in mm, unless specified

DO NOT SCALE

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CLEARANCES

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DESIGN PREPARED VER/CHD APPROVED

| SCALE | REFERENCES | SOFT COPY REF | | | DWG/DOC/SK No. | SHEET | REV |
|-------|------------|---------------|--------|------|----------------------------|--------|-----|
| | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED-01-01 00 XXX | 2 OF 2 | - |

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STORAGE SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 2)

PROJECT CODE : -

CLIENT : -

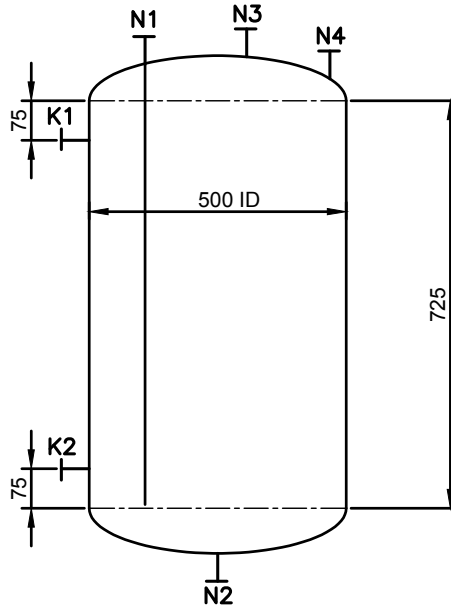
CAPACITY : 0.125 TPD

LOCATION : -

-

1 Unit No. : ST-304

Title : P Collection Tank



NOZZLE SCHEDULE

| NOZZLE MARK | SERVICE | NOZZLE DETAILS | | | | FLANGE DETAILS | | | | REMARKS | R |
|-------------|------------------|----------------|------|-----------|--------|----------------|--------|-------|--------|---------|----|
| | | SIZE NB(mm) | Sch. | Length mm | M.O.C. | STANDARD | RATING | TYPE | M.O.C. | | |
| N1 | Inlet from S-301 | 50 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | Dipleg | 1 |
| N2 | Outlet to ETP | 50 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 2 |
| N3 | Vent | 25 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 3 |
| N4 | Spare | 25 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 4 |
| | | | | | | | | | | | 5 |
| K1 | Level Gauge | 20 | 40s | 100 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 6 |
| K2 | Level Gauge | 20 | 40s | 100 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 7 |
| | | | | | | | | | | | 8 |
| | | | | | | | | | | | 9 |
| | | | | | | | | | | | 10 |
| | | | | | | | | | | | 11 |
| | | | | | | | | | | | 12 |

| NOTES | | |
|-------|--|----|
| 9 | Lifting lugs, earthing boss(SS 316) and name plate are to be provided. | 13 |
| 10 | Dip leg to be provided with 3Ø antisiphon holes and suitable supporting arrangement. | 14 |
| 11 | Dished ends shall conform to IS 4179. | |

| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------|--------|-------------|----|-----|-----|------|------|---------|--------------------------------|---|---|---|---|---|---|---|
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All dimensions in mm, unless specified

DO NOT SCALE

MECH ENGR PRCS ENGR INST ENGR ELECT ENGR CIVIL ENGR CLIENT CONSULTANT CONTRACTOR

CLEARANCES

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DESIGN PREPARED VER/CHD APPROVED

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|-------|------------|---------------|--------|------|----------------------------|--------|-----|
| | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED-01-01 00 XXX | 2 OF 2 | - |

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STORAGE SPECIFICATION DATA SHEET

Page
- OF -

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 2)

PROJECT CODE : -

CLIENT : -

CAPACITY : 0.125 TPD

LOCATION : -

-

| GEN. | | | | | | R | |
|--------------------------|--|-------------------------|------------------------------|----------------------------------|-------------|------------|----|
| 1 | Unit No. : ST-305 | Dwg. No.: | Code : ASME Sec. VIII Div. I | | | 1 | |
| 2 | Title : RF Collection Tank | Nos. required : One | Type : Vertical, Cylindrical | | | 2 | |
| 3 | Service : To Collect the RF Material | | | | | 3 | |
| 4 | Nominal Capacity : lit. : 1250 lit. | | | | | 4 | |
| | | | | | | 5 | |
| | | | | | | 6 | |
| PROCESS DATA | | | | | | | |
| 1 | Fluid | C5 Solution | | | | 7 | |
| 2 | Operating Temperature : °C | Normal : 25 | Maximum : 30 | | | 8 | |
| 3 | Operating Pressure : kg/sq.cm.-g/¢ | Normal : Atm. | Maximum : 1.1 | | | 9 | |
| 4 | Density : at 30 °C kg/cu.m. | 1000 | | | | 10 | |
| 5 | Hazard Condition : - | | | | | 11 | |
| | | | | | | 12 | |
| | | | | | | 13 | |
| CONSTRUCTION DATA | | | | | | | |
| 1 | Temperature : °C | Design : 40 | Test : Amb. | | | 14 | |
| 2 | Pressure : kg/sq.cm.-g/¢ | Design : 1.2 | Test : Full with Water | | | 15 | |
| 3 | Corrosion Allowance | | | | | 16 | |
| 4 | Shell | ØD/ID : 1000 mm | | St. Length : 1400 mm | | 17 | |
| | | Thk. : 5 MM | | | | 18 | |
| 5 | Ends | Top | Type : Dish, Torispherical | KR : 10% | Thk. : 5 MM | SF : 50 mm | 19 |
| | | Bottom | Type : Dish, Torispherical | KR : 10% | Thk. : 5 MM | SF : 50 mm | 20 |
| 6 | Supports | | | | | 21 | |
| | | Type : LEG | | Nos. : 4 Nos. | | 22 | |
| 7 | Material Of Construction | Shell : SA 240 SS 316 | | Heads : SA 240 SS 316 | | 23 | |
| | | Supports : CS to IS 226 | | Internal Bolting : SS 316 | | 24 | |
| | | Gaskets : PTFE | | External Bolting : CS to IS 1364 | | 25 | |
| | | Shell Flanges : - | | Jacket / Internals : SS 316 | | 26 | |
| | | Nozzles : SS 316 | | Other wetted parts : SS 316 | | 27 | |
| | Flanges : - | | | | | 28 | |
| 8 | Heat Treatment | | | | | 29 | |
| | Stress Relieving : - | | Others : - | | | 30 | |
| 9 | Tests | | | | | 31 | |
| | Hydraulic / Pneumatic : Yes | | Dye-Penetrant : - | | | 32 | |
| | Radiographic : - | | Others : - | | | 33 | |
| 10 | Insulation | | | | | 34 | |
| | Type : HCI / CCI / PPI - | | Thk. : - | | | 35 | |
| 11 | Painting / Finish | | | | | 36 | |
| | All CS parts to be painted with two coats of red oxide primer | | | | | 37 | |
| 12 | Weight : kg | | | | | 38 | |
| | Empty : 355 | | Full of water : 1675 | | | 39 | |
| 13 | Inspection By | | | | | 40 | |
| | IICT / Client / Third Party - | | Others : - | | | 41 | |
| | | | | | | 42 | |
| | | | | | | 43 | |
| NOTES | | | | | | | |
| | GENERAL NOTES. | | | | | | 44 |
| 1 | All dimensions are in mm | | | | | | 45 |
| 2 | VTS - Vendor to specify. | | | | | | 46 |
| 3 | Nozzles shall be provided with companion flange, gaskets, nuts, and washers shall be suitably blanked off before dispatch. | | | | | | 47 |
| 4 | All nozzle - top, side and bottom shall be 150 mm in length unless otherwise specified. | | | | | | 48 |
| 5 | Nozzle orientation and support height shall be provided by vendor | | | | | | 49 |
| 6 | Vendor shall provide detailed drawing for approval from CSIR-IICT and shall guarantee the mechanical performance. | | | | | | 50 |
| 7 | Suitable stiffeners to be provided for all the nozzles. | | | | | | 51 |
| 8 | Dimensions are based on IS 4179. Vendor to specify the equivalent. | | | | | | 52 |

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| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--|--------|-------------|----|---------------|--------|------------|----------------------------|------------|---|--------|---|------------|---|------------|---|---|
| All dimensions in mm, unless specified | | | | | | | | | | | | | | | | |
| DO NOT SCALE | | | | | | | | | | | | | | | | |
| MECH ENGR | | PRCS ENGR | | INST ENGR | | ELECT ENGR | | CIVIL ENGR | | CLIENT | | CONSULTANT | | CONTRACTOR | | |
| CLEARANCES | | | | | | | | | | | | | | | | |
| MR | | - | | MR | | 19.07.23 | | MR/SAK | | - | | TPK/MR/SAK | | | | |
| DESIGN | | | | PREPARED | | | | VER/CHD | | | | APPROVED | | | | |
| SCALE | | REFERENCES | | SOFT COPY REF | | | DWG/DOC/SK/No. | | | SHEET | | REV | | | | |
| | | | | CD/FP | FOLDER | FILE | DE-XXX-XXX-ED-01-01 00 XXX | | | 1 OF 2 | | - | | | | |



STORAGE SPECIFICATION DATA SHEET

Page
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PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 2)

PROJECT CODE : -

CLIENT : -

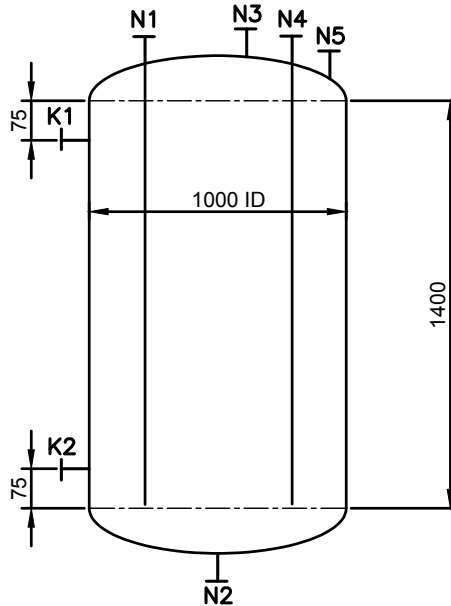
CAPACITY : 0.125 TPD

LOCATION : -

-

1 Unit No. : ST-305

Title : RF Collection Tank



NOZZLE SCHEDULE

| NOZZLE MARK | SERVICE | NOZZLE DETAILS | | | | FLANGE DETAILS | | | | REMARKS | R |
|-------------|-------------------|----------------|------|-----------|--------|----------------|--------|-------|--------|---------|----|
| | | SIZE NB(mm) | Sch. | Length mm | M.O.C. | STANDARD | RATING | TYPE | M.O.C. | | |
| N1 | Inlet from Fi-302 | 50 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | Dipleg | 1 |
| N2 | Outlet to P-306 | 50 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 2 |
| N3 | Vent | 25 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 3 |
| N4 | Recirculation | 50 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | Dipleg | 4 |
| N5 | Spare | 25 | 40s | 150 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 5 |
| | | | | | | | | | | | 6 |
| K1 | Level Gauge | 20 | 40s | 100 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 7 |
| K2 | Level Gauge | 20 | 40s | 100 | SS 316 | ANSI,B16.5 | #150 | SO,RF | SS 316 | - | 8 |
| | | | | | | | | | | | 9 |
| | | | | | | | | | | | 10 |
| | | | | | | | | | | | 11 |
| | | | | | | | | | | | 12 |

| NOTES | DESCRIPTION | NO. |
|-------|--|-----|
| 9 | Lifting lugs, earthing boss(SS 316) and name plate are to be provided. | 13 |
| 10 | Dip leg to be provided with 3ø antisiphon holes and suitable supporting arrangement. | 14 |
| 11 | Dished ends shall conform to IS 4179. | |

| S.No. | STATUS | DESCRIPTION | BY | CHD | APD | DATE | DATE | TR. No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------|--------|-------------|----|-----|-----|------|--------------------------------|---------|---|---|---|---|---|---|---|---|
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All dimensions in mm, unless specified

DO NOT SCALE

MECH ENGR PRCS ENGR INST ENGR ELECT ENGR CIVIL ENGR CLIENT CONSULTANT CONTRACTOR

CLEARANCES

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|-------|------------|---------------|--------|------|-------------------------------|--------|-----|
| | | CD/FP | FOLDER | FILE | | | |
| | | | | | DE-XXX-XXX-ED-01-01 00 XXX | 2 OF 2 | - |

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| | | | |
|---|--|--|--|
| Instrument Index | | Date: _____ Doc. No.: _____ Revision No.: Rev. 0 | |
| Project: _____ Client: _____ Location: _____ Unit: Section-300 | Prepared By: GSS Checked By: KK & Approved By: _____ | | |

| S.No | Tag No. | Equipment Name | Service | Location | Range | Units | Description | Type | Remarks |
|------|------------------------------|----------------------------|---|--------------------|---------|------------------|----------------------------|--------------------|---------|
| 1 | TE-301 a,b,c TI-301 a,b,c | R-301 a,b,c R-301 a,b,c | R-301 a,b,c Hot Oil Jacket Inlet Temp. Temp. Indicator | R-301 a,b,c | 0-250 | deg. C deg. C | Temp. element Indicator | RTD Ctrl. Panel | |
| 2 | TE-302 a,b,c TI-302 a,b,c | R-301 a,b,c R-301 a,b,c | R-301 a,b,c Temp. Temp. Indicator | R-301 a,b,c | 0-150 | deg. C deg. C | Temp. element Indicator | RTD Ctrl. Panel | |
| 3 | TE-303 a,b TI-303 a,b | ST-301 a,b ST-301 a,b | ST-301 a,b Cooling Water Return Temp Temp. Indicator | ST-301 a,b | 0-100 | deg. C deg. C | Temp. element Indicator | RTD Ctrl. Panel | |
| 4 | TE-304 a,b TI-304 a,b | Cr-301 a,b Cr-301 a,b | Cr-301 a,b Temp. Temp. Indicator | Cr-301 a,b | 0-100 | deg. C deg. C | Temp. element Indicator | RTD Ctrl. Panel | |
| 5 | TE-305 a,b TI-305 a,b | Cr-301 a,b Cr-301 a,b | Cr-301 a,b Jacket Temp. Temp. Indicator | Cr-301 a,b | ~10-50 | deg. C deg. C | Temp. element Indicator | RTD Ctrl. Panel | |
| 1 | PG-301 | CY-301 | CY-Header to R-301 Line Pressure | CY-301 Header | 0-6 | Bar | Pressure Gauge | Bourdon | |
| 2 | PG-302 a,b,c | R-301 a,b,c | R-301 a,b,c Hot Oil Inlet Pressure | R-301 a,b,c | 0-6 | Bar | Pressure Gauge | Bourdon | |
| 3 | PG-303 a,b | ST-301 a,b | Pump P-301 a,b Outlet pressure | P-301 a,b Outlet | 0-6 | Bar | Pressure Gauge | Diaphragm | |
| 4 | PG-304 a,b | Cr-301 a,b | Cr-301 a,b EG-Mix Supply to Jacket Pressure | Cr-301 a,b EG-Mix | 0-6 | Bar | Pressure Gauge | Bourdon | |
| 5 | PG-305 a,b | Fi-301 a,b | Pump P-302 a,b Outlet pressure | P-302 a,b Outlet | 0-6 | Bar | Pressure Gauge | Diaphragm | |
| 6 | PG-306 | ST-302 | Pump P-303 Outlet pressure | P-303 Outlet | 0-6 | Bar | Pressure Gauge | Diaphragm | |
| 7 | PG-307 | ST-303 | Pump P-304 Outlet pressure | P-304 Outlet | 0-6 | Bar | Pressure Gauge | Diaphragm | |
| 8 | PG-308 | ST-304 | Pump P-305 Outlet Pressure | P-305 Outlet | 0-6 | Bar | Pressure Gauge | Diaphragm | |
| 9 | PG-309 | ST-305 | Pump P-306 Outlet Pressure | P-306 Outlet | 0-6 | Bar | Pressure Gauge | Diaphragm | |
| 1 | PSV-301 a,b,c | R-301 a,b,c | R-301 a,b,c Jacket pressure safety valve | R-301 a,b,c Jacket | 0-6 | Bar | Pressure safety valve | Spring Loaded | |
| 2 | PSV-302 a,b | ST-301 a,b | ST-301 a,b Jacket pressure safety valve | ST-301 a,b Jacket | 0-6 | Bar | Pressure safety valve | Spring Loaded | |
| 3 | PSV-303 a,b | Cr-301 a,b | Cr-301 a,b Jacket pressure safety valve | Cr-301 a,b Jacket | 0-6 | Bar | Pressure safety valve | Spring Loaded | |
| 1 | LG-301 a,b | ST-301 a,b | ST-301 a,b Level | ST-301 a,b | *1400 | mm | Level Gauge | Glass Tube | *Note-1 |
| 2 | LG-302 | ST-302 | ST-302 Level | ST-302 | *1400 | mm | Level Gauge | Glass Tube | *Note-1 |
| 3 | LG-303 | ST-303 | ST-303 Level | ST-303 | *1400 | mm | Level Gauge | Glass Tube | *Note-1 |
| 4 | LG-304 | S-301 | S-301 Level | S-301 | *2350 | mm | Level Gauge | Glass Tube | *Note-1 |
| 5 | LG-305 | ST-304 | ST-304 Level | ST-304 | *725 | mm | Level Gauge | Glass Tube | *Note-1 |
| 6 | LG-306 | ST-305 | ST-305 Level | ST-305 | *1400 | mm | Level Gauge | Glass Tube | *Note-1 |
| 1 | FT-301 | CY-301 | Flow Transmitter in Co2 to R-301 a,b,c Line | CY-301 Header | 0-50 | Kg/Hr | Mass flow transmitter | | |
| | FIC-301 | CY-301 | Flow Indicating Controller for CY-301 | CY-301 Header | | Kg/Hr | flow Ind. controller | Ctrl. Panel | |
| | FCV-301 | CY-301 | Co2 Flow Control Valve to R-301 a,b,c | CY-301 Header | 0 - 100 | % | Control Valve | pneumatic | |



| | | |
|-------------------------|--|-----------------------|
| Instrument Index | | Date: |
| Project: | | Doc. No.: |
| Client: | | Revision No. : Rev. 0 |
| Location: | | |
| Unit: Section-300 | | |
| Prepared By: GSS | | Checked By: KK & |
| | | Approved By: |

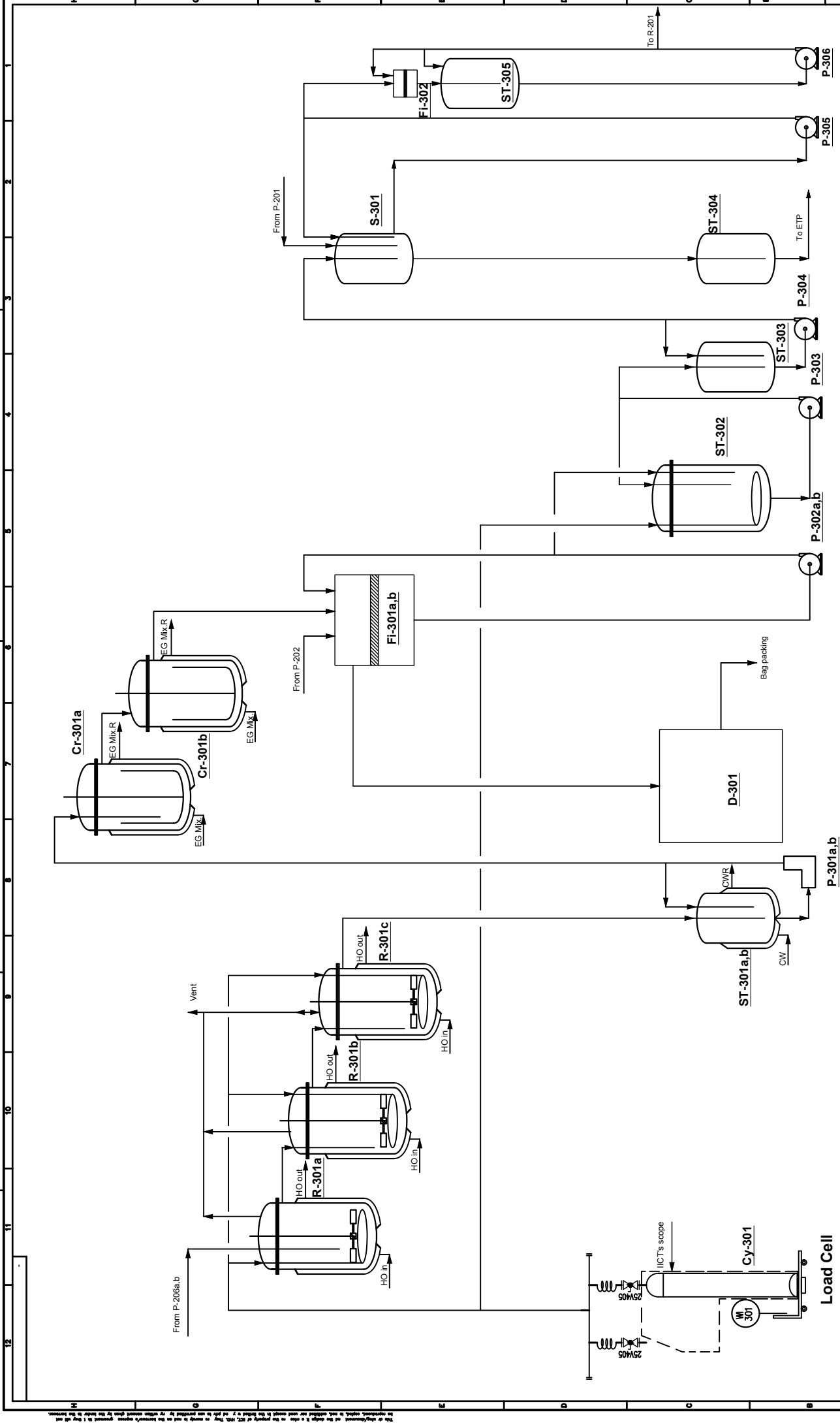
| S.No | Tag No. | Equipment Name | Service | Location | Range | Units | Description | Type | Remarks |
|------|---------------|----------------|--|--------------|---------|-------|-----------------------|-------------|---------|
| 2 | FT-302 | ST-301 a,b | Flow Transmitter for P-301 a,b to Cr-301a Line | P-301 a,b | 0-500 | Kg/Hr | Mass flow transmitter | | |
| | FIC-302 | ST-301 a,b | Flow Indicating Controller for P-301 a,b Outlet Line | P-301 a,b | | Kg/Hr | flow Ind. controller | Ctrl. Panel | |
| | FCV-302 | ST-301 a,b | Filtrate Flow Control Valve to Cr-301a | P-301 a,b | 0 - 100 | % | Control Valve | pneumatic | |
| 1 | VFD-301 a,b,c | R-301 a,b,c | R-301 a,b,c RPM Controller | R-301 a,b,c | 0-100 | % | Variable freq. Drive | Electronic | *Note-2 |
| 2 | VFD-302 a,b,c | Cr-301 a,b,c | Cr-301 a,b,c RPM controller | Cr-301 a,b,c | 0-100 | % | Variable freq. Drive | Electronic | *Note-2 |
| 1 | pHE-301 a,b,c | R-301 a,b,c | R-301 a,b,c pH Element/Sensor | R-301 a,b,c | 1-14 | | pH Element/Sensor | | |
| | pHI-301 a,b,c | R-301 a,b,c | R-301 a,b,c pH indicator | R-301 a,b,c | 1-14 | | pH indicator | Ctrl. Panel | |
| 2 | pHE-302 a,b | ST-301 a,b | ST-301 a,b pH Element/Sensor | ST-301 a,b | 1-14 | | pH Element/Sensor | | |
| | pHI-302 a,b | ST-301 a,b | ST-301 a,b pH indicator | ST-301 a,b | 1-14 | | pH indicator | Ctrl. Panel | |
| 3 | pHE-303 | ST-302 | ST-302 pH Element/Sensor | ST-302 | 1-14 | | pH Element/Sensor | | |
| | pHI-303 | ST-302 | ST-302 pH indicator | ST-302 | 1-14 | | pH indicator | Ctrl. Panel | |
| 1 | P-301 a,b | ST-301 a,b | Metering Pump | ST-301 a,b | 50 | LPM | Metering Pump | | |
| 2 | P-302 a,b | Fi-301 a,b | Transfer Pump | Fi-301 a,b | 100 | LPM | Transfer Pump | | |
| 3 | P-303 | ST-302 | Transfer Pump | ST-302 | 100 | LPM | Transfer Pump | | |
| 4 | P-304 | ST-303 | Transfer Pump | ST-303 | 100 | LPM | Transfer Pump | | |
| 5 | P-305 | S-301 | Transfer Pump | S-301 | 100 | LPM | Transfer Pump | | |
| 6 | P-306 | ST-305 | Transfer Pump | ST-305 | 100 | LPM | Transfer Pump | | |
| 1 | WI-201 | CY-301 | Weight Indicator | CY-301 | | kg | Indicator | Ctrl. Panel | |

*Note-1: Vendor has To be verified with equipment fabrication drawing.

*Note-2: Required RPM Display at Control Panel for VFDs.

Annexure II

PFDs AND P & I DRAWINGS



DO NOT SCALE

DESIGN & ENGINEERING DIVISION
CSIR-INDIAN INSTITUTE OF CHEMICAL TECHNOLOGY
HYDRABAD - 500 007

PROJECT : Pilot Plant Facility For Bulk Chemicals (Step 2)
 CLIENT : In-House
 LOCATION : IIC Hyderabad
 All dimensions in mm unless specified

PROJECT CODE : -
 CAPACITY : 125 Kg/Day

PROCESS FLOW DIAGRAM
 (Section - 300)

| DESIGN | PREP. RED. | VER./CHD. |
|--------|----------------|----------------|
| SC/LE | SOFT COPY REF. | DWG/DOC/SK No. |
| NTS | CD/FP/ FOLDER | FILE |

APPROVED
 SHEET 2 of 2
 REV 0

LEGEND

| S/No | EQPT. No. | Description | S/No | EQPT. No. | Description | S/No | EQPT. No. | Description |
|------|------------|---------------------------------|------|-----------|----------------------------------|------|-----------|-------------|
| 01 | P-301a,b | Centrif. Pump | 13 | ST-301a,b | Recycled Product Collection Tank | 27 | | |
| 02 | P-301c | Centrif. Pump | 14 | ST-302 | Proposed Product Vessel | 28 | | |
| 03 | P-302a,b | Centrif. Pump | 15 | ST-303 | Collection Tank | 29 | | |
| 04 | P-303 | Centrif. Pump | 16 | ST-304 | Collection Tank | 30 | | |
| 05 | P-304 | Centrif. Pump | 17 | ST-305 | Recycle Filtrate Collection Tank | 31 | | |
| 06 | P-302a,b | L. Transfer. Pump | 18 | | | 32 | | |
| 07 | P-303 | L. Transfer. Pump | 19 | | | 33 | | |
| 08 | P-304 | L. Transfer. Pump | 20 | | | 34 | | |
| 09 | P-305 | L. Transfer. Pump | 21 | | | 35 | | |
| 10 | P-306 | Recycle Filtrate Transfer. Pump | 22 | | | 36 | | |
| 11 | R-301a,b,c | Reaction Reactor | 23 | | | 37 | | |
| 12 | S-301 | Stripping Tank | 24 | | | 38 | | |

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