



सी०एस०आइ०आर०-भारतीय पेट्रोलियम संस्थान
CSIR-Indian Institute of Petroleum

(वैज्ञानिक एवं औद्योगिक अनुसंधान परिषद)
(Council of Scientific & Industrial Research)

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Subject: Invitation of Expression of Interest for “Fully Automated Customized Reactor Unit for 10 Kg/day Methanol Production”

CSIR-Indian Institute of Petroleum (IIP), Dehradun, and ISO 9001-2015 Institute, is one of the leading constituent laboratories under Council of Scientific & Industrial Research (CSIR) engaged in R&D work in petroleum refining, natural gas and petro-chemicals and contributing towards creation of state of the art technology & products. CSIR-IIP has been working on several projects of National importance independently and also in collaboration with well-known Indian & foreign organizations.

This EOI is designed to explore the market and to finalize specifications based on technical discussions/presentations with the experienced Engineering/Fabricating companies/Firms in a transparent manner for a ‘Fully Automated Customized Reactor Unit for 10 Kg/day Methanol Production’.

E-BIDS for EOI are hereby invited through Central Public Procurement (CPP) Portal (<https://www.etenders.gov.in>) and only online offers will be entertained from the registered bidders of CCP Portal.

Reference No.: IIP/PUR/1/21-22/EOI/484/RRB/LSPD/PO:

“Fully Automated Customized Reactor Unit for 10 Kg/day Methanol Production”

Last date of submission : 26th Oct, 2021 by 2:00 PM

Date of opening : 27th Oct, 2021 at 2:00 PM

Interested bidders may download the details from our Website: www.iip.res.in or on CPP Portal (<https://www.etenders.gov.in>).

For and on behalf of CSIR


Controller of Stores & Purchase

Subject: Invitation for Expression of Interest (EOI) for “Fully Automated Customized Reactor Unit for 10 Kg/day Methanol Production”

CSIR-Indian Institute of Petroleum (IIP), Dehradun, and ISO 9001-2015 Institute, is one of the leading constituent laboratories under Council of Scientific & Industrial Research (CSIR) engaged in R&D work in petroleum refining, natural gas and petro-chemicals and contributing towards creation of state of the art technology & products. CSIR-IIP has been working on several projects of National importance and also in collaboration with well-known Indian & foreign organizations.

EOI are hereby invited from reputed engineering/fabricating companies/firms for putting up “Fully Automated Customized Reactor Unit for 10 Kg/day Methanol Production. Firms having done similar nature of work can apply along with the documentary evidence for the work done in the past. The firms should also meet the other parameters as given below and are required to submit following information along with their applications.

- 1) Name of the firm with their constitution/proprietorship/partnership detail, etc with the date of establishment/registration.
- 2) List of similar works successfully completed in the last three years as above with testimonials from department concerned and the details of contact persons.
- 3) The firm should not have incurred any loss in more than two years during the last five years ending 31st March, 2021.
- 4) Details of after sales support Infrastructure.
- 5) List of works in hand giving nature of work, department, cost, date of start and completion with present progress and the contact details of clients.
- 6) Balance sheet of the firm for previous two years (2019-2020 and 2020-2021) must be enclosed with the offer certified by chartered accountant evidencing turnover.
- 7) The article of association to underscore the activities and mandate of the bidding firm.

Offers against this EOI containing the technical aspects and contractual terms and conditions of the proposed procurement without a bid price should be submitted in form of E-BIDS through Central Public Procurement (CPP) Portal (<https://www.etenders.gov.in>) and only online offers will be entertained from the registered bidders of CPP Portal. Last date of submission of EOI is **26th OCT, 2021 by 2.00 PM**, and shall be opened on the 27th OCT 2021 at 2:00 PM. Shortlisted firms shall be called for making a presentation at a later date.

If the Procuring Entity is of the view that after EOI stage, there is likelihood of further participation by many more bidders and to avoid getting trapped into a legacy technology, the second stage bidding may not be restricted only to the shortlisted bidders of EOI stage. In the second stage, normal OTE/GTE bidding may be done.

If any information furnished by the applicant is found incorrect at a later stage, it shall be liable to be debarred from tendering/taking up of work in CSIR. CSIR-IIP reserves the right to verify the particulars furnished by the applicant; independently, CSIR-IIP reserves the right to reject any prospective application without assigning any reason.

Brief description of Expression of interest for Fully Automated Customized Reactor Unit for 10 Kg/day Methanol Production

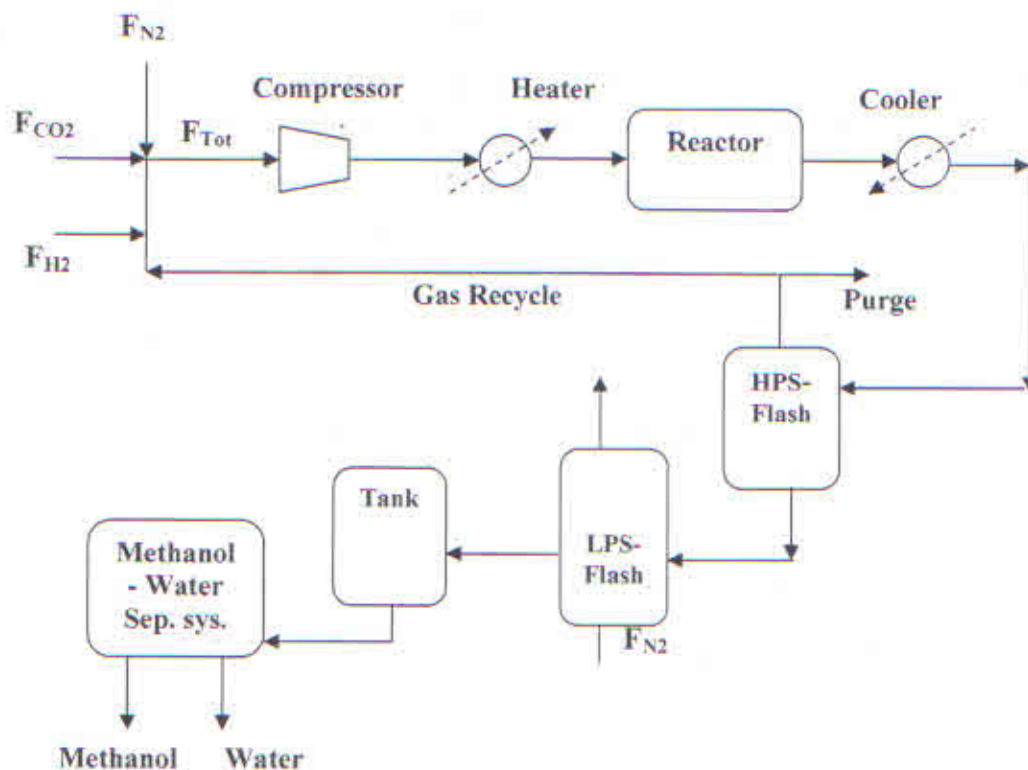
Brief Process Description

The fresh feed of CO₂ and H₂ in a pre-set stoichiometric ratio of 1:2 up to 1:4, is mixed with the gas recycle stream at a Pressure of ~ 10-20 Bar and sent to recycle gas compressor. The discharge pressure of the compressor outlet is ~ 50-60 Bar. The discharged outlet is passed through a heater to raise the mixed stream temperature at ~ 220 - 260 degree C and sent to the oil cooled multitubular reactor operating in the pressure range of 40 - 60 bar and operating temperature range is ~ 220 - 340 degree C where hydrogenation of CO₂ is happening.

The catalyst loading is estimated to be around ~ 4.0 to 7.0 kg. The catalyst is loaded in the form of pellet or tablet. Required catalyst bed volume is in the range of XXX - YYY

Once the reaction occurs, the reactor effluent is passed through a cooler from where the material outlet stream from cooler is desired at a temperature of $\sim 1 - 5$ degree C. The gas-liquid multiphase outlet from cooler is sent to the High Pressure Separator (flash drum), where the gas outlet is split in purge stream and recycle stream. The recycle stream is mixed with fresh feed.

The liquid outlet from HPS is sent to LPS where a nitrogen purging may occurred. Finally the liquid from LPS is taken to the storage tank. The storage tank liquid mixture consists of methanol and water. This is further taken to a methanol - water separator arrangement from where the high purity methanol is obtained.



01. Mass flow controllers for F_{Tot}

Total flow in the reactor (initial guess) - 250 - 420 LPM

- Gas : CO_2 , Flow range - 30 - 60 LPM
- Gas : H_2 , Flow range - 90 - 180 LPM
- Gas : N_2 , Flow range - 30 - 50 LPM (Intermittently for purging)

02. Recycle Gas Compressor

- Inlet pressure - 10-20 bar
- Outlet pressure - 50-60 bar
- Flow in - 250 - 420 LPM

03. Heater

- Feed outlet temperature - 220 - 260 degree C

04. Reactor

- oil cooled - multitubular catalytic reactor system
- Operating pressure range of 40 - 60 bar
- Temperature range of 220 - 340 degree Celsius
- GHSV Range of 3000- 6000
- temperature measurements of catalyst bed
- Operating and design philosophy for heat removal from reactor
- Catalyst form: Tablets or pellets.
- Catalyst weight - 3.5 - 6.5 Kg
- Provision for easy catalyst loading-unloading arrangements

05. Effluent Cooler

- The hot stream from FEHE needs to be cooled at ~ 1 to 5 deg C

06. HP Gas- Liquid separator (HPS)

- Separated gas stream to have a split arrangement, for recycle and purge
- Mass flow controllers to minutely control recycle rate (indirectly setting purge)
- HPS operating pressure - 40 - 60 bar

07. LP Gas- Liquid separator (LPS)

- The liquid from HPS will be taken to LPS, a provision for N2 purge stream arrangement is required at LPS
- LPS operating Pressure - 1.2 - 2 bar

08. Methanol water storage tank : Final product tank of ~ 50 Litre capacity

09. Methanol - Water Separation System

- Possibly a batch distillation

NOTE: Technical Details on unit specifications and other relevant specifications for flow, pressure and temperatures will be discussed in greater detail during EoI presentations.

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