



सीएसआईआर-केन्द्रीय खनन एवं ईंधन अनुसंधान संस्थान (सिंफर)
CSIR-CENTRAL INSTITUTE OF MINING & FUEL RESEARCH (CIMFR)

बरवा रोड, धनबाद & 826 001 झारखंड, भारत

Barwa Road, Dhanbad – 826 001 Jharkhand, India

☎ : 0326-2203156/ 2093/ 202774/8789051398

E-mail: cospcimfr@cimfr.nic.in, spocimfr@cimfr.nic.in

वेबसाइट/website: - www.cimfr.nic.in

GSTIN : 20AAATC2716R1ZT

TENDER NO : CIMFR/PUR-14(09)2021

Date: 11.10-2021

GLOBAL TENDER ENQUIRY DOCUMENT (NIT) FOR THE PURCHASE OF

सिनगैस टु मेथानोल पायलट प्लान्ट/ Syngas to Methanol pilot plant.

Kindly Note :

1. Only those documents/ forms which are relevant to this tender and which have been called for should be submitted. (Not more than 50 Pages)
2. Bidders are requested to submit technical catalogue of relevant pages ONLY for the equipment/model they are quoting.
3. Kindly **do not** submit our NIT (duly signed and sealed), instead you can convey your acceptance of NIT terms and conditions in toto on your letter head as a self declaration.

Kindly cooperate with us in saving the environment by reducing the requirement of printing .

For any techno-commercial queries contact:- Mr. Pavan Kumar Gupta, Scientist, Mob: 9955335308, Email ID: pavan@cimfr.nic.in, pkchehit@gmail.com & Dr. Sudipto Datta, Sr. Pr. Scientist, Mob: 9471191154, Email ID: sdatta@cimfr.nic.in, sud.datta@gmail.com

INVITATION FOR BIDS / NIT

The Director, **CSIR-CIMFR, Barwa Road Campus, Dhanbad, Jharkhand.**, invites **E-bids** from manufacturers, their authorised distributors and Indian Agent of Foreign principals, if any, for purchase of items listed below:

Sl.No.	Tender No.	Description of items	Quantity	Single / Two bid	Bid Security (EMD) (in Indian Rupees)
1	CIMFR/PUR-14(09)2021 E-tender ID: 2021_CSIR_91329_1	Syngas to Methanol pilot plant. Detailed specifications, accessories are detailed in chapter 4	01 Set	Two	EMD/Bid Security is not required, however Bid Securing Declaration must be submitted by all bidders irrespective of belonging to any Category (viz. MSME/Non- MSME, etc.)

02. Interested Bidders may obtain further information from the office of the **Controller of Stores & Purchase, CSIR-CIMFR, Barwa Road Campus, Dhanbad, Jharkhand.**

03. Each complete set of bidding document may be downloaded directly from the CSIR- CIMFR website (www.cimfr.nic.in) free of cost and printed. No Hard copy of the Tender Documents will be sold or issued by the office.

The e-bids must be submitted through the CPPP – <https://etenders.gov.in/>, as per the critical dates mentioned. Bidders should also possess a valid Digital Signature Certificate (DSC) for online submission of bids. Bids received on e-tendering portal only will be considered. Bids in any other form sent through sealed cover/email/post/fax etc. will be rejected. will not be responsible for any delay in enrolment / registration as bidder or submitting /uploading the offer on e-tender portal. Hence, bidders are advised to register in e-tendering website URL– <https://etenders.gov.in/> and enrol their Digital Signature Certificate and upload their quotation well in advance.

Any change/corrigendum/extension of opening date in respect of this tender shall be issued through websites only. Bidders are therefore requested to regularly visit our website for updates.

04. ~~A Pre-bid Conference will be held on the date and time as indicated in Critical Date Sheet at CSIR- CIMFR. All prospective bidders are requested to kindly submit their queries with NIT reference No. through email, if any so as to reach Shri Pavan Kumar Gupta (pavan@cimfr.nic.in) and Controller of Stores & Purchase (cospcimfr@cimfr.nic.in) latest by the date and time as indicated in Critical Date Sheet.~~

05. ~~All bids must be accompanied with a bid security as specified above and must be delivered to the above office at the date and time indicated above. Bids will be opened in the presence of Bidders' authorized representatives who choose to attend on the specified date and time. In the event of the date specified for bid receipt and opening being declared as a closed holiday for purchaser's office, the due date for submission of bids and opening of bids will be the following working day at the appointed time.~~

~~Or~~

All bids must be accompanied with a **Bid Securing Declaration** as specified above and must be delivered to the above office at the date and time indicated above. Bids will be opened in the presence of Bidders' authorized representatives who choose to attend on the specified date and time. In the event of the date specified for bid receipt and opening being declared as a closed holiday for purchaser's office, the due date for submission of bids and opening of bids will be the following working day at the appointed time.

06. Eligibility of Bidders-

(i.) As per DPIIT Order No. P-45021/2/2017-PP (BE-II) dated 16.09.2020, 'Non Local Suppliers' are also eligible to bid for this tender alongwith 'Class-I Local Suppliers' and 'Class-II Local Suppliers'.

The definitions and the relevant terms of purchase preference policy in respect of Make in India is available in Clause 1.32 titled "Evaluation and comparison of bids " of Chapter- 1 (Instructions to Bidders) of this document.

(iii.) Any bidder from a country which shares a land border with India will be eligible to bid for this tender only if the bidder is registered with the competent authority and fulfills all the eligibility criteria as per Department of Expenditure, MoF order No. 6/18/2019-PPD dated 23.07.2020.

The definitions and the relevant terms of Department of Expenditure, MoF order No. 6/18/2019-PPD dated 23.07.2020 is available in Clause 1.46 of Chapter- 1 (Instructions to Bidders) of this document.

06. As per Govt. of India procurement policies (*Ministry of Commerce and Industry, Dept. for Promotion of Industry and Internal Trade Order No. P- 45021/2/2017-PP(BE-II) dated 16.09.20,*

- a. The Purchaser intends to give purchase preference to Class-I Local suppliers in this procurement.
- b. Non Local Suppliers are also eligible along with class-I and Class-II local suppliers in this tender.

"Local content" means the amount of value added in India which shall, unless otherwise prescribed by the Nodal Ministry, be the total value of the items procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties) as a proportion of the total value, in percent.

Class- I Local supplier means a supplier or service provider, whose goods, services or work offered for procurement, has local content equal to or more than 50%

Class- II Local Supplier means a supplier or service provider, whose goods, services or work offered for procurement, has local content more than 20% but less than 50%

07. The Director, CSIR- CIMFR 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 without assigning any reason.

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3	Schedule of Requirement
4	Specifications and Allied Technical Details
5	Price Schedule Forms
6	Qualification Requirements
7	Contract Form
8	Other Forms

CRITICAL DATE SHEET

Sl. No.	Stage	Date & Time	Date & Time
1	Publish Date & Time	12-10-2021	11:00
2	Document Download Start Date & Time	12-10-2021	11:00
3	Last Date & time for receipt of queries	22-10-2021	17:00
4	Pre-bid Conference, if any Venue- CSIR- CIMFR, Digwadih Campus, Dhanbad VIDE Open Tender No CIMFR/PUR-14(09)2021	Already held ON 06-10- 2021	
5	Date of technical corrigendum after pre-bid conference	NA	
6	Bid Submission Start Date & time	12-10-2021	11:00
7	Bid Submission End Date & Time	02-11-2021	11:00
8	Bid Opening Date & Time (XX)	03-11-2021	11:00

TENTATIVE TIME SCHEDULE OF PROCUREMENT PLANNING

Sl.No	Stage	Tentative Time Frame (in days)
1.	Date of Bid Opening	XX
2.	Date of Completion of Technical Bid Evaluation	XX + 50
3.	Date of communication of Rejection of Bids	XX + 65
4.	Date of Receipt of context, if any, from Bidders	XX + 70
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CHAPTER - 1

INSTRUCTIONS TO BIDDERS

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1.1. Eligible Bidders

1.1.1

This Invitation for Bids is open to all suppliers subject to para 06 of the invitation for bids/NIT.

1.1.2

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 than 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.

1.1.3

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

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

1.1.4

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

1.1.5

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.

1.1.6

Bids from Joint Ventures, Consortium or Associations so long as they are formed and registered prior to the bid submission date.

1.1.7

The bidders who have been put under Holiday listing / **debarred/ blacklisted** or removed from the list of registered suppliers by the purchaser or banned from Ministry/country wide procurement shall be ineligible for participation in the bidding process.

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 For Public Procurement

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, and so on.

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 sue-moto 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.

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 bid security;
 - 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

Interested eligible bidders may purchase the bidding documents on payment of the cost of bidding documents as indicated in the invitation for bids/NIT or alternatively, the bidding documents can be downloaded from our Website 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:
(1) Bidder Information Form
(2) Manufacturer's Authorization Form (MAF);
(3) Bid Security Form – if EMD is applicable
(4) Bid Securing declaration
(5) Performance Statement form
(6) Deviation Statement Form;
(7) Service Support details;
(8) Bid form
(9) Performance Security Form;
(10) Acceptance Certificate Form
(11) Integrity pact
(12) Format for declaration by the bidder for code of integrity and Conflict of interest.
(13) Format for Certificate of compliance to MoF, DOE Order No. 6/18/2019-PPD dated 23rd July, 2020.
(14) Price Schedule Form For Goods Being Offered From India Or For Goods Manufactured Abroad But Quoted In INR.

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 at the Purchaser's address specified in the Special Conditions of Contract (SCC), latest by the date specified in the critical date sheet. No request for clarification or query shall normally be entertained after the deadline/pre-bid conference/ **Date specifically mentioned in the critical date sheet**, if any. Should the Purchaser deem it necessary to amend the Tender Documents as a result of a clarification, it shall do so following the

procedure under Clause relating to amendment of Tender 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 and also shall be sent to all bidders who have purchased the tender documents.

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 all prospective bidders are expected to surf the website before submitting their bids to take cognizance of the amendments. However, the copies of the amendments would be sent by registered post/speed post/courier/e-mail to all the bidders who have purchased the tender documents.

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.

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 only.

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

1.9.1

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 Small and Medium enterprises (SMEs) and disadvantaged sections of the society and to address environmental concerns along with preferential market access in govt. procurements.

1.9.2

The extant procurement would abide by DPIIT Order No. P-45021/2/2017-PP (BE-II) dated 16.09.2020 to provide purchase preference to Class-I Local Suppliers as defined and directed by the order.

1.10.1 Documents comprising the bid

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/ **Bid Securing Declaration** as specified in the Invitation for Bids;
- (d) Service support details form;
- (e) Deviation Statement Form;
- (f) Performance Statement Form;
- (g) Manufacturer's Authorization Form 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) Integrity Pact, if required;
- (j) Documents establishing goods eligibility and conformity to bidding documents; indicating the Indian Customs Tariff Number (ICT & HSN No.) .
- (k) Schedule of requirements.
- (l) Self-certification that the item offered meets the minimum local content of 50% giving 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.
- (m) In cases of procurement for a value in excess of ₹ 10 crores, the local supplier shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content to avail the benefits under the make in India policy, if applicable.
- (n) Documentary evidence about the status of the bidder i.e. whether MSE or not, owned by SC/ST or not and whether the MSE is owned by a women entrepreneur or not.

B. Price bid

- (i) Bid form;
- (ii) 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

- (i) The price of the goods quoted Ex-works including taxes already paid.
- (ii) GST and other taxes, if any which will be payable on the goods if the contract is awarded.
- (iii) 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.
- (iv) Wherever applicable, the cost towards the installation, commissioning, spares, extended warranty, AMC/CMC, site preparation and training including any incidental services, if any.

(b) For Goods manufactured abroad

- (i) The price of the goods, quoted on FCA (named place of delivery abroad) or FOB (named port of shipment), as specified in the price schedule form.
- (ii) The charges for insurance and transportation of the goods to the port / place of destination both by Air/Sea.
- (iii) The agency commission charges, if any.
- (iv) Wherever applicable, the cost towards the installation, commissioning, spares, extended warranty, AMC/CMC, site preparation and training including any incidental services, if any.

1.12.3

The terms FOB, FCA, CIF, CIP etc. shall be governed by the rules prescribed in the current edition of the Incoterms published by the International Chambers of Commerce, Paris.

1.12.4

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

1.12.5

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

1.12.6

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.

1.12.7

The Purchaser is registered with Dept. of Scientific & Industrial Research, Govt. of India and concessional customs duty and GST & IGST are leviable 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

1.12.8

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.

1.12.9

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 TDS etc.), wherever applicable.

1.13. Bid Currencies

1.13.1

Prices shall be quoted in Indian Rupees for offers received for supply within India and in freely convertible foreign currency in case of offers received for supply from foreign countries i.e. domestic tenderers are to quote and accept their payment in Indian currency; Indian agents of foreign suppliers are to receive their agency commission in Indian currency; cost of imported goods & services rendered in India, which are directly imported against the contract, may be quoted in foreign currency (currencies).

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) In case a bidder not doing business within India, it shall furnish the certificate to the effect that the bidder is or will be represented by an agent in India equipped and able to carry out the supply, maintenance, repair obligations etc. during the warranty and post warranty period or ensure a mechanism at place for carrying out the supply, maintenance, repair obligations etc. during the warranty and post-warranty period.

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

Alternate offers/makes/models would not be considered.

1.16. Bid Security

1.16.1

The Bidder shall furnish, as part of its bid, a 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.

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 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; or
- (b) Fixed Deposit receipt pledged in favour of the Lab. /Institute.
- (c) A Banker's cheque or demand draft in favour of the purchaser issued by any Scheduled commercial bank in India.
- (d) Bid Securing Declaration

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 **1.16.10** 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. 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 **180 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 single envelop or 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 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 comprising 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 initialled 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 initialled by the persons or persons signing the bid.

1.18.5

A Bidder from whose tenders id a bid is uploaded and submitted on e-tenders portal would be held fully responsible for the same even if the bid has not be signed and/ or stamped.

D. Submission and sealing of Bids

1.19. Submission of Bids on e-tenders

1.19.1

The Bidders may submit their duly signed, and stamped bids on e-tenders portal (etenders.gov.in) ONLY. No bids / copies of bids should be submitted by post/ courier/ FAX/ e-mail in any case.

1.19.2

In case of 2 Bid tenders, there will be a minimum of 2 envelops – (i) Technical Bid, (ii) Price Bid. The Technical and Price Bids must be submitted in the respective envelops/ covers only.

1.19.3

In case of 1- Bid tenders there will be one envelope, viz. Techno-commercial (Technical – cum- commercial) Bid in which technical bid as

well as a duly filled Price Schedule (as per format available in this tender document) may be submitted. The Price Schedule (cost breakup of the components and the net price) must match with the BOQ (Excel Sheet Price schedule on e-tenders). In case of mismatch between BOQ price and price schedule , the price schedule submitted in Techno-commercial bid will be considered valid.

1.19.4

Firms submitting Technical and Price bids in the Techno commercial Bid envelope against the requirement of two-bid system would be considered for further evaluation at the risk & responsibility of the bidder.

1.20. Deadline for Submission of Bids

1.20.1

The Bids must be uploaded / submitted on e-tenders portal from the bidder's registered e- tenders id on or before the Last date (and time) of Submission of bids, failing which the e-tenders portal will not allow Bid submission. No request for extension of Last date of Bid submission will normally be entertained by the competent authority.

1.20.2

The Purchaser is not bound to consider any technical difficulty faced by the bidder as a reason to extend the Last date of Bid submission.

1.21. Late Bids

1.21.1

e- tenders portal does not allow submission of late bids.

1.22. Withdrawal, substitution and Modification of Bids.

1.22.1

A Bidder may withdraw, substitute or modify its bid after it has been submitted , as per e-tenders portal rules/ provisions, prior to the last date (and time) of bid submission.

E. Opening and Evaluation of Bids

1.23 Opening of Bids by the Purchaser

1.23.1

All e- Bids would be opened online ONLY on or after the Bid Opening Date (and Time).

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 Bidder is not eligible.
- (ii) The Bid validity is shorter than the required period.
- (iii) The Bidder has quoted for goods manufactured by a different firm without the required authority letter from the proposed manufacturer.
- (iv) Bidder has not agreed to give the required performance security or has not furnished the bid security.
- (v) The goods quoted are sub-standard, not meeting the required specification, etc.
- (vi) Against the schedule of Requirement (incorporated in the tender enquiry), the bidder has not quoted for the entire requirement as specified in that schedule.
- (vii) The bidder has not agreed to some essential condition(s) incorporated in the tender enquiry.
- (viii) Integrity Pact not signed and submitted with the technical bid, if applicable as per SCC.

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 special conditions of contract (SCC) 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 and the SCC 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.

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.

1.32.3

Purchase preference shall be given to Class- I local suppliers in all procurements undertaken by the purchaser in the following manner (as per DPIIT Order No. P-45021/2/2017-PP (BE-II) dated 16.09.2020) :

(a) Definitions:

'Local Content' means the amount of value added in India which shall, unless otherwise prescribed by the Nodal Ministry, be the total value of the items procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties) as a proportion of the total value, in percent.

Please Note that Profit, warehousing, marketing, logistics, freight, Transportatin, Insurance, Installation & Commissioning, training and after sales services like AMC/CMC, etc can not be considered as local value addition. [as per clarification received from DPIIT on File No. P-45021/102/2019-PP(BE-II) (E-29930) dated 26.11.2020 and OM on File No.P-45021/102/2019-PP(BE-II) (E-50310) dated 04.03.2021.

'Class- I Local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, has local content equal to or more than 50%

'Class- II Local Supplier' means a supplier or service provider, whose goods, services or works offered for procurement, has local content more than 20% but less than 50%

'Non Local Supplier' means a supplier or service provider, whose goods, services or works offered for procurement, has local content less than or equal to 20%, as defined under above mentioned order.

'L1' means the lowest tender or lowest bid or the lowest quotation received in a tender, bidding process or other procurement solicitation as adjudged in the evaluation process as per the tender or other procurement solicitation.

'Margin of purchase preference' means the maximum extent to which the price quoted by a "Class-1 local supplier" may be above the L1 for the purpose of purchase preference. Margin of Purchase preference would be 20% for this tender.

'Nodal Ministry' means the Ministry or Department identified pursuant to this order in respect of a particular item of goods or services or works.

'Procuring entity' means a Ministry or department or attached or subordinate office of, or autonomous body controlled by, the Government of India and includes Government companies as defined in the Companies Act.

'Works' means all works as per Rule 130 of GFR-2017, and will also include turnkey works'.

(b) Purchase Preference:

(I) Purchase preference shall be given to 'Class-I local supplier' in procurements undertaken by procuring entities in the manner specified here under.

(II) In the procurements of goods or works, which are divisible in nature, the 'Class-1 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-1 local supplier', the contract for full quantity will be awarded to L1.

(ii) If L1 bid is not a 'Class-1 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-1 local supplier' fails to match the L1 price or accepts less than the offered quantity, the next higher 'Class-1 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-1 local suppliers, then such balance quantity may also be ordered on the L1 bidder.

- (III) In the procurements of goods or works, which are not divisible in nature, and in procurement of services where the bid is evaluated on price alone, the 'Class-1 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-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-1 local supplier', will be invited to match the L1 price subject to Class-1 local supplier's quoted price falling within the margin of purchase preference, and the contract shall be awarded to such 'Class-1 local supplier' subject to matching the L1 price.
- (iii) In case such lowest eligible 'Class-1 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-1 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.

(C) Verification of Local Content:

(I) The 'Class -I Local supplier'/ 'Class- II Local Supplier' at the time of the tender/ bidding or solicitation shall be required to indicate percentage of local content and provide self- certification that the item offered meets the local content requirement for 'Class -I Local supplier'/ 'Class- II Local Supplier', as the case may be. They shall also give details of the location(s) at which the local value addition is made.

(II) In cases of procurement for a value in excess of Rs. 10 Crores, the 'Class -I Local supplier'/ 'Class- II Local Supplier' shall be required to provide a certificate from a statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or a practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content. They shall also give details of the location(s) at which the local value addition is made.

(III) Decisions on complaints relating to implementation of this order shall be taken by the competent authority which is empowered to look into procurement -related complaints relating to the procuring entity.

(III) False declarations will be in breach of the code of integrity under Rule 175 (1) (i) (h) of the General Financial Rules for which a bidder or its successors can be debarred for up to Two years as per Rule 151(iii) of General Financial Rules along with such other actions as may be permissible under law.

(IV) A supplier who has been debarred by any procuring entity for violation of this order shall not be eligible for preference under this order for procurement by any other procuring entity for the duration of the debarment. The debarment for such other procuring entities shall take effect prospectively from the date on which it comes to the notice of other procurement entities, in the manner prescribed under paragraph 9 (h) of the order.

1.32.4

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.

For goods manufactured abroad

- (i) The price of the goods, quoted on FCA (named place of delivery abroad) or FOB (named port of shipment), as specified in the bidding document.
- (ii) The charges for insurance and transportation of the goods to the port/place of destination.
- (iii) The agency commission etc., if any.
- (iv) Wherever applicable, the cost towards the installation, commissioning, spares, extended warranty, AMC/CMC, site preparation and training including any incidental services, if any.

1.32.5. The comparison between the indigenous and the foreign offers shall be made on FOR destination basis and CIF/CIP basis respectively. However, the CIF/CIP prices quoted by any foreign bidder shall be loaded further as under:

- (a) Towards customs duty and other statutory levies - as per applicable rates.
- (b) Towards custom clearance, inland transportation etc. - 2% of the CIF/CIP value.

The bidder should give a clear cut breakup of EXW, FOB/FCA, CIF/CIP prices to facilitate proper comparison with the purchaser reserving the right to order on either basis, failing which the bid would be summarily ignored.

Note: Where there is no mention of packing, forwarding, freight, insurance charges, taxes etc. such offers shall be rejected as incomplete. However, all these costs must be quoted in INR.

1.32.6 Orders for imported stores need not necessarily be on FOB/FCA basis rather it can be on the basis of any of the incoterm specified in ICC Incoterms 2010 as may be amended from time to time by the ICC or any other designated authority and favourable to the purchaser.

- 1.32.7 Wherever the price quoted on FOB/FCA and CIF/CIP basis are the same, the Contract would be made on CIF / CIP basis only.
- 1.32.8 The GCC and the SCC shall specify the mode of transport i.e., whether by air/ocean/road/rail.
- 1.32.9 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.
- 1.32.10 The Purchaser shall compare all substantially responsive bids to determine the lowest valued bid, in accordance with ITB Clause 1.32.

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

- 1.37.1 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.

1.38 Option Clause

- 1.38.1 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)

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

- 1.39.1 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.

1.40 Notification of Award

- 1.40.1 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.
- 1.40.2 Until a formal contract is prepared and executed, the notification of award should constitute a binding contract.

- 1.40.3 Upon the successful Bidder's furnishing of the signed Contract Form and performance security pursuant to ITB Clause 1.43, the Purchaser will discharge its bid security.
- 1.41 Signing of Contract**
- 1.41.1 Promptly after notification, the Purchaser shall send the successful Bidder the Agreement/Purchase Order.
- 1.41.2 Within twenty-one (21) days of date of the Purchase Order, the successful Bidder shall sign, date, and return it to the Purchaser.
- 1.42 Order Acceptance**
- 1.42.1 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 1.16.10 of ITB.
- 1.42.2 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.
- 1.43 Performance Security**
- 1.43.1 Within 21 days of receipt of the notification of award/PO, the Supplier shall furnish performance security (PS) in the amount specified in SCC, valid till 60 days after the warranty period.
- 1.43.2 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.
- 1.43.3 The Performance Security shall be denominated in Indian Rupees.
- 1.43.4 PS may be submitted by either the manufacturer or their authorized dealer/bidder.
- 1.43.5 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 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.
- 1.43.6 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 in SCC, without levy of any interest.
- 1.43.7 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.
- 1.43.8 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.
- 1.43.9 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)**
- 1.44.1 A Pre-bid Conference shall be held as indicated in invitation to bid, if any. All prospective bidders are requested to kindly attend the Pre-bid Conference. In order to facilitate the purchaser the proper conduct of the Pre-bid Conference, all prospective bidders are requested to kindly submit their queries (with envelope bearing Tender No. and Date on top and marked "Queries for Pre-bid Conference") so as to reach the purchaser as indicated in invitation to bid. The purchaser shall answer the queries during the pre-bid conference, which would become a part of the proceedings of the Pre-bid Conference. The proceeding of the Pre Bid Conference would be hosted on the website of the purchaser. Before formulating and submitting their bids, all prospective bidders are advised to surf through the purchaser's website after the Pre-bid Conference, in order to enable them take cognizance of the revised tender conditions.

CSIR-CIMFR will not be bound to accept all/ any of the suggestions of the prospective bidders. CSIR-CIMFR reserves the right to finalize its technical specifications and eligibility criteria after the Pre-Bid Conference as per suggestions of the participants of the PBC and the

Consultant.

1.45 Integrity Pact

1.45.1

Integrity Pact 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.

1.45.6

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.

1.46 **Restrictions on procurement from a bidder of a country which shares a land border with India [As per Dept. of Expenditure, MoF Order No. 6/18/2019-PPD Dated 23rd July, 2020].**

1.46.1 Requirement of registration

Any bidder from a country which shares a land border with India will be eligible to bid in any procurement whether of goods , services (including consultancy services and non- consultancy services) or works (including turnkey projects) only if the bidder is registered with Department for Promotion of Industry and Internal Trade (DPIIT).

1.46.2 Definitions

(1) **"Bidder"** for the purpose of this order (including the term 'tenderer', 'consultant', 'vendor' 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),

(2) **"Tender"** for the purpose of this Order will include other forms of procurement except where the context requires otherwise.

(3) **"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 and 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 county; or
 - g) A consortium or joint venture where any member of the consortium or joint venture falls under any other above
- (4) **"Beneficial owner"** for the purpose of paragraph 8 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 juridical person(s), has a controlling ownership interest or who exercises control through other means.

Explanation-

- a. "Controlling ownership interest" means ownership of, or entitlement to, more than twenty-five per cent of shares or capital or profits of the company;
 - b. "Control" shall include the right to appoint the majority of the directors or to control the management rights or shareholders agreements or voting agreements;
 - (ii) In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical 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 juridical 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 (i) or (ii) or (iii) 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.
- (5) "Agent" for the purpose of this Order is a person employed to do any act for another, or to represent another in dealings with third persons.

1.46.3 A certificate would be submitted by the bidders regarding their compliance with this order. If such certificate given by a bidder whose bid is accepted is found to be false, this would be a ground for immediate termination and further legal action in accordance with law.

1.47 Terms of Reference of the Consultant

- (1) CSIR-CIMFR has appointed a consultant for the extant procurement. The name and address of the consultant is as follows:
M/S M N Dastur & Company (P) Ltd., Kolkata.
- (2) The Consultant will support and validate the design of 250Kg/ day Syngas to Methanol Pilot Plant.
- (3) The Consultant will support in evaluation of technical bids received in response to this tender.
- (4) The Consultant will support during installation and commissioning of the plant.

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) "SCC" means the Special Conditions of Contract.
- (j) "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.
- (k) "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.
- (l) 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.
- (m) The "Purchaser" means any of the constituent Laboratory/Institute of the Council situated at any designated place in India as specified in SCC.
- (n) "The final destination," where applicable, means the place named in the SCC.

2.2 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.

2.3 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.
- a) Provisions in addition to 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.

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 SCC, 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. A bank Guarantee issued by a foreign bank must also be confirmed by a Nationalized/Scheduled bank located in India.
 - 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.
- 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 in SCC, 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 Chapter-4 of the Bidding Document relating to Specification and Allied Technical details.

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 SCC and in any subsequent instructions ordered by the Purchaser.

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 specified in SCC.
- 2.16.2 The mode of transportation shall be as specified in SCC. 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 despatch, then the bidder is free to engage the services of any other Airlines.

2.17 Insurance

2.17.1 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 by the Indian Agent/bidder, 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.

2.18 Transportation

2.18.1

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, shall be arranged by the Supplier, and the related costs shall be included in the Contract Price.

2.18.2 **E- way bill will be the responsibility of the supplier.**

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 chapter 4.

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 otherwise specified in the SCC, the warranty shall remain valid for Twelve (12) months after the Goods, or any portion thereof as the case may be, have been delivered to and accepted at the final destination, Installed & Commissioned as indicated in the SCC, or for Eighteen (18) months after the date of shipment from the port or place of loading in the country of origin, whichever period concludes earlier.

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 SCC.

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.

2.22.4

Payment shall be made in currency as indicated in the contract.

2.23 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 option 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 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.

2.26 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 the percentage specified in SCC 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 the Percentage specified in SCC. 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.) In case of Dispute or difference arising between CSIR- CIMFR and a domestic supplier relating to any matter arising out of or connected with this agreement, such disputes or difference shall be settled in accordance with the Indian Arbitration & Conciliation Act, 1996, the rules there under and any statutory modifications or re-enactments thereof shall apply to the arbitration proceedings. The dispute shall be referred to Delhi International Arbitration Centre (DIAC), Delhi High Court, New Delhi as per section 12(5) of Arbitration and Conciliation (amend.) Act, 2015 whose award shall be final, conclusive and binding on all parties to this order.
- b.) The venue of the arbitration shall be New Delhi.

2.32.4

The resultant contract will be interpreted under Indian Laws in case of Purchase from Indian suppliers and / or United Nations

Commission on International Trade Laws (UNCITRAL) in the case of foreign suppliers.

2.32.5

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 as specified in SCC.

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 SCC.

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 manufactured outside India, the Supplier shall be entirely responsible for all taxes, stamp duties, license fees, and other such levies imposed outside India.

2.36.2

For goods Manufactured within India, the Supplier shall be entirely responsible for all taxes, duties, license fees, etc., incurred till its final manufacture/production.

2.36.3

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.

2.36.4

All payments due under the contract shall be paid after deduction of statutory levies (at source) (like TDS etc.) wherever applicable.

2.36.5

Customs Duty - If the supply is from abroad this Institute is permitted to import goods as per notification No.51/96 - Customs and pay a concessional duty up to 5% as per notification 24/2002 - Customs on all imports.

2.36.6

The bid (Technical and / or Price Bid) must clearly indicate which of the components of the equipment are imported items and which are indigenous . Custom Duty Exemption Certificate would be issued for the imported items and GST exemption certificate would be issued for indigenous items.

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 50 Hz.

2.39 Site preparation and installation

2.39.1

Unless otherwise specified in the SCC or Chapter 4, The Supplier is solely responsible for the preparation of the equipment sites in compliance with the technical and environmental specifications defined by the Supplier and accepted by the purchaser. 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/ fitness of the sites before the installation of the Equipment, if required. The supplier shall carry out 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 Integrity Pact

2.43.1

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

2.43.2

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.

2.44 Order Acceptance

2.44.1

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.

SPECIAL CONDITIONS OF CONTRACT

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(m)	The Purchaser is: <i>Director, CSIR-CIMFR, Barwa Road Campus, Dhanbad, Jharkhand</i>
2	GCC 2.1.1(n)	The Final Destination is: Transit Stores, CSIR-CIMFR, Digwadih, Dhanbad, Jharkhand.
3	GCC 2.13.1	The amount of the Performance Security shall be 03 % of the contract value valid till two months beyond end of warranty period.
4	GCC 2.15.2	<p>The marking and documentation within and outside the packages shall be:</p> <p>(a) Each package should have a packing list within it detailing the part No(s), description, quantity etc.</p> <p>(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.</p> <p>(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.</p> <p>(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.</p>
5	GCC 2.16.1	<p>Details of Shipping and other Documents to be furnished by the Supplier are :</p> <p><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 registered post / speed post and copies thereof by FAX/Email.</p> <p>(a) Two copies of Supplier's Invoice indicating, <i>inter-alia</i> description and specification of the goods, quantity, unit price, total value;</p> <p>(b) Packing list;</p> <p>(c) Insurance certificate, if required under the contract;</p> <p>(d) Railway receipt/Consignment note;</p> <p>(e) Manufacturer's guarantee certificate and in-house inspection certificate;</p> <p>(f) Inspection certificate issued by purchaser's inspector, if any; and</p> <p>(g) 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> <p><u>For goods manufactured abroad but quoted in INR</u> Within 24 hours of dispatch, the supplier shall notify the purchaser the complete details of dispatch and also supply following documents by Registered Post/courier and copies thereof by FAX/Email.</p> <p>(a) Two copies of supplier's Invoice giving full details of the goods including quantity, value, etc.;</p> <p>(b) Packing list;</p> <p>(c) Certificate of country of origin issued by supplier;</p> <p>(d) Manufacturer's guarantee and Inspection certificate;</p> <p>(e) Inspection certificate issued by the Purchaser's Inspector, if any;</p>

		<p>(f) Insurance Certificate, if required under the contract;</p> <p>(g) Name of the Vessel/Carrier;</p> <p>(h) Bill of Lading/Airway Bill;</p> <p>(i) Bill of entry</p> <p>(l) 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>
6	GCC 2.16.2	In case of supplies from within India, the mode of transportation shall be by <i>Rail/Road</i> .
7	GCC 2.17.1	The Insurance needs to be done by the supplier.
8	GCC 2.21.3	<p>The whole system including all supplied items (material and workmanship) will be under comprehensive warranty for 03 (three) years including one year standard comprehensive warranty from final acceptance of the plant. If any part is found defective, the same must be replaced free of cost. The rectification/replacement of spares should be done within 15 days of written request, failing to which the warranty period of the entire system will be extended for those days/months of delay in attending and putting the plant in operation.</p> <p>The firm should quote year wise break up for warranty as below.</p> <p>First year standard comprehensive warranty: Free of cost</p> <p>Second year CMC: Rs_____</p> <p>Third year CMC: Rs_____</p> <p>Payment of the CMC charges will be paid annually at the end of each year on successful certification by the IO/PL. The successful bidder has to make two regular visits per annum and as and when required during breakdown. The breakdown visits have to be made within fifteen days of report submitted by either mail or telephone. PBG for CMC has to be submitted within one month of expiry of PBG of the main system or otherwise PBG amount deposited for the system will be forfeited. 10% of PBG amount of CMC charges can be paid on annual basis or for total two years.</p> <p>The successful bidder will be selected on summation of price of the item quoted and the CMC charges for two years after completion of one year standard warranty after successful installation and commissioning of the plant.</p> <p>In any of the quoted goods by the Indian Agent it will be his responsibility to ensure manufacturer's warranty.</p> <p>N.B.- However, it will be the prerogative of competent authority, CSIR-CIMFR to enter or not to enter into an AMC/CAMC with the Supplier at the time of placement of P.O.. Competent authority, CSIR-CIMFR may also decide to go for AMC/CAMC on a later date (i.e. just after completion of warranty period), however the price quote for the AMC/CAMC should stand valid for a minimum of 3 months after completion of warranty period.</p>
9	GCC 2.22.1	<p>The method and conditions of payment to be made to the Supplier under this Contract shall be as follows:</p> <ol style="list-style-type: none"> 70% payment to be released on receipt of material at CSIR-CIMFR in good condition duly certified by the user Scientists. 30% payment would be released after satisfactory installation & commissioning as certified by the user Scientists subject to submission of Performance Bank Guarantee (PBG) for 03% of the purchase order value covering the period of warranty + 60 days. All the bidders are required to furnish requisite information for making payment by e-mode. OR 30% of the Contract Value may be paid on receipt of Advance Bank Guarantee of equivalent amount. 40% payment to be released on receipt of material at CSIR-CIMFR in good condition duly certified by the user Scientists. payment to be released on receipt of material at CSIR-CIMFR in good condition duly certified by the user Scientists. In case of imported items, 70% payment through Letter of Credit/ Wire Transfer may be considered for foreign OEMs on successful delivery of the items at CSIR- CIMFR in good condition. In all cases of supplies made through foreign suppliers, the demonstration of satisfactory receipt of the items in good condition before the user scientist and PL would be the responsibility of the Indian Agent/ Indian Fabricator/ Turnkey Contractor, based on which the payment will be released.

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	ITB 1.17.1	Bids shall remain valid for minimum of 180 days after the date of bid opening prescribed by the Purchaser.
12	GCC 2.34.1	The place of jurisdiction is Dhanbad, India.
13	GCC 2.35.1	For notices, the Purchaser's address is Kind Attention: Stores and Purchase Officer Location: CSIR-CIMFR, Barwa Road Campus, Dhanbad, Jharkhand. Telephone: :+91- 0326-2203156/ 2093/ 202774 Electronic mail address cospcimfr@cimfr.nic.in , spocimfr@cimfr.nic.in
14	GCC 2.43.1	The integrity pact must be signed in the format attached.
15	GCC 2.43.2	The name and contact details of the IEMs are as under: Shri Anand Deep, IRS (Retd.), Ex-Principal Chief Commission of Income Tax, 117/363, H-I, Next to Gurudwara Pandu Nagar, Kanpur UP - 208005 (Mobile-9044796781)

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)
1.						

Term of delivery: **FOR/ DDP*, CSIR- CIMFR**

Period of delivery shall count from : Date of issue of Purchase Order

Scope of Supply : As per Chapter 4

Training requirement: As per Chapter 4

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 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.

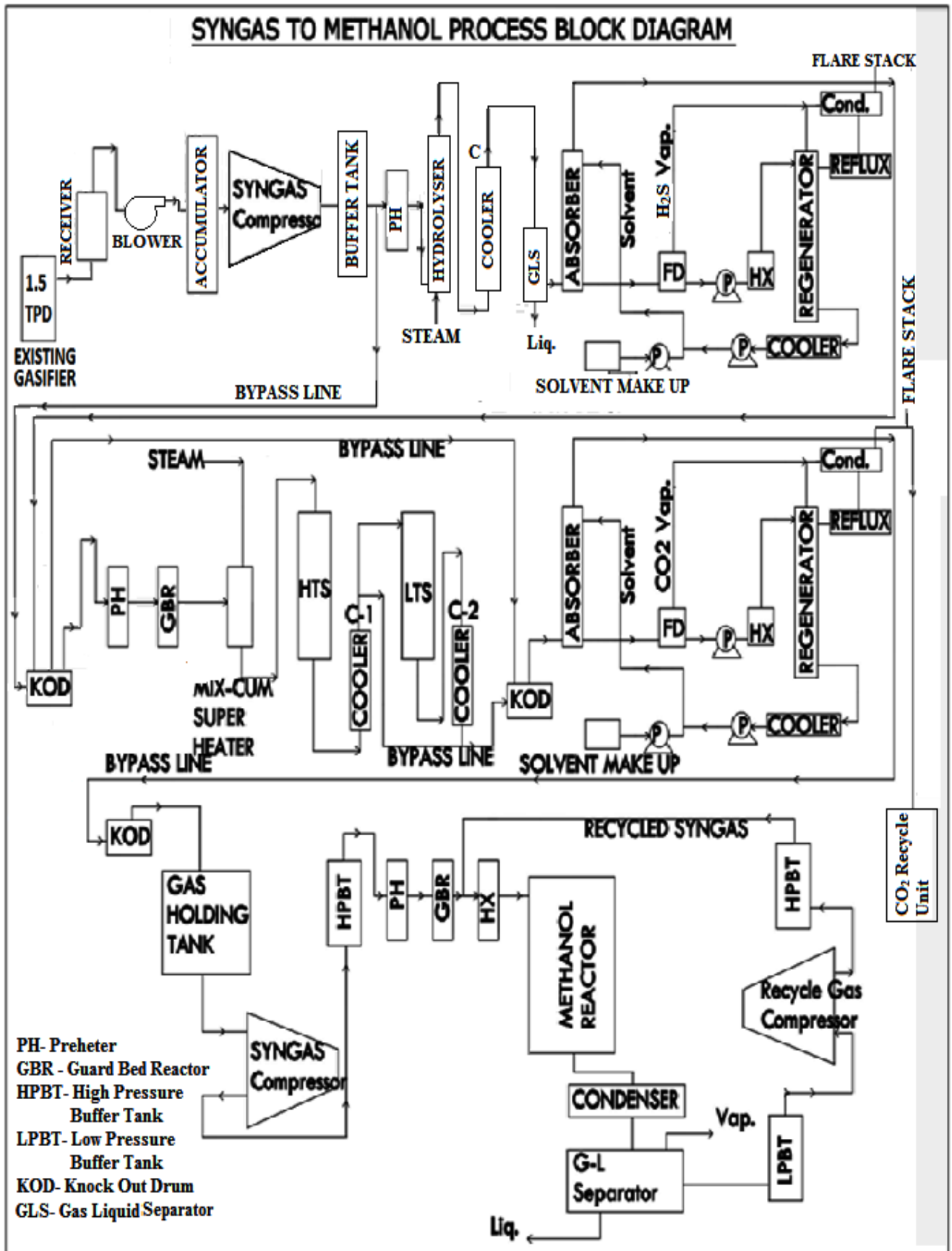
- Delivered Duty Paid as per INCOTERMS 2020
-

Chapter 4

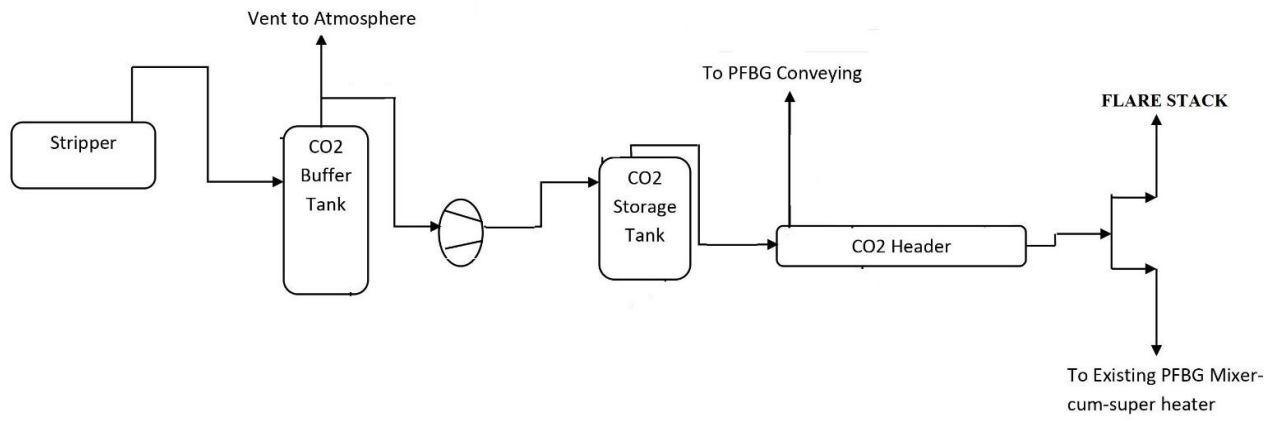
1. (A) Specifications and allied Technical details Form

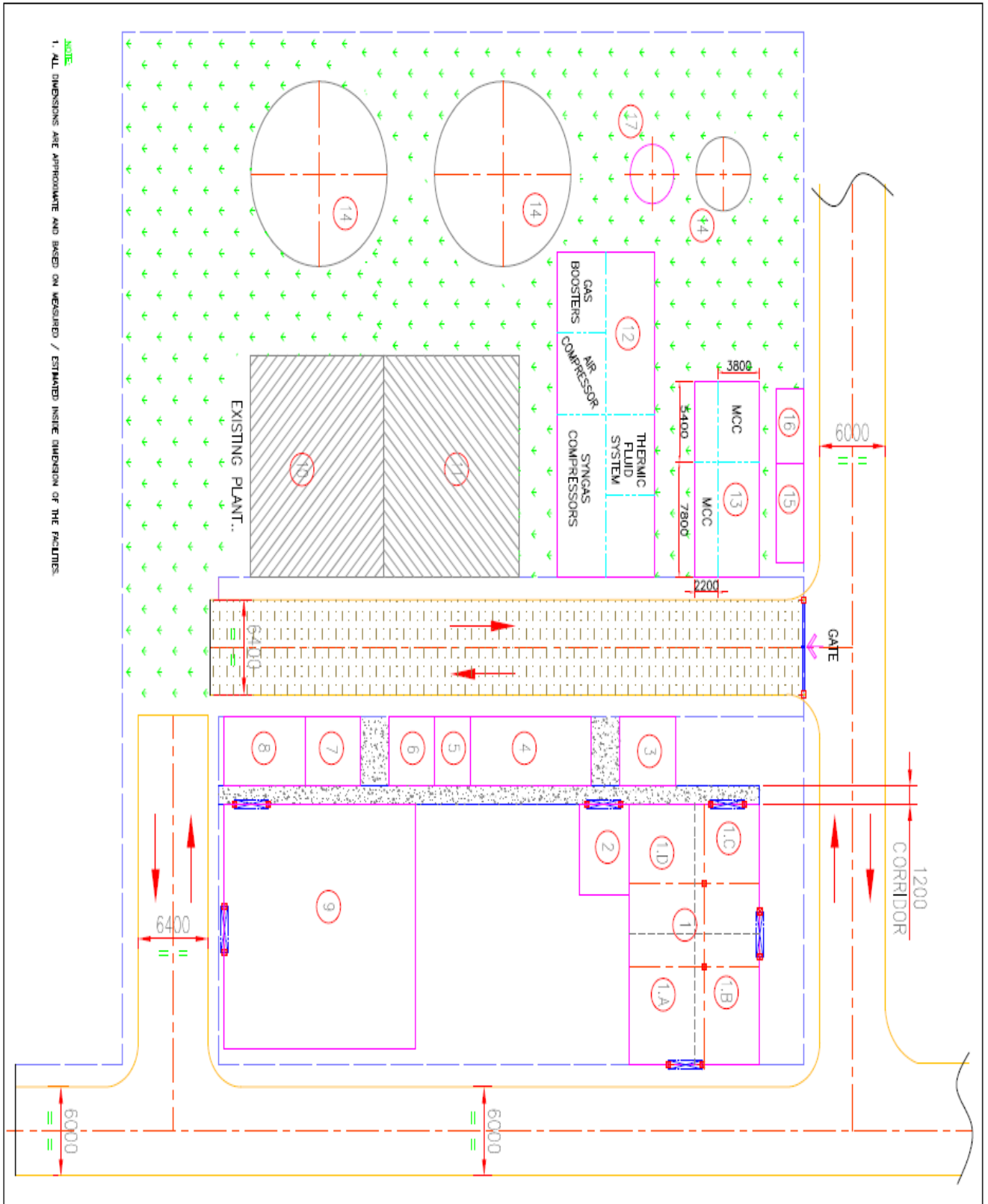
Annexure-1

SYNGAS TO METHANOL PROCESS BLOCK DIAGRAM



CO2 Recycle Unit





NOTE
1. ALL DIMENSIONS ARE APPROXIMATE AND BASED ON MEASURED / ESTIMATED INSIDE DIMENSION OF THE FACILITIES.

Layout of the proposed Plant

LEGEND:
PLANT FACILITIES



ITEM NO	DESCRIPTION
1	PROPOSED METHANOL UNIT (17.6x12)
1.A	PROPOSED CONTROL ROOM
1.B	PROPOSED HTS & LTS UNIT
1.C	PROPOSED ABSORBER UNIT
1.D	PROPOSED METHANOL REACTOR UNIT
2	POWER DISTRIBUTION BOARD ROOM (6.1x4.5)
3	TOILET (5.1x4.7)
4	EXISTING TRANSFORMER & SWITCH ROOM (11x4.7)
5	OLD FURNACE ROOM (4.7x3.3)
6	EXISTING AIR COMPRESSOR ROOM (4.7x4.2)
7	TOILET (5.1x4.7)
8	SPACE FOR COAL HANDLING (7.4x4.7)
9	1.5 TPD PFBG PILOT PLANT (17.5x16.5)
10	EXISTING SHED
11	EXISTING BUILDING
12	UTILITY ROOM (22x9.0)
13	PROPOSED MCC ROOM (13.2x6.0)
14	EXISTING GAS HOLDERS (ø12.5x2) & (ø5.0x1)
15	PACKAGE BOILER
16	COOLING TOWER (ø12.5 & ø5.0)
17	NEW SYNGAS ACCUMULATOR (ø4.0)

EXISTING SHOWN THUS...	
PROPOSED SHOWN THUS...	
FENCING SHOWN THUS...	
GREENERY SHOWN THUS...	

Syngas to methanol conversion Process involves the Development of Pilot Plant for study of catalytic conversion of Indian coal derived syngas to methanol at elevated pressure (35 – 70 Bar) and temperature (200 – 300°C). The syngas is utilized from existing facility of Oxy Blown Pressurized Fluidized Bed Gasifier after preliminary cleaning. The generated gas from gasifier (known as syngas, mixture of mainly CO and H₂) having composition H₂: 25-35%, CO: 25-35%, CO₂: 10-20%, CH₄: 3-6%, N₂: 5-15% and also contains impurities. The approximate composition of syngas after shift reaction process would be H₂: 35-50%, CO: 15-25%, CO₂: 20-35%, CH₄: 3- 6%, N₂: 5-15% and after removal of CO₂ by amine scrubbing the composition would be H₂: 50- 60%, CO: 25-35%, CO₂: 5-10%, CH₄: 3-6%, N₂: 5-20%. The syngas to methanol Pilot scale facility comprises following units:

1. Syngas accumulator
2. COS hydrolyser unit
3. Absorption & stripping unit for H₂S
4. Water gas shift reactor assembly
5. Absorption and Stripping unit for CO₂
6. Gas holding tank
7. High pressure syngas compressor
8. High pressure gas holding Tank
9. Pre-heater
10. Guard bed for sulphur impurities
11. Multi-tubular Fixed Bed Reactor with suitable heat exchanger
12. Condenser
13. Methanol- Unconverted Syngas separator
14. Catch pot
15. Unconverted syngas Holding tank
16. Unconverted syngas recycle compressor
17. Unconverted syngas high pressure gas holding Tank
18. CO₂ storage and recycling section
19. Thermic fluid generation system
20. Cooling tower
21. Steam generator
22. Flare stack
23. DCS/PLC- SCADA Control system for syngas to methanol plant
24. Online Gas Analyzer system

Process description including operational procedure:

Syngas generated from 1.5 TPD PFBG pilot plant will be cleaned and carried to the syngas storage

tank. Impurities like Sulphur need to be separated from gas stream. Sulphur in form of COS will be hydrolysed to H₂S in hydrolyser reactor. H₂S will be removed from gas through amine absorption and passing it through guard bed reactor. For methanol conversion from syngas, proportion of H₂ and CO is important and need to maintain at a particular ratio. Proportion of syngas will be preheated then passed through guard bed for sulphur removal and then it will enter in the High Temperature Shift (HTS) and Low Temperature Shift (LTS) reactor. One bypass line will carry required amount of syngas from gas storage tank and will be mixed with the exit gas stream coming from the LTS for maintaining proper H₂/CO ratio. It will be passed through knockout drum for removal of moisture then the gas will enter into N-methyl di-ethanolamine (MDEA) absorption tower for removal of CO₂. The stripped CO₂ will be stored and recycled back to Gasifier section for operation of the gasifier. The cleaned syngas will be stored in a gas storage tank at atmospheric pressure. Syngas will be pressurized up to 70 bar using syngas compressor and pressurized syngas will be stored in high pressure buffer tank (HPBT). Then gas will be preheated to desired temperature and will be passing through the catalytic guard bed reactor and multi tubular fixed bed methanol reactor. The generated methanol and unconverted syngas coming out the methanol reactor will be condensed and passed to gas liquid separator. The un-converted gas coming out of the gas-liquid separator will be compressed and stored to HPBT and it will be recycled back to methanol reactor and fed at the inlet of the pre-heater. Methanol will be collected from gas-liquid separator after releasing pressure.

Sr. No.	Item	Description
1.	Syngas accumulation system including receiver vessel, boosters and accumulator	<p>Syngas coming out from the exit of the 1.5 TPD oxy-blown gasifier need to be carried to the syngas accumulator with 50 NB pipe. The pressure of raw syngas coming out of the gasifier will be at near atmospheric pressure to 10 bar depending on the gasifier condition. The outlet syngas pipeline coming out of the gasifier will be connected to receiver vessel of 2 m³ capacity and before connecting to the receiver vessel, this outlet gas line will also be connected to the flare stack, in case if any bypassing of gas is required. The outlet of the gas receiver tank will be connected to a tri-lobe boosterblower of capacity around 50 Nm³/h which can boost the raw syngas to 2 bar pressure and convey this gas to the gas accumulator tank in the downstream of it. Booster motor will run electrically and would be equipped with VFD so that it can adjust its working depending on the pressure of raw syngas coming out of the gasifier. Pressure sensor should be installed at the gas receiver tank so that it can send feedback signal to the compressor if the gas pressure inside the receiver drops down to less than 50 mm water column. Necessary bypass arrangement for the booster blower and compressor should be considered. This bypass line will mostly come into action when outlet gas pressure from the gasifier will be more than 2 bar. In that case the raw syngas from receiver tank will be directly passed on to the accumulator tank and no boosting will be required in this case. The syngas accumulator should have a capacity of 100 m³ and operating pressure will be 2 bar to 10 bar depending on the condition of the raw syngas. This will be placed near the syngas to methanol pilot plant. Approximate distance between existing 1.5 TPD PFBG plant to syngas accumulator will be 200 m. This gas accumulator tank will be vertical pressure vessel of around 4 m internal diameter and 8 m height (cylindrical part). The accumulator must be provided with all necessary safety arrangements like safety valve rupture disc to be connected to flare stack, local pressure and temperature gauge as well as pressure, temperature transmitter should be provided. There should be provision of syngas bypass</p>

		<p>line from accumulator (after syngas compressor) which needs to be connected to syngas inlet line of the knock out drum placed after LTS cooler. Two MFMs and control valves should be provided in syngas mainline and bypass line having capacity of 0-50 Nm³/h suitable for handling rich and lean syngas combinations (calibrated for H₂:CO:CO₂:N₂= 35:35:25:5 and calibration chart for at least another two syngas combinations i.e. H₂:CO:CO₂:N₂= 20:20:15:45,60:30:5:5).</p> <p>Suitable MOC should be selected as per the norms for storing of inflammable toxic gases (CO, H₂). Pressure and temperature sensors as well as local gauges should be provided on accumulator. All the mass flow meters and control valves should be provided with isolation as well as by pass valves.</p> <p>Capacity: 100 m³</p> <p>Pressure: Atmospheric pressure to 10 bar</p> <p>Make of gas booster blower – GDW – Nash/ Swam/ Usha/ Air equipment</p>
2	Syngas Compressor	<p>In the outlet of this gas accumulator a syngas compressor will be connected which can boost the gas to 5 bar pressure. This will be equipped with VFD and it will operate on feedback data for pressure at the gas accumulator tank. In case if the gas pressure inside the gas accumulator goes below 1 bar, this compressor will stop and gas flow to the downstream methanol section will stop. Necessary bypass arrangement for the compressor should be considered. This bypass line will mostly come into action when outlet gas pressure from the accumulator will be more than 5 bar. In that case the raw syngas from accumulator tank will be directly passed on to the downstream plant circuit.</p> <p>All international safety precautions (e.g. High pressure/temperature cut-off, safety relief valve, rupture disc, out- let of the safety relief valve to be connected to flare stack etc.) for high pressure syngas handling should be ensured. Need to include suitable dryer system</p> <p>Capacity: 35Nm³/h Operating pressure: 5 atm and should be electrically driven.</p> <p>Make: Fluitron/PPI</p>

3.	Preheater	<p>Compressed syngas will be fed in the shell and tube preheater (PH) at room temperature and will be heated up to 200°C required for COS hydrolysis reactor. The heating source of Preheater will be thermic fluid in liquid state. Vapour pressure should be less than 0.5 bar at highest operating temperature. Suitable Grade and Specification should be mentioned. Thermic fluid should be Therminol, Dowtherm, Exxon, Shell make. Thermic fluid heaters should be made of Thermax, Ross.</p>
4.	COS Hydrolyser	<p>After syngas collected in gas accumulator needs to be hydrolyzed. Most of the sulfur in the coal is converted to hydrogen sulfide (H₂S) during gasification. However, depending on the gasification temperature and moisture content, approximately 3 to 10% of the sulfur is converted to carbonyl sulfide (COS). In this application for methanol production where very low sulfur (< 10 ppmv) syngas is required, converting COS to H₂S before sulfur removal will be necessary, because most current acid gas removal processes do not efficiently remove sulfur in the form of COS. This is done by passing syngas from the water scrubber through a catalytic hydrolysis reactor where over 99% of the COS is converted to H₂S according to the following reaction:</p> $\text{COS} + \text{H}_2\text{O} \leftrightarrow \text{H}_2\text{S} + \text{CO}_2$ <p>The syngas will be fed to hydrolyser reactor after preheating the gas to ~150 -200 °C. The reactor consists of a cylindrical packed bed column with torispherical top end designed for operating at a gauge pressure of atmospheric pressure to 10 kg/cm² and at a temperature of up to 180°C to 210°C. The I.D of the reactor is 0.15 m with reactor height of 3 m. Reactor shell of suitable thickness will need to be provided. COS hydrolysis is done with activated alumina-based catalyst. Required amount of steam need to be added in the reactor. Independent steam flow control valve along with flow meter in the range: 3-5kg/h(suitable steam bypass line need to be considered depending on the availability of the flow meter for inserting controlled amount of steam in to the reactor). The reactor to be heated in a jacketed heating system (thermic fluid heated) and both inlet and outlet temperature to be monitored and controlled through PLC and the temperature should not go beyond 250°C. Capacity of the reactors assembly would be suitable for approximately 10 L catalyst loading. The reactor should be provided with a wire mesh support and supporting bed need to be considered as per standard practice at the top and bottom and the catalyst will</p>

be packed in between wire mesh supports. The reactor will be provided with adequate nozzles for pressure, differential pressure, and temperature measurements. Entire control/measurement and instrumentation for temperature at different levels of bed, reactor pressure, safety systems including safety valve and rupture disc, support structure and accessories needs to be provided.

The exit gas of the reactor will be cooled in jacketed pipe Cooler (C) through water/thermic fluid to achieve room temperature and fed to a Gas liquid separator before feeding it to the amine based absorber-stripper sections for H₂S removal. Level sensor and level transmitter with auto bottom drain valve should be provided for removal of water from Gas liquid separator for maintaining desired liquid level so that syngas cannot escape from drain line.

Pressure, Temperature Indicators and sensor should be provided for preheater (PH), Cooler(C) and Gas liquid separator.

Gas sampling points at inlet and exit of the reactor needs to be provided (for analysis the gas composition) as well as there should be provision of cylindrical gas injection for activation of the catalyst.

Syngas handling capacity: ~35Nm³/h

Operating pressure: Atmospheric to 10kg/cm²

Temperature: 180-210 °C

MOC: SS316/304 as per suitability

Reactor I.D. of 0.15m and total reactor height of 3 m

Necessary certificates/test report as per standard practices from proper agencies needed. ASME section VIII division 1, TEMA type R

DPT with fluid filled diaphragm isolation system: operating pressure 12 kg/cm², Differential Pressure Span: 0 - 2000 mmWC, Operating Temperature – 250°C, Accuracy - 5 mmWC.

The heating source of the reactor will be thermic fluid in liquid state. Vapour pressure should be less than 0.5 bar at highest operating temperature. Suitable Grade and Specification should be mentioned. Thermic fluid should be Therminol, Dowtherm, Exxon, Shell make. Thermic fluid heaters should be made of Thermax, Ross.

5.	Absorber and Stripping Section for sulfide gas impurity removal	<p>The syngas from gas liquid separator after the hydrolysis unit will be fed to bottom of the absorber column for removal of H₂S. Also there should be provision of bypass line with isolation valve to bypass the absorption column in case of H₂S concentration of the syngas remains within acceptable limit.</p> <p>The flow rate of the gas entering the absorber will be measured with a flow meter. Mass flow meter should be provided having capacity of 0-50 Nm³/h suitable for handling rich and lean syngas combinations (calibrated for H₂: 25-30%, CO 25-30%, CO₂ 15-20, N₂= 15-20).The absorber column is a cylindrical vessel with an ID of 0.2 m and a total height of 4.5m. The absorber column will be filled with random packings. The maximum height of the packing zone will be 4 m. There should be provision of level transmitter as well as level indicator and certain liquid level should be maintained at the bottom of absorber column to prevent release of gas from that section. Solvent will be fed to the top of the absorber column and will be in contact with the “sour” syngas in a counter current mode. Mass flow meter and solvent pump having flow measurement range upto 5000-6000 LPH and discharge head of ~ 15-20 bar should be installed in solvent feed line. Flow control valve and return line with valve need to be installed at the outlet of the solvent pump to keep desired solvent flow rate inside the absorber column. The H₂S rich solvent will exit the bottom of the absorber column and pressure will be released in flash drum. The flash drum will be a cylindrical vessel and capacity will be approximately 250L (ID 0.4m, height 2m). Control valve for release of solvent from the bottom of absorption column reservoir should be installed and it needs to be linked with level transmitter. The syngas exits from the top of the absorber column and is sent to a knock out drum placed after H₂S absorber section. The absorber column will be maintained at atmospheric pressure to 10 kg/cm².</p> <p>Temperature sensors need to be provided in the absorber column, for measuring the liquid temperature inside the column. The gases coming out from the top of flash drum is connected with the gas exit line coming out from top of the stripper before reflux condenser used for maintaining the reflux in stripper column and will be finally connected to flare stack.</p>
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Then the H₂S rich amine solvent from the bottom of the flash drum will be fed to the feed point of the stripper section maintaining required temperature and with controlled flow rate.

Flow meter and solvent pump having flow measurement range upto 5000-6000 LPH and operating pressure 15-20 bar should be installed for feeding the H₂S rich amine solvent to the stripping column after heating the liquid stream upto 100°C in a shell and tube heat exchanger.

There should be provision of level transmitter as well as level indicator and certain liquid level should be maintained at the bottom of flash drum to prevent release of gas from that section.

The stripper is a cylindrical vessel with an ID of 0.2 m and a total height of 5 m. The stripping column will be filled with random packings, with a maximum packing height of 4 m. The bottom of the stripping column will be provided with a steam heated reboiler to strip the absorbed gas from the solvent. The approximate temperature of the liquid in the reboiler section at the bottom of the stripping column need to be maintained ~ 150°C so that temperature near to the liquid feed line remains ~100°C. The stripper should be properly insulated to maintain the desired temperature of 100°C inside the bed of column. The vapors from the reboiler are fed back to the stripper. Multiple points of entry of this vapour must be provided (4 entry points) on the stripper body. A control valve and flow meter will be provided in the recycled line to ensure that the flow is identical to the flow exiting out of the absorber bottom. At the top of the stripping column, a reflux condenser needs to be provided to reflux the solvent back into the column and prevent the solvent vapors from escaping. Cooling water will be fed to the tubes of the condenser and the hot vapors from the stripping column fed to the shell side. The liquid condensate from the shell side will be sent back to the top of the column, while the gases (acid gases like H₂S etc) will be sent to the flare stack. Required lines (30 NB) need to be provided for conveying gas from stripper top exit to the flare stack. A storage tank for the storage of the fresh solvent also needs to be provided. Provision for direct in-line mixing of the fresh solvent with suitable pump and flow meter must be provided. There should be provision of level

transmitter as well as level indicator and certain liquid level should be maintained at the bottom of stripper column to prevent release of gas from that section. Liquid coming out from the bottom of stripper column will be passed through a shell and tube heat exchanger to maintain desired temperature ~30-40°C. After heat exchanger it will be stored in a storage vessel having capacity 200L. Recycled solvent from the storage vessel will be pumped back to the absorber column top after doing required make up solvent.

Absorber column: ID 0.2 m and height of 4.5 m

Absorber operating Temperature:40-60°C; operating Pressure: Atmospheric to 10 kg/cm²

Level transmitter, Indicator and controller for absorber

Level transmitter guided radar type: atmospheric to 10 kg/cm², 100°C, Level - minimum 0.2 m, Maximum - 1.5 m

Temperature indicators (2 No.) in absorber

Stripper column: ID 0.2 m and height of 5m

Stripper Operating Temperature: 120-130°C; Operating Pressure: 1 atm to 10 atm,DPT with fluid filled diaphragm isolation system: operating pressure 12 kg/cm², Differential Pressure Span: 0 - 1000 mmWC, Operating Temperature – 150 °C Accuracy - 5 mmWC

Level transmitter, Indicator and controller for stripper

Temperature indicators (3No.) in stripper

Solvent Circulation Pump Capacity (4No.): 5000-6000 LPH (2 set of pump will be installed in parallel for redundancy of the pump both for absorber and stripper section)

Solvent flow meter (2 No.): 5000-6000 LPH

Fresh Solvent flow meter with control valve (1 No.): up to 5000 LPH

Fresh solvent pump upto 5000LPH

Solvent control valve (2 No.):5000-6000 LPH

Preheater: Heating of solvent to 110 °C

Temperature Indicators and temperature controller (for reboiler)

Cooling: Cooling of solvent to 40 °C

Steam heated/thermic fluid heated Reboiler operating pressure: 1 atm

Steam heated/Thermic fluid heated Reboiler operating temperature: upto

		<p>200°C (Shell Side)</p> <p>Water cooled vertical Condenser operating pressure: 1 atm</p> <p>Water cooled vertical Condenser operating temperature: upto 130°C (Shell Side)</p> <p>Solvent Storage Tank Capacity: 200 L</p> <p>Operating Temperature: 50 °C</p> <p>Pressure gauge and Rupture disk for absorber and stripper. Level transmitter, indicator and controller to be provided.</p> <p>MOC: SS316</p> <p>Entire system should have control system along with all the valves, control and instrumentation for temperature, pressure, flow, safety systems (safety valve and rupture disc), structure mounting, accessories, etc.</p> <p>All the mass flow meters and control valves should be provided with isolation as well as by pass valves.</p>
6.	Pre-heater	<p>The syngas coming out from knock out drum placed after amine absorber will be fed in the shell and tube preheater (PH1) at room temperature and will be heated up to 250°C. The heating source of Preheater will be thermic fluid in liquid state. Vapour pressure should be less than 0.5 bar at highest operating temperature. Suitable Grade and Specification should be mentioned. Thermic fluid should be Therminol, Dowtherm, Exxon, Shell make. Thermic fluid heaters should be made of Thermax, Ross.</p>
7.	Guard bed reactor	<p>Guard bed for chlorine and sulfur removal needs to incorporate for HTS catalyst. Syngas coming out from Preheater through mass flow meter and controller should be preheated to desired temperature (150 – 200°C). It will be used to remove Chlorine/sulphur component from the gas stream up to less than 10 ppm level. It will be a cylindrical vessel loaded with catalyst. All international safety precautions (e.g. High pressure/temperature cut-off, safety relief valve, rupture disc, local temperature, pressure gauge, out-let of the safety relief valve to be connected to flare stack etc.) for high pressure syngas handling should be ensured.</p> <p>Guard bed reactor capacity: ~20L packed bed column</p>

8.	Mixer cum Super Heater	<p>The hot syngas will then further have mixed with steam in a mixer cum super heater to a temperature of 320 °C (PH2) and will be fed to HTS inlet. The heating source of mixer cum superheater will be thermic fluid in liquid state. Vapour pressure should be less than 0.5 bar at highest operating temperature. Suitable Grade and Specification should be mentioned. Thermic fluid should be Therminol, Dowtherm, Exxon, Shell make. Thermic fluid heaters should be made of Thermax, Ross</p>
9.	Water gas shift reactor- (WGSR)	<p>WGSR is to maximize the hydrogen composition to achieve the desired H₂/CO (~2 or above) value for further downstream process. Two WGSR are in series operation (WGSR1 and WGSR2) will be required, known as HTS and LTS reactor respectively. HTS and LTS reactor consists of a cylindrical packed bed column with torispherical top end designed for operating at a gauge pressure of atmospheric pressure to 10 kg/cm² and at a temperature of up to 320°C and 250°C respectively. Commercial Shift Catalysts will be used for this purpose. Three temperature sensing points to be provided inside the reactor equidistant from each other to measure the catalyst bed temperature. The I.D of the reactor is 0.15 m with reactor height of 2 m. Reactor shell of suitable thickness will need to be provided. Both the HTS and LTS are to be heated in a jacketed heating system (thermic fluid heated) and both inlet and outlet temperature for each bed to be monitored and controlled through PLC and the temperature should not go beyond 330°C and 250°C respectively (These are deactivation temperatures for HTS and LTS catalysts). Capacity of the Shift reactors assembly would be suitable for approximately 10 L catalyst loading. Both HTS and LTS reactors will be provided with a wire mesh support and supporting bed need to be considered as per standard practice at the top and bottom and the catalyst will be packed in between wire mesh supports. The reactor will be provided with adequate nozzles for pressure, differential pressure, and temperature measurements. Entire control/measurement and instrumentation for temperature at different levels of bed, reactor pressure, safety systems including safety valve and rupture disc, support structure and accessories needs to be provided.</p> <p>The exit gas of the HTS will be cooled in jacketed pipe Cooler-1 (C1) through</p>

water to achieve a desired temperature around 200°C, before feeding it to LTS.

There should be also provision of bypass line with isolation valve for LTS i.e. exit gas from HTS can be directly fed to cooler-2(C2).

One Steam control valve of the range 25–50 kg/h should be provided for feeding steam in HTS.

Normally the exit gas from LTS will be cooled in a water cooled cooler-2 (C2) to achieve a desired temperature of ~40 °C, and fed to a knock out drum before feeding it to the absorber-stripper sections. Level sensor and level transmitter with auto bottom drain valve should be provided for removal of moisture from knock out drum for maintaining desired liquid level so that syngas cannot escape from drain line.

Pressure, Temperature Indicators and sensor should be provided for preheater (PH1), super heater (SH), HTS, cooler-1(C1), LTS, cooler-2(C2), and Knockout drum.

Gas sampling points at exit of HTS and LTS needs to be provided (for analysis the gas composition) as well as there should be provision of cylindrically gas injection for reduction of catalyst.

HTS/LTS syngas handling capacity: ~35Nm³/h

Operating pressure: ~10kg/cm²

Temperature: 320°C and 250°C (for HTS and LTS)

MOC: SS316/304 as per suitability

Reactor I.D. of 0.15m and total reactor height of 2 m (for both HTS and LTS)

Necessary certificates/test report as per standard practices from proper agencies needed. ASME section VIII division 1, TEMA type R

DPT with fluid filled diaphragm isolation system: operating pressure 12 kg/cm², Differential Pressure Span: 0 - 2000 mmWC, Operating Temperature – 320-330 °C, Accuracy - 5 mmWC

Independent steam control valve along with flow meter of the range: 25–50kg/h

The heating source of HTS/LTS will be thermic fluid in liquid state. Vapour pressure should be less than 0.5 bar at highest operating temperature. Suitable Grade and Specification should be mentioned. Thermic fluid should

		be Therminol, Dowtherm, Exxon, Shell make. Thermic fluid heaters should be made of Thermax, Ross
10.	Boiler	<p>Feed to the shift reactor consists of syngas and steam. Steam will be generated in the steam generator. Diesel fired steam generator having steam generation capacity of at least 200 kg/h at operating pressure 12 kg/cm² will be required. Feeding lines from the steam generator to WGSR1(HTS) inlet needs to be provided. The flow meters and flow control valves are to be provided to regulate steam and syngas flow rates. Steam accumulator from OEM of boiler manufacturer along with necessary certification needs to be considered. Steam accumulator should be provided with float/ bucket type steam trap at the bottom, level indicator, pressure/temperature sensors and local gauges, safety valve, rupture disk, isolation valve at the outlet, moisture separator in the steam line between boiler and steam accumulator as well as steam traps (6 Nos) bucket/ puppet type in the line at suitable distance to ensure complete dry steam in reactor. Steam generator capacity of at least 200 kg/h at operating pressure 12 kg/cm²</p> <p>All the pressure parts of boilers will be designed as per ASME SEC VII Div-1 and heat exchangers will be designed as per TEMA standard.</p> <p>Package type demineralized (DM) water generating plant will be installed along with boiler to supply necessary DM water required for steam generation.</p> <p>Flue gas generated will be discharged at a safe height by exhaust duct. Combustion air blower, boiler feed pump, diesel storage tank of adequate capacity, de aerator, pressure and flow control valves as well as necessary instruments need to be considered for smooth functioning of the boiler.</p>
11.	HTS Cooler	It is double pipe heat exchanger of suitable length need to be considered to cool the exit gas stream coming out from the HTS reactor (cooler-1, C1). The heat exchange should be capable to reduce the temp. of gas stream from 320 to 200 °C. Cooling medium should be thermic fluid.

12.	LTS Cooler	<p>It is shell and tube heat exchanger will be used to cool (cooler-2, C2) the exit gas stream coming out from the LTS reactor. The heat exchange should be capable to reduce the temp. of gas stream from 200°C to room temp.</p> <p>Cooling media: Water</p>
13.	Intermediate Holding Tank cum Knockout Drum	<p>Knockout drum of suitable capacity has to be provided for removal of moisture. There should be provision of level transmitter as well as level indicator and certain liquid level should be maintained at the bottom of Intermediate Holding Tank cum knockout drum to prevent release of gas from that section. All international safety precautions (e.g. High pressure, cut-off, safety relief valve, rupture disc, local temperature, pressure gauge as well as transmitter, out-let of the safety relief valve to be connected to flare stack etc.) for high pressure syngas handling should be ensured. Suitable MOC should be selected as per the norms for storing of inflammable toxic gases.</p> <p>Capacity: 200L</p> <p>Pressure: 10 bar</p>
14.	Absorber and Stripping Section for carbon dioxide removal	<p>After the shift reaction the syngas will be richer in CO₂ and needs to be scrubbed. Standard scrubbing procedure may be followed for CO₂ (target <5%) and H₂S (target in ppm level) removal. During plant operation, the syngas from the knock out drum will be fed to bottom of the absorber column. Also there should be provision of bypass line with isolation valve to bypass the absorption column in case of CO₂ concentration of the syngas remains within acceptable limit.</p> <p>The flow rate of the gas entering the absorber will be measured with a flow meter. Mass flow meter should be provided having capacity of 0-50 Nm³/h suitable for handling rich and lean syngas combinations (calibrated for H₂: CO: CO₂: N₂= 45:20:30:5 and calibration chart for at least another two syngas combinations i.e. H₂: CO: CO₂: N₂= 25:12:20:43, 60:30:5:5).</p> <p>The absorber column is a cylindrical vessel with an ID of 0.2 m and a total height of 4.5m. The absorber column will be filled with random packings. The maximum height of the packing zone will be 4 m. There should be provision of level transmitter as well as level indicator and certain liquid level should be maintained at the bottom of absorber column to prevent</p>

release of gas from that section. Solvent will be fed to the top of the absorber column and will be in contact with the “sour” syngas in a counter current mode. Mass flow meter and solvent pump having flow measurement range upto 5000-6000 LPH and discharge head of ~ 15-20 bar should be installed in solvent feed line. Flow control valve and return line with valve need to be installed at the outlet of the solvent pump to keep desired solvent flow rate inside the absorber column. The CO₂ rich solvent will exit the bottom of the absorber column and pressure will be released in flash drum, where small percentage of acidic gases will remove from the liquid stream. The flash drum will be a cylindrical vessel and capacity will be approximately 250L (ID 0.4m, height 2m). Control valve for release of solvent from the bottom of absorption column reservoir should be installed and it needs to be linked with level transmitter. The syngas exits from the top of the absorber column and is sent to a knock out drum placed after absorber stripper section. The absorber column will be maintained at atmospheric pressure to 10 kg/cm².

Temperature sensors need to be provided in the absorber column, for measuring the liquid temperature inside the column. The gases coming out from the top of flash drum is connected with the gas exit line coming out from top of the stripper before reflux condenser used for maintaining the reflux in stripper column.

Then the amine rich solvent from the bottom of the flash drum will be fed to the feed point of the stripper section maintaining required temperature and with controlled flow rate.

Flow meter and solvent pump having flow measurement range upto 5000-6000 LPH and operating pressure 15-20 bar should be installed for feeding the CO₂rich amine solvent to the stripping column after heating the liquid stream upto 100°C in a shell and tube heat exchanger.

There should be provision of level transmitter as well as level indicator and certain liquid level should be maintained at the bottom of flash drum to prevent release of gas from that section.

The stripper is a cylindrical vessel with an ID of 0.2 m and a total height of 5 m. The stripping column will be filled with random packings, with a

maximum packing height of 4 m. The bottom of the stripping column will be provided with a steam heated reboiler to strip the absorbed gas from the solvent. The approximate temperature of the liquid in the reboiler section at the bottom of the stripping column need to be maintained $\sim 150^{\circ}\text{C}$ so that temperature near to the liquid feed line remains $\sim 100^{\circ}\text{C}$. The stripper should be properly insulated to maintain the desired temperature of 100°C inside the bed of column. The vapors from the reboiler are fed back to the stripper. Multiple points of entry of this vapour must be provided (4 entry points) on the stripper body. A control valve and flow meter will be provided in the recycled line to ensure that the flow is identical to the flow exiting out of the absorber bottom. At the top of the stripping column, a reflux condenser needs to be provided to reflux the solvent back into the column and prevent the solvent vapors from escaping. Cooling water will be fed to the tubes of the condenser and the hot vapors from the stripping column fed to the shell side. The liquid condensate from the shell side will be sent back to the top of the column, while the gases (acid gases like H_2S etc) will be sent to the flare stack. Required lines for (40 NB) need to be provided for supplying gas from stripper top exit to the flare stack. A storage tank for the storage of the fresh solvent also needs to be provided. Provision for direct in-line mixing of the fresh solvent with suitable pump and flow meter must be provided. There should be provision of level transmitter as well as level indicator and certain liquid level should be maintained at the bottom of stripper column to prevent release of gas from that section. Liquid coming out from the bottom of stripper column will be passed through a shell and tube heat exchanger to maintain desired temperature $\sim 30\text{-}40^{\circ}\text{C}$. After heat exchanger it will be stored in a storage vessel having capacity 200L. Recycled solvent from the storage vessel will be pumped back to the absorber column top after doing required make up solvent.

Absorber column: ID 0.2 m and height of 4.5 m

Absorber operating Temperature: $40\text{-}60^{\circ}\text{C}$; operating Pressure: Atmospheric to 10 kg/cm^2

Level transmitter, Indicator and controller for absorber

	<p>Level transmitter guided radar type: atmospheric to 10 kg/cm², 100°C, Level - minimum 0.2 m, Maximum - 1.5 m</p> <p>Temperature indicators (4 No.) in absorber</p> <p>Stripper column: ID 0.2 m and height of 5m</p> <p>Stripper Operating Temperature: 120-130°C; Operating Pressure: 1 atm</p> <p>DPT with fluid filled diaphragm isolation system: operating pressure 12 kg/cm², Differential Pressure Span: 0 - 1000 mmWC, Operating Temperature – 150 °C Accuracy - 5 mmWC</p> <p>Level transmitter, Indicator and controller for stripper</p> <p>Temperature indicators (4 No.) in stripper</p> <p>Solvent Circulation Pump Capacity (4No.): 5000-6000 LPH (2 set of pump will be installed in parallel for redundancy of the pump both for absorber and stripper section)</p> <p>Solvent flow meter (2 No.): 5000-6000 LPH</p> <p>Fresh Solvent flow meter with control valve (1 No.): up to 5000 LPH</p> <p>Fresh solvent pump upto 5000LPH</p> <p>Solvent control valve (2 No.):5000-6000 LPH</p> <p>Preheater: Heating of solvent to 110 °C</p> <p>Temperature Indicators and temperature controller (for reboiler)</p> <p>Cooling: Cooling of solvent to 40 °C</p> <p>Steam heated/thermic fluid heated Reboiler operating pressure: 1 atm</p> <p>Steam heated/Thermic fluid heated Reboiler operating temperature: upto200°C (Shell Side)</p> <p>Water cooled vertical Condenser operating pressure: 1 atm</p> <p>Water cooled vertical Condenser operating temperature: upto130°C (Shell Side)</p> <p>Solvent Storage Tank Capacity: 200 L</p> <p>Operating Temperature: 50 °C</p> <p>Pressure gauge and Rupture disk for absorber and stripper. Level transmitter, indicator and controller to be provided.</p> <p>MOC: SS316</p> <p>Independent steam control valve along with flow meter of the range: 25–50kg/h</p> <p>Entire system should have control system along with all the valves, control</p>
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		<p>and instrumentation for temperature, pressure, flow, safety systems (safety valve and rupture disc), structure mounting, accessories, etc.</p> <p>All the mass flow meters and control valves should be provided with isolation as well as by pass valves.</p>
15.	Knock out Drum	<p>The syngas coming out from absorption tower will be sent to the knock out drum. All international safety precautions (e.g. High pressure/temperature cut-off, safety relief valve, rupture disc, local temperature, pressure gauge, temperature and pressure transmitter, out-let of the safety relief valve to be connected to flare stack etc.) for high pressure syngas handling should be ensured. Suitable MOC should be selected as per the norms for storing of inflammable toxic gases.</p> <p>Capacity: 100L</p> <p>Pressure: atmospheric pressure to 10 bar</p>
16.	Gas Holding Tank	<p>The syngas coming out from knock out drum will be stored in gas holding tank. There should be provided mass flow meter to measure the gas coming out from knock out drum. The mass flow meter should be calibrated for H₂: CO: CO₂: N₂= 60:26:6:8 and calibration chart for at least another two syngas combinations i.e. H₂:CO:CO₂:N₂= 29:14:6:51, 60:30:5:5. The capacity of the storage tank should be 400L with all safety arrangements (e.g. High pressure/temperature cut-off, safety relief valve, rupture disc, local temperature, pressure gauge, temperature and pressure transmitter, out-let of the safety relief valve to be connected to flare stack etc. Suitable MOC should be selected as per the norms for storing of inflammable toxic gases. There should be temperature and pressure indicator for reading the temperature and pressure of the stored syngas at least two points of the Gas Holder.</p> <p>The mass flow meters and control valves should be provided with isolation as well as by pass valves.</p>

		<p>Temperature: Room temperature Capacity: 400L</p> <p>Pressure: atmospheric pressure to 10atm</p>
17.	High Pressure Syngas Compressor	<p>Syngas coming from the gas holding tank is fed to the High Pressure Syngas Compressor. Syngas to methanol is exothermic reaction and favors at High pressure, hence the operating pressure is to go up to ~ 70 atm. The compressor should be such that it can build up to 70 atm from near atmosphere to maintain required operating pressure in Multi tubular reactor and its capacity should be of ~ 35 Nm³/h. The operation of the compressor should be controlled variable RPM in order to maintain stable syngas pressure in the High pressure buffer tank having capacity of ~100L. All international safety precautions (e.g. High pressure/temperature cut-off, safety relief valve, rupture disc, out- let of the safety relief valve to be connected to flare stack etc.) for high pressure syngas handling should be ensured. Need to include suitable dryer system</p> <p>Capacity: 35-50Nm³/h Operating pressure: 70 atm and should be electrically driven.</p>
18.	HPBT (high Pressure Buffer Tank)	<p>Compressed Syngas by the High Pressure Compressor will temporarily be stored in a High Pressure buffer tank (Capacity of: ~ 100 L) and simultaneously fed into the downstream Reactor (i.e methanol reactor). The Gas Flow rate (up to 35 Nm³/h) can be varied according to the requirement of the reaction parameter. The High pressure tank should be made of suitable quality material and thickness conforming to the standards of high pressure inflammable and toxic gas storage vessels. A mass flow-meter and control valve should be provided to quantify the total amount of gas to be fed in to the Pre-heater vis-à-vis Reactor. All international safety precautions (e.g. High pressure/temperature cut-off, local temperature, pressure guage as well as transmitter safety relief valve, rupture disc, outlet of the safety relief valve to be connected to flare stack etc.) for high pressure syngas handling should be ensured.</p> <p>Mass flow-meter and control valve: up to 35 Nm³/h Capacity of high pressure buffer tank: ~ 100 L</p>

		Pressure: 70 atm
19.	Pre-heater	The cold gas is not directly fed in to the Methanol Reactor, hence the feed gas is pre-heated to a temperature ~150–200°C less than the reaction temperature. Suitable heating arrangement by using Thermic fluid should be provided to keep the temperature of pre-heater in the range of 150 – 200°C. There will be separate thermocouples for reading the temperature inlet and outlet of the pre-heater.
20.	Guard Bed	Syngas coming out from Preheater through mass flow meter and controller should be preheated to desired temperature (150 – 200°C). It will be used to remove sulphur component from the gas stream up to <1ppm level. It will be a cylindrical vessel loaded with catalyst. All international safety precautions (e.g. High pressure/temperature cut-off, safety relief valve, rupture disc, local temperature, pressure gauge as well as temperature and pressure transmitter, out- let of the safety relief valve to be connected to flare stack etc.) for high pressure syngas handling should be ensured. Mass flow meters and control valves should be provided with isolation as well as by pass valves. Guard bed reactor capacity: 20L
21.	Pre-heater	The gas coming from guard bed reactor will mix with the recycle gas stream (capacity: 210 Nm ³ /h) and will be fed into the shell and tube pre-heater to raise the temperature of entire gas stream up to ~ 200-300 ⁰ C (<i>only in case of catalyst reduction the temperature will be raised upto~300⁰C</i>). Suitable heating arrangement by using thermic fluid should be provided to keep the temperature of pre-heater in the range of 200-300 ⁰ C. There will be separate thermocouples for reading the temperature inlet and outlet of the pre-heater. Provision for additional H ₂ and N ₂ feed line from gas cylinder with mass flow meter and Flow controller should be incorporated for reduction of methanol catalyst at the initial stage of experiment. For H ₂ (1 Number)MFC flow ranges between 50 ml per min to 2 L per min. For N ₂ (1 Number)MFC flow ranges between 1-20 L per min.

		<p>No. of filled N₂ cylinder (Purity- 99.999 %.) required: 5 (47 L water capacity) along with 1 No. of dual stage gas regulator (SS316 diaphragm) of reputed brand.</p> <p>No. of filled H₂ cylinder (Purity- 99.999 %.) required: 2 (47 L water capacity) along with 1 No. of dual stage gas regulator (SS316 diaphragm) of reputed brand.</p> <p>Necessary tubing from cylinder to preheater (20 m) need to be provided.</p>
22.	Multi-tubular Fixed Bed Reactor with Suitable heat exchanger	<p>This is the main reactor system. It is multi-tubular Fixed Bed Reactor of 20 L catalyst capacity. The length of the reactor would be 2.5 M and it can hold 10 – 14 smaller tubes. These tubes (ID of each tube: 40 mm) should be jacketed and suitable cooling system should be arranged to maintain the temperature of the reactor ~180 -250⁰C. Proper design of flow distribution has to be maintained so as to ensure the equal reaction conditions in all tubes. The temperature of the reactor should be monitored at least at 3 zones (top, mid and bottom zones) of all around the reactor and suitable temperature controller system should be given to maintain the reactor temperature at certain reaction temperature (± 5⁰C). The reaction temperature may be varied from 180 to 250⁰C. Suitable arrangement should be made for loading of the catalyst from the top and used catalyst discharge from the bottom of the reactor. All international safety precautions (e.g. High pressure/temperature cut-off, safety relief valve, rupture discs, out-let of the safety relief valve to be connected to flare stack etc.) should be ensured for this reactor. The out-let of the reactor is connected to the condenser and gas liquid separator followed by product collector.</p> <p>Pressure: 70atm Catalyst Volume:20L</p> <p>Temperature:~180 – 250⁰C</p>
23.	Condenser	<p>Condenser is joined at the end of the reactor outlet. This device mainly removes heat from gas/vapor, once sufficient heat removes liquefaction occurs. The outlet temperature of condenser should be ~20⁰C. Necessary chiller arrangement should be provided to maintain the temperature.</p> <p>Chiller make: Warner Finley/Marlin/Julabo</p>

24.	Methanol- Unconverted Syngas separator	<p>This is high pressure tank having capacity of 100L used to separate a gas-liquid mixture. There should be provision of level transmitter as well as level indicator. All international safety precautions (e.g. High pressure/temperature cut-off, safety relief valve, rupture discs, local temperature, pressure gauge as well as transmitter, out-let of the safety relief valve to be connected to flare Stack etc.) Should be ensured for this separator.</p> <p>Tank capacity: 100L Pressure: 70 atm</p>
25.	Methanol Collection System	<p>Catch pot is a housing used to remove the bulk of the liquid.</p> <p>All international safety precautions (e.g. High pressure/temperature cut-off, safety relief valve, ruptures discs, local temperature and pressure gauge as well as transmitter etc.) Should be ensured for this system. There should be provision of level transmitter as well as level indicator with mass flow meter for discharging of the product.</p> <p>Mass flow meters and control valves should be provided with isolation as well as by pass valves.</p> <p>Capacity: 50L</p>
26.	CO ₂ Buffer Tank	<p>CO₂ gas coming out from CO₂ Stripper section (described in sl.no. 14) will be collected in this tank. CO₂ from this tank will be fed to the CO₂ compressor. The pressure of the tank should always be maintained few mm of Water column of the atmospheric. There is one CO₂ vent control valve required to maintain the tank pressure near to atmosphere. The vent control valve is interlocked with the pressure transmitter, mounted at the top of the tank. If the CO₂ buffer tank pressure is getting less than atmospheric pressure then there should be provision to stop the gas compressor. If buffer tank pressure goes safe limit of CO₂ pressure in the buffer tank (around 100 mm of Water column) valve needs to be open automatically to control the pressure inside the tank.</p> <p>Specifications: Capacity: 1KL MOC: SS/MS Working Pressure: Near to atmospheric pressure Design Pressure: above 12 kg/cm²</p>

		<p>Working Temperature: ambient</p> <p>Nozzels: Inlet nozzle with isolation valve</p> <p style="padding-left: 40px;">Outlet nozzle with isolation valve</p> <p style="padding-left: 40px;">Drain with isolation valve</p> <p style="padding-left: 40px;">Auto-drain with isolation valve</p> <p style="padding-left: 40px;">Safety valve</p> <p style="padding-left: 40px;">Rupture Disc</p> <p>Sensors: Local pressure gauge (Range 0 -100 mmbar)</p> <p style="padding-left: 40px;">Make: Wika/Dwyer/Waree/Baumer</p> <p style="padding-left: 40px;">Quantity: 1 Nos.</p> <p>Pressure Transmitter (Range 0 – 100 mmWC)</p> <p style="padding-left: 40px;">Make: Emersion/Honeywell</p> <p style="padding-left: 40px;">Quantity: 1 Nos.</p> <p>Temperature Transmitter (0 – 100 °C)</p> <p style="padding-left: 40px;">Make: Watlow/Exotherm/ Anderson Negle</p> <p style="padding-left: 40px;">Quantity: 1 Nos.</p> <p>Vent control valve:</p> <p style="padding-left: 40px;">Type: Globe</p> <p style="padding-left: 40px;">Capacity: 50 Nm³/h</p> <p style="padding-left: 40px;">Quantity: 1 Nos.</p> <p style="padding-left: 40px;">Pressure range: 12 kg/cm²</p> <p style="padding-left: 40px;">Higher CV value should be selected for wide range application</p> <p style="padding-left: 40px;">Make: Jordan/Samson/Forbes Marshal/ Tescom</p>
27.	CO ₂ Compressor	<p>CO₂ will get compressed from atmospheric to desired pressure of 10 kg/cm² and after that the gas will be store in CO₂ storage tank. Compressor flow rate should control by Variable Frequency Drive (VFD) with desired set point through SCADA. Compressor must have interlocked with the CO₂ buffer tank to stop compressor when the pressure of CO₂ buffer tank goes down below atmospheric.</p> <p>Specifications:</p> <p>Compressor with variable RPM (To control flow rate)</p> <p>Gas : Carbon-di-oxide (CO₂)</p> <p>Inlet Gas Temperature: ambient</p> <p>Inlet Gas Pressure : Near to atmospheric</p>

		<p>Capacity : 3 to 30 Nm³/h</p> <p>Discharge Gas Pressure: 10 kg/cm²</p> <p>Inlet Gas Line Isolation valve</p> <p>Outlet Gas Line Isolation valve</p> <p>Inlet Water/Moisture Filter</p> <p>Outlet Oil Filter</p> <p>Make: Kirloskar, SIAD, Atlas Copco</p>
28.	Compressed CO ₂ Storage Tank	<p>Compressed gas from CO₂ Compressor will further be stored in Storage Tank. There is requirement of Pressure Regulating Valve (PRV) in the gas line from CO₂ storage tank to CO₂ Gas header. On CO₂ Gas header, one CO₂ conveying line having needle valve and rotameter is required and this line will connect to existing air conveying line of PFBG pilot plant. Another line from CO₂ header which consisting needle valve, Rotameter, Control valve followed by Flow meter again will be divided into two streams. After this flow meter there should be provision for CO₂ discharge as and when required into the atmosphere along with ball valve in the exit line and another line will carry CO₂ to the existing air cum mixer super heater facility.</p> <p>Specifications:</p> <p>Capacity: 0.2 KL</p> <p>MOC: SS/MS</p> <p>Working pressure: 10 kg/cm²</p> <p>Working temperature: ambient – up to 100 °C</p> <p>Nozzles: Inlet nozzle with isolation valve</p> <p>Outlet nozzle with isolation valve</p> <p>Drain with valve</p> <p>Auto-drain valve</p> <p>Safety valve</p> <p>Rupture Disc</p> <p>Make: BS&B/FIKE</p> <p>Sensors: Local pressure gauge (Range 0 -10 kg/cm²)</p> <p>Make: Wika/Dwyer/Waree/Baumer</p> <p>Quantity: 1 Nos.</p> <p>Pressure Transmitter (Range 0 -10 kg/cm²)</p>

Make: Emersion/Honeywell

Quantity: 1 Nos.

Temperature Transmitter (0 – 100 °C)

Make: Watlow/Exotherm/ Anderson Negle

Quantity: 1 Nos.

Pressure Regulating Valve:

Capacity: 30 Nm³/h

Quantity: 2 Nos.

Capacity: 150 Nm³/h

Quantity: 1 Nos.

Pressure range: up to 12 kg/cm²

CO₂ Gas Header:

MOC: SS

Pressure Transmitter: 10 kg/cm² (1 Nos.)

Make: Wika/Dwyer/Waree/Baumer

Quantity: 1 Nos.

Safety valve: 1 Nos.

Rupture Disc: 1 Nos.

Make: BS&B/Fike

Drain valve: 1 Nos.

Rotameter: 3 Nos. (3 – 30 Nm³/h)

Make: Eureka/Scientific/veksler

Needle valve: 3 Nos.

CO₂ Gas Flow control valve:

Type: Needle/Globe valve

MOC: SS

Capacity: 3 – 30 Nm³/h

Quantity: 1 Nos.

Pressure range: 12 kg/cm²

Higher CV value should be selected for wide range application

		<p>Make: Jordan/Samson/Forbes Marshal/ Tescom</p> <p>CO₂ Gas Flow meter:</p> <p>Type: Vortex Flow meter</p> <p>MOC: SS</p> <p>Capacity: 3 – 30 Nm³/h</p> <p>Size: suitable for above mentioned flow range</p> <p>Make: E+H/ Rosemount/ Yokogawa/ForbesMarshal</p>
29.	CO ₂ storage tank along with refrigeration and vaporization facility	<p>CO₂ storage unit needs to be provided with its refrigeration and vaporization unit. There is a requirement of CO₂ storage and supply system for 05-25 Nm³/h suitable for at least 3-4 hours continuous supply into the existing 1.5 TPD PFB gasifier. A gaseous form of CO₂ is required to feed in the gasifier. So the CO₂ storage system has the ability to storage CO₂ with utilization of refrigeration associated with vent and vaporizer to convert liquid CO₂ into gaseous phase. According to the requirement, the CO₂ storage tank needs to be provided. There should be a provision for customize filling and delivery connections. A refrigeration auto control unit to maintain temperature inside the tank needs to be provided. The entire system needs to be insulated as per standards. This CO₂ storage facility will be connected to the existing gasifier, so all the related piping, fitting, control and safety features need to be provided (as mentioned in serial no 28). All other instruments associated with CO₂ storage facility and connections with existing gasifier should be incorporated as per standard practice.</p> <p>Finally, the liquid storage tanks should be equipped with various control devices such as Valves, Safety valves, Pressure gauge, Piping Arrangement, Pumping facility, Chiller/Refrigeration Unit, insulation as required. The complete Design, Material Procurement, Supply, Fabrication, Erection, Inspection, Testing & Commissioning of Liquid CO₂ Storage and transport tanks should be done by the supplier.</p> <p>CO₂ requirement – 10-25 Nm³/h (gas form)</p> <p>Continuous supply time – 3-4 hours</p> <p>MOC: SS</p>

Recycle Section

(The unconverted gas will recycle, mix with fresh feed and sent back to reactor)

30	Unconverted syngas Holding tank	<p>The unconverted gas will be stored in Gas holder. All international safety precautions (e.g. High pressure/temperature cut-off, safety relief valve, rupture discs, local temperature, pressure gauge as well as transmitter out-let of the safety relief valve to be connected to flare stack etc.) should be ensured for this reactor.</p> <p>Gas holder capacity: 100L Pressure: 65-68 atm.</p> <p>Temperature: Room temperature</p>
31	Syngas recycle compressor	<p>To maintain the required pressure, the recycled gas is needed additional Compressor to maintain the desired pressure up to 70 atm. The operation of the compressor should be controlled variable RPM in order to maintain stable syngas pressure in the High pressure buffer tank having capacity of ~100L. All international safety precautions (e.g. High pressure/temperature cut-off, safety relief valve, rupture disc, out- let of the safety relief valve to be connected to flare stack etc.) for high pressure syngas handling should be ensured.</p> <p>Compressor capacity: 250 Nm³/h</p> <p>Pressure: ~70 atm</p> <p>Compressor should be electrically driven.</p>
32	Recycle high pressure syngas storage tank	<p>Recycle Syngas compressed by the High Pressure Syngas Compressor will temporarily be stored in a High Pressure syngas storage tank (Capacity of: ~ 100 L) and simultaneously fed into the inlet of preheated (i.e. before methanol reactor). Necessary water drainage arrangement has to be made from the bottom of this drum. Packing arrangement should be there to facilitate water condensation. In case, if this packing cannot be provided in this drum, separate knockout drum of suitable size (may be in order of 0.5 m³ subject to calculation by the compressor OEM) should be provided. The High pressure tank should be made of suitable quality material and thickness conforming to the standards of high pressure inflammable and Toxic gas storage vessels. A mass flow-meter and control valve should be provided to quantify the total amount of gas to be fed in to the Pre-heater. All international safety precautions (e.g. High pressure/temperature cut-off, safety relief valve, rupture disc, local temperature and pressure</p>

		<p>gauge as well as transmitter, out- let of the safety relief valve to be connected to flare stack etc.) for high pressure syngas handling should be ensured.</p> <p>Capacity: 100 L</p> <p>Pressure: 70 atm</p>
33	Purging Valve	<p>Provisions should be made to provide a flow control valve on the Unconverted Syngas Holding tank before recycle compressor. This valve will be used to purge the syngas as and when required to maintain desired gas composition in the methanol reactor. The outlet of the valve will be connected to the flare stack.</p>
34	Thermic fluid heating/cooling system	<p>Thermic fluid is used for the following purposes:</p> <ol style="list-style-type: none"> i. Heating of feed syn gas in shell & tube preheater from room temperature to 200°C for COS hydrolysis ii. Heating of syn gas in shell & tube preheater from room temperature to 250°C for catalyst guard bed iii. Heating of syn gas from 250°C to 320°C in mixer cum superheater before entering into HTS. iv. Maintaining temperature at HTS and LTS as 320°C and 250°C respectively. v. To preheat compressed syngas from 150°C to 200°C before entering guard bed reactor. vi. To preheat compressed syngas from 200°C to 300°C before entering methanol reactor. <p>Thermic fluid will be selected in a way so that it stays in liquid phase at temperature 350°C or more.</p> <p>Thermic fluid system will consist of the following:</p> <ul style="list-style-type: none"> Fuel (Diesel) tank Fuel pump Fuel pipework Combustion air blower Flue gas exhaust duct Burner and heat exchanger

		<p>DE-Aerator and expansion tank</p> <p>Thermic fuel storage tank</p> <p>Thermic fuel pump</p> <p>Flow control valves.</p> <p>Necessary pipework with insulation</p> <p>Necessary instrumentation and standalone control system</p>
35	Water System including cooling tower	<p>This section describes the water system necessary to cater the indirect cooling water and make-up water requirement of the plant as well as the drinking water system.</p> <p>Recirculation water system</p> <p>Recirculation water circuits with industrial water is envisaged for :</p> <ol style="list-style-type: none"> i. Heat exchanger secondary side cooling of various fluids, viz. gases, thermic fluid etc. ii. Cooling of solvents. iii. Condenser cooling circuit. iv. Cooling of other miscellaneous equipment. <p>A suitable cooling tower with minimum two (1W+1S) pumps, ID fan, water storage tank, should be provided with necessary pressure, temperature gauges, safety devices to maintain the temperature of different unit at desired level.</p> <p>The hot water from indirect cooling circuits will be cooled in the cooling tower and will be collected in cold well. The cold water from cold well will be pumped back to above consumers. The cooling tower will be made of FRP (fiber glass reinforced polyester).</p> <p>The pumps will be located in a pump house. Minimum one (1) no. stand by pump for the above services shall be provided. The pumps shall be selected considering 5% margin over actual flow rate.</p> <p>Make-up water system</p> <p>Industrial quality make-up water will be supplied to the cold well/cooling tower basin from existing plant make-up water</p>

		<p>system. Make up water will also be provided for once-through process and service water requirements.</p> <p>Industrial quality make-up water will be supplied for generation of steam for process use in package type boiler along with DM plant.</p> <p>Suitable isolation and throttling valves need to be provided in the make-up water lines. Water will also be required for hydrolysis of syngas.</p> <p>Chilled water system</p> <p>Chilled water is required to be provided at condenser of methanol reactor and stripper to cool down temperature of methanol from 250°C to 20°C. For this purpose water cooled water cooled scroll / screw/reciprocating vapor compression type chillers will be installed to supply chilled water at 7 to 8°C . Chillers will be made considering ARI, ASME SEC VIII DIV 1 standards. Ozone friendly refrigerant will be used in chillers. Along with chillers necessary chilled water pumps, expansion tanks, cooling tower with condenser water pumps, insulated chilled water pipework and condenser cooling water pipework will be installed.</p> <p>Distribution pipework</p> <p>Mild steel pipework will be used for conveyance of make-up water and indirect cooling water.</p> <p>Water drainage</p> <p>Open drains are envisaged for the plant storm water drainage within the battery limit of methanol pilot plant and the same should be connected to drains outside plant boundary.</p>
36	Flare stack	<p>All vent points of different equipment, gas storage tanks, reactors, compressors, analyzers etc. and purge out connections from syn gas pipe line will be connected to flaring system through pipe lines and valves. Exhaust duct which will be supported from building will be provided with spark/flame</p>

		generator, pilot burner, fuel tank, purge in connection etc. LPG will be used as pilot fuel. Outlet of exhaust duct to be kept five (5) meter above nearest tallest building. 2(two) numbers of filled commercial LPG cylinders need to be supplied for this purpose.
37	Instrumentation Air Compressor and Dryer	To fulfill the requirement of dry compressed air for pneumatic valve actuation it is proposed to install positive displacement type compressor of adequate capacity along with refrigerant type dryer. Diaphragm/lobe type compressor will be considered. Pressure of compressed air will be approximately 6-7 bar (g). Compressors and dryers will be air cooled and oil free. Pressure dew point for dry compressed air will be (+)3°C. Ozone friendly refrigerant will be used in dryer. Make: Kaeser, atlas copco, Noxerion (Novair) Operating pressure: 6 to 7bar (g) Accumulator capacity: ~3 m ³
38	Air conditioning system	Air cooled split type air conditioner (3 nos of 1.5 ton capacity) shall be installed in control room to maintain room inside temperature below 25°C.
39	Ventilation system	Proper ventilation system (by exhaust fan of suitable capacity or around 15 in numbers) shall be provided for process buildings/ compressor house etc. will be catered by existing ventilation system.
40	Fire Extinguisher	All process building, compressor house, electrical and control rooms to be provided with ABC type fire extinguishers as per IS: 2190. 15 numbers of fire extinguishers will be required.
41	Nitrogen Network	Nitrogen line will be tapped from nearest nitrogen header located in the existing 1.5 TPD gasifier building, and new pipeline should be laid along syngas network. Purge in connections to be provided at different strategic points from nitrogen gas pipeline.
42	Online and continuous Gas Analyzer system	Minimum two sets of online gas analyzer need to be provided for continuous gas analysis or as and when required basis.It will use to

		<p>analyze the syngas compositions at different locations syngas accumulator, before and after COS hydrolyzer reactor, H₂S absorption column, guard bed reactor, HTS and LTS, after absorption tower, before and after methanol reactor, in recycle section. Necessary fittings for sample collections at different location need to be Provided. The sample will be collected from different points and gas will enter to a header of suitable capacity. Analyzer will take the sample from the sample header. Necessary flushing arrangement for the header needs to be incorporated. Flushing needs to be carried out after each analysis to avoid mixing with previous sample taken for analysis. It should be connected with flare stack for safe flushing. There will be provision for sequential analysis or as per user requirement. Analyzer should be capable to analyze on multipoint basis as mentioned above.</p> <p>Range of Detection Limit: CO: 0 – 60 %; CO₂: 0- 20%, CH₄: 0 –10%, H₂: 0-70%, O₂: 0 – 20%</p> <p>Detector for CO, CO₂, CH₄ should be NDIR based. Detector for O₂ should be Paramagnetic based and detector for H₂ should be TCD based.</p> <p>Make: Nova/Siemens/Metler/Yokagawa/MRU/ABB</p>
43	H ₂ S, COS analyzer	<p>H₂S & COS analyzer needs to be provided to measure H₂S and COS concentration before and after COS hydrolyser reactor, after H₂S amine absorber, and guard bed reactor. The measurement limit should be between few percentages to ppm level. Make : Metler/Nova/Madur/Aqua Gas/Ametek/ Gasmot</p>
44	Catalyst	<p>The catalyst for COS hydrolyser (activated alumina catalyst), HTS (Fe-Cr based catalyst), LTS (Cu based catalyst), guard bed reactor, and syngas to methanol (Cu-ZnO-Al₂O₃ based catalyst) need to be provided with all boundary conditions and reaction parameter. Approximately 100kg of each catalyst need to be provided from reputed catalyst manufacturer (Johnson Matthey/ Sud-Chemie/Haldor-Topsoe/ Casale or equivalent)</p>
45	MDEA	<p>The firm should supply ~2000 L of industrial grade of MDEA for CO₂</p>

.		absorption.																												
46	Essential document certificates	The supplier has to provide material certificates, quality certificates as well as the certificates guaranteeing the all aspect of the manufacturing at his own cost from competent authority. Provision should be there for CIMFR to inspect progress of work during fabrication at supplier's site with prior intimation.																												
47	Plant piping	<p>The supplier has to prepare P&I diagram of the entire plant and the piping/tubing layout for the entire plant need to be prepared as per flow diagramed P&I diagram. Supplier has to carryout flexibility analysis for the plant. The other interconnecting pipe/tubing layouts have to be done by the supplier with necessary brackets and supports. All steel structures, piping, equipment's shall undergo rigorous metal treatment and finish as per standard color coding practices.</p> <table border="1"> <thead> <tr> <th>Sl. no.</th> <th>Service</th> <th>Piping specification</th> <th>Desi gn velocity</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Dry compressed air</td> <td>ERW as per IS: 1239</td> <td>8-10 m/sec</td> </tr> <tr> <td>2.</td> <td>Steam</td> <td>Seamless as per ASTM A 106 Gr.B , dimension as per ANSI 36.10,insulated</td> <td>30-35 m/sec</td> </tr> <tr> <td>3.</td> <td>Thermic fluid</td> <td>Seamless as per ASTM A 106 Gr.B , dimension as per ANSI 36.10,insulated</td> <td>2-3 m/sec</td> </tr> <tr> <td>4.</td> <td>Syn gas</td> <td>SS-316 seamless pipe,</td> <td>8-10 m/sec</td> </tr> <tr> <td>5.</td> <td>Nitrogen</td> <td>ERW as per IS: 1239</td> <td>8-10 m/sec</td> </tr> <tr> <td>6.</td> <td>Chilled water supply and return</td> <td>ERW as per IS: 1239, insulated</td> <td>2-2.5m/sec</td> </tr> </tbody> </table>	Sl. no.	Service	Piping specification	Desi gn velocity	1.	Dry compressed air	ERW as per IS: 1239	8-10 m/sec	2.	Steam	Seamless as per ASTM A 106 Gr.B , dimension as per ANSI 36.10,insulated	30-35 m/sec	3.	Thermic fluid	Seamless as per ASTM A 106 Gr.B , dimension as per ANSI 36.10,insulated	2-3 m/sec	4.	Syn gas	SS-316 seamless pipe,	8-10 m/sec	5.	Nitrogen	ERW as per IS: 1239	8-10 m/sec	6.	Chilled water supply and return	ERW as per IS: 1239, insulated	2-2.5m/sec
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48	Electrical, Equipment and Connections including MCCs	Total electrical power requirement has to be finalized by the supplier and needs to be communicated to CIMFR to make arrangements at installation site. Laying of the electrical cable within and outside of the structure up to control room and supplier's																												

battery limit will be the responsibility of supplier. All accessories such as MCC and other controlling devices have to be provided and fitted by the supplier.

This section covers the following:

- i) The source of power.
- ii) Selection of voltage levels.
- iii) Proposed plant power supply arrangement.
- iv) Selection criteria for major electrical equipment.

Source of power: Power require for the proposed pilot plant shall be obtained from the existing main LT board which is located at an approximate distance of 60 m. Necessary switching arrangement for tapping power needs to be provided by the supplier.

Selection of voltage levels:

Voltage level:

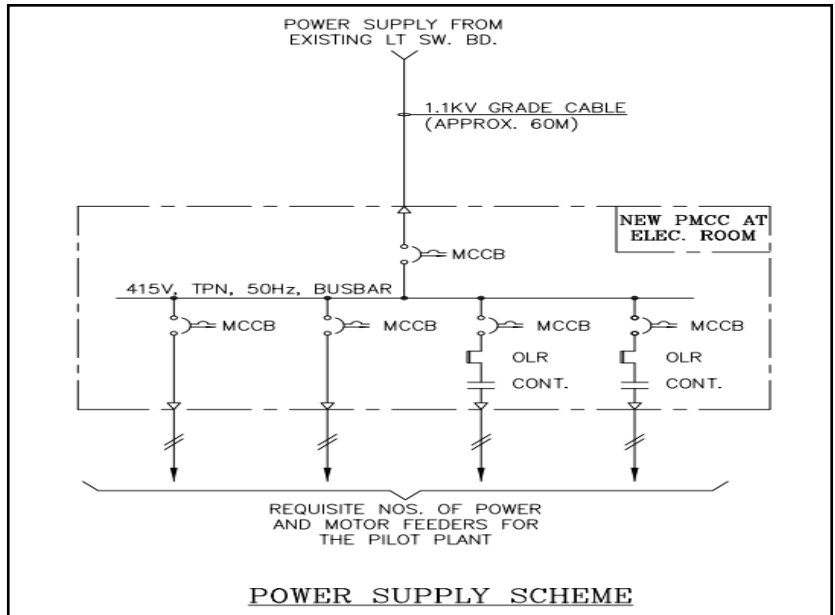
- Incoming source : 415 V, 3 Ph-4 Wire
- Distribution system : 415 V-240V, 3 Ph-4 Wire
- Voltage variation : +/-6%
- Frequency : 50 Hz +/-3%
- System fault level : 50kA for 1 sec.
- Neutral solidly earthed at source end.

Control voltages:

- AC control circuit : 240 V AC
- Solenoid Valve : 24 V DC

Proposed plant power supply arrangement: It is proposed to establish a new 415V Power cum motor control centre (PMCC) to cater to the loads of the proposed pilot plant. The new PMCC shall have single incoming feeder and requisite nos. of outgoing power and motor feeders to meet the plant requirement. This new PMCC shall be fed from existing LT switchboard.

A tentative power supply scheme is depicted in the below sketch:



Selection criteria for major electrical equipment: Major electrical equipment for the plant is briefly described hereunder:

a) Power cum Motor Control Centre (PMCC)

PMCC shall be designed to cater to all electrical loads of syngas to methanol Pilot plant facility. PMCC shall have one incomer. Incomer and outgoing feeders of the PMCC shall be fixed type modules. Incomer and motor feeding cubicles of PMCC shall have MCCB as circuit breaker with O/C, S/C and E/F protection. Incoming MCCB /outgoing MCCBs shall be thermal magnetic. The MCC shall be of type tested design and shall be of sheet steel, cubicle type, free standing, enclosed, factory built assembly for indoor use. The MCC shall be designed for 415V, 3-ph, 4-wire 50 Hz power supply system and rated for 1100V insulation voltage. Separate bus-bar compartment shall be given at the top for housing the main bus-bars. Bus-bars shall be extended to the full length of the compartment. Vertical bus-bars shall have the rating corresponding to the breakers/switches connected with it. Four-pole MCCB with protection system for entire panel as well as suitable MCBs with protection system for all the equipment like compressor, boiler, motors, etc. needs to be provided in the PMCC. Bus bar shall be capable to withstand

the fault current of 50 kA for 1 sec and peak short circuit current of 84 kA. Arrangement and spacing of the bus bars shall be made in such a way that it can withstand the fault level as specified. The bushing of bus bar shall be capable to withstand thermo-mechanical shock arising out of heating of bus bars during short circuit.

Control Circuit voltage for PMCC modules shall be 240 V AC. PMCC should have its own control. The control transformer shall have fuse & MCB protection on primary side as well as in the secondary side. Earthing terminals 4 nos. should be provided at the two opposite ends of the PMCC. Voltmeter, ammeter and indicating LED lamps should be provided for incoming and ammeter and LED indicating lamps for outgoing feeders. KWH meter of reputed make shall be provided at the incomer feeder of the PMCC panel. Separate marshalling cubicle shall be provided in the PMCC, housing all the terminals of the feeders for onward connection with PLC/Automation system. Detailed drawing with connection diagram of PMCC need to be submitted before execution.

b) Local Control Station (LCS)/Local push button station (LPBS)

LCS/LPBS shall be provided with start, Stop, L/R switch, LED indicating lamp (G&R) and shall be provided by the side of the motors for local/manual operation. Mushroom head, emergency push button (press to stop – turn to release type) shall be considered in each LCS/LPBS for lockable disconnection of the power supply of the motor during maintenance.

c) LT motors

All AC motors should be squirrel cage induction machines of energy efficient type (IE-3 as per IS-12615-2018). Motors should be provided with Class-F insulation with

temperature rise limited to that of Class-B. Motor enclosure protection should be IP54 for indoor, IP55 for outdoor.

Motors with Variable Speed Drives (VSD) application, if any, should be provided with embedded stator winding temperature detectors, one (1) working and one (1) standby in each phase.

d) Lighting distribution board (LDB)

LDB located in electrical rooms shall be provided with TPN MCB/isolation incoming and adequate number of DP/SPN MCBs. LDB shall feed to different Sub-lighting DB /(MCBDB) with MCBs as incomer and as outgoing feeders.

e) Switch sockets

Switch-socket outs: 415 V, 63 A, 5-pin (3 ph, N+E) industrial type socket outlets and plugs along with mechanically interlocked MCCB/RCCB (with earth fault protection) for maintenance purposes should be provided in strategic location.

Adequate no. of 240 V, 16 A 3-pin (1 ph, N+E) switch socket outlets with RCCB (O/L, S/C and Earth leakage protection) having sensitivity 100 mA should be provided in strategic locations for common purpose.

f) Power and control cables

The power distribution network within the plant should be through cables. Cables for 415 V systems should be of 1.1 kV grade, XLPE insulated, PVC sheathed armoured type with aluminium conductors. Multicore PVC insulated, PVC sheathed armoured type cables with copper conductors should be used for control application. Special cables should be used for signal/data transmission as required. Cables of special heat resistant type should be provided in locations having high ambient temperature.

g) Earthing and lightning protection

		<p>415 V systems shall be effectively earthed. Requisite number of earthing stations shall be provided both for system earthing as well as equipment earthing. Separate earth network and stations should be provided for special electronic equipment as per manufacturer's recommendation. Earthing system design shall be done in accordance with Indian Electricity Rules and in accordance with Code of Practices recommended by BIS.</p> <p>Lightning protection system with separate earthing station should be provided for all plant buildings/ structures etc. as required as per the standard IS/IEC-62305.</p> <p>h) Lighting system</p> <p>The plant lighting system should be planned to cater to the illumination requirements for the different units. The various factors (viz. desired illumination levels, easy access for maintenance and energy saving etc.) should be taken into consideration in designing the plant internal and external lighting system.</p> <p>All the light fixtures should be LED type and should be supplied as per latest state of art design.</p> <p>i) Personnel protective equipment (PPE)</p> <p>Electrical premises should be equipped with insulating rubber mats at the front/back side of the panels, danger boards, first-aid boxes, fire extinguishers, sand buckets, shock treatment charts etc. as per I.E. rules.</p>
49	The scope of work for . Electrical	<p>Motor Control Centre, LT Motors & Starters, Local Control Stations, all LT power and control cables, GI cable trays, motors, switches, junction box including plant illumination fittings etc. cabling materials & accessories, galvanized iron (GI) conduits, conduit fittings and materials etc. as required within the battery limits & as per IS standards are within the scope of supplier work.</p> <p>Tapping of power with suitable provision/range for (S/F of SFU at tapping point) from outgoing terminals of Purchaser's Main LT panel</p>

		<p>which is located at an approx. cable route distance of 60 m including supply of double break SFU of suitable range at plant end cabling, laying and termination of all cables under the scope, etc.</p> <p>Detailed drawings need to be submitted for electrical distribution systems with mentioning make/models.</p> <p>Earthing of all electrical equipment & with provision of adequate earth stations and the requisite lightning arrester or with suitable 25 x 3 mm / 50 x 6 mm G.I. flat is under the scope of supplier. The size of the earth connection of the motors to the shop earth grid shall be as specified in IS3043-1987.</p> <p>Adequate lighting and illumination with LED lights should be provided in and around plant area.</p> <p>Minimum 15 metallic body exhaust fan of industrial duty need to be fixed in the plant area.</p> <p>The supplier should take care of all statutory requirements for all electrical installations. Necessary test certificates should be provided.</p> <p>All electrical connections and installations should confirm to relevant Indian electricity (IE) rules.</p> <p>Shock treatment chart (02 Nos.) with frame to be provided at plant.</p>
50	Instrumentation, Level-1 Automation and Fire Detection & Alarm (FDA) Systems	<p>Control and instrumentation work will be as per the P&I diagram to enable the plant operation in “Auto mode” and “Manual mode” through the PLC-SCADA system considering safe zone. It should contain 20% spare I/Os.</p> <ul style="list-style-type: none"> • PLC redundancy: There should be redundant PLC with ring topology, communication protocol profi net and profi bus. • SCADA software should have development and run time license copy. <ol style="list-style-type: none"> 1. PLC-SCADA system of reputed make (Allen Bradley, Siemens, ABB, Honeywell) should be provided for entire plant. 2. Local indicators/gauges for the temperature, pressure, differential pressure and flow measuring instruments should be provided. 3. Alarm indicators to alert the operator during abnormal conditions. 4. Push button switches for power, emergency stop etc.

5. Plant can be started, run, maintained and shut down through the above instruments with PLC control system.
6. SCADA screen for proposed facility with section wise screens as well as overview screen needs to be developed and provided by supplier. Real time data recording in the form of graphs for all the parameters as well as report generation as and when required for all the parameters. Mathematical computation and execute control logics as per the "control logic philosophy" which will be shared with successful vendor.
7. 3 HMI with screen size of 12 inch need to be supplied for 3 different modules (shift reactors, absorption/stripping section and methanol reactor section).
(Make: Stahl/Siemens/ABB/Mitsubishi)
8. Minimum of 20 KVA of UPS of reputed (Make: schneider electric, vertiv, Hitachi, Delta) should be provided with half an hour back up time for maximum load condition.
9. Two computers, two monitors and one printer having minimum configuration as follows connected with PLC system in parallel;
 - Make (DELL, HP, Fujitsu) Intel® Core™ i5 (7th Generation Processor) or better Processor with suitable Graphics, 4 GB DDR4 or higher, 1 TB 7200 rpm SATA.
 - Latest Windows original software, Latest original Microsoft Office software, Licensed copy of antivirus software for three years.
 - 50 inch or more Full HD and 27 inch or more Full HD Monitor with HDMI inputs of Reputed Make (HP, Sony, Samsung).
 - Colour Printer with all in one (copier, scanner) (HP, Canon, Epson)
 - Development of suitable "software for data acquisition and control" activity is to be developed by the supplier. CIMFR will provide the scheme control logic for process. Supplier has to check the same before manufacturing/supply for proper functioning.

Description:

The Methanol plant along with various process & utilities shall be provided

with Instrumentation and Level-1 Automation System following the latest state-of-art technology.

Automation system for various Utilities like Thermic Fluid system, Boiler and Steam system, Compressed Air System, Chilled/Cooling Water System may have separate Controller/Micro-Controller/PLC as per OEM design, otherwise the same will be included in the above main process Plant PLC system.

All above mentioned different Package Process Automation system will be integrated with main process Plant Automation system using field bus communication vide Profibus, Profinet etc. However, the integration will be robust and on real time basis data/signal exchanges amongst them.

The hot redundant PLC will have separate & individual rack having Central Processing Unit (CPU), Power Supply Unit (PSU), Communication Module and other cards/modules as may be required for each PLC rack. The Automation system will be provided with required nos. of Input/Output (IO) Modules interfaced with CPU racks over redundant IO Bus, which will be Profibus, Fieldbus, Profinet etc as per OEM design and standard. Required nos. of IO Panels will be provided, which will be located suitably in the Control Room.

Redundant Managed (Layer-2) type Ethernet switches will be provided for Automation System network. Industrial Ethernet/Profinet network as per OEM standard will be established, to form a redundant topology for the Automation System.

The Digital IO will be generally 24DC/110VAC type and Analog IOs will be 4-20mA DC type. For Digital output miniature/Din Rail mounted relays will be used to provide minimum 1NO+1NC 230VAC, 5A rating potential free contacts.

Terminal strips/TBs will be used for termination of field cables at PLC end, from where prefab cable or panel wiring will be used for termination up to IO Modules.

All field mounted instruments shall be weather-proof and dust-tight, suitable for use under ambient conditions prevalent in the plant. Selection of wetted parts of all field mounted instruments shall be as per process application.

All RTDs will be connected directly to the PLC and all Thermocouples will be connected to PLC through temperature transmitters. Necessary RTD cards will be provided in the PLC.

Instruments with profibus/fieldbus outputs will be used wherever available and as per OEM design. Wherever profibus/fieldbus outputs are not

available, standard 4-20 mA DC analogue type instruments will be used.

The cabling for interfacing of signals from field to IO modules at PLC will be implemented using following cables:

- i) For Digital Signals: Multi-cores 1.5sqmm Cu armoured cables
- ii) For Analog Signals: Multi-pairs 1.0sqmm Cu individual & overall screened, armoured Cables.
- iii) For RTDs: Multi-Triads 1.0sqmm Cu individual & overall screened, armoured Cables.

All special, bus, communication cables will be laid in field using GI conduits as they are usually un-armoured and need special protection. Optical Fiber Cables (OFC) will be multi-mode type, minimum 6 core and armoured.

Junction Boxes will be made of SS316, minimum 1.6mm thick and having IP65 protection. The door will be 2.0mm thick, hinged with lock and keys. Separate Junction Boxes will be used for Analog Signals, Digital Signals, and Instrument Power. Double compression type cable Glands will be used, which will be of SS316.

Ergonomically designed control desk/console should be provided in control room, along with required revolving chairs, shelf etc. Control desk will be made of CRCA sheet with stainless steel top (SS304, 2mm thick) which will be used for mounting of ES/OS, OS etc.

The Automation system will have necessary hardware and software features to ensure plant safety as well as ease in operation and maintenance. Automation system will provide the following functions and features:

- i) Plant operation, control, monitoring, safety interlocks & safe shut-down.
- ii) System configuration, PLC, HMI programming/ development.
- iii) Dynamic interactive graphic displays, group displays, loop displays.
- iv) Real time trends and Historical trends.
- v) Process alarms, events monitoring & event management
- vi) Diagnostic tools & preventive maintenance
- vii) Data logging and on-line configurable report generation.
- viii) Multi-level password.
- ix) Third party system interface.
- x) Bump less data transfer without any loss of data
- xi) Seamless data transfers amongst the integrated system along with Package systems, analyzers etc.

The design of the control systems and related equipment will adhere to the

principle of "fail safe" operation at all system levels, as per process requirement. "Fail safe operation" signifies that the loss of signal or loss of power will not cause a hazardous and unsafe condition for plant equipment and/or operating personnel.

Various types of Local Gauges/Indicator should be provided for pressure, flow, temperature, level monitoring. Transmitters/switches should be provided for pressure, flow, temperature, level, vibration, position etc. Limit/proximity switches, laser sensors, ultrasonic/Radar detectors, hooters, beacons etc. should be provided for remote indication & controls as per process requirement. Control valves, Solenoid Valves & isolation valves will be used for various fluids, water, steam etc. as required. Syngas Analyzers, CO Detectors, Chlorines, Sulfur Analyzer etc. will be used. All the field mounted instruments/sensors/control devices will be interfaced over hardwired Inputs/Outputs and/or field bus technique to the Remote I/Os. The requirements of various instruments, sensors, analyzers, valves are indicated in the attached P&IDs.

In general the protection class of enclosures for panel, desk, cabinets etc shall be as follows, if otherwise not requested/indicated:

- i)Field Instruments, JB .. IP-65
- ii)PLC & I/O Panels .. IP-54

The below standards will be generally followed for Instrumentation & Automation System:

Programming Logic Controller (PLC)	IEC 61131
Industrial Communication	IEC 61784
Field Bus	IEC 61158 & ISA 50.2
Optical Fiber (OFC) Communication	IEC 60793, 60874 & 61753, TIA/EIA-568
Enclosures	NEMA 250 & ICS6
Earthing	NFPA70 & IS3043

Acceptance Criteria for Automation System from the OEM will be as follows:

Availability	≥ 99.8%
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	of Level-1 Automation System	or better
	HMI screen refresh time	≤ 1 sec
	I/O scan time/data upgradation time	≤ 250 milisec for analog signals
		≤ 100 milisec for digital signals
		Priority processing shall be provided for the data requiring faster scan rate
	Network bandwidth utilisation (Average of 5 minutes) (To be measured over continuous period of 8 hours)	< 10%
	Spare (free) memory capacity available (for system, server & PCs, PLC)	≥ 50% (after commissioning)
	Spare I/O capacity of each type at each location, spare foundation field bus and profibus modules, spare ports of networking switches	≥ 20% (after commissioning)
	CPU loading (average)	≤ 50% (after commissioning)
	<p>Control Room: Glass Partitioned on aluminium frame 12'X12'(feet), with two 1.5 ton split AC need to be build-up under the plant shed (appropriate area, which will be finalized later) for housing of PLC panel, control units etc. for proper operation and monitoring of the syngas to methanol plant.</p> <p>Control system desk for three SCADA controlling consoles along with revolving chair (6 Nos.) Make: Godrej, Zuari, Durian</p>	

51	Safety & Accessibility	<p>There shall be adequate provisions for access to and around equipment for operational and maintenance functions. All moving and exposed parts shall be adequately guarded. The equipment shall be provided with suitable lifting attachment to facilitate erection and maintenance, wherever necessary.</p> <ol style="list-style-type: none"> 1. The system should be according to fire safety regulations. All equipment and components should conform to the standard safety regulations. Supporting documents from the statutory bodies should be provided at the time of installation. Sufficient energy saving LED lighting arrangements for illumination of all the plant sections/floors, plant area and utility area needs to be provided by supplier. 2. At least 10 numbers of CO detector and 2 numbers of H₂ detector with audio visual alarm need to be fixed at different strategic location to sense the CO and H₂ in ppm level (having lower detection limit 10 ppm) in case of leakage. Smoke detectors (20 numbers) should be placed at different strategic locations inside the plant battery limit. 3. The supplier should provide instruments, materials, labour and any other arrangement normally required for testing, checking of materials and workmanship at his own cost. The Supplier shall give all necessary personal superintendence during the execution of the work. The supplier shall employ competent site engineers, workmen as per standard norms. All other works not mentioned herein shall be carried out as per provision of latest IS codes and as per site requirements. Current standard practices, specifications should be followed during execution of the work.
52	Erection, testing, training and Handing over the plant	<p>During erection, CIMFR will allocate a place for storage of equipment's and a room for instruments. However, responsibility of safe keeping of equipment's and instruments will lie on the supplier. During commissioning, sectional mechanical integration and performance tests of all sub- systems have to be carried out to the satisfaction of user. Pressure test of the entire set up at given operating condition as</p>

		<p>specified in NIT. Flow rates, temperature attainment of different units at the given pressure should be tested. Solvent flow circulation operation in absorber and stripper section at specified temperature and pressure should be tested. Steam generation and addition circuit should be tested at desired pressure specified in NIT. Temperature attainment at different units with thermic fluid as specified in NIT. The entire plant should be tested for 5 days in integrated manner under actual operating conditions during trial run.</p> <p>Requisite training for operation and routine maintenance is to be provided by the Bidder before handing over the test facility at CIMFR site for free of cost.</p> <p>For fabrication, installation and commissioning at site sufficient no. of qualified and experienced engineers of respective discipline (Chemical, mechanical, instrumentation) need to engaged by the firm. All the personnel involved in installation/commissioning should be skilled properly trained and certified personnel, insured by the firm as well as they should be provided with personal safety equipments.</p>										
53	Civil Work	<p>Design parameters for civil work such as equipment foundation shall be as follows:</p> <table border="1" data-bbox="518 1411 1461 2060"> <tr> <td data-bbox="518 1411 901 1512">Plant location and climatic conditions</td> <td data-bbox="901 1411 1461 1512">:As described earlier</td> </tr> <tr> <td data-bbox="518 1512 901 1736">Design code/standard</td> <td data-bbox="901 1512 1461 1736">:All relevant IS Codes. International Codes/Standards like British (BS/BS EN) or equivalent should be followed. Codes/Standards like British Standard (BS/BS EN) or equivalent</td> </tr> <tr> <td data-bbox="518 1736 901 1825">Site Leveling</td> <td data-bbox="901 1736 1461 1825">Comprising of land cutting and filling as per finalised finished ground level (FGL)</td> </tr> <tr> <td data-bbox="518 1825 901 2016">Clearance from bottom of structure</td> <td data-bbox="901 1825 1461 2016">Minimum headroom clearance from top of road (at centre) to the bottom most part of any structure shall be 5.5 m.</td> </tr> <tr> <td data-bbox="518 2016 901 2060">Type of cement to be</td> <td data-bbox="901 2016 1461 2060">OPC/Slag cement. SRC to be used if</td> </tr> </table>	Plant location and climatic conditions	:As described earlier	Design code/standard	:All relevant IS Codes. International Codes/Standards like British (BS/BS EN) or equivalent should be followed. Codes/Standards like British Standard (BS/BS EN) or equivalent	Site Leveling	Comprising of land cutting and filling as per finalised finished ground level (FGL)	Clearance from bottom of structure	Minimum headroom clearance from top of road (at centre) to the bottom most part of any structure shall be 5.5 m.	Type of cement to be	OPC/Slag cement. SRC to be used if
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		used for various structures	required as per soil report.																											
54	Structural Steelwork	<p>Proposed design parameters considered for this project are as follows:</p> <p>Minimum Clear Width of Walkway</p> <p>Minimum clear width of walkway will be 800 mm (unless governed by process requirement).</p> <p>Stairs</p> <p>Stairs as might be considered inside process building shall be made of steel with chequered plate or open gratings (in place where there is possibility of dust accumulation) for access to walkways, landings, floors etc. Handrails shall be provided to the staircases.</p> <p>In general, the following guidelines shall be followed for design of staircases.</p>																												
			<table border="1"> <thead> <tr> <th></th> <th>Main staircase</th> <th>Secondary staircase</th> </tr> </thead> <tbody> <tr> <td>Minimum width of flight (mm)</td> <td>1000</td> <td>800</td> </tr> <tr> <td>Maximum vertical distance between landing platforms (m)</td> <td>2.28</td> <td>2.28</td> </tr> <tr> <td>Maximum no. of risers per flight</td> <td>12</td> <td>12</td> </tr> <tr> <td>Maximum height of riser (mm)</td> <td>190</td> <td>190</td> </tr> <tr> <td>Minimum width of tread without nosing (m)</td> <td>250</td> <td>250</td> </tr> <tr> <td>Minimum headroom (mm)</td> <td>2400</td> <td>2100</td> </tr> <tr> <td>Preferable slope with horizontal</td> <td>37.2°</td> <td>37.2°</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Main staircase	Secondary staircase	Minimum width of flight (mm)	1000	800	Maximum vertical distance between landing platforms (m)	2.28	2.28	Maximum no. of risers per flight	12	12	Maximum height of riser (mm)	190	190	Minimum width of tread without nosing (m)	250	250	Minimum headroom (mm)	2400	2100	Preferable slope with horizontal	37.2°	37.2°			
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		<p>(1) Main Staircase - These are staircases provided in administrative buildings, office buildings, substation buildings, process buildings et</p>																												

These should follow the norms given for “Internal” staircases in A.P. Factories Rules, 1950. For definition of “Internal Staircase”, clause 4.9 of National Building Code of India 2005 (Part 4) shall be referred.

- (2) Secondary Staircase - These are staircases which are not used frequently. Staircases for access to crane walkway, monorail walkway, lighting walkway, roof, miscellaneous platforms, staircases in junction houses and other buildings of material handling system, staircases for access to conveyor galleries etc. fall under this category. Number of users of secondary staircases is much lower than those of main staircases. Ladders will be provided for access to platforms of overhead yard piping.

For secondary staircase the preferred slope may be exceeded up to a maximum limit of 45°. As a result, the minimum width of tread without nosing may go up to 190 mm in case of unavoidable circumstances. However, maximum height of one riser shall not exceed 190 mm. In exceptional cases, maximum no. of risers per flight may go up to 15 and the maximum vertical distance between landing platforms may go up to 2.85 m.

As per OSHA (Occupational Safety and Health Administration) width of an industrial staircase will not be less than 560 mm. If due to any reason, minimum 800 mm width cannot be maintained, the guideline given in OSHA should be followed.

- (3) For any flight of staircase uniform height of riser shall preferably be maintained.

When ladders have to be used, they shall generally conform to the following:

- i. Minimum width will be 400 mm
- ii. Maximum spacing of rungs will be 300 mm
- iii. Safety cage shall be provided where ladder height is 2200mm and more above floor/G. L.

Specification of Material

Structural steel: Hot rolled medium and high tensile structural steel shall conform to IS 2062. Chequered plates shall conform to IS: 2062 Grade E250 – Quality A/IS: 3502. Steel Tubes shall conform to grade Yst 240 of IS 1161. Hollow steel sections shall be hot formed and shall conform to Grade Yst 240 of IS 4923. If cold formed hollow sections are used, a specific requirement as laid down in IS: 4923

		<p>shall be complied with.</p> <p>Bolts and Nuts: All bolts and nuts shall conform to IS: 1363 or IS:1364 as applicable. Nuts shall have property class conforming to IS: 1367 (Part 6), compatible to the property class of the mating bolts. High strength structural bolts and nuts shall conform to IS 3757 and IS 6623 respectively.</p> <p>Washers: Plain washers shall conform to IS 2016 unless otherwise specified. Each nut shall be provided with one washer. Taper washers conforming to IS 5372 and IS 5374 shall be used for channels (MC) and I-beams (MB) respectively. Washers for high strength structural bolts and nuts shall conform to IS 6649. Bolts of property class 10.9 and above shall be provided with two washers. For High Strength Friction Grip bolts, if pre-tensioning is applied through DTI (Direct Tension Indicator), the same should be counted as one of the two washers.</p> <p>Grating: Hot dip galvanised MS grating shall be used on walkway/floors where grating will be used for flooring.</p> <p>Handrail: M.S. tubes of 32 NB conforming to Medium class (Grade Yst 240) of IS:1161 shall be used as top & mid rails. Handrail posts made of tubes/angles shall be spaced as per design requirement. Square/rectangular sections of suitable design may also be provided for hand rails and posts.</p> <p>Type of flooring: All floors/platforms and treads and landing of indoor staircase will be made of grating/chequered plate supported on structural steel beam. Painting will be applied as corrosion protective measures, in chequered plate.</p> <p>Painting/Galvanising: All structural steel works, excluding grating should be protected against corrosion by painting.</p> <p>Color code: As per standard industrial practice.</p>
55	Plant construction	The proposed syngas to methanol pilot Plant is envisaged to be

implemented in turnkey mode of construction.

Construction Water, Power and Lighting System:

Construction water: Construction water for the proposed plant shall be made available by CIMFR at one point from the existing water system at the site within 60 m lead distance.

Construction power: Construction power for the pilot project shall be provided by CIMFR from a common take over point within 60 meter lead distance on chargeable basis.

CIVIL AND STRUCTURAL WORK

These activities will be carried out as follows:

Civil Work

Civil work will cover equipment foundations, restoring of shop flooring after foundation etc.

Structural Steel and Sheeting Work

Structural steelwork will cover fabrication, erection of technological structures including auxiliary supports for pipelines etc.

Installation of Electricals and instrumentation including all types of cabling should be properly routed with covered cable trays, all utility and process lines and headers with necessary supports preferably at the back side of the plant structures

Equipment Manufacture and Delivery at site including unloading

Major delivery of equipment at site will have to be completed before starting equipment erection for individual units. The placement of orders and delivery schedules of equipment for power, water and utility systems and other auxiliary facilities will have to be planned so that these facilities can be erected and commissioned in time to match the schedule for commissioning of the plant. Arrangement for material delivery, unloading, handling, and safe storage should be done by the supplier.

Equipment Erection

Erection of equipment for plant facilities will commence after receipt of equipment at the site to match the sequence of erection. The

		<p>installation of power, water and utility packages should also be taken up simultaneously.</p> <p>Erection of the equipment for different plant facilities should be completed in a sequential manner.</p>
56	Providing maintenance support for plant facility	<p>Providing regular maintenance support for plant facility including plant components, mechanical equipment's, electrical and instrumentation components deputing experienced (minimum 1 years) graduate engineers (Minimum B.E/B.Tech in Chemical: 01, Mechanical: 01, Instrumentation and automation: 01) for the period of one years for smooth running of plants after successful commissioning and Handing over of the plant.</p>
57	Special Instructions to Bidder/supplier	<p>Instructions to Bidder</p> <p>P&I Diagram of the main facility should be submitted along with Technical Bid.</p> <p>P&I for utilities including thermic fluid, steam, cooling water, process water, vent header, instrumentation air headers, gas sampling header, N₂ flushing and purging header wherever necessary, condensate drain header should be submitted along with Bid.</p> <p>Instrumentation lay out diagram and electrical SLD should be submitted along with Bid.</p> <p>All utilities header should be laid upto skid and from headers required sub-connection need to be provided to particular equipment.</p> <p>Process piping should be made off with SS 316 with seamless pipes and high pressure fittings should be as per the line pressure/temperature condition.</p> <p>Make, model & catalogues of the all the subsystems, utilities, control system, electrical components need to be provided along with Technical Bid.</p> <p>Bidder needs to provide Time Bar Chart of delivery showing break up of time required for engineering, order placement for bought out items and their delivery to assembly shop. Fabrication, dispatch, installation commissioning, testing, training, etc. Schedule needs to be provided along with the bid.</p>

Instructions to Successful Bidder after getting order

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Successful bidder needs to submit the GA drawing and technical data sheets for the fabricated items or equipment's, technical data sheets for bought out items, initial lay out of the plant, PLC architecture need to be supplied within 3 months after getting the PO.

Third Party Inspection agency (TUV, BUREAU VERITAS, Lloyd) approved design data sheet and detail fabrication drawings for all the fabricated items like High pressure syngas accumulator, high pressure buffer tank, heat exchanger, reactor vessels and pipe line, detailed lay out along with 3D model, detail architecture, electrical and instrumentation diagram, SLD drawings, detailed engineering documents for bought out items including drawing, technical data sheet from OEM, electrical circuit diagram need to be submitted within 6 months.

All the certificates including MTC, calibration certificate, inspection and test report of respective agencies, final as built drawing (3D model, structural drawing, detailed P&ID (including utilities), detailed instrumentation and electrical diagram, installation and operational manuals for all the bought out items need to be submitted along with delivery of the plant.

Qualified and skilled manpower for installation and commissioning work of the plant.Until the equipment is handed over to the purchaser, the successful Bidder shall be sole custodian of all materials.

Equipment's, assembled at site and will be responsible for loss, theft, damage or destruction. For this purpose, the successful Bidder shall take out a 'Contractor Risk Insurance' at his own cost to cover the assets.

All tools & tackles, apparatus, special instruments required for installation, testing, shall be arranged, stored, maintained and guarded by the Successful Bidder.

In the event of order, firm should submit the GA drawings of equipment and layout of the unit to CIMFR along with other relevant drawings for smooth functioning of fabrication, Installation activities.

If needed, CSIR-CIMFR will visit manufacturing/fabrication site to see

		<p>the progress of work with prior intimation on CIMFR expenditure. Preliminary electrical load data for entire plant should be provided by firm.</p>
59		<p>Instructions to Supplier during hand over of the facilities</p> <ul style="list-style-type: none"> • Firm should also submit corresponding process equipment datasheets, instrument datasheets, individual manual of standard items/bought out, Installation & Maintenance manual of the system etc. at the time of hand over of the facility. • Detailed wiring diagram for PLC panel should be provided. • Catalogues/ complete documentation of equipment and instruments along with operation manual needs to be provided by supplier. • Latest calibration certificates for all equipment/instruments/ control accessories should be provided from manufacturer/Competent authority/accredited institutes. • Complete motor details like kW rating, CDF, duty class of insulation, make etc. by supplier.
60		<ul style="list-style-type: none"> • On completion of work, all rubbish debris, temporary supports, enabling structures etc. shall be removed from the site and the site (including storage site) handed over to the purchaser in a tidy manner. All scrap should be dumped suitably at specified places as directed by the purchaser. • All high pressure equipment/instruments/fittings should conform to the safety standards as applicable/ as in practice. Necessary certificates from the statutory bodies should be provided by supplier.

61	CIMFR's Scope of supply	<ul style="list-style-type: none"> • Raw materials for testing and commissioning. Water tapping at distance of 60 meter from system. Electrical power Supply at distance of 60 meter from system. Space with shade and concrete flooring for installation of plant. (Dimension: length: 17.8m, width: 11.8 m, height: varying between 6-9m). Successful vendor should visit the CIMFR site before finalizing the fabrication drawing.
62	Exclusions and Deviations	<ul style="list-style-type: none"> • Exclusion in the offer, if any, shall be clearly stated under the heading "Exclusions", quoting the respective serial reference number in the tender document. • Deviations from the Tender Specifications, if any, shall be clearly stated under the heading "Deviations" quoting the respective serial reference no. in the tender document. • The Bidder shall submit along with his tender a statement under his signature with the official seal, a list of similar jobs executed in the past indicating the name of the purchaser, job title, value of work, order reference, time period of delivery/execution as per the order, actual period of delivery/execution and reasons for any delay. Any tender without this statement may not be considered.

62.	Completion Period	<ul style="list-style-type: none"> • The Project must be completed as per delivery schedule (B) mentioned. • The Bidder shall quote the best and earliest completion period of this package. The Bidder shall submit implementation chart giving total time schedule. • The Successful Bidder needs to submit detailed time schedule for completion of the various jobs involved in the form of bar chart, PERT/CPM chart as well as prescribed format provided in NIT. • If, any time the purchaser finds that any particular work is not progressing properly according to the detailed program, the purchaser shall have the right to take over the particular work for execution by himself or by any other agency at the risk and cost of the Successful Bidder, provided such delays are due to the Successful Bidder. The purchaser reserves the right to accept/reject the offer without assigning any reason.
63.	Secrecy	<ul style="list-style-type: none"> • All the technical information, specification, drawings and designs should

	Agreement	<p>not be disclosed to third party and the confidentiality will be maintained strictly. The drawing and document enclosed remain fully, CIMFR's property and can neither be produced nor communicated to third party in any way, nor utilized for any other purpose, without a written consent of the CIMFR. In this regard, successful bidder has to sign a Non-Disclosure Agreement (NDA) related to the concept, knowhow, data provided, drawings, specifications, etc. by CSIR-CIMFR. The bidders have to submit INTEGRITY PACT. Make in India/MSME will be given Preference as per rule.</p>
64.	Warranty	<ul style="list-style-type: none"> • The whole system including all supplied items (material and workmanship) will be under comprehensive warranty for 03 (three) years including one year standard warranty from final acceptance of the plant. If any part is found defective, the same must be replaced free of cost. The rectification/replacement of spares should be done within 15 days of written request/ Email, failing to which the warranty period of the entire system will be extended for those days/months of delay in attending and putting the plant in operation. During the warranty period, at least two preventive maintenance visits per year along with break down visits as and when required has to be made by the supplier. • The firm should quote year wise break up for warranty as below. <ol style="list-style-type: none"> 4. First year warranty: Free of cost 5. Second year CMC: Rs _____ 6. Third year CMC: Rs _____ <p>Payment of the CMC charges will be paid annually at the end of each year on successful certification by the IO/PL. The successful bidder has to make two regular visits per annum and as and when required during breakdown. The breakdown visits have to be made within fifteen days of report submitted by either mail or telephone. PBG for CMC has to be submitted within one month of expiry of PBG of the main system or otherwise PBG amount deposited for the system will be forfeited. 10% of PBG amount of CMC charges can be paid on annual basis or for total two years.</p> <p>The successful bidder will be selected on summation of price of the item quoted and the CMC charges for two years after completion of one year</p>

		standard warranty after successful installation and commissioning of the plant.
65.	Training	<ul style="list-style-type: none"> • Requisite training for operation and routine maintenance is to be provided by the Bidder before handing over the test facility at CIMFR site for free of cost.
66.	Eligibility Criteria	The firm should have past experience towards supply of similar kind or high pressure pilot/ demo/ commercial plant (gaseous reactant plant above 400 Nm ³ per day or liquid reactant plant above 200 kg/day) related to the area of chemical/petrochemical/fertilizer in other CSIR Labs/ Institutions/ Govt. org./ Govt. research Laboratory/ Govt. University/ Autonomous body/ PSU/ Govt./ Private sector industry. Client list with contact details must be provided with the technical bid.
67.	Essential for the bidders	All the vendors have to submit priced breakup without mentioning amount of individual equipment/module in the Technical Bid and the price break up with amount of equipment/module in the financial bid in a Tabular form. The same is provided under the head “PRICE SCHEDULE FOR GOODS TO BE OFFERED WITH THE SYSTEM”. Any deviation in submission of this format in both Technical and financial bid will not be considered for evaluation. While submitting the price breakup without mentioning the amount of equipment/module in the Technical bid, the bidder has to confirm their submission of pricebreak up of equipment/module in the financial bid.

68. Make of Items:

SI No.	Name of the Instrument	Broad Specification	Make/Model
1.	Pressure gauge	Bottom or back Mounted, Wetted parts of SS 316	Wika/Dwyer/Waree/Baumer
2.	MFM	MOC (Wetted Parts) SS 316 Accuracy: +/-1% Repeatability: +/- 0.5% Output signal: 0-5 VDC & 4-20mA	E+H/ Rosemount/ Yokogawa/ ForbesMarshal(for steam)
3.	NRV	Screwed or flange end, SS 316, PTFE seated. Wafer type or poppet type	Swagelok/Parker/Hamlet/ ForbesMarshal/L&T
4.	BV	Screwed or flange end, Body SS 316, internally PTFE/EPDM seated	Virgo/Parker/L&T (high Pressure) L&T/Festo/Elomatic (Low Pressure)
5.	Rupture Disc		BS&B /Fike
6.	Basket Filters	5-7 microns, Body SS 316	Pall/Domnic Hunter/Millipore
7.	FCV	4-20 mA, Flange ended Pneumatically actuated, Double Diaphragm, % opening type	Jordan/Samson/Forbes Marshal/ Tescom
8.	SRV	SS 316, threaded end connection, spring loaded	L&T/ Forbes Marshal/ Faingar
9.	TE	Two wire PT-100, variable length as vessel dimension	Watlow/Exotherm/ Anderson Negle
10.	Level transmitter	Guided Radar type	Emerson/E&H/Yokagawa
11.	Rotameter	Metal tube rotameter as per pump Flow Rates	Eureka/Scientific/veksler
12.	Fasteners	Class 450 rating, SS 316 for process line, SS 304 for utility lines. Chemically itched	APL/Unbrako
13.	Flanges	Forged, rating as per design, SS 316 for process lines, SS 304 for utility	Tested

		line. Chemically itched	
14.	Gaskets	O ring type.	
15.	Electrical Cables	As per IP 65. Shielded PVC insulated with copper conductor supply lines. GI flexible conduits for the Power/control cable from cable tray to particular instrument	Havells/ Finolex/Polycab
16.	Cable Trays	Powder coated 300/250/200 mm * 50 mm* 2 mm as per requirement CRCA	Fabricated
17.	PLC/SCADA	Process Controlling, Trending, Data Acquisitions etc	Allen Bradley/Siemens/ABB (For PLC & SCADA)
18.	Control Panel	To Accommodate PLC, MCBs, Relays, Push Buttons, Power Supply Connectors	Rittal/Eldon
19.	MCBs/Switch gears	For Electrical Power, Four pole switch gear for main in comer to panel	Siemens/GE/ABB/L&T
20.	Connectors	For Connection with filed instruments and power supply	IE/Phoenix/connect well
21.	HMI/Computer	For firing the set values and monitoring the process Data	Siemens/Stahl/ Mitsubishi (HMI) Dell/HP/Fujitsu(Computer)
22.	Syngas Compressor	70 atm	Fluitron/PPI
23.	Pump	Centrifugal	Sulzer /Grundfoss/ Johnson
24.	Gas booster	For raw syngas boosting upto 2 bar pressure	GDW- Nash/ Swam/ Usha/ Maximator/ Air Equipment
25.	Gas detector	Detection of CO and H ₂	Honeywell/Dragger/ Pemtech
26.	DPT		Yokogawa, ABB, Rosemount (Emerson), E&H

27.	Boiler		Thermax, Ross, Forbes Marshal
28.	Smoke Detector		Honeywell/ Bosch/ Schneider electric
29.	Flare Stack		CRA / Super Combustion / ACL / Equivalent
30.	Thermic Fluidsystem		Thermax, Ross, Forbes Marshal
31.	Steam Trap		Forbes Marshal, Spirax,

69. The Bidder must ensure that a particular component of its accessories should be from the same OEM. Modules of each component should be from one country of origin (COO) and from one OEM. Multiple OEM's within single module or one single component would not be acceptable and will be liable for technical rejection.

B. Delivery Schedule

The supplier would be responsible for delivery of the whole system (instruments) at CSIR-CIMFR Digwadih Campus, P.O. FRI, Dhanbad-828108 on its own cost and details are as follows. All efforts and planning must be made by the successful bidder to complete the plant alongwith erection, installation and commissioning before the expected delivery period.

Schedule	Purchaser's time frame	Reference
Expected delivery period	12 months	From the date of purchase order
Expected installation & commissioning period	3 months	From the date of delivery in CIMFR store
Expected Period of Demo/ Trial run	4 weeks	From the date of completion of commissioning/installation
Expected period of observation	1 weeks	From the date of demo trail run/ demo
Expected date of training	2 weeks	From the date of completion of trail run/ demo

C. Allied Technical Details-

S.N.	Allied technical details	bidder's response
1.	Product catalogues/ user manual/ other informative material/ sketches/ drawings etc.	Enclosed (Yes/ No) (Ensure that it should be up to date and page numbered)
2.	Country of origin,	
3.	Port of shipment	
4.	Banker's details	
5.	Free Warranty/Guarantee for a period of	
6.	Extended Warranty/Guarantee for a period of	
7.	Installation , commissioning & training,	
8.	Details of service provider for after sales/complaints etc.	
9.	AMC including Visits & breakdown visits	
10.	Comprehensive AMC including Visits & breakdown visits and spares	
11.	Details of accessories (if any)	
12.	List of non-consumables (if any)	
13.	List of consumables (if any)	
14.	Any other relevant detail	

CHAPTER 5

Price Schedule Forms

~~Bidder may fill in the Price Schedule form as per Annexure 5 Q or 5 R, as required. Submission of Bid in any other format will not be accepted.~~

Or

In case of Submission of E-bids through E-tenders - <https://etenders.gov.in/>, price bid should be uploaded as BoQ.xls and PDF Price Schedule.

Important Note :

1. The BoQ price filling is mandatory on CPP Portal. The bidder will not have much fields for showing the price break up and other technical details in the BoQ. Therefore, the bidder is requested to give all the details (breakup) in a separate PDF as per Annexure 5Q and / or 5R, as applicable .
2. If any price difference is found between BOQ and the PDF Price Schedule, PDF Price Schedule will prevail for price comparison purposes.
1. The Technical as well as the Price Bid must contain detailed break up of all the components clearly mentioning whether they are imported or indigenous so as the Customs Duty exemption certificate (CDEC) available with CSIR- CIMFR can be issued subject to fulfilling the local content criteria as per DPIIT order dated 16th September 2020.
2. All imported items must be separately invoiced .

CHAPTER 6

Qualification Requirements (refer to Annexure-4E of the CSIR Manual)

Eligibility Criteria:

Qualification:

The firm should have past experience towards supply of similar kind or high pressure pilot plant (gaseous reactant plant above 400 Nm³ per day or liquid reactant plant above 200 kg/day) related to the area of chemical/petrochemical/fertilizer in other CSIR Labs/ Institutions/ Govt. org./ Govt. research Laboratory/ Govt. University/ Autonomous body/ PSU/ Govt./ industry. Client list with contact details must be provided with the technical bid.

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
- (c) General Conditions of Contract
- (d) Technical Requirements (including Schedule of Requirements and Technical Specifications)
- (e) 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	Remarks by bidder <u>Compliance/ Document submitted</u> (Y/N)
01.	Bidder Information Form (to be enclosed with the technical bid)	
02.	Manufacturers' Authorization Form (to be enclosed with the technical bid)	
03.	Bid Security Form (Not applicable) (In case of EMD)	
04.	Bid Securing Declaration. (to be enclosed with the technical bid)	
05.	Performance Statement Form (to be enclosed with the technical bid)	
06.	Deviation Statement Form (to be enclosed with the technical bid)	
07.	Service Support Detail Form (to be enclosed with the technical bid)	
08.	Bid Form (to be enclosed with the priced bid)	
09.	Performance Security Form (After the acceptance of Purchase order)	
10.	Acceptance Certificate Form (Not applicable)	
11.	Integrity Pact (Not applicable)	
12.	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)	
13.	Format of Certificate of compliance to MoF, DOE Order No. 6/18/2019-PPD dated 23 rd July, 2020 (to be enclosed with the technical bid, if required as per Clause 1.46 of ITB)	
14.	Format for Self - declaration by the Bidder for local content (%) (to be enclosed with the technical bid)	
15.	Price Schedule Form For Goods Being Offered From India (to be enclosed with the priced bid)	
16.	Price Schedule Form For Goods Being Offered From Abroad (to be enclosed with the priced bid)	
16.	Unpriced list of Imported/ Indigenous components (to be submitted with Technical Bid)	

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

Bidder Information Form
(Refer para 5.1.2 (ix)(a) of the CSIR Manual)

- (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 [insert Bidder's legal name]
02.	In case of JV, legal name of each party: [insert legal name of each party in JV]
03.	Bidder's actual or intended Country of Registration: [insert actual or intended Country of Registration]
04.	Bidder's Year of Registration: [insert Bidder's year of registration]
05.	Bidder's Legal Address in Country of Registration: [insert Bidder's legal address in country of registration]
06.	Bidder's Authorized Representative Information Name: [insert Authorized Representative's name] Address: [insert Authorized Representative's Address] Telephone/Fax numbers: [insert Authorized Representative's telephone/fax numbers] Email Address: [insert Authorized Representative's email address]
07.	Attached are copies of original documents of: [check the box(es) of the attached original documents] Articles of Incorporation or Registration of firm named in 1, above.

Signature of Bidder _____

Name _____

Business Address _____

MANUFACTURERS' AUTHORIZATION FORM
(Refer para 5.1.2 (ix)(b) of the CSIR Manual)

[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: *[insert complete*

name and address of Purchaser] 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]*

(In case of EMD)
BID SECURITY FORM
 (Refer para 5.1.2 (ix)(c) & 6.1.1 (01) of the CSIR Manual)

Whereas _____ (hereinafter called the tenderer”) has submitted their offer dated ___ for the supply of _____ (hereinafter called the tender”) against the purchaser’s tender enquiry No. _____

KNOW ALL MEN by these presents that WE _____ of _____ having our registered office at _____ are bound unto _____ (hereinafter called the “Purchaser”)

In the sum of _____ for which payment will and truly to be made to the said Purchaser, the Bank binds itself, its successors and assigns by these presents. Sealed with the Common Seal of the said Bank this _____ day _____ 20____.

THE CONDITIONS OF THIS OBLIGATION ARE:

- (1) If the tenderer withdraws or amends or modifies or impairs or derogates from the Tender in any respect within the period of validity of this tender.

Or

- (2) If the tenderer having been notified of the acceptance of his tender by the Purchaser during the period of its validity:-
 - (a) If the tenderer fails to furnish the Performance Security for the due performance of the contract.
 - (b) Fails or refuses to accept/execute the contract.

WE undertake to pay the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that in its demand the Purchaser will note that the amount claimed by it is due to it owing to the occurrence of one or both the two conditions, specifying the occurred condition or conditions.

This guarantee will remain in force up to and including 45 days after the period of tender validity i.e., up to _____ and any demand in respect thereof should reach the Bank not later than this date.

 (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 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.

Bid-Securing Declaration Form
(Refer para 5.1.2 (ix)(d) & 6.1.1 (02) of the CSIR Manual)

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 one year 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)

PERFORMANCE STATEMENT FORM
(Refer para 5.1.2 (ix)(e) of the CSIR Manual)

(For a period of last 3 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 delivery as per Contract	Date of actual completion of delivery	Remarks indicating reasons for late delivery, if any	Has the equipment been installed satisfactorily ? (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 :

DEVIATION STATEMENT FORM
(Refer para 5.1.2 (ix)(f) of the CSIR Manual)

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

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:

- 1) Where there is no deviation, the statement should be returned duly signed with an endorsement indicating "No Deviations".

SERVICE SUPPORT FORM
(Refer para 5.1.2 (ix)(g) of the CSIR Manual)

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 :

Bid Form
(Refer para 5.1.2 (ix)(h) of the CSIR Manual)

[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 for Bid No.: *[insert No of IFB] To: [insert*

complete name of 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]*

PERFORMANCE SECURITY FORM
(Refer para 5.1.2 (ix)(i) & 6.1.2 (O2) of the CSIR Manual)

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.

ACCEPTANCE CERTIFICATE FORM
(Refer para 5.1.2 (ix) (j) of the CSIR Manual)

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.....

Format of Integrity Pact
(Refer para 5.1.2 (ix) (k) of the CSIR Manual)

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".

Andherein referred to as "The Bidder/ Contractor."

Preamble

The Principal intends to award, under laid down organizational procedures, contract/s forThe 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)/Contractor(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.
- (3) The person signing IP shall not approach the courts while representing the matters to IEMs and he/she will await their decision in the matter.

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)
(Office Seal)

(For & On behalf of Bidder/Contractor)
(Office Seal)

Place.....

Place.....

Date.....

Date.....

Witness 1:(Name & Address): _____

Witness 2:(Name & Address): _____

Format for declaration by the Bidder for Code of Integrity & conflict of interest
(Refer para 3.2.1,3.2.3 & 5.1.2 (ix)(m) of the CSIR Manual)

(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 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 including the CSIR labs/Institutes 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

Certificate of compliance to MoF, DOE Order No. 6/18/2019-PPD dated 23rd July, 2020

(Refer to ITB Clause 1.46)

I Have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India, I certify that this bidder...M/s..... is not from such country, has been registered with the Competent Authority. I hereby certify that this bidder fulfills all requirements in this regard and is eligible to be considered.

[Where applicable, evidence of valid registration by the Competent Authority shall be attached]

Yours sincerely,

Signature
(Name of the Authorized Signatory)
Company Seal

N.B -In case of partnership or consortium this form needs to be filled by each partner separately.

Format for Self - declaration by the Bidder for local content (%)

[For the tenders below Rupees 10 crores]

(on letter head)

Dear Sir/Madam,

We M/s....., Address :....., GSTIN :

Declare that we are the supplier Class I / Class II local supplier [kindly keep only one] with local content (%),..... [kindly mention percentage (%) here] and the the details of place/s of value addition is/are as follows -

Place of value addition –

(1)Address -.....

.....

.....

(2)Address -.....

.....

.....

The basis of claim of value addition/s is/are :

.....

.....

.....

Yours sincerely

Signature

Name

Designation.....

Name of the firm.....

Date

(SEAL AND STAMP)

Kindly note :

As per OM no. No. P-45021/102/2019-PP(BE-II)(E-29930) Dated 26.11.2020, Ministry of Commerce and Industry, Government of India, that bidders offering imported products will fall under the category of Non-local suppliers. Further, Ministry of Finance , Department of Expenditure vide its note dated 26.11.2020 have clarified that suppliers/ bidders can not claim themselves as Class-I local supplier/class-II local supplier by claiming profit, warehousing, marketing, logistics, freight, etc as local value addition.

As per MOF, DOE OM NO. P-45021/102/2019-BE-II-Part(1) (E-50310) dated 04.03.2021 have clarified that suppliers/ bidders can not claim themselves as Class-I local supplier/class-II local supplier by claiming the services such as transportation, Insurance, installation, commissioning, training and after sales service support like like AMC/ CMC, etc. as local value addition.

PRICE SCHEDULE FORM FOR GOODS BEING OFFERED FROM ABROAD

(Refer para 5.1.4 (02)(l) of the CSIR Manual)

Name of the Bidder _____

TENDER No. _____

1	2	3	4	5	6	7	8	9	10	11	12
Sl. No.	Item Description	Country of origin	Unit	Qty.	Unit price Indicating currency FOB (named port of shipment or FCA (named place of delivery) (retain only one))	Total price (5x6) FOB (named port of shipment) or FCA (named place of delivery) (retain only one))	Charges for Insurance & transportation to port//place of destination	Total price CIF/CIP (retain one only) (7+8)	Indian Agents Commission as a percent of FOB /FCA price included in the Quoted price	Approx. Ship-ment weight and volume	Indian Customs Tariff No and HSN No. (ICT & HSN No.)
01	Accumulator, booster, receivers etc before water shift reactor along with piping , fittings, instruments, supports, Safety accessories										
02	Preheater, Guard bed reactor, mixer cum super heater along with piping , fittings, instruments, Safety accessories										

03	Water gas shift reactor assembly (HTS, LTS, coolers, knock out drum) with all fittings, piping, instruments, safety accessories										
04 05	Boiler and accumulator along with instruments, piping, fitting and safety accessories										
06	Thermic fluid heating and cooling system along with thermic fluid, instruments, safety accessories										
07	Hydrolyzer, Absorber , Stripper, Flush drum, solvent pumps, make up solvent pump, solvent tank along with piping , fittings, instruments, Safety accessories										
08	Knockout drum, Gas holding tank after absorber stripper along with piping , fittings, instruments, Safety accessories										

09	Syngas Compressors, CO ₂ compressor, Instrumentation air compressor along with piping , fittings, instruments, Safety accessories										
10	High pressure buffer tank, preheater, guard bed, Heat exchanger along with piping , fittings, instruments, Safety accessories										
11	H ₂ /N ₂ Gas feeding system from cylinder, MFC, Pressure regulator, Required cylinders along with tubing , fittings, instruments, Safety accessories										
12	Multi tubular methanol reactor, condenser, gas-liquid separator along with piping , fittings, instruments, Safety accessories										

13	Recycle syngas compressor along with piping , fittings, instruments, Safety accessories										
14	LPBT and HPBT before and after recycle compressor along with piping , fittings, instruments, Safety accessories										
15	Online gas analyzer along with piping , fittings, instruments, Safety accessories										
16	Catalyst for COS Hydrolysis, HTS, LTS, Methanol synthesis, Guard bed										
17	MDEA Solvent										
18	Control Panel, SCADA, Computers, printer, UPS										
19	Structure and support of the plant										
20	Cooling tower along with all accessories, piping ,fitting, instruments										
21	Spares										

22	Annual Maintenance Charges 1. Comprehensive AMC for 2 nd year 2. Comprehensive AMC for 3 rd year										

Note:

Currency _____

Total Bid price in foreign currency _____
in words _____

(a) Indian agents name & address _____

(b) Installation, commissioning & training charges, if any _____

Signature of Bidder _____

(c) Cost of Spares, if any _____

Name _____

(d) The Indian agent's commission shall be paid in Indian Rupees only based on the Exchange Rate prevailing on the date of negotiation of documents in accordance with clause 22.1 of GCC.

Business Address _____

(e) The cost of optional items shall be indicated separately.

PRICE SCHEDULE FORM FOR GOODS BEING OFFERED FROM INDIA

(refer para 5.1.4 (02)(l) of the CSIR Manual)

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
01	Accumulator, booster, receivers etc before water shift reactor along with piping , fittings, instruments, supports, Safety accessories										
02	Preheater, Guard bed reactor, mixer cum super heater along with piping , fittings,										

	instruments, Safety accessories										
03	Water gas shift reactor assembly (HTS, LTS, coolers, knock out drum) with all fittings, piping, instruments, safety accessories										
040 5	Boiler and accumulator along with instruments, piping, fitting and safety accessories										
06	Thermic fluid heating and cooling system along with thermic fluid, instruments, safety accessories										
07	Hydrolyzer, Absorber , Stripper, Flush drum, solvent pumps, make up solvent pump, solvent tank										

	along with piping , fittings, instruments, Safety accessories										
08	Knockout drum, Gas holding tank after absorber stripper along with piping , fittings, instruments, Safety accessories										
09	Syngas Compressors, CO ₂ compressor, Instrumentation air compressor along with piping , fittings, instruments, Safety accessories										
10	High pressure buffer tank, preheater, guard bed, Heat exchanger along with piping , fittings, instruments, Safety accessories										

11	H ₂ /N ₂ Gas feeding system from cylinder, MFC, Pressure regulator, Required cylinders along with tubing , fittings, instruments, Safety accessories										
12	Multi tubular methanol reactor, condenser, gas-liquid separator along with piping , fittings, instruments, Safety accessories										
13	Recycle syngas compressor along with piping , fittings, instruments, Safety accessories										
14	LPBT and HPBT before and after recycle compressor along with piping , fittings,										

	instruments, Safety accessories										
15	Online gas analyzer along with piping , fittings, instruments, Safety accessories										
16	Catalyst for COS Hydrolysis, HTS, LTS, Methanol synthesis, Guard bed										
17	MDEA Solvent										
18	Control Panel, SCADA, Computers, printer, UPS										
19	Structure and support of the plant										
20	Cooling tower along with all accessories, piping ,fitting, instruments										
21	Spares										

22	Annual Maintenance Charges 3. Comprehensive AMC for 2 nd year 4. Comprehensive AMC for 3 rd year										

Note:

- (a) The cost of optional items, 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 _____

Annexure-5'S'

Unpriced list of Imported/ Indigenous components

Sl.No.	Description/Part No./ Make Mode*	Imported / Indigenous	Currency	Name of the OEM/ Principal
1.	Accumulator before water shift reactor along with piping , fittings, instruments, supports, Safety accessories			
2.	Preheater, Guard bed reactor, mixer cum super heater along with piping , fittings, instruments, Safety accessories			
3.	Water gas shift reactor assembly (HTS, LTS, coolers, knock out drum) with all fittings, piping, instruments, safety accessories			
4.	Boiler and accumulator along with instruments, piping, fitting and safety accessories			
5.	Thermic fluid heating and cooling system along with thermic fluid, instruments, safety accessories			
6.	Absorber , Stripper, Flush drum, solvent pumps, make up solvent pump, solvent tank along with piping , fittings, instruments, Safety accessories			
7.	Knockout drum, Gas holding tank after absorber stripper along with piping , fittings, instruments, Safety accessories			
8.	Syngas Compressor along with piping , fittings, instruments, Safety accessories			
9.	High pressure buffer tank, preheater, guard bed, Heat exchanger along with piping , fittings, instruments, Safety accessories			
10.	H ₂ /N ₂ Gas feeding system from cylinder, MFC, Pressure regulator, Required cylinders along with tubing , fittings, instruments, Safety accessories			
11.	Multi tubular methanol reactor, condenser, gas-liquid separator along with piping , fittings, instruments, Safety accessories			
12.	Recycle syngas compressor along with piping , fittings, instruments, Safety accessories			
13.	LPBT and HPBT before and after recycle compressor along with piping , fittings, instruments, Safety accessories			
14.	Online gas analyzer along with piping , fittings, instruments, Safety accessories			

15.	Catalyst for HTS, LTS, Methanol reactor, Guard bed			
16.	MDEA			
17.	Control Panel, SCADA, Computers, printer, UPS			
18.	Exhaust System & Flare Stack			
19.	Structure and support of the plant			
20.	Cooling tower along with all accessories, piping ,fitting, instruments			
21.	Other components/ items, if any			
22.	Spares			
23.	Annual Maintenance Charges Comprehensive AMC for 2 nd year Comprehensive AMC for 3 rd year			

