

## TENDER FORM

### प्लाज्मा अनुसंधान संस्थान

(भारत सरकार के परमाणु ऊर्जा विभाग का सहायता प्राप्त संस्थान)  
इंदीरा ब्रिज के पास, भाट, गांधीनगर - 382428, भारत  
दूरभाष: 079-23962020/23962021, फ़ैक्स: 079-23962277

### निमंत्रण निविदा और निविदाकारों को निर्देश करने के लिए Invitation to Tender and Instructions to Tenderers

The Purchase Officer, Institute for Plasma Research invites, online tenders IN **TWO PART (INR QUOTE ONLY)** for supply of stores as detailed in the Purchaser's Tender documents. The conditions of contract and instructions to tenderers which will govern the contract pursuant to tender are given below.

If you are in a position to quote for the supply in accordance with the requirements stated in the attached Tender Form please submit your quotation **online. The quote should be in INR only.**

Tender submitted by **fax/cable/telegram or any mode other than online will NOT be considered at all** and all such tenders will be rejected without any notice to the tenderer.

Yours faithfully,

#### **Purchase Officer-II**

For and on behalf of Director, IPR  
Institute for Plasma Research

Encl: as above.

## INSTRUCTIONS FOR ONLINE SUBMISSION

- 1) It is mandatory for all the applicants to have **class-III digital signature certificate** from any of the licensed Certifying Applicant to participate in e-tendering.
- 2) In order to participate in online e-tendering process, it is mandatory for the applicants to have **user ID & password** to get access to the website [www.tenderwizard.com/DAE](http://www.tenderwizard.com/DAE). The applicants have to get registered their firm / company with the service provider, M/s ITI Limited for user ID & password. The registration shall be done by paying an annual registration fees to M/s ITI Limited and completing other formalities as mentioned in the website, [www.tenderwizard.com/DAE](http://www.tenderwizard.com/DAE). Validity of online registration is for one year from the date of its issuance and may be renewed by paying the applicable amount. For assistance/clarifications please contact Mr. Sunil K Patel at mobile 09624981992, e-mail: [twhelpdesk426@gmail.com](mailto:twhelpdesk426@gmail.com) or [nodalofficer.et@ipr.res.in](mailto:nodalofficer.et@ipr.res.in) or All India Help line No: 91-80-40482000/[18004255048](tel:18004255048), e-mail: [daehelpdesk@tenderwizard.co.in](mailto:daehelpdesk@tenderwizard.co.in).
- 3) The applicants, who have already obtained such valid user ID and password from M/s ITI Limited, for any other tender of DAE, need not obtain fresh user ID and password for the purpose of participation in the present tender.
- 4) The services for e-tendering in IPR/DAE is provided by M/s ITI Ltd., Tender wizard Help Desk Centre, # 24, 1st Floor, Sudha Complex, Near Havanoor Circle, 3rd Stage, 4th Block, Basaveshwaranagar, Bangalore – 560079, Ph:91-80-40482000/[18004255048](tel:18004255048), Telefax: 91-80-40482114, Email: [daehelpdesk@tenderwizard.co.in](mailto:daehelpdesk@tenderwizard.co.in).
- 5) The quotations shall be submitted online in the prescribed format before the date and time as mentioned in tender document. No other mode of submission is acceptable.
- 6) On successful e-payment of tender processing fees, the applicants can download the tender documents (including Excel sheets, if any) from the e-tendering portal.
- 7) Submission of the offer document after the due date and time shall not be permitted. Time being displayed on e-Tendering portal shall be final and binding on the applicant.
- 8) Applicants are advised to submit their documents well before the due date. IPR shall not be responsible for any delay in submission of documents for any reason including server and technical problems.
- 9) **Applicants are advised to fill all the mandatory fields (coloured cells) of the excel files of the Tender. If applicant keeps any mandatory cell blank, System will not allow to close/save the file.**
- 10) In case of any problem with the submission of the offer documents, the applicant may have the assistance of helpdesk or use the help manual given on the said website or mobile and e-mail mentioned elsewhere.

<p><b>प्लाज़्मा अनुसंधान संस्थान</b>  इंदीरा ब्रिज के पास, भाट, गांधीनगर - 382428  गुजरात राज्य  दूरभाष: 079 23962020, 23962021  फैक्स: 079 23962277</p>	<p><b>INSTITUTE FOR PLASMA RESEARCH</b>  NEAR INDIRA BRIDGE, BHAT, GANDHINAGAR 382 428  GUJARAT STATE  Phone: 079 23962020, 23962021  Fax: 079 23962277</p>
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**निविदा सूचना TENDER NOTICE NO: IPR/TN/PUR/TPT/ET/19-20/11**

**दिनांकित DATED 27-6-2019**

निम्नलिखित के लिए प्रतिष्ठित और योग्य पार्टियों से ई-निविदा विधि के माध्यम से दो भाग में ऑनलाइन निविदा आमंत्रित की जाती है।

Online tender is invited in **TWO PART** through e-tendering mode from reputed and eligible parties for the following.

मद का विवरण Item Description	Supply, Installation, testing and commissioning of Screw chiller system including cooling tower, pumps, piping, valves, insulation, electrical panel, cables, earthing, removal of existing plant equipment, bringing new equipment inside the plant and minor civil work as per the specifications mentioned in the tender documents
निविदा प्रक्रिया शुल्क Tender Processing Fee	Tender Processing Fee of <b>Rs.5,900.00</b> should be paid through electronic mode to M/s ITI Limited.
बयाना राशि जमा EMD	<b>Rs.3,30,000.00</b> (Copy of Demand Draft to be uploaded with the quotation, Original DD should be sent to IPR on or before the specified closing date and time)
निविदा दस्तावेज वेबसाइट पर देखने और डाउनलोड करने के लिए उपलब्ध है Tender document available for view and downloading on website	<b>09.00 hrs. on 28-6-2019 to 12.55 hrs. on 21-8-2019</b>
साइट देखने का समय Site visit	Between <b>1-7-2019</b> and <b>9-8-2019</b> (Monday to Friday – Time: 10.00 hrs to 16.00 hrs) with prior appointment.
निविदा दस्तावेज के संबंध में स्पष्टीकरण Clarifications regarding Tender document	<b>09.00 hrs. on 28-6-2019 to 16.00 hrs. on 12-7-2019</b>
बोली-पूर्व बैठक Pre-Bid meeting	On <b>15-7-2019</b> at 11.00 hrs at IPR campus
बोली-पूर्व स्पष्टीकरण Pre-Bid clarification	Will be uploaded on e-portal by <b>22-7-2019 (17:30 Hrs)</b>
निविदा ऑनलाइन जमा करने की अंतिम तिथि Closing of online submission of tenders	<b>21-8-2019 at 13.00 hrs.</b>

भाग-I के ऑनलाइन खोलने का समय और तिथि (तकनीकी बोली) Time and Date of online Opening of PART-I (Technical Bid)	21-8-2019 at 14.30 hrs.
भाग-II के ऑनलाइन खोलने का समय और तिथि (मूल्य बोली) Time and Date of online Opening of PART-II (Price Bid)	Will be declared later on

आवेदक निविदा दस्तावेज के बारे में वेबसाइट [www.tenderwizard.com/DAE](http://www.tenderwizard.com/DAE) पर **12-7-2019** (16:00 बजे) तक अपने प्रश्नों को अपलोड करके स्पष्टीकरण (बोली-पूर्व) मांग सकते हैं। इसके अलावा, हमने स्पष्टीकरणों पर चर्चा करने के लिए आईपीआर, गांधीनगर में **15-7-2019** को 11:00 बजे बोली-पूर्व बैठक की व्यवस्था की है। स्पष्टीकरण उसी वेब पोर्टल [www.tenderwizard.com/DAE](http://www.tenderwizard.com/DAE) पर **22-7-2019** (17:30 बजे) तक अपलोड किए जाएंगे।

**The applicant can seek clarifications (pre-bid) regarding the tender document up to 12-7-2019 (16:00 Hrs) by uploading their queries on website [www.tenderwizard.com/DAE](http://www.tenderwizard.com/DAE) . Moreover, we have arranged a pre-bid meeting at IPR, Gandhinagar on 15-7-2019 at 11:00 AM to discuss on the clarifications. The clarifications will be uploaded on the same web portal [www.tenderwizard.com/DAE](http://www.tenderwizard.com/DAE) by 22-7-2019 (17:30 Hrs).**

साइट देखने के लिए आप निविदा दस्तावेजों के धारा-सी की धारा-VII में वर्णित व्यक्तियों से संपर्क करें। कृपया ध्यान दें कि इस निविदा में तकनीकी या अन्य कोई भी स्पष्टीकरण की आवश्यकता हो तो, बोलियाँ प्रस्तुत करने से पहले किया जाएगा। बोलीदाता को एक बार जमा की गई बोली को संशोधित करने का कोई अधिकार नहीं होगा।

**For site visit you shall contact the persons mentioned under Section-VII of Section-C of tender documents. It may please be noted that any clarifications required in this tender either technical or otherwise shall be carried out before submission of bids. Bidder shall not have any right to revise the price bid once submitted**

विस्तृत निविदा सूचना, योग्यता मानदंड और निविदा दस्तावेज के साथ वेबसाइट [www.tenderwizard.com/DAE](http://www.tenderwizard.com/DAE) पर निःशुल्क देखने और डाउनलोड करने के लिए उपलब्ध है। ई-निविदा प्रक्रिया में भाग लेने के लिए, उपर्युक्त ई-निविदा पोर्टल पर रजिस्टर करना अनिवार्य है और डिजिटल हस्ताक्षर प्रमाणपत्र (श्रेणी-III) होना आवश्यक है। बोलीदाता नए रजिस्ट्रेशन/टेन्डरिंग में सहायता के लिए पऊवि हेल्पडेस्क से [daehelpdesk@tenderwizard.co.in](mailto:daehelpdesk@tenderwizard.co.in) पर संपर्क कर सकते हैं, फोन नंबर: (80)-40482000/ 9624981992/18004255048

Detailed tender notice along with Eligibility criteria and Tender Document is available on website [www.tenderwizard.com/DAE](http://www.tenderwizard.com/DAE) for free view and downloading. For participating in the e-tendering process, it is mandatory to get registered on the above e-tender portal and required to have Digital Signature Certificate (Class -III). For new registration/ tendering help, bidders may contact DAE Helpdesk at [daehelpdesk@tenderwizard.co.in](mailto:daehelpdesk@tenderwizard.co.in) Phone No: (80)-40482000/ 9624981992/ 18004255048

इस निविदा सूचना की एक प्रति संस्थान की वेबसाइट [www.ipr.res.in//purchasetenders.html](http://www.ipr.res.in//purchasetenders.html) पर भी उपलब्ध है। अधिक जानकारी के लिए, कृपया संपर्क करें: 079 23962020/2021, फ़ैक्स: 079 23962277।

A copy of this tender notice is also available on the Institute's website [www.ipr.res.in//purchasetenders.html](http://www.ipr.res.in//purchasetenders.html). For further information, please contact: 079 23962020/2021, Fax: 079 23962277.

## **TWO-PART TENDER SECTION – A**

### **Invitation to Tender and Tendering Conditions**

#### **1.0 INVITATION TO TENDER**

1.1 Institute for Plasma Research (IPR) invites online tenders for supply of Plant, Machinery, Equipment/Components to the specifications detailed in Section "C" to this tender document. The conditions of contract/purchase order which will govern the contract pursuant to the tender are as contained in Section "B" of this tender document. If you are in a position to quote for supply in accordance with the technical specifications indicated in Section "C" to this tender document and as per the conditions stipulated in this Section and Section B, please upload your offer in a manner and method specified below.

#### **2.0 MANNER AND METHOD FOR SUBMISSION OF TENDERS**

2.1 All tenderers in response to this invitation shall be submitted through online mode only. Tender submitted by **fax/cable/telegram or any mode other than online will NOT be considered at all** and all such tenders will be rejected without any notice to the tenderer.

2.1.1 **Part-I (Techno-commercial):** This part of the tender shall include/contain documents related to eligibility criteria, all technical details, technical specifications, drawings and also the commercial terms and conditions of contract for the supplies to be made and the services to be rendered **EXCLUDING ANY PRICE DETAILS THEREOF.**

**Proof for fulfillment of eligibility criteria mentioned in Annexure-A should be uploaded along with the tender. If the tender is submitted without valid documents, we shall not consider your offer. Tenders received without proof of eligibility criteria will be rejected. The offers which meets the eligibility criteria will only be considered for evaluation.**

2.1.2 **Part-II (Price):** This part should contain only the prices of the stores offered for the services to be rendered. Part-II (Price) should be furnished in accordance with the format provided by the Purchaser at Section "D" of this tender document

2.1.3 If tenderer includes prices of any nature in Part-I (Techno-commercial) of the tender such offers are liable for rejection without any notice to the tenderers.

#### **3.0 EARNEST MONEY DEPOSIT (EMD)**

3.1 The Tenderer shall submit, as part of its bid, interest free Earnest Money Deposit (EMD) for an amount as specified in the Tender Notice. In the case of foreign bidders, the EMD shall be submitted either by the principal or by the Indian agent and in the case of indigenous bidders;

the EMD shall be submitted by the manufacturer or their specifically authorized dealer/bidder. EMD shall be submitted by way of Demand Draft from **SBI/nationalized banks or any one of the scheduled banks mentioned in the bracket (Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank)** issued in favour of "**Institute for Plasma Research**" and payable at **Ahmedabad**. **Tender received without EMD will be rejected at the discretion of IPR.**

***(Copy of Demand Draft to be uploaded with the quotation, Original DD should be sent to IPR on or before the specified closing date and time)***

- 3.2 The EMD of unsuccessful Tenderer will be discharged/returned after finalizing award of the Contract/placement of Purchase order.
- 3.3 The successful Tenderers EMD shall be discharged upon the Bidder submitting the Security Deposit as specified in the contract/purchase order, without any interest.
- 3.4 **Exemption from payment of EMD:** The firms registered with DGS&D, NSIC, DPS or Micro & Small Enterprises (MSEs) which are actual producers/manufacturers of tendered items are exempted from payment of EMD provided valid registration certificate is uploaded along with the offer. In the case of foreign bidders, payment of EMD is exempted if they submit their bid directly or through their Indian agent in **foreign currency** against the tender document bought by them, so that the order can be placed directly on their Principals.
- 3.5 **The EMD may be forfeited:**
  - 3.5.1 If a Tenderer 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
  - 3.5.2 In case of a successful tenderer, if the tenderer fails to furnish order acceptance within 15 days of the order or fails to submit the Security Deposit within 21 days from the date of contract/order.

#### **4.0 LATE/DELAYED TENDERS**

- 4.1 Uploading of the offer document after the due date and time shall not be permitted. Time being displayed on e-Tendering portal shall be final and binding on the applicant.

#### **5.0 OPENING OF TENDERS**

- 5.1 Unless otherwise pre-opened or postponed with advance intimation to the tenderers, tender will be opened in two stages on the date and time indicated on e-Tendering portal.
- 5.2 Part-I (Techno-commercial) of the tender will be opened at the first stage on the due date and time indicated for opening on the e-Tendering portal while the Part-II (Price) will be opened at the second stage after completion of the evaluation of the Techno-Commercial Part (Part-I) of the tender.
- 5.3 While all the tenderers who uploaded tenders within the due date and time will be permitted to participate in the opening of Part-I (Techno-Commercial) of the tender on the due date and time indicated on e-Tendering portal, opening of the Part-II (Price) of the tender can be attended to only by such of those tenderers whose Part-I (Techno-Commercial) of the tenders are found to be technical suitable/

acceptable to the Purchaser and to whom intimation thereof is given by the Purchaser by Email/letter or through e-Tendering portal.

- 5.4 The tenderers whose Techno-commercial part (Part-I) are found suitable/acceptable to the Purchaser, will be given seven days advance intimation by the Purchaser to enable such tenderers to depute their representative to participate in the opening of the Part-II (Price) of the tender. The technically unqualified tenderers will neither be given any intimation about the date and time of opening of Part-II (Price) of the tender nor will they be permitted to participate in the opening of the same. **Part-II (Price) of the technically disqualified tenderers will not be opened.**

## **6.0 AUTHORITY LETTER**

- 6.1 The tenderers who wish to participate in the opening of the tenders may depute their representatives to IPR on the respective due date and time as indicated in the tender notice with an authority letter addressed to the Purchase Officer which should be produced to the officers who are opening the tenders, on demand to prove the bonafides of the representative who participates in the opening of the tender. In case the representative of the tenderer fails to produce such an authority letter on behalf of the tenderer, he will be debarred from participating in the opening of the tenders.

- 6.2 The tenderers representative, who reaches the venue of the tender opening late, i.e. after the starting time specified for opening of the tenders, may not be allowed to take part in the tender opening. It should be noted that only one representative of each tenderer will be permitted to participate in the tender opening.

## **7.0 EVALUATION OF TENDER**

- 7.1 Evaluation of tender shall be based on all inclusive landed cost.

## **8.0 PURCHASER'S RIGHTS TO REJECT QUOTATION**

- 8.1 The Purchaser reserves the right to reject any quotation without assigning any reason thereof.

## **9.0 TECHNICAL CLARIFICATIONS**

- 9.1 After opening of Part-I (Techno-commercial) of the tender, if it becomes necessary for IPR to seek clarifications from the tenderers, the same will be sought for from the tenderers.

## **10.0 DATE FOR OPENING OF PART-II (PRICE):**

After completion of technical evaluation, Part-II (Price) of only technically qualified tenderers shall be opened. The date and time of opening of Part-II (Price) shall be intimated only to the technically qualified tenderers. Whose Part-I offers have been found suitable will only be permitted to participate in the opening of the Part-II (Price) of the tender.

## **11.0 HOLIDAYS**

If the date (s) specified for receipt and opening of the tenders is/are declared as holidays abruptly by the competent authority due to any administrative reasons, then the date(s) for opening of tenders will get postponed automatically to the next working day. As for instance, if the due date for receipt of tender and its opening falls on 3<sup>rd</sup> of a particular month and if the 3<sup>rd</sup> day of the month is declared as a holiday, then the

opening date of tender will stand automatically postponed to 4th day of the month at the same time. However, due date for submission of tender online will remain same as mentioned in the tender notice.

**12.0 VALIDITY OF OFFERS**

Offers shall be kept valid for acceptance for a period of 120 (One hundred twenty) days from the date of opening of Part-II (Price) of the tender. Offers with shorter validity period will be liable for rejection.

**13.0 CATALOGUES/TECHNICAL LITERATURE**

Vendor shall upload all necessary catalogues/drawings technical literature data as are considered essential for full and correct evaluation of the offers shall invariably accompany the Part-I (Techno-Commercial) of the tender. The quotations are liable to be ignored if this condition is not complied with.

**14.0 TERMS AND CONDITIONS OF THE CONTRACT**

It must be clearly understood that any contract concluded pursuant to this invitation to tender shall be governed by the General Conditions of the Contract as contained in Section "B" of this tender document. Tenderers must therefore, take special care to go through these general conditions of contract and in exceptional cases if any deviations are proposed, these must be clearly indicated in the Part-I of the tender as a separate annexure instead of merely enclosing their printed conditions of Sale. Tenders made subject to counter conditions or far too many deviations from the general conditions of contract, i.e. Section "B" of this tender document are liable to be ignored. It should also be realised that failure to bring out deviations from the General Conditions of Contract contained in Section "B" of this tender document will imply that the tenderer is willing to execute the contract as per the Purchaser's terms and conditions of contract.

**15.0 TENDERING CONDITIONS FOR BIDS**

- 15.1 The prices quoted must be FIRM and preference will be given to such tenders. In exceptional cases (e.g. items involving substantial use of raw materials susceptible to sharp fluctuations in prices) if prices quoted subject to variation it shall be on the basis of a standard 'Price Variation Formula'. The basis for calculation shall be very clearly stated. The responsibility for furnishing the documentary evidence for price variation lies with the vendor. Here again preference will be given to the tenders with a specific ceiling on escalation.
- 15.2 Prices quoted by the tenderer should include all charges involved for direct and safe-delivery of the stores to the consignee/place of delivery indicated in the tender document. If a tenderer so desires, separate lump sum charges for safe-delivery of the stores to the consignee/purchaser's site, could be furnished. However, the purchaser reserves the right to call for break-up. The purchaser will neither undertake responsibility for transit insurance nor pay for it separately.
- 15.3 In respect of tenders on Ex-works basis, in case the tenderer has not mentioned in the offer packing, forwarding and transportation charges for safe delivery up to Purchaser's site, 2% of the price quoted towards packing (in respect of both local and outstation firms), 1% of the basic price quoted towards safe delivery charges in respect of local tenderer and 3% of the basic price quoted towards safe delivery charges in



respect of outstation firm will be added for comparison of offers on safe door delivery at Purchaser's site.

- 15.4 The stores shall neither be despatched under 'owner's risk' nor consigned to 'self', but only to the consignee's name and address indicated in the Purchase order. Non-adherence to this condition shall make the contractor liable to bear all consequential penalties/expenses such as demurrage, wharf age, etc. which the Purchaser may incur.
- 15.5 The consignee will, as soon as possible, but not later than 45 days from the date of arrival of stores at destination notify the contractor of any loss or damage to the stores that may have occurred during transit to enable the contractor to repair/rectify the defects/damages or replace the goods as is appropriate, free of all charges. In case it is desired by the contractor for returning of the material to them all expenses towards transportation etc. will be borne by the supplier and also will furnish bank guarantee towards the cost of material.
- 15.6 In case an Indian supplier/Agent furnishes an offer for supply of outrightly imported stores, the price of such stores shall be quoted in Indian Rupees for delivery to the consignee's premises exclusive of import duties and on firm price basis.
- 15.6 **Conditional Discount:** In case the tenderer offers any conditional discount with regard to acceptance of their offer within a specific payment terms, delivery, quantity etc. the purchaser will not take into consideration such conditional discount while evaluating their offer.

## **16.0 SPARES AND ACCESSORIES**

- 16.1 Tenders for plant/machinery/equipment/component shall also indicate prices for essential accessories, optional accessories and spares necessary for satisfactory operation of the plant/machinery/equipment.
  - 16.1.1 for a period of two years and
  - 16.1.2 for a period of five years
- 16.2 Prices for accessories and spares shall be itemized. Tenders where only lumpsum prices are indicated are liable to be ignored. Particular care must be taken to list out each item of spare and quantity recommended and also the individual price for these items. These details should be included only in Part-II (Price) of the tender. However, a list of spares and accessories without Price should be included in Part-I (Techno-Commercial) of the tender.

## **17.0 QUANTITY**

The purchaser reserves the right to accept tenders for any quantity of his choice and the tenderer shall be bound to accept a contract for any quantity. The Purchaser also reserves the right to accept or reject lowest or any tender in full or in part without assigning any reasons.

## **18.0 STATUTORY LEVIES SUCH AS CUSTOMS DUTY, GOODS AND SERVICE TAX**

### **18.1 CUSTOMS DUTY**

- 18.1.1 The Purchaser is entitled for assessment of customs duty at the concessional rate as per Customs Notification No. 51/96-Custom dated 23.7.1996 issued by the Department of Revenue, Ministry of Finance, as amended from time to time, in respect of purchases made for the Research Institutions under the Department of Atomic Energy and the Purchaser will obtain the requisite

- certificate from the appropriate authority.
- 18.1.2 In case an Indian vendor/agent submits an offer for supply of outrightly imported stores in Indian Rupees, they should quote price for free and safe delivery of stores at destination.
- 18.1.3 Wherever, against a requirement, both indigenous as well as imported offers are received, the offers for imported stores will be evaluated on the basis of the total landed cost after loading the custom duty and other levies as may be applicable from time to time for taking purchase decision.
- 18.1.4 High Seas sale will not be considered.

**18.2 FLUCTUATION IN THE CUSTOMS DUTY**

- 18.2.1 Unless otherwise specifically agreed to in terms of the Contract, the purchaser shall not be liable for any claim on account of fresh imposition and /or increase in Customs Duty on raw materials and/or components used directly in the manufacture of the contracted stores, taking place during the pendency of the contract.

- 18.3 Offers from Indian Agents on behalf of foreign suppliers:** In case the tender is submitted by an Indian supplier/Indian agent on behalf of their foreign supplier/ principals, following documents should be submitted with the tender, failing which, their offer is liable to be ignored.

- 18.3.1 Photocopy of the Agency Agreement between the Principals and the Indian Agent showing the percentage or the quantum of agency commission payable and a Letter of Authority from the Principals authorizing the Indian Agents to submit the tender on their behalf.
- 18.3.2 The type and nature of after sales services to be rendered by the Indian Agent.
- 18.3.3 Both Indian Agent and Principal/OEM cannot bid simultaneously for the same item/product in the same tender.
- 18.3.4 The Indian Agents are allowed to quote on behalf of only one foreign Principal/ Supplier against this tender.
- 18.3.5 Copy of Registration Certificate with DGS&D or DPS.

**18.4 GOODS AND SERVICE TAX**

- 18.4.1 GOODS AND SERVICE TAX where legally leviable as per relevant HSN code will be admitted and reimbursed at the rate applicable during original delivery date.
- 18.4.2 GOODS AND SERVICE TAX intended to be claimed should be distinctly shown separately along with the price quoted. Where this is not done, no claim for GOODS AND SERVICE TAX will be admitted at any later stage and on any ground whatsoever.
- 18.4.3 The Purchaser is entitled for assessment of GST at the Concessional rate as per Notifications issued by the Government, as amended from time to time, in respect of purchases made for the Research and Development applications under the Department of Atomic Energy and other R&D units.
- 18.4.4 **GST for R&D Unit:** Goods and Service Tax (GST) wherever applicable will be paid extra at actual during the delivery period stipulated in the Purchase order. In terms of notifications issued by the Central Government and State Governments, R&D units of Department of Atomic Energy are entitled for IGST @ 5% or CGST @ 2.5% and SGST @ 2.5% as applicable for stores covered under the Purchase Order.

- 18.4.5 **GST for Services:** As applicable. Specify the SAC codes wherever services are involved.
- 18.4.6 It would be the responsibility of the contractor to ensure that relevant certificate is obtained from the Purchaser before effecting the delivery of goods ordered failing which the excess tax paid by the contractor shall not be reimbursed by the Purchaser.
- 18.4.7 When GOODS AND SERVICE TAX is claimed as extra by the vendor in general and on packing charges in particular, the following certificates should be submitted by the vendor to the Paying Authority on the bills itself.
- 18.4.8 Certified that the goods and packing charges on which GOODS AND SERVICE TAX has been charged have not been exempted under the Central Sales Tax or the State Sales Tax Act or the rules made there-under and the amount charged on account of GST on these goods and packing charges are not more than what is payable under the provision of relevant Act or the rules there-under.
- 18.4.9 Certified further that we have actually paid GOODS AND SERVICE TAX and are being assessed to GST on packing charges and also that where there are statutory exemption under the Relevant Act/Law of the State Government concerned, we have availed ourselves of it and certified non-availability of such a provision for GST on packing charges wherever claimed.
- 18.4.10 Certified further in respect of amount claimed into the bill no claim is pending for refund/or admissible. Certified that in the event of our getting refund in whole or in part of the element of GOODS AND SERVICE TAX on packing charges claimed from Government, we shall pass on the benefit to the Purchaser by remitting to Government the amount equivalent to the amount of refund obtained by us.
- 18.4.11 Further certified that we abide by the all the provisions of Acts of Governemnt and rules made thereunder especially regarding anti-profiteering provisions.
- 18.4.12 Certified further that we (our Branch or agent) \_\_\_\_\_  
 \_\_\_\_\_  
 (address) are registered as dealers in the State of \_\_\_\_\_  
 under Local Regn. No. \_\_\_\_\_ and in the State of \_\_\_\_\_  
 under Central Regn. No. \_\_\_\_\_ for the  
 purpose of State/Central Tax.  
 (Stamp & Signature of the Vendor)
- 18.4.13 The vendor shall solely be responsible for declaration of Goods and Service Tax made in his invoice and shall indemnify the purchaser from any claim or its liability from concerned authorities at any stage.
- 18.4.14 Certificate with each bill to the effect that no refund has been obtained in respect of the reimbursement of GST made to vendor during three months immediately preceding the date of the claim covered by the relevant bill.
- 18.4.15 AN UNDERTAKING to the effect that in case any refund of GST is granted to the vendor by concerned authorities in respect of stores supplied under the contract, they shall pass on the credit to the purchaser immediately alongwith a certificate from their Director/Manager/Proprietor/ Accountant to the effect that the credit so passed on relates to the GST originally paid for the stores

supplied under the contract. In case of their failure to do so within 10 days of the issue of the refund orders to them by the Authorities, the purchaser would be empowered to deduct a sum equivalent to the amount refunded by the authorities without any further reference to the vendor, from any of their outstanding bills against this or any other pending Government Contracts and that no dispute on this account would be raised by the vendor.

18.4.16 Statutory Deductions, as applicable shall be made from the supplier's bill.

#### 18.5 **DEDUCTION OF TAX AT SOURCE (TDS)**

As per Government of India rules, it is mandatory that income tax shall be deducted at source at applicable rates as per relevant act, rules and notifications issued by the government from time to time.

18.5.1 **In case of Indigenous Vendors** (Indian Suppliers who provide indigenous products and services, Indian subsidiaries with permanent establishment in India who supply imported goods and services and paid in Indian currency only): Tax deducted at source will be applicable under Section 194-C for carrying out any work (including supply of labour for carrying out any work) in pursuance of contract as per Income Tax Act 1961. In case of technical or professional services, TDS will be applicable as per under Section 194-J of Income Tax Act 1961.

18.5.2 **In case of Foreign Vendors** (Foreign Suppliers who provide goods from abroad paid in foreign currency and providing technical services by Indian subsidiary paid in Indian currency): The TDS is applicable where services are rendered in India directly or through their Indian counter part against foreign Purchase order / Contract as per the provision of under Section 195 of Income Tax act of India. Wherever DTAA (Double Taxation Avoidance Agreement) agreement exists between India and the supplier country the provisions of the agreement shall be applicable. For getting benefit of DTAA (Double Taxation Avoidance Agreement), the following documents must be submitted, otherwise full TDS will be deducted.

- a) No Permanent Establishment in India certificate
- b) Tax Residency Certificate (TRC) issued by Tax authorities of their country
- c) Form 10F if TRC does not contain required details
- d) PAN (Permanent Account Number) details issued by Indian Income Tax Authority

#### **Important Note:**

- a) Where bifurcation is inappropriate and unacceptable for supply of material and providing services the purchase order / contract will be treated as **Composite Contract** and TDS will be deducted on whole contract / purchase order value as per applicable rate.
- b) TDS or any other leviable taxes or duties, if applicable, shall be deducted recovered from the Supplier's bill and necessary certificate will be issued to the supplier.

- c) Details on relevant sections of Income Tax Act and DTAA treaties can be obtained from [https://www.incometaxindia.gov.in/ Pages/acts/income-tax-act.aspx](https://www.incometaxindia.gov.in/Pages/acts/income-tax-act.aspx).

**19.0 FLUCTUATION IN STATUTORY LEVIES**

Unless otherwise specifically agreed to in terms of the Contract, the purchaser shall not be liable for any claim on account of fresh imposition and/or increase in statutory levies on raw materials and/or components used directly in the manufacture of the contracted stores, taking place during the pendency of the contract. However, any reduction in statutory levies on these raw materials and/or components must be passed on to the Purchaser.

**20.0 SAMPLES/PROTOTYPES**

If any called for shall be submitted free of all charges by the Tenderer and the Purchaser shall not be responsible for any loss or damage thereof for any reason whatsoever. In the event of non-acceptance of the tender, the tenderer will have to make arrangements to remove/collect the sample/prototypes at his own expenses.

**21.0 QUANTITIES**

Quantities indicated are approximate only and one or more of the items of the stores tendered, or a portion of any one or more of the items of such stores may be accepted and the tenderer notwithstanding that his Tender has not been accepted in whole shall be bound to supply contracted quantity to the Purchaser.

**22.0 SUBMISSION OF DRAWINGS**

The tenderer shall furnish all drawings pertaining to the plant/machinery/ equipment/component to the Purchaser along with the tender for correct understanding and appreciation of the tender in quadruplicate. Besides, tenderers should also furnish general arrangement, schematic and such other drawings prescribed by the Purchaser within 4 weeks from the date of receipt of a Purchase Order for approval. Such drawings should be furnished along with Part-I (Techno-Commercial) of the tender. Tenderer's drawing will form part of the purchase order/contract only after these are approved by the Purchaser.

**23.0 INSTALLATION AND COMMISSIONING**

- 23.1 Wherever, the purchaser's invitation to tender calls for installation and commissioning or supervision of installation and commissioning of the instrument/equipment by the tenderer, the tenderer must clearly and separately quote the prices for the supply of the stores and the charges and the terms for installation and commissioning or supervision of installation and commissioning, as the case may be. The charges towards installation and commissioning should not be included in the price of the stores.
- 23.2 In respect of contracts involving installation and commissioning by vendors including overseas vendors where identifiable charges for the same has been quoted by the vendor, he shall bear the Income-tax liability as per the rates prevailing at the time of undertaking the job in accordance with the Income-tax Act in force in India.

23.3 Wherever, the scope of the contract includes installation and commissioning, it shall be the sole responsibility of the contractor to undertake the installation and commissioning as and when called for, by the Purchaser.

24.0 **INSPECTION**

24.1 The Contractor shall be responsible for and perform all inspection and testing required in accordance with the contract/purchase order and specifications included therewith.

24.2 The Purchaser may at his option depute his representative for inspection of the stores to be supplied under the contract or authorize and nominate a Quality Surveillance Agency of his choice for the purpose hereinafter called, in either case, the inspection.

24.3 The supplier shall give notice of readiness for inspection to the Purchaser so that the Inspector can be present at the requisite time. In such an event delivery shall not be effected until an authorization or shipping release is obtained from the Purchaser.

24.4 The contractor shall allow reasonable facility and free access to his work/factory and records to the inspector for the purpose of inspection or for ascertaining the progress of delivery under the contract.

25.0 **FACTORY REGISTRATION/SHOP & ESTABLISHMENT CERTIFICATE**

The tenderers shall upload the copy of the Factory Registration/License or Shop & Establishment Certificate as applicable, along with the tender, failing which the tenders are liable for rejection.

26.0 **PRODUCTS WITH ISI MARK**

26.1 Products with ISI mark will be preferred.

26.2 In respect of following categories of item, Purchaser will consider offers for products with ISI mark only:

- Fire Extinguisher
- Building Material
- PVC Pipes & fittings
- Agricultural Implements & sprayers
- Medical instruments such as syringes, needles, BP apparatus etc.

27.0 **SHOP/FACTORY EVALUATION, QUALITY SURVEILLANCE /INSPECTION AND SUBMISSION OF PROGRESS REPORTS**

27.1 The Purchaser or his technical authorities may at his option and prior to evaluation of the tender depute his Inspector or any quality surveillance Agency of his choice to the factory/workshop of the tenderer to assess and establish the manufacturing capability etc. of the tenderer. Similarly, the Purchaser may also depute his inspector/Quality Surveillance agency of his choice for inspection of the plant/machinery/equipment/component during the various stages of manufacture in such an event the tenderer/contractor shall:-

27.1.1 Allow reasonable facility and free access to his factory/work/ records to the Inspector for the purpose of inspection or for ascertaining the progress of manufacture and delivery.

27.1.2 Provide the drawings, toolings, gauges, instruments etc. required for carrying out the inspection work.

- 27.1.3 Produce an inspection plan to the Purchaser's satisfaction notifying him when check points on the plan are imminent.
- 27.1.4 Not supply or deliver the plant/machinery/equipment/ component unless and until a Shipping Release or an authorisation for despatch is obtained in a format provided by the Purchaser. Failure to comply with this instruction will not only result in withholding of the payment to the contractor/supplier, but also hold the tenderer/contractor liable for payment of compensation to the Purchaser due to delay in clearance of the Equipment/plant/machinery/ component from the carriers.

**28.0 INSTRUCTION MANUAL**

In respect of plant/ machinery/ equipment/ instrument/ apparatus, where instruction/ operation manual is normally necessary to enable the user to put the plant/machinery/equipment/instrument/ apparatus to proper use, the Contractor shall furnish such an instruction/operation manual specific to the stores being supplied along with the plant/machinery/equipment/instrument/apparatus. The Contractor shall clearly specify in the offer about his readiness to supply instruction/operation manual

**29.0 PACKING**

- 29.1 Tenderers shall note that packing for shipment shall be in accordance with the instructions outlined in this tender document, each package shall be limited to the size and weights that are permissible under the existing Air and Sea limitations. Even when no packing specification is included in the invitation to tender, it will be Supplier's responsibility to provide appropriate packing depending upon the nature of the supply and the transportation and handling hazards.
- 29.2 The equipment shall be so packed and protected as not to suffer deterioration, damage or breakage during shipment and storage in a tropical climate.
- 29.3 Each package shall be properly labeled to indicate the type and quantity of material it contains, the purchase order number, its dimensions and weight and any other necessary data to identify the equipment and relate it to contract.

**30.0 DEVIATIONS TO PURCHASER'S SPECIFICATIONS AND CONDITIONS OF CONTRACT**

- 30.1 If any deviation or substitution from the technical specifications contained in Section "C" to this tender document is involved, such details should be clearly indicated in Part-I (Techno-Commercial) and should be added as an annexure to Part-I (Techno-commercial) of the tender as otherwise it shall be an admission on the part of the tenderer that he will supply the equipment as specified by the Purchaser. Similarly, deviations to the Purchaser's General Conditions of Contract/Special Conditions of Contract contained in Section "B" of this tender document shall be indicated by the tenderer in another annexure to Part-I (Techno-commercial) of the tenderer.

30.2 Part-II (Price) should be furnished in accordance with the format provided by the Purchaser at Section “D” of this tender document.

**31.0 DELIVERY**

Tenderer should note that no tender will be considered by the Purchaser unless the Tenderer can meet the delivery schedule specified by the Purchaser. All equipments/machinery/plant/ component covered by this tender document should be supplied on or before \_\_\_\_\_ or \_\_\_\_\_ month from the date of approval of drawings or \_\_\_\_ month from the date of receipt of free issue materials. The prices quoted by the tenderer should include all charges involved for direct and safe delivery of the items by Road to the project site of the Purchaser. If a tenderer so desires/separate lumpsum charges for transportation and safe delivery to Purchaser’s site could be furnished. Purchaser will neither undertake responsibility for transit insurance nor pay for it separately. No other, delivery term will be accepted by the Purchaser.

**32.0 ACCEPTANCE OF TENDERS**

32.1 The purchaser shall be under no obligation to accept the lowest or any other tender and shall be entitled to accept or reject any tender in part or full without assigning any reasons whatsoever.

32.2 Acceptance of tenders by the Purchaser will be sent by fax, E-mail, letter etc. within the validity date of the tender and such a fax, letter etc. would then be followed by a formal purchase order/contract. The tenderer whose offer is accepted will proceed with the execution of the contract on the basis of such advance acceptance of tenders without waiting for a formal purchase order/contract, and will be responsible to seek and obtain whatever clarifications that are necessary from the Purchaser to proceed with the manufacture without waiting for a formal purchase order/contract and delivery period will be reckoned from the date of the Letter of Intent.

**33.0 SETTLEMENT OF COMMERCIAL TERMS AND CONDITIONS OF CONTRACT**

In case the commercial terms and conditions of sale/contract stipulated in Part-I (Techno-commercial) of the tender submitted by the tenderer are at variance with the Purchaser’s General Conditions of all Contracts/Special Conditions of Contract stipulated in Section “B” of this tender document, the Purchase Officer will settle the commercial terms and conditions of contract with the tenderers chosen for award of the contract by holding discussions with them OR by sending Fax/Letter/E-mail etc. In case the concerned tenderer to whom an intimation thereof is given does not respond/fail to respond to communication sent by the Purchaser within the date specified, his tender is liable for rejection at the discretion of Director, IPR and no complaints whatsoever will be entertained from the tenderer for rejection of this tender. The tenderers should not discuss with the technical authorities/user department any of the commercial terms and conditions of contract and any agreement/understanding reached between the tenderer and the technical authorities will not be valid and binding.



34.0 **COMPLIANCE WITH THE SECURITY REQUIREMENTS OF THE PURCHASER**

The Contractor shall strictly comply with the Security Rules and Regulations of the Purchaser in force and shall complete the required formalities including verification from Police and any other authority and obtain necessary prior permission for entry into the Purchasers premises, wherever authorized by the Purchaser.

35.0 **PAST PERFORMANCE**

In case the past performance of the tenderer is not found to be satisfactory with regard to quality, delivery, warranty obligation and non-fulfillment of terms and conditions of the contract, their offer is liable to be rejected by the purchaser.

36.0 **CAPACITY & FINANCIAL STANDING**

In case it is found that the tenderer does not possess the requisite infrastructure, capacity, capability and their financial standing is not satisfactory, such tender is liable to be rejected by the Purchaser.

37.0 **CONFIDENTIALITY**

Drawings, specifications, prototypes, samples or any other correspondence/details/information provided by the Purchaser relating to the tender or the contract shall be kept confidential by the contractor, and should not be disclosed or passed on to any other person/firm without the prior written consent of the purchaser. This clause shall apply to the sub-contractors, consultants, advisers or the employees engaged by the Contractor.

38.0 **RESTRICTED INFORMATION CATEGORIES UNDER SECTION 18 OF THE ATOMIC ENERGY ACT, 1962 AND OFFICIAL SECRETS UNDER SECTION 5 OF THE OFFICIAL SECRETS ACT, 1923**

Any contravention of the above mentioned provisions by the contractor, sub-contractor, consultant, adviser or the employees of the contractor will invite penal consequences under the aforesaid legislation.

39.0 **PROHIBITION AGAINST USE OF THE NAME OF ANY INSTITUTION OF DEPARTMENT OF ATOMIC ENERGY WITHOUT PERMISSION FOR PUBLICITY PURPOSES**

The Contractor or sub-contractor, consultant, adviser or the employees engaged by the contractor shall not use the name of any Institution of Department of Atomic Energy for any publicity purpose through any public media like Press, Radio, TV or Internet without the prior written approval of the Purchaser.

40.0 **FREE ISSUE MATERIAL** *(This clause shall apply only to contracts for supply of fabricated equipment with purchaser's Free Issue Materials (FIM)).*

40.1 Wherever contracts envisage supply of Free Issue Material (FIM) by the Purchaser to the contractor, such Free Issue Material shall be safeguarded by an insurance policy to be provided by the Contractor at his own cost for the full value of such materials and the insurance policy shall cover, the following risks specifically and shall be valid for six months beyond the contractual delivery date.

- **Risk to be covered:** Any loss or damage to the Purchaser's material due to fire, theft, riot, burglary, strike, civil commotion, terrorist act, natural calamities etc. and any loss or damage arising out of any other causes such as other materials falling on purchaser's materials.
- **Insured by:** (Name of the Contractor)
- **Beneficiary:** Institute for Plasma Research, Near Indira Bridge, Bhat, Gandhinagar-382428.
- **Amount for which insurance policy to be furnished:** The amount will be indicated in the respective contract.

Free Issue Material (FIM) will be issued to the Contractor only after receipt of the Insurance Policy from the Contractor. The contractor shall arrange collection of the FIM from the Purchaser's premises and safe transportation of the same to his premises at his risk and cost.

Notwithstanding the insurance cover taken out by the Contractor as above, the contractor shall indemnify the purchaser and keep the Purchaser indemnified to the extent of the value of free issue materials to be issued till such time the entire contract is executed and proper account for the FIM is rendered and the left over/surplus and scrap items are returned to the Purchaser. The contractor shall not utilize the Purchaser's free issue materials for any job other than the one contracted out in this case and also not indulge in any act, commission or negligence which will cause/result in any loss/damage to the Purchaser and in which case, the Contractor shall be liable to the Purchaser to pay compensation to the full extent of damage/loss. The Contractor shall be responsible for the safety of the free issue materials after these are received by them and all through the period during which the materials remain in their possession/control/ custody. The free issue materials on receipt at the Contractor's works shall be inspected by them for ensuring safe and correct receipt of the material. The Contractor shall report the discrepancies, if any, to the Purchaser within 5 days from the date of receipt of the material. The Contractor shall take all necessary precautions against any loss, deterioration, damage or destruction of the FIM from whatever cause arising whilst the said materials remain in their possession/custody or control. The FIM shall be inspected periodically at regular intervals by the Purchaser for ensuring safe preservation and storage. The contractor shall also not mix up the FIM with any other goods and shall render true and proper account of the materials actually used and return balance remaining unused material on hand and scrap along with final product and if it is not possible within a period of one month from the date of delivery of the final product covered by this purchase order. The Contractor shall also indemnify the Purchaser to compensate the difference in cost between the actual cost of the FIM lost/damaged and the claim settled to the Purchaser by the insurance company. The decision of the Director, Institute for Plasma Research, as to whether the Contractor has caused any loss, destruction, damage or deterioration of the FIM while in his possession, custody or control from

whatever cause arising and also on the quantum of damage suffered by the government, shall be final and binding upon the Contractor.

**41.0 EXPORT LICENCE/EXPORT PERMISSION**

41.1 It is entirely the responsibility of the vendors who are quoting for materials of foreign origin to ensure obtaining export permission/licence/authorisation as required from the respective Government before arranging shipment. This Department would not accept post supply inspection by any agency/authority of any foreign country. It is, therefore, necessary that the vendors offering materials from foreign countries shall have thorough knowledge of export contract regulations in vogue in those countries.

41.2 The vendors shall indemnify the purchaser against any consequences in respect of any end-use declaration they/their overseas Principals may furnish to the government/government agencies of the country of origin of the materials, while seeking export permission/licence. Post supply inspection, contrary to the terms and conditions of purchaser's contract shall be deemed to be null and void.

**42.0 END USE CERTIFICATE**

42.1 Whenever an End-use Certificate is desired by the vendor, the same shall be clearly mentioned in the quotation and the purchaser shall provide an Enduser Certificate as per the format given below. The Purchaser will not provide any other document/declaration in this regard.

**END USER STATEMENT:**

*"We hereby certify that the item/s i.e. \_\_\_\_\_, being procured from M/s \_\_\_\_\_ against our Purchase Order No. \_\_\_\_\_ dated \_\_\_\_\_ will be used for \_\_\_\_\_. We also certify that the item/s will not be used in designing, developing, fabricating or testing of any chemical, biological, nuclear, or weapons of mass destruction or activities related to it. It is further certified that we will not re-export the Item/s prior to obtaining permission from the concerned authorities as may be required".*

**43.0 COUNTRY OF ORIGIN**

43.1 Wherever the tenders are for imported stores, the Country of Origin of the stores must be clearly specified in the quotation.

**44.0 LIABILITY**

44.1 Vendors shall be liable for any damage to the purchaser or any third party out of any patent or latent defect in the goods supplied by him or sub-standard services rendered by him.

**45.0 RIGHT TO REJECT QUOTATION**

45.1 The Purchaser reserves the right to reject any quotation, which is not in conformity with the above instructions.

45.2 The Purchaser also reserve the right to reject any quotation without assigning any reason whatsoever.

46.0 **PRICE / PURCHASE PREFERENCE**

Purchase/Price preference to industries will be given as per the policy of the Government of India in force at the time of evaluation provided their offer is in compliance with the conditions of the policy.

47.0 **PERMANENT ACCOUNT NUMBER (PAN)**

47.1 Vendors are required to upload a true copy of the PAN Card/Letter issued by the Income-tax Department, failing which the tenders are liable to be rejected.

48.0 MSE bidders should declare their UAM (Udyog Aadhar Memorandum) number on CPPP portal to avail benefits as per Public Procurement Policy for MSE's order 2012.

49.0 The bidder shall not be under a declaration of ineligibility for corrupt or fraudulent practices or blacklisted with any of the Government Agencies.

Any additional conditions attached to this Invitation to Tender shall also form part of the contract conditions.

**SECTION 'B'**

**GENERAL CONDITIONS OF  
CONTRACT**

**INSTITUTE FOR PLASMA RESESARCH  
PURCHASE SECTION**

**GENERAL CONDITIONS OF ALL  
CONTRACT**

**&**

**SPECIAL CONDITIONS OF CONTRACT  
GOVERNING SUPPLIES OF  
PLANT AND MACNHINERY**

## **GENERAL CONDITIONS OF CONTRACT**

### **1. DEFINITIONS**

- 1.1 The term 'PURCHASER' means the Institute for Plasma Research or its successors or assigns.
- 1.2 The term 'PARTICULARS' means the following:
  - 1.2.1 Specification
  - 1.2.2 Drawing
  - 1.2.3 Sealed pattern denoting a pattern sealed and signed by the Inspector
  - 1.2.4 Proprietary make denoting the produce of an individual firm
  - 1.2.5 Any other details governing the construction manufacture and/or supply as existing for the contract.
- 1.3 The term 'CONTRACTOR' or 'SUPPLIER' means, firm or company with whom or with which the order for the supply of stores is placed and shall be deemed to include the Contractors/Successors (approved by the Purchaser), representatives, heirs, executors and administrators unless excluded by the contract.
- 1.4 The term 'CONTRACT' or 'PURCHASE ORDER' means and comprises of a Letter or Email or ink signed or digitally signed document conveying acceptance of Contractor's offer and invitation to tender, tender containing offer, advance acceptance of offer, general and special conditions of contract specified in the acceptance of offer and any subsequent amendments/alterations thereto made on the basis of mutual agreement.
- 1.5 The term 'STORES' or 'MATERIAL' means, the goods specified in the contract/purchase order which the contractor has agreed to supply under the contract.
- 1.6 The term 'SUB-CONTRACTOR' or 'SUB-SUPPLIER' means any contractor or supplier engaged by the contractor or the supplier with the prior approval of the Purchaser in relation to the contract/purchase order.
- 1.7 The term 'INSPECTOR' or 'QUALITY SURVEYOR' means any person nominated and deputed by the purchaser or their appointed Consultants or Quality Surveillance Agency or any other person from time to time authorized by the Purchaser to act as his representative for the purpose of inspection of stores under the contract/purchase order.

### **2. AUTHORITY OF PERSON SIGNING THE CONTRACT ON BEHALF OF THE CONTRACTOR**

The person signing the contract or the purchase order or any other document in respect of the contract or purchase order on behalf of the contractor shall be deemed to warrant that he has the authority to bind the contractor.

**3. SUBLETTING OF CONTRACT OR BILLS OR ANY BENEFIT ACCRUING THEREFROM**

- 3.1 The Contractor shall not sublet, transfer or assign the Contract or any part thereof or bills or any other benefits, accruing therefrom or under the contract without the prior written consent of the Purchaser (All Sub-contractors are required to be appraised and approved by the Purchaser before placement of orders by the Contractor/Supplier). However, such consent shall not be unreasonably withheld by the Purchaser, if such stores are not normally manufactured by the Contractor, such assignment or subletting shall not relieve the Contractor from any contractual obligation or responsibility under the Contract.
- 3.2 Any breach of this condition shall entitle the Purchaser to cancel the Contract or any part thereof and to purchase from other sources at the risk and cost of the Contractor and shall recover from the Contractor damages arising from such cancellations.
- 3.3 In case the Contractor sublets, transfers or assigns any part of the Contract with the prior written consent of the Purchaser, all payments to the Sub-Contractor shall be the responsibility of the Contractor and any requests from such sub-Contractor shall not be entertained by the Purchaser.

**4. SECURITY DEPOSIT**

- 4.1 On acceptance of tender, the Contractor shall at the option of the Purchaser and within the period specified by him, submit a Bank Guarantee from SBI or any one of the nationalized banks or reputed private banks, viz. AXIS Bank, ICICI Bank, IDBI Bank and HDFC Bank towards Security Deposit not exceeding 10% (ten percent) of the tendered value of the contract/purchase order valid till at least 2 months beyond the acceptance date of the material, as the Purchaser shall specify.
- 4.2 If the Contractor is called upon by the Purchaser to submit Security Deposit and the contractor fails to provide the same within the period specified such failure shall constitute a breach of the Contract and the Purchaser shall be entitled to make other arrangements for the repurchase of the stores contracted for at the risk and expenses of the Contractor in terms of clause 9.2.4 hereof and/or recover from the Contractor damages arising from such cancellation. No claim shall lie against the purchaser either in respect of interest if any due on Security Deposit or depreciation in value.
- 4.3 Offers wherein contractors declined to submit Security Deposit are liable to be rejected.

**5. DRAWINGS & SPECIFICATIONS**

- 5.1 The drawings and specifications are intended to be complementary and to provide for an comprise everything necessary for the completion of supply. Any material shown on the drawing even if not particularly described in specifications or vice versa is to be supplied by the Contractor as if it were both shown and specified.



- 5.2 Should any discrepancy be noted in the drawings and/or specifications and should any interpretation of the same be required, the matter shall be referred to the Purchaser for clarification which shall be binding upon the contractor. Otherwise, the contractor shall assume responsibility for the interpretation of the drawings and specifications including interpretation by his sub-contractors.
- 5.3 Should any difference or dispute arise with regard to the true intent and meaning of drawings or specification or should any portion of the same be obscure or capable of more than one interpretation, the same shall be decided by the Purchaser whose decision shall be final.
- 5.4 All lettering on the drawings is to be considered as part of the specification and contract. In all cases figured dimensions are to be followed rather than those indicated by scale. Large scale drawings will take precedence over small scale drawings.
- 5.5 The contractor's drawings shall, when approved by the Purchaser, be deemed to be included in the list of drawings which form part of the contract. The Contractor shall not proceed with fabrication until all drawings associated therewith have been duly approved by the Purchaser.
- 5.6 The Contractor shall be responsible for and shall pay for any alterations of the stores and shall indemnify the Purchaser for any consequential expenditure incurred by the Purchaser due to any discrepancies, errors, omissions in the drawings or other particulars supplied by him whether such drawings or specifications have been approved by the Purchaser or not, provided that such discrepancies, errors or omissions be not due to inaccurate information or specifications furnished to the contractor on behalf of the Purchaser.
- 5.7 **General Warranty**
- 5.7.1 The stores supplied by the contractor under the contract shall be of best quality and workmanship. The contractor shall supply the stores in accordance with the contract specifications unless any deviation has been expressly specified in the contract and any amendments agreed thereto.
- 5.7.2 The contractor's offer to supply stores in accordance with the tender specifications shall be deemed to be in admission on his part that he has fully acquainted himself with the details thereof and no claim shall lie against the Purchaser on the ground that the contractor did not examine or acquaint himself fully with the tender specifications.
- 5.8 **Contractor's Liability for Defective Stores**
- 5.8.1 For a period of twelve months after the stores have been accepted by Purchaser the Contractor shall be responsible for any defects that may be discovered therein notwithstanding that such defects could have been discovered at the time of inspection or any defects therein are found to have developed under proper use, arising from faulty materials, design or workmanship and the Contractor shall remedy all such defects as aforesaid at his own cost provided he is called upon within a period of 14 months from the date of acceptance thereof to do

so, by the Purchaser who shall state in writing in what respect the goods are faulty and further if in the opinion of the Purchaser the defects are of such a nature that it is necessary to replace or renew any defective stores, such replacement or renewal shall be made by the Contractor without any extra costs to the Purchaser, provided notice informing the Contractor of the defect is given by the Purchaser within the said period of 14 months. The decision of the Purchaser notwithstanding any prior approval or acceptance of the Inspector as to whether or not the stores delivered are defective or any defect has developed within the said period of twelve months or as to whether the nature of defects renewal or replacement shall be final conclusive and binding on the Contractor.

## **6. ALTERATIONS**

- 6.1 The Purchaser may, from time to time, make changes in the drawings specifications and issue additional instructions without altering the purchase order in any manner provided that no changes shall have been ordered which materially alter the character and scope of the supply under the contract.
- 6.2 It shall be lawful for the parties to the contract to alter by mutual consent at any time and from time to time the drawings and specifications and as from the dates specified by him stores to be supplied shall be in accordance with such altered drawings and specifications provided that if any such alterations involve increase or decrease in the cost of or in the period required for production, a revision of the contract price and/or the period prescribed for delivery shall be made by mutual agreement in respect of the stores to which the alteration applies. In all other respects, the contract shall remain unaltered.

## **7. SAMPLES**

- 7.1 Samples submitted for any reason shall be supplied without charge and freight paid without any obligation of the Purchaser as regards safe custody or safe-return thereof. All samples submitted must be clearly labelled with the Contractor's name and address and tender number. If the Contractor submits the sample with his tender the same shall not govern the standard of supply except when it has been specifically stated in the Purchase Order that it is accepted instead of any sealed pattern. Should certified samples be lent to the Contractor by the Purchaser, the Contractor is responsible for the return in perfect order of all certified samples with the labels intact.

## **8. PACKING**

- 8.1 The contractor shall be held responsible for the stores being sufficiently and properly packed for transport by rail, road, sea or air so as to ensure their being free from any loss or damages on arrival at their destination. The packing and marking of packages shall be done by and at the expenses of the Contractor. Each package shall contain a Packing

Note quoting Purchase Order number and date and showing its contents in detail.

- 8.2 Unless otherwise provided in the contract all containers (including packing cases, boxes, tins, drums and wrappings) in which the stores are supplied by the contractor shall be considered as property of the Purchaser and their cost as having been included in the contract price.

**9. DELIVERY:**

**9.1 TIME FOR AND DATE OF DELIVERY, THE ESSENCE OF THE CONTRACT:**

The time for and the date of delivery of the stores stipulated in the purchase order/contract shall be deemed to be of the essence of the contract and delivery must be completed not later than the date/dates stipulated.

**9.2 EXTENSION OF DELIVERY SCHEDULE**

- 9.2.1 If any delay in delivery shall have arisen from any cause such as strike, Lock-outs, fire, accidents, riot or the like which the purchaser may admit as reasonable ground for grant of extension of delivery schedule, the purchaser will allow such additional period for the purpose as he may consider necessary taking the circumstances into consideration.
- 9.2.2 If the contractor fails to deliver the stores or any instalment or part thereof within the period fixed for such delivery or such additional period allowed by the purchaser in accordance with foregoing paragraphs or any time before the expiry of such period repudiates the contract, the Purchaser may without prejudice to the rights of the purchaser.
- 9.2.3 Recover from the contractor as Liquidated Damages and not by way of penalty as detailed under clause No.222 given herein below for any stores which the contractor has failed to deliver within the period fixed for delivery in the contract or such additional period as mentioned in paragraph 9.2.1. during which the delivery of such stores, may be in arrears where delivery thereof is accepted after expiry of the aforesaid period. (For the purpose of computing the damages for delayed supplies under the clause, the cost of the entire plant/machinery/equipment/instrument will be taken into consideration if the plant/machinery/equipment/instrument cannot be put to the intended use for want of delayed portion of supply).
- 9.2.4 Purchase or authorise the purchase elsewhere without notice to the contractor, on account and at the risk of the contractor of the stores not so delivered or others of a similar description (where stores exactly complying with the contract specification are not in the opinion of the Purchaser, which opinion shall be final, readily procurable) without cancelling the contract in respect of the portion instrument not yet due of delivery, OR
- 9.2.5 Cancel the contract or portion thereof and if so desired purchase or authorise purchase of the stores not so delivered or others of a similar description (where stores exactly complying with the contract specification are not in the opinion of the Purchaser, which opinion shall be final, readily procurable) at the risk and cost of the contractor, if the contractor had defaulted in the performance of the original contract, the purchaser shall have the right to ignore his offer in response to risk purchase enquiry even though the lowest.

- 9.2.6 Where action is taken under sub-clause 9.2.4 or sub-clause 9.2.5 above the contractor shall be liable for any loss which the purchaser may sustain on that account provided that the repurchase, or if there is an agreement to repurchase then such agreement, is made within a reasonable period from the date of such failure, depending upon the nature / merit of the purchase and in case of repudiation of the contract before the expiry of the aforesaid period of delivery, shall not be entitled to any gain on such purchase and the manner and method of such purchase shall be in the entire discretion of the Purchaser. It shall not be necessary for the purchaser to serve a notice of such purchase on the contractor.

## **10. INSPECTION**

- 10.1 The contractor shall be responsible for and perform all inspection and testing required in accordance with the contract/purchase order and specifications included herewith.
- 10.2 The Purchaser may at his option depute his representative for Inspection of the stores to be supplied under the contract or authorize and nominate a Quality Surveillance Agency of his choice for the purpose hereinafter called, in either case, the inspection.
- 10.3 The contractor shall give notice of readiness for inspection to the Inspector (deputed under clause 10.2 above) so that the Inspector can be present at the requisite time. In such an event delivery shall not be effected until an authorization or shipping release is obtained from the Purchaser's Inspector.
- 10.4 The contractor shall allow reasonable facility and free access to his work/factory and records to the inspector for the purpose of inspection or for ascertaining the progress of delivery under the contract.

## **11. RECTIFICATION AND REPLACEMENT OF DEFECTIVE STORES**

- 11.1 If the inspector find that the contractor has executed any unsound or imperfect work, the inspector shall notify such defects to the contractor and the contractor on receiving the details of such defects or deficiency, shall at his own expenses, within seven days or otherwise within such time as may be mutually agreed upon as reasonably necessary, proceed to alter, reconstruct or remanufacture the stores to the requisite standard and specifications as called for by the tender specification.

## **12. INSPECTION AND REJECTION**

- 12.1 **Inspection and Rejection:** The stores shall be tendered by the Contractor for inspection at such places as may be specified by the Inspector, at the Contractor's own risk, expenses and costs and shall lie at such places of inspection at the risk of the Contractor and the stores will be subject to inspection and test as may be considered necessary by the inspector and his decision as regards rejection of goods shall be final and binding on the Contractor. If any goods are rejected as aforesaid, then without prejudice to the foregoing provision, the Purchaser shall be at liberty to
- 12.1.1 Allow the Contractor to re submit without prejudice to the Purchaser's right to claim and recover Liquidated damages as provided in clause 9.2.3 hereof, stores in replacement of those rejected within a time specified by the Purchaser (which time shall be essence of the contract), the contractor bearing the

- cost of freight for such replacement without being entitled to any extra payment, or
- 12.1.2 Buy the quantity of stores rejected or others of a similar nature elsewhere at the risk and cost of the Contractor in accordance with the provisions contained in second paragraph of clause 9.2.4 thereof without effecting the Contractor's liability as regards the supply of any further consignments due under the Contract, or
- 12.1.3 Terminate the Contract and recover from the Contractor the loss Purchaser thereby incurred
- 12.2 **Removal of rejection:** Any stores submitted for inspection and rejected by the Inspector must be removed by the Contractor within fourteen days from the date of receipt of intimation of rejection, provided that in the case of dangerous infected or perishable stores, the Inspector (whose decision shall be final) shall notify the Contractor to remove such stores within 48 hours of receipt of intimation of rejection and it shall be the duty of the Contractor to remove them accordingly. Such rejected stores shall lie at the Contractor's risk from the time of such rejection and if not removed within the aforementioned time, the Purchaser shall have the right either to return the rejected stores to the Contractor at the Contractor's risk by such mode of transport as Purchaser may select or to dispose off or segregate such stores as he thinks fit at the Contractor's risk and on his accounts and to appropriate such portion of the proceeds as may be necessary to cover any loss or expenses incurred by the Purchaser in connection with the said sale. Freight to destination of stores rejected after examination at destination shall be recoverable from the Contractor at the Tariff Rate.
- 12.3 **Test Certificate and Guarantees:** Test Certificate Guarantees, if required by the Inspector shall be obtained and furnished by the Contractor free of costs.

### **13. RECOVERY OF SUMS DUE**

- 13.1 Whenever any claim for payment of, whether liquidated or not, moneys arises out of or under this contract against the Contractor the Purchaser shall be entitled to recover sum by appropriating, in part or whole, by encashing the Bank Guarantee submitted towards Security deposit by the Contractor, if a Security Deposit is taken against the Contract. In the event of the security being insufficient or no Security Deposit has been taken from the Contractor then the balance or the total sum or which at any time hereafter may become due to the Contractor under this or any other contract with the Purchaser, should this sum be not sufficient to cover the full amount recoverable, the Contractor shall pay to the Purchaser on demand the remaining balance due. Similarly, if the Purchaser has or makes any claim, 'whether liquidated or not against the Contractor under any other contract with the Purchaser the payment of all moneys payable under the contract to the contractor including the security deposit shall be withheld till such claims of the Purchaser are finally adjudicated upon and paid by the Contractor.
- 13.2 All demurrage, wharfage and allied expenses incurred by the Purchaser, if any, due to delayed clearance of Stores in view of non receipt, incomplete or delayed receipt of documents by the Purchaser, shall be recovered from the payment due to the Contractor.

**14. BAR/PERT CHART**

- 14.1 The contractor at the discretion of the Purchaser shall submit the BAR/PERT chart indicating various activities from the date of purchase order to handing over of the stores.

**15. PERFORMANCE BANK GUARANTEE**

- 15.1 In the event of acceptance of the offer in respect of plant, machinery, equipment, instrument, etc. the tenderer will be required to submit a performance bank guarantee for 10% of the total value of the stores inclusive of all statutory levies and other charges admitted in the contract, from SBI/any nationalized bank or private sector banks, namely, ICICI Bank, IDBI Bank, HDFC Bank and AXIS Bank, on a non-judicial stamp paper of appropriate value valid till 2 months beyond the expiry date of warranty period as per the Purchaser's format towards satisfactory performance of the plant, machinery, equipment, instrument, etc. during the warranty period. In case of bids in currency other than INR performance bank guarantee shall be furnished from any bank of international repute.
- 15.2 In case of non-submission of performance bank guarantee by the Contractor, an amount equivalent to 10% of the total value of the stores and other charges admitted in the contract will be retained by the purchaser till the expiry of the warranty period of the stores.
- 15.3 Offers of the tenders who are not agreeable to furnish performance bank guarantee or retaining of an equivalent amount by the purchaser as per clause No.15.1 and 15.2 above, are likely to be rejected.

**16. PERMIT AND LICENCES**

- 16.1 The contractor shall secure and pay all licenses and permit at his end which he may be required to comply with all laws ordinances and regulations of the public authorities in connection with the performance of his obligations under the contract. The contractor shall be responsible for all damages and shall indemnify and save the purchaser harmless from against all claims for damages and liability which may arise out of the failure of the contractors to secure and pay for any such licenses and permits or to comply fully which any and all applicable laws ordinances and regulations.

**17. PATENTS & PATENT RIGHTS INDEMNIFICATION**

- 17.1 The Contractor shall indemnify and keep indemnified the Purchaser from and against any and all claims, actions, costs, charges and expenses arising from or for infringement of patent rights, copy right or other protected rights, of any design plans, diagrams, drawings in respect of the stores supplied by the contractors or any of the manufacturing methods or process adopted by contractor for the stores supplied under the contract.
- 17.2 In the event of any claim being made or action being taken against the purchaser in respect of the matter referred to clause 17.1 above, the contractor shall promptly be notified thereof and he shall at his own expense, conduct all negotiations for the settlement of the same and any litigation that may arise therefrom.
- 17.3 In the event of any designs, drawing, plans or diagrams or any manufacturing methods or process furnished by the contractor constituting infringement of patent or any other protected rights and use thereof is restrained, the contractor shall procure for Purchaser, at

no cost to the latter, the rights to continue using the same or to the extent it is possible to replace the same so as to avoid such infringement and subject to approval by the Purchaser or modify them so that they become non-infringing, but such modifications shall otherwise be to the entire satisfaction of the Purchaser.

- 17.4 The provision of the clause remains effective and binding upon the Contractor even after the completion, expiration or termination of the contract.

## **18. LAW GOVERNING THE CONTRACT**

- 18.1 This Contract shall be governed by the laws of India for the time being in force. The marking of all stores supplied must comply with the requirements of India Acts relating to Merchandise Marks and all the rules made under such Acts.

## **19. JURISDICTION**

- 19.1 The Courts within the local limits (i.e. Gandhinagar) of whose jurisdiction the place from which the purchase order is issued is situation only shall, subject to Arbitration Clause, have jurisdiction to deal with and decide any matter out of this Purchase Order/Contract.

## **20. SETTLEMENT OF DISPUTES**

- 20.1 The Purchaser and the Contractor shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the Contract.
- 20.2 If 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.

## **21. ARBITRATION**

- 21.1.1 In the event of any dispute or difference arising out or of in connection with any of the terms and conditions of the Purchase Order/Contract, the matter shall be referred to the Director, IPR for settlement. In case the parties to the Purchase Order are not in a position to settle the dispute mutually, the matter shall be referred to a Sole Arbitrator to be appointed in accordance with the Arbitration & Reconciliation Act, 1996 & Arbitration and Conciliation (Amendment) Act, 2015 as amended time to time.

## **22. LIQUIDATED DAMAGES**

- 22.1 As per Standard Terms & conditions, the Purchaser reserves the right to levy the Liquidated Damages, for delay in supply beyond the contractual delivery date at the rate of half percent (0.5 percent) of the total Contract price (Basic price) for each calendar week of delay. The total liquidated damages shall not exceed five percent (5%) of the contract price (Basic price). Stores/Goods will be deemed to have been delivered only when all its component parts are also delivered. If certain

components are not delivered in time, the Stores/Goods will be considered as delayed until such time as the missing parts are delivered.

- 22.2 Where the Contract entered into is a composite one with supply cum erection and installation/commissioning activities and the completion of erection and installation/commissioning is delayed irrespective of the fact that whether supply of material has been made within the original delivery period, the contract is to be considered as a whole and Liquidated Damages will be recovered on the total contract value.

**23. EXERCISING THE RIGHTS AND POWERS OF THE PURCHASER**

- 23.1 All the rights, discretions and powers of the Purchase under the contract shall be exercisable by and all notices on behalf of the Purchaser shall be given by the Purchase Officer and any reference to the opinion of the Purchaser in the terms and conditions contained in these General Conditions of all Contracts shall mean and be construed as reference to the opinion of any of the persons mentioned in this clause.

**24. TRAINING**

- 24.1 The successful tenderer shall, if required by the Purchaser, provide facilities for the practical training of Purchaser's engineering or technical personnel for their active association on the manufacturing process throughout the manufacturing period of the Contract/stores, number of such personnel to be mutually agreed upon. If demanded by the Purchaser, such training shall be conducted at Purchaser's site by the Contractor free of charge. The duration of training shall be mutually decided upon by the Purchaser and the Contractor.

**25. RISK PURCHASE**

- 25.1 In the event supplier fails to fulfill the contractual obligations as per the terms and conditions of the Contract, the Purchaser has an option of completing the Contract at the risk and expenses of the Contractor. While initiating risk purchase at the risk and expenses of the supplier, the Purchaser must satisfy himself that the supplier has failed to deliver and he has been given all the opportunities as per the Contract to execute the Contract and also adequate and proper notice. Wherever risk purchase is resorted to, the supplier is liable to pay the additional amount spent by the government, if any as compared to contracted amount. All the factors including the method of recovering such amount should also be considered while taking a decision to invoke the risk purchase.

**26. LIEN IN RESPECT OF CLAIMS IN OTHER CONTRACTS**

- 26.1 Any sum of money due and payable to the Contractor under any contract may be withheld or retained by way of lien by the purchaser or any other person or persons contracting through the Director, IPR against any claim of the Purchaser or such other person or persons in respect of payment of a sum of money arising out of or under any other contract made by the contractor with the Purchaser or with other such person or persons.
- 26.2 It is an agreed term of the contract that the sum of money so withheld or retained under this clause by the Purchaser will be kept withheld or retained as such by purchaser till this claim arising out of in the same



contract or any other contract is either mutually settled or determined by the arbitrator, and that the contractor shall have no claim for interest or damages whatsoever on this account or on any other ground in respect of any sum of money withheld or retained under this clause and duly notified as such to the contractor.

## **SPECIAL CONDITIONS OF CONTRACT GOVERNING SUPPLIES OF PLANT AND MACHINERY**

In addition to the General Conditions of Contract hereinbefore set out the following special conditions shall apply to contracts for the supply of Plant and Machinery and manufactured equipment. These Special Conditions where they differ from the General Conditions shall over-ride the later.

### **27. DEFINITION OF PLANT**

27.1 The word "PLANT" wherever, appears in these "Special Conditions of Contract governing supplies of Plants and Machinery" shall mean all machinery, plants, equipment or parts thereof or what the Contractor agrees to supply under contract as specified in the Purchase Order.

### **28. MISTAKES IN DRAWING**

28.1 The Contractor shall be responsible for and shall pay for an alterations of the works due to any discrepancies, errors or omissions in the drawings or other particulars supplied by him whether such drawings or particulars have been approved by the Purchaser or not.

### **29. RESPONSIBILITY FOR COMPLETENESS**

29.1 All fittings or accessories which may not be specifically mentioned in the specification but for which are usual or necessary, are to be provided by the Contractor without extra charge and the plant must be complete in all respects.

### **30. REJECTION OF DEFECTIVE PLANT**

30.1 If the completed plant or any portion thereof before it is finally accepted is found to be defective or fails to fulfill the requirements of the contract, the Purchaser shall give the Contractor notice setting forth with the details of such defects or failure and the contractor shall forthwith rectify the defective plant or alter the same to make comply with the requirement of the contract. Should the contractors fail to do so within a reasonable time the Purchaser may reject and replace at the cost of the Contractor, the whole or any portion of the Plant as the case may be, which is defective or fails to fulfill the requirement of the contract. Such replacement shall be carried out by the Purchaser within a reasonable time and at reasonable price and where reasonably possible to the same specifications and under competitive conditions. The Contractor shall be liable to pay to the Purchaser the extra cost, if any, of such replacement delivered and or erected as provided for in the contract such extra cost being the difference between the price paid by the Purchaser under the provisions above mentioned for such replacement and the contract price for them. Contractor shall refund to Purchaser any sum paid by the Purchaser to the Contractor in respect of such defective

plant.

**31. INSPECTION AND FINAL TESTS**

31.1 All tests necessary to ensure that the plant complies with the particulars and guarantees shall be carried out at such place or places as may be determined by the inspector. Should, however, it be necessary for the final tests as to performance or guarantees to be held over until the Plant is erected at site they shall be carried out within one month of completion of erection.

**32. TRANSPORT AND RESPONSIBILITY FOR BREAKAGES EN-ROUTE**

32.1 Unless otherwise specified the Purchaser will take delivery of the plant from the place named in the purchase order but the contractor will be responsible for any damage which may be caused to the Plant during transit to the site of erection thereof.

**33. ERECTION AND COMMISSIONING**

33.1 In all cases where contracts provide for supervision of erection and commissioning or for test at the Purchaser's premises the Purchaser except where otherwise specified, shall provide free of charge, such labour, materials, fuels, stores, apparatus and instruments as may be required from time to time and as may reasonably be demanded by the contractor to carryout efficiently such supervision of erection and commissioning and for the requisite test. In case of contracts requiring electricity for the completion of erection, commissioning and testing at site, such electricity shall be supplied free to the contractor.

33.2 Action by the Purchaser under the clause shall not relieve the contractor of his warranty obligations under the contract.

**34. WARRANTY**

34.1 The contractor warrants that stores to be supplied under the contract shall be free from all defects and faults in materials, workmanship and manufacture and shall be of the highest grade and consistent with the established and generally accepted standards for stores of the types under the contract in full conformity with the specifications, drawings or samples, if any and shall if operable, operate properly. This warranty shall expire (except in respect of complaints notified to the contractor prior to such date) twelve months after the date of receipt of the last lot of stores under the contract at the ultimate destination stipulated in the contract.

34.2 For a period of twelve calendar months after the plant/machinery/equipment/instruments has been put into operation (or a suitable mutually agreed longer period to be reckoned from the date of last major shipment depending upon the nature of the plant/machinery/equipment/instrument) the Contractor shall be responsible for any defects that may develop under conditions provided for the contract and under proper use, arising from the faulty materials, design or workmanship in the plant or from faulty erection of the plant by the Contractor, but otherwise and shall rectify such defects at his own cost when called upon to do so by the Purchaser who shall state in writing such defects.

34.3 If it becomes necessary for the Contractor to replace or renew any defective portions of the plant for purpose of rectification under this

clause, the provisions of this clause shall apply to the portions of the plant so replaced or renewed under the expiration of six months from the date of such replacement or renewal or until the end of the above mentioned period of twelve months whichever may be the later. If any defects not rectified within reasonable time, the purchaser may proceed to get the work done at contractor's risk and expenses but without prejudice to any other rights which the Purchaser may have against the Contractor in respect of such defects as provided in clause 9.2.4 or 9.2.5.

- 34.4 All inspections adjustments, replacements or renewals carried out Contractor during the warranty period shall be subject to the same conditions as in the contract.
- 34.5 Contractor shall, spare parts of equipment before going out of production, give adequate advance notice to the purchaser so that the latter may order requirement of spares in one lot if so desires.
- 34.6 The contractor shall further guarantee that if spare parts go out of production, will make available blue prints, drawings of spare parts and specifications of material at no cost to the Purchaser, if and when required in connection with the equipment to enable Purchaser to fabricate or procure spare parts from other sources.
- 34.7 The provision of this clause shall remain effective and binding upon the Contractor even after the completion or expiration of the contract and till the plant/machinery/equipment supplied under the contract is in use by the Purchaser.

### **35. MODE OF PAYMENT**

- 35.1 Unless otherwise agreed to in writing between the Purchaser and the Contractor, payment for the delivery of the material will be made as follows.

**Within 30 days from the date of final acceptance and on receipt of Performance Bank guarantee for 10% of the contract value amount from SBI/nationalized banks or any one of the scheduled banks mentioned in the bracket (Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank) valid through out the guarantee period mentioned in the contract/purchase order.**

- 35.1.1 In case any of the vendors seek advance or progressive payment prior to delivery of the material, such requests can be considered only in exceptional cases of large value items, in which case the vendor will be required to furnish a bank guarantee for an equivalent amount of the advance/progressive payment sought for, valid till the execution of the contract. The bank guarantee shall be got executed as per the Purchaser's format from the State Bank of India (SBI)/nationalized banks or any one of the scheduled banks mentioned in the bracket (Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank).
- 35.1.2 Besides, the offers of the vendors seeking advance/progressive payment will be evaluated by loading 12% interest charges per annum on the amount of advance desired up to the delivery period quoted.
- 35.1.3 In case any of the vendors seek pro-rata payment for the stores to be supplied they should clearly mention in their offer the maximum number of installments of supply. However, such installment delivery and pro-rata payment will be considered only in respect of contract involving large value and sizeable quantity of the item and the

maximum number of installments shall be normally restricted to four. Acceptance or otherwise of this condition is reserved by the purchaser.

35.1.4 **Bank Charges:** All bank charges to be borne by the Contractor/Supplier.

35.1.5 No correspondence will be entertained within 30 days from the date of receipt of material and bills, whichever is later.

35.1.6 **Interest for delay in supply beyond the contractual delivery date:** Wherever advance payments are sought for by the contractor and admitted in the contract, against Bank Guarantee for equivalent amount, in the event of any delay in supply beyond the contractual delivery date for reasons attributable to the contractor, interest charges @ 12% shall be levied for the period beyond the contractual delivery date, on the amount of balance advance payment to be adjusted.

### **36. DELAY IN ERECTION**

36.1 Wherever erection of a plant or machinery is the responsibility of the Contractor as a term of the contract and in case the Contractor fails to carry out the erection as and when called upon as to do within the period specified by the Purchaser, the Purchaser shall have right to get the erection done through any source of his choice. In such an event, the contractor shall be liable to bear any additional expenditure that the Purchaser may incur towards erection. The Contractor shall, however, not be entitled to any gain due to such an action by the Purchaser.

**SECTION 'C'**

**TECHNICAL SPECIFICATIONS  
OF  
STORES AND DRAWINGS**

***Please refer tender document***

## **SECTION 'D'**

# **FORMAT FOR SUBMISSION OF PART-II (PRICE)**

***Please refer tender document***



TENDER FORM  
**INSTITUTE FOR PLASMA RESEARCH**  
(An Aided Institute of  
Department of Atomic Energy, Government of India)  
Near Indira Bridge; Bhat; Gandhinagar-382428; India

Following terms are replaced in our Form for Tender No.IPR/TN/PUR/TPT/ET/19-20/11 dated 27/6/2019.

- 1) Sr.No.3.1 (Section-A) under heading “Earnest Money Deposit (EMD)” of Form No.IPR-LP-ET-02.V5 (Terms and Conditions) is replaced with the following:  
The Tenderer shall submit, as part of its bid, interest free Earnest Money Deposit (EMD) for an amount as specified in the Tender Notice. EMD shall be submitted by way of Demand Draft from **SBI/nationalized banks or any one of the scheduled banks mentioned in the bracket (Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank)** issued in favour of **"Institute for Plasma Research"** and payable at **Ahmedabad. Tender received without EMD will be rejected at the discretion of IPR.**  
***(Copy of Demand Draft to be uploaded with the quotation, Original DD should be sent to IPR on or before the specified closing date and time)***
- 2) Sr.No.3.4 (Section-A) under heading “Earnest Money Deposit (EMD)” of Form No.IPR-LP-ET-02.V5 (Terms and Conditions) is replaced with the following:  
**Exemption from payment of EMD:** The firms registered with DGS&D, NSIC, DPS or Micro & Small Enterprises (MSEs) which are actual producers/manufacturers of tendered items are exempted from payment of EMD provided valid registration certificate is uploaded along with the offer.
- 3) Sr.No.18 (Section-A) under heading “Statutory Levies such as Customs Duty, Goods and Service Tax” of Form No.IPR-LP-ET-02.V5 (Terms and Conditions) is replaced with the following:  
**Clause Nos.18.1, 18.2, 18.3, 18.5.2 and its sub-clauses deleted from Form No: IPR-LP-ET-02.V5.**
- 4) Sr.No.31 (Section-A) under heading “Delivery” of Form No.IPR-LP-ET-02.V5 (Terms and Conditions) is replaced with the following:  
**Delivery:** All equipments/machinery/plant/component covered by this tender document should be supplied, installed, tested in all respect and commissioned at IPR within 7.5 months from the date of Purchase Order. The prices quoted by the tenderer should include all charges involved for direct and safe delivery of the items by Road to the project site of the Purchaser. If a tenderer so desires/separate lumpsum charges for transportation and safe delivery to Purchaser’s site could be furnished. Purchaser will neither undertake responsibility for transit insurance nor pay for it separately. No other, delivery term will be accepted by the Purchaser
- 5) Sr. No. 35 (Section-B) under heading Mode of Payment of “General Conditions of Contract” of Form No.IPR-LP-ET-02.V5 (Terms and Conditions) is replaced with the following:

**Payment:** Unless otherwise agreed to in writing between the Purchaser and the Contractor, payment for the delivery of the tendered items, will be made as follows.

- a) 80% of supply portion of SOQ (i.e. basic price of Item Sr.No.1 to 14 & 16 to 23 of Part-II – Price Bid) + 100% of all other charges will be paid on pro-rata basis (Maximum 4 {four} bills) after receipt of material at IPR site and its verification by IPR representative and on receipt of invoice in triplicate.
- b) Balance 20% of Item Sr.No.1 to 14 & 16 to 23 mentioned in Price Bid (Part-II – supply portion) along with 100% of remaining items (i.e. Sr.No.15, 24,25 and 26 of Part-II – Price Bid) will be paid within 30 days from the date of acceptance and on receipt of Performance Bank Guarantee for 10% of the order value from SBI/nationalized banks or any one of the scheduled banks mentioned in the bracket (Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank) valid throughout the warranty period and on receipt of final invoice.

Following terms is **added to** our Form No. IPR-LP-ET-02.V5 for Tender No.IPR/TN/PUR/TPT/ET/19-20/11 dated 27/6/2019.

- a) **TDS as per CGST Act:** As per the provisions mentioned under Section No. 51 of the CGST Act 2017, TDS @ 2% (IGST 2% or CGST 1% and SGST 1%) will be deducted while making payment to the suppliers where total value of the purchase order/contracts/work orders exceeds Rs.2.5 Lakhs. Necessary TDS Certificate will be issued to the supplier after TDS deduction.

**IMPORTANT NOTE:**

**[1] QUOTATIONS ARE INVITED IN INDIAN CURRENCY ONLY**

**[2] QUOTATIONS RECEIVED OTHER THAN “INR” QUOTE SHALL SUMMARILY BE REJECTED.**

# INSTITUTE FOR PLASMA RESEARCH

BHAT, GANDHINAGAR-382 428, INDIA

TENDER DOCUMENT

FOR

**Supply, Installation, Testing, and Commissioning of Screw Chillers, Pumps, valves, piping, electrical and instrumentation work for Air Conditioning plant - SST1 Area at IPR-Bhat, Gandhinagar.**

**SECTION-C**

(Please note that the bidder should sign on all pages)

**INDEX**

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**PART- A: DOCUMENTS TO BE PROVIDED.**

Prospective Bidders shall satisfy themselves of fulfilling all the eligibility criteria and in possession of all the documents required before submission of tender document. The interested Bidders are required to upload all required documents as per following lists.

**Note: The Bidders are requested to fill up the facts & figures in the prescribed format.**

Sr No.	Information	Checklist (Put <input type="checkbox"/> mark)
1.	A certificate for Chiller Manufacturer/Authorized Dealer / distributor for eligibility criteria no: 1.	
2.	Work order / Purchase order copy along with completion certificate for eligibility criteria no: 2	
3.	Relevant document shall be provided for eligibility criteria no: 3	
4.	<b>PAN registration</b>	
5.	<b>Additional information</b> if any to meet the eligibility criteria.	
6.	<b>Technical details to be furnished by bidder (Refer Section-V).</b>	

**Note:**

- The evaluation shall be done based on the data provided with the relevant documents to support the same. Therefore the bidders in their own interest shall fill all the relevant information and provide commensurate supporting documents.

Date of submission:

Seal and signature of Bidder

**SECTION –I**

**INSTRUCTIONS TO BIDDERS AND TERMS AND CONDITIONS**

1. Intent of these specifications is to define the requirements for design, supply, installation, testing & commissioning of HVAC System. The entire work shall be carried out in accordance with these terms and conditions and generally as per the scope drawings set forth in the documents. The liability of the contractor shall not be limited to the scope of work mentioned, but shall also extend to achievement of the inside conditions as per the DESIGN, as well as complete, safe and satisfactory operation of the system as approved by the Engineer In-Charge. Any instruments, material and labour required in order to achieve the completeness of the HVAC system as above shall be deemed to be included in the scope of the contractor without any extra cost to the client. However, any changes required in design and installation shall be brought to the notice of the Engineer In-Charge; and due approval shall be obtained therefor.

**2. Scope of Work:**

The scope of work covered under this tender includes design, supply, installation, testing & commissioning of the HVAC system for the application mentioned, and shall be generally as per the schedule of quantities and scope/tender drawings.

**3. Tender Drawings:**

- The tender drawings, which are enclosed herewith, shall serve as scope drawings and item quantities are indicative. They indicate the general scheme of the HVAC system requirement. However, actual location, distance, levels, etc. will be governed by actual field conditions. All equipments, quantities and technical data indicated in this are based on the engineering by IPR and shall be indicative and for the Contractor's guidance only.

- 1) Proposed Plant Room Equipment Layout of System
- 2) P & I DIAGRAM for System
- 3) Proposed Electrical Single Line Diagram for System
- 4) Existing cooling tower foundation details

These drawings for execution / construction are to be prepared by contractor at the minimum time frame. Additional drawings including sections may have to be prepared if required and intimated by Engineer In – Charge. All the drawings in the hard and soft copy shall be submitted.

Discrepancies in different plans and actual field conditions or between plans and specifications shall be promptly brought to attention of the Engineer In-Charge for a decision.

**4. Schedule of Quantities:**

- (a) The quantities of Items mentioned in the tender documents are tentative and are given for tenderer's guidance and to have uniform basis for tendering. The contractors should quote unit rates for variation in quantities.
- (b) The accompanied tender drawings show the route of ducts, pipes, cutouts provided in slabs, beams, etc. and the equipment layout. Should there be any ambiguity in plans and specifications or obstructions, the same should be brought to the notice while submitting the tender documents.
- (c) The contractor should carry out detailed calculations for estimating the quantities of Variable quantity items on award of the tender.

**5. Codes & Regulations:**

- The installation shall be in conformity with bye-laws and regulations of local authorities concerned in so far as these become applicable to the installation. The installation shall also be in conformity with the relevant codes of the Bureau

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of Indian Standards and ASHRAE standards. Wherever a reference of Standard specification is made in this document, it should imply the latest revision of that standard, including such revisions/amendments as may be issued by the issuing authority, during the course of the work contract. Compliance with all the applicable laws/rules pertaining to materials and workers/personnel shall be the liability of contractor.

- In case the drawings and/or specifications require something which violates the bye-laws and regulations then the bye-laws and the regulations shall govern the requirement of this installation and the fact shall be brought to the notice of the Engineer In-Charge.

**6. SUPERVISION BY THE CONTRACTOR:** The contractor shall have sufficient supervisory work force so that one supervisor may be available for day-to-day site work. The contractor shall have to arrange day-to-day planning and execution of each job. All measuring instruments, tapes (of steel), scaffolding and ladders which may be required for installation and taking measurements shall be supplied by the contractor.

**7. Whole work must be carried out to IPR satisfaction and as per instruction of IPR EIC.**

**8. *Quality is essential part of the whole project and no compromise will be entertained as far as the quality of the work is concern in all respect of the work.***

**9. Materials & Workmanship:**

The materials used by the contractor shall be new, free from defects and of the best quality and workmanship and shall be in conformity with the latest and best engineering practice. The entire installation work shall comply with the applicable standard specifications of:

- (a) The Bureau of Indian Standards
- (b) The Air Conditioning and Refrigeration Institute of America (ARI)
- (c) American Society of Heating, Refrigerating & Air Conditioning Engineers (ASHRAE)

**10.** Any material supplied by the contractor, if damaged in any way during cartage or execution of work or otherwise, shall be made good or replace with new one by the contractor at his own cost.

**11. Accompaniment to Tender:**

- (a) The contractor should check all the drawings attached with the tender document, for the areas made available for installing his equipment and machines for proper and efficient functioning of his equipment. Any changes required to be made in the building and/or structure should be clearly brought out in a separate letter to be submitted along with the tender document.
- (b) Absence of specific comments on this issue by the Bidder along with quotation will be deemed as acceptance of the spaces available for HVAC equipment.

**12. Working Drawings:**

- On award of the work, the contractor shall submit to the Engineer In-Charge detailed Working Drawings covering all items of equipment and installation. The shop/working drawings shall also contain details of other services that are required for installation/completeness of HVAC system.

**13. Site acceptance**

System components or system as a whole shall be tested for performance as per the approved technical specifications. System can be accepted and taken-over by IPR for regular operation only after satisfactory performance testing in all respect. All the system components shall meet the guaranteed performance requirements to the satisfaction of IPR.

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Necessary replacement / modification / rectification shall be carried out with the approval of Engineer In-charge. The installation shall be tested again after removal of defects and shall be commissioned only after approval by the Engineer In-charge.

**14. Handing over:**

**1. System handing over: The whole system will be handed over to IPR after satisfactory testing and commissioning of whole system in presence of IPR EIC.**

**2. Site clearance:**

The Scope of work includes site clearance (after completion of job), hence all the area shall be cleared of debris and excess material left due to the contract and related work.

**3. Handing over Documents:**

On completion of the work in all respects, the contractor shall furnish 2 sets of handing over documents in a good quality file containing:

- ❖ System description.
- ❖ Equipment technical data, Operation and maintenance manuals, Material test reports, Rating charts, Performance curves etc.
- ❖ Inspection and performance test reports (Including pre-dispatch, site test reports).
- ❖ Operation instructions.
- ❖ Complete set of detail as-built drawings.

**15. Guarantee / Warranty:** The material/goods/equipment offered by the bidder should be guaranteed for a minimum period of twelve months from the date of acceptance of whole system, against defective materials, design, workmanship, operation or manufacture. For defects noticed during the Guarantee period, replacement/ rectification should be arranged free of cost within a reasonable period of such notification. All consumables like Refrigerant Gas, Nitrogen gas etc. shall be provided by the vendor. In cases where our specifications call for a guarantee period more than 12 months specifically, then such a period shall apply.

**16. WATER AND ELECTRICITY:**

IPR shall provide free power and water for the requirement of this project. However the contractor shall maintain his entire electrical installation, appliances etc. in good and safe condition as required under relevant rules and codes of practice.

**17. CLEANING, PROTECTION AND ADJUSTMENT**

**Cleaning:**

Upon completion of the work, clean the exterior surface of equipment, accessories, and trim installed. Clean, polish, and leave equipment, accessories, and trim in first-class condition.

**Protection of Surfaces:**

Protect new and existing surfaces from damage during the work execution period. Provide plywood or similar material under equipment or materials stored on floors or roofs. Provide protection in areas where work may damage building surfaces.

Surfaces damaged during the work shall be repaired or replaced by the Contractor at his own cost. The method of repairing or replacing the surface shall be approved by the IPR

**Protection of Services:**

Protect new and existing services from damage during the work execution period. Repair, replace and maintain in service any new or existing utilities, facilities or services (underground, Over ground, interior or exterior) damaged, broken or otherwise rendered inoperative during the course of work. Equipments and Services damaged during the work shall be repaired / replaced by the Contractor at his own cost. The method used in repairing, replacing or maintaining the equipment and services shall be approved by the IPR.

**The Contractor shall make good all damages to the building, property, existing equipments and articles etc, how so ever arising from the execution of work. The method used in repairing or replacing shall be decided and approved by the IPR.**

During erection the Contractor shall at all times keep the working and storage areas free from waste or rubbish. On time-to-time, as directed by engineer in charge, he shall remove all temporary structures, debris, insulation bitumen, EPS wastage and leave the premises neat and clean in a satisfactory condition.

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All equipment shall be complete with approved safety devices wherever a potential hazard to personnel exists and with provision for safe access of personnel to and around equipment for operational and maintenance functions.

These items shall include not only those usually furnished with elements of machinery but also covers, guards, crossovers, stair ways, ladders, platforms, handrails etc. which are necessary for safe operation of the system. The contractor shall include for all safety devices.

**Protection of Equipment and Materials:**

Equipment and materials shall be stored in a manner that shall maintain an orderly, clean appearance. If stored on-site in open or unprotected areas, equipment and material shall be kept off the ground and out of standing water by means of pallets or racks or suitable arrangement, and covered with tarpaulins.

Equipment and material, if left unprotected and damaged, shall be repainted or otherwise refurbished at the discretion of the IPR. Equipment and material is subject to rejection and replacement if, in the opinion of the IPR or the manufacturer's engineering department, the equipment has deteriorated or been damaged to the extent that its immediate use or performance is questionable, or that its normal life expectancy has been curtailed. The contractor shall make his own arrangements for the storage of materials & their safe custody at site.

During the work execution, protect piping and equipment from damage and dirt. Properly cap piping. Each system of piping shall be flushed to remove grit, dirt, sand, and other foreign matter for as long a time as required to thoroughly clean the systems.

**SECTION –II****TECHNICAL SPECIFICATIONS****1. SCOPE OF WORK:**

- Supply, Installation, testing and commissioning of:

(1) 2 Nos. of 125 TR each Water-cooled screw compressor water chilling machines, (2) 3 Nos. of Induced Draft FRP Cooling Towers, (3) 3 Nos. of chilled water Pump-sets, (4) 3 Nos. of cooling tower pump-sets, (5) Electrical panel, power cabling & wiring, and associated electrical works (6) MS piping, valves, strainers, (7) Instruments & controls and (8) Associated minor/major civil works, as per the details available with IPR confirming to tender specifications, relevant BIS codes, in accordance with proposed schedule of quantities.

- The purpose of the new screw compressor water chilling machine is to cater the air conditioning need of the SST1 in IPR. These screw chillers will replace the DUNHAM BUSH MAKE (125 TR each) water cooled chiller. We have 3 nos of screw chillers of 125 TR capacities. Two existing screw chillers shall be replaced with new 2 screw chillers and one existing screw chillers shall be hooked up with new two screw chillers.
- The Bidder shall carry out work in every respect in conformity with the contract documents and with the directions of the Engineer in-charge.

**2. TECHNICAL DETAILS:****A. Screw chiller (Water Cooled):**

<b>Scope</b>	<ul style="list-style-type: none"> <li>Semi hermetic screw compressor (<b>Single Compressor model only</b>) with lubrication and control system, evaporator, condenser, refrigerant control device, <b>DP switch, Closed transient type Star-Delta / Normal Star-Delta Starter, operating panel</b> and any other components necessary for a complete and operable chiller package with following specifications.</li> <li>Including providing necessary documentation and special tools for routine operation and maintenance.</li> </ul>
<b>Type :</b>	Water-cooled – Single stage - Positive pressure –bolted together- Flooded type Screw packaged chiller.
<b>Refrigerant</b>	<ul style="list-style-type: none"> <li><b>R-134a</b></li> </ul>
<b>Performance : Capacity :</b>	<ul style="list-style-type: none"> <li>Performance shall be rated as per design parameters indicated in Basis of Design.</li> <li><b>Actual Delivered Capacity 125 TR</b></li> <li>At CHW leaving Temp. <math>\leq 7^{\circ}\text{C}</math>.</li> <li>CTW entering Temp. <math>\geq 32^{\circ}\text{C}</math>.</li> <li>Power supply: 3 Phase, 400/415 V <math>\pm</math> 10 %, 50 Hz.</li> </ul>
<b>Operation / Capacity Control</b>	<ul style="list-style-type: none"> <li>Reliable, Stable operation and step less capacity control</li> <li>Efficient part load operation as per ARI standard.</li> <li>Refrigerant flow control by self actuating thermostatic expansion valve or by electronic expansion valve</li> </ul>
<b>Compressor</b>	<ul style="list-style-type: none"> <li><b>Horizontal twin screw or mono screw type, single compressor model</b></li> <li><b>Compressor shall have :</b></li> <li>Higher EER.</li> <li>Proper accesses to major wearing parts, main bearings &amp; thrust bearings for maintenance. Statically and dynamically balanced Screw.</li> </ul>
<b>Lubrication System</b>	Unit shall have : <ul style="list-style-type: none"> <li>Independent lubrication system to provide lubrication to all moving parts by a positive</li> </ul>

	displacement submerged oil pump or work on positive differential pressure created within the system.
<b>Condenser / Evaporator / Heat Exchangers</b>	<p>MS Shell and Copper Tube type, 2 pass, designed and constructed according to ASME code section VIII / Relevant BIS pressure vessel code with :</p> <ul style="list-style-type: none"> <li>• Tubes enhanced externally and internally, replaceable and supported properly. Tube shall be rolled in and expanded in to tube sheets providing a leak-proof seal.</li> <li>• <b>Water side design pressure <math>\geq 10 \text{ kg / cm}^2</math></b></li> <li>• Separate shell for condenser and evaporator.</li> <li>• Reset type spring loaded pressure relief valves according to <b>ASHRAE 15 safety code for mechanical refrigeration</b>. Condenser shall be provided with dual relief valve including transfer valve.</li> <li>• Chiller shall be insulated with multi layer thermal insulation with vapour barrier, thermal insulation material.</li> </ul>
<b>Accessories</b>	<ul style="list-style-type: none"> <li>• NRV at discharge side of compressor.</li> <li>• Isolation valves for service and system pump-down.</li> <li>• Moisture indicating sight glass.</li> <li>• Evaporator, suction line and any other component subject to condensing moisture shall be insulated with closed cell insulation. All joints and seams shall be carefully sealed to form a vapor barrier.</li> <li>• Vents and drain shall be provided.</li> <li>• Provide Pr. switches factory mounted and wired for no operation with no flow.</li> <li>• The contractor shall supply serrated rubber pads for field mounting under unit feet for vibration isolation.</li> </ul>
<b>Prime Mover :</b>	<ul style="list-style-type: none"> <li>• Electric Motor: Suitable for 3 Phase, 400/415 V <math>\pm 10 \%</math>, 50 Hz.</li> <li>• Squirrel cage Induction motor with internal thermal overload protection devices embedded in the winding of each phase. Motor shall be compatible with the starting method specified and shall comply latest IEC code.</li> <li>• <b>Refrigerant Gas cooled.</b></li> <li>• The efficiency and power factor shall be higher at rated voltage and frequency and at the specified loads.</li> <li>• The motor shall be capable of successful operation when running at rated load with variations in voltage and frequency. Terminal box of sturdy construction shall provide enough space for terminating, connecting and earthing of PVC / XLPE - insulated aluminum conductor cable. All terminal boxes shall have terminal and cable glands suitable for cables specified.</li> </ul>
<b>Motor Starter</b>	<ul style="list-style-type: none"> <li>• All contactors are to be continuous duty AC magnetic type and capable of carrying the specified current on a continuous basis. The starter shall be:</li> <li>• Star Delta starter based on latest technology</li> <li>• The starter shall be coordinated with the chiller package(s) marking all terminals properly according to the chiller manufacturer's wiring diagrams.</li> <li>• The Star – Delta starter shall be equipped with redundant motor control relays (MCR) with all the protection features. The relays interconnect the starters with the unit control panels and directly operate the main motor contactors for tripping.</li> <li>• The main contractors shall have a normally open and a normally closed auxiliary contact rated at 125VA pilot duty at 115 VAC. An additional set of normally open contacts shall be provided for each MCR.</li> <li>• There shall be electronic overloads in each phase of motor. The overloads shall be adjustable and selected for mid-range. Each starter shall include the following protective devices:</li> <li>• Phase failure and reversal protection.</li> <li>• Stall protection.</li> </ul>
<b>Micro Computer Control Panel</b>	<p>A microprocessor based control panel with locked enclosure shall be fully wired and factory mounted on the chiller and has the following features:</p> <ol style="list-style-type: none"> <li>1. The display shall have Messages in plain English language. Coded two or three character displays are not acceptable. Must have OPEN PROTOCOL for integration with all DACS systems and easy operator interface.</li> </ol>

	<p>2. The following information shall be available on the display with simple entry on the keypad. Pressure and temperature gauges are not acceptable.</p> <ul style="list-style-type: none"> <li>• Entering and leaving chilled water temperatures.</li> <li>• Entering and leaving condenser water temperatures.</li> <li>• Evaporator, suction, discharge, condenser, and liquid refrigerant temperatures.</li> <li>• Hours of operation and number of starts, time of last start and stop.</li> <li>• Chilled water set point and reset temperature set point.</li> <li>• Fault history</li> <li>• Chiller having facility for both remote and manual on / off activity.</li> <li>• Unit status; start up and shut down sequence, operational status.</li> </ul> <p>3. The microprocessor shall either unload or shut down the compressor during an abnormal condition. At a minimum the following safeties shall be incorporated in the control system:</p> <ul style="list-style-type: none"> <li>• High and low refrigerant discharge pressure.</li> <li>• Low evaporator refrigerant pressure</li> <li>• High refrigerant discharge temperature.</li> <li>• No evaporator or condenser water flow.</li> <li>• High or low oil feed temperature.</li> <li>• Low oil differential pressure.</li> <li>• High motor temperature, low motor current.</li> <li>• Starter fault, no starter transition.</li> <li>• Sensor failure, specific to sensor.</li> </ul> <p>4. The controller shall be able to reset chilled water temperature by controlling return chilled water temperature. The amount of reset shall be adjustable.</p> <p>5. Soft loading shall be provided to prevent the unit from operating at full load during pull down if desired.</p> <p>6. Indicating chiller is ready to start, chiller is operating, chiller is shut down on a safety requiring reset, and chiller is shut down on a recycling.</p>
<p><b>Factory Testing</b></p>	<p>Refer : Section – III.</p>

**B. PUMPS**

<p><b><u>Scope :</u></b></p>	<ul style="list-style-type: none"> <li>• Water pumps shall conform to following Specifications and in accordance with requirements of Schedule of Quantities.</li> </ul>
<p><b><u>Type :</u></b></p>	<ul style="list-style-type: none"> <li>• The type and size of all chilled water, condensing water, drain pumps shall be in accordance with requirement of Drawings and Schedule of Quantities.</li> </ul>
<p><b><u>Capacity :</u></b></p>	<ul style="list-style-type: none"> <li>• Water flow rates and head of the pumps shall be in accordance with the requirements of Drawings and Schedule of Quantities.</li> </ul>
<p><b><u>Back-pull out Pumps</u></b></p>	<ul style="list-style-type: none"> <li>• <b>Pump casing</b> shall be Cast iron / SS of heavy section, back pull out type, making possible complete servicing of rotating parts without breaking piping. Motor to pump connection shall be of the flexible coupling type. Suction passages shall be volute in form, promoting smooth entry to impeller and increased efficiency. Impeller shall be SS / Bronze, enclosed type, hydraulically balanced and passages smooth-finished for minimum friction and Maximum efficiency. Stuffing boxes shall be supported in ball /journal bearings, grease lubricated, contained in easily removable housing. Pumps shall be fitted with an air valve, two grease lubricators, drain plug and water seal connections. Mechanical seals shall be provided, as indicated in Schedules of Quantities.</li> <li>• <b>Motor</b> shall be totally enclosed, fan-cooled, class-F insulation, of approved make as per section "ELECTRICAL INSTALLATION". Motor shall be specially designed for quiet operation. <b>The motor rating shall be such as to ensure non overloading of the motor throughout its capacity range including the pumps operating in parallel. Motor shall be suitable for 415 ± 10% volts, 3 phase, 50 cycles AC, and power supply.</b></li> <li>• <b>Base</b> shall be of a size suitable for the pump, motor and shaft and shall be constructed of cast iron or welded steel.</li> </ul>

	<ul style="list-style-type: none"> <li>A <b>guard</b> mounted on the common base shall protect flexible coupling.</li> <li><b>Performance:</b> All the pumps must perform according to selected duty point and respective performance curve.</li> </ul>
<b>Lubrication</b>	<ul style="list-style-type: none"> <li>Upon installation of the complete system and before testing, the pump shall be lubricated in strict accordance with the manufacturer's instructions. A metal instruction plate shall be attached to the pump in a location where it is clearly visible.</li> </ul>

<b>Monobloc Pumps :</b>	<ul style="list-style-type: none"> <li><b>Pump</b> shall be monobloc / Submersible design directly connected to motor. The pump casing shall be of cast iron. Impeller shall be Bronze/Gunmetal/SS, hydraulically balanced and keyed to shaft. <b>Motor</b> shall be of a size suitable for the pump, drip and splash proof, designed as integral part of pump. Motor shall be suitable for <math>415 \pm 10</math> % volts, 3 phases, 50 cycles AC power supply, and class F insulation.</li> <li><b>Installation:</b> The pump base shall be mounted in pit as directed by EIC.</li> <li><b>Alignment:</b> All pumps shall be factory-aligned prior to shipment by the Manufacturer.</li> <li><b>Performance:</b> All the pumps must perform according to selected duty point.</li> </ul>
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### c. COOLING TOWERS:

<b>Scope:</b>	<ul style="list-style-type: none"> <li>Cooling towers in accordance with requirements of Drawings and Schedule of Quantities.</li> </ul>
<b>Type :</b>	<ul style="list-style-type: none"> <li>Cooling Towers shall be induced draft type, single cell in accordance with requirement of Drawings and of the Schedule of Quantities.</li> </ul>
<b>FRP Induced Draft Cooling Tower :</b>	<p><b>Fiber-reinforced plastic Cooling Towers</b> shall be suitable for outdoor use. Tower shall be vertical, induced draft, counter flow, fiber reinforcement plastic construction, in square, complete with fan, motor, surface and spray section, eliminators, steel supports, and where called for in Schedule of Quantities.</p> <p>a. <b>Capacity :</b> The cooling tower capacities shall be as per the Drawings and Schedule of Quantities.</p> <p>b. <b>Side Casing :</b> This shall be made out of FRP with minimum resistance to air flow. It shall have sufficient structural strength to adequately withstand high wind velocities and vibration with UV protection from sun rays. The casing shall be installed in the fiberglass reinforced basin. The tower supporting structure shall be made out of hot dip galvanized frame. Air intake shall be all along the sides so that tower can be installed quite independent of prevailing wind direction. Anodized aluminum or PVC louvers integrated with fill shall be provided at air intake. Sufficient clearance between casing and water basin shall be provided to enable servicing and periodic cleaning.</p> <p>c. <b>Cold Water Basin :</b> Cold water basin shall be a deep fiberglass reinforced sump on which cooling tower super structure shall be supported. Basin fittings shall include the following :</p> <ol style="list-style-type: none"> <li>Bottom outlet.</li> <li>Screened suction assembly fixed to the casing.</li> <li>Drain point connection.</li> <li>Overflow fixed to inside of casing side sheet.</li> <li>Ball type automatic makeup water valve.</li> <li>Equalizing piping connection.</li> </ol> <p>d. <b>Distribution System :</b> Hot water distribution system shall comprise of HDPE/PVC /Suitable sump header and branch arms system with HDPE nozzle / Gravity flow system.</p> <p>e. <b>Fillings :</b> Fillings shall be made of corrosion proof, UV protected and rigid virgin PVC film in honey comb design and arranged in square / rectangular form or fill sheets shall be suspended from H.D.G steel structural tubing supported from the lower structure &amp; shall be elevated above the floor of the cold water basin to facilitate cleaning and easy replacement. They shall be arranged in such a manner to ensure negligible resistance to air flow and to eliminate back water spots and prevent fouling through scales that may form. In order to reduce carry-over losses through</p>

	<p>entrapment of moisture drops in air stream, virgin PVC drift eliminator shall be installed.</p> <p><b>f. Mechanical Equipment :</b></p> <p>Fan shall be of the propeller type cast AL alloy / FRP, light-weight rotor fitted with multiple aerofoil blades. The entire fan assembly shall be made of Al casting, statically and dynamically balanced. Fan shall be directly driven by <math>415 \pm 10\%</math> volts, 3 phase, 50 cycles, AC supply, 2 Speed, IP55, motor, totally-enclosed, fan-cooled, weather- proof construction, designed and selected to operate in humid air stream. Fan shall be protected by fan guard &amp; shall be easily accessible for inspection and maintenance. A service ladder shall also be provided for greater convenience. The mechanical equipment assembly shall be adequately supported on a rugged steel base welded to tubular support assuring vibration-free support. Fan guard shall be provided to prevent birds from nesting during idling periods. Canopy shall be provided over the fan motor for protection against rain water. Care shall be taken that fan air is not restricted. Motor terminal box shall be made water tight.</p>
<b>Operating Weight</b>	<ul style="list-style-type: none"> <li>• <i>Operating Weight of each cooling tower must not exceed 3500 Kg.</i></li> </ul>

**D. INSTRUMENTS AND CONTROLS :**

<b>Scope :</b>	<ul style="list-style-type: none"> <li>• The scope of this section comprises the supply, erection, testing and commissioning of automatic controls and instruments conforming to these Specifications and in accordance with the requirements of Drawings and Schedule of Quantities.</li> </ul>
<b>Type :</b>	<ul style="list-style-type: none"> <li>• All automatic controls shall be electro-mechanical controls as described in the various sections of these Specifications.</li> </ul>
<b><u>Instruments :</u></b>	<p>Instruments required for different types of machines have been described in the various sections of these Specifications and shown on the Drawings. Following instruments may be provided as per the requirements indicated in the Schedule of Quantities.</p> <p><b>a. Temperature gauge :</b> shall be dial type 100 mm dia. Thermometers capillary shall be sufficiently long installed on, supply and return at chillers, condensers as shown on the Drawings and included in Schedule of Quantities. Range of scales shall be 0-50 degree C for Chilled water applications of cooling only. Gages shall be connected to the pipes by SS thermowell.</p> <p><b>b. Pressure Gauges:</b> shall be installed on suction and discharge sides of pumps, chilled water supply and return, inlet and outlet at chillers and condensers and as shown on the Drawings and included in Schedule of Quantities. Suction side gauges at pumps shall be compound gauges with 100 mm dia, range 0 - 10 kg/cm<sup>2</sup> pressure. Discharge sides gauges at pumps and at all other locations shall be 150 mm range 0-10 kg/cm<sup>2</sup> (0-150 psi) pressure or higher as indicated in SOQ.</p>
<b>Calibration and Testing :</b>	All automatic controls and instruments shall be factory calibrated and provided with necessary instructions for site testing.

**E. PIPING :**

The scope of this section comprises the supply, site fabrication and laying of pipes, pipe fittings and valves, testing and balancing of all water piping required for the complete installation as shown on the Drawings. All piping inclusive of fittings and valves shall follow the applicable Indian Standards.

**a. Piping Specifications:**

- **Water Piping: Pipe** and all fittings shall be MS Class 'C' (Heavy Class) conforming to relevant BIS Codes.
- **All jointing** in the pipe system shall generally be by welding, unless otherwise mentioned, or directed at site. All welding shall be done by qualified welders and shall strictly conform to BIS Code of practice for manual metal arc welding of Mild Steel. First butt weld of each welder shall be fully DP tested. Upon approval of welding joints the concerned welder shall be allowed to carry further welding of the pipes. Rest of the welds shall have 100% visual inspection. Before welding of pipes, make proper 'V' notch at the joints by chamfering the end of pipe with surface grinder. All electrodes shall be selected to match the mechanical and chemical properties of the parent material.
- **All pipes** and their supports shall be thoroughly cleaned and given one primary coat of red oxide paint before being insulated. All welded piping shall be subject to the approval at site.

- **Fittings** shall be malleable casting of pressure rating suitable for the piping system. Fittings used on welded piping shall be of the weldable type.
- **Piping Installation :**  
Tender Drawings indicate schematically the size and location of pipes. The Contractor, on award of the work, shall prepare detailed shop drawings, details of fittings, locations of isolating valves, drain and air vent with valves, and all pipe supports. He must keep in view the specific openings in buildings and other structures through which pipes are designed to pass.
- Piping shall be properly supported with proper support and clamps, or stands- clamps, as specified in SOQ. The Contractor shall adequately design all the brackets, saddles, clamps and hangers and be responsible for their structural sufficiency.

Pipe size	Spacing between supports
Up to 12 mm	1.5 Meter
15 to 25 mm	2.0 meter
30 to 150 mm	2.0 meter
Over 150 mm	2.0 – 2.5 meter

- Vertical risers shall be parallel to walls and column lines and shall be straight and plumb. Risers passing from terrace floor, suitable flashing shall be provided to prevent water leakage. Pipe shall have a suitable clean out at the lower point and air vent at the highest point.
- All piping work shall be carried out in a workmen like manner, causing minimum disturbance to the existing services, buildings, roads and structure. The entire piping work shall be organized, in coordination with other agency's work, so that laying of pipe supports, pipes and pressure testing for each area shall be carried out in one stretch.
- Auto purge valves shall be provided at all high points in the piping system for venting. Air valves shall be 15 mm pipe size valves with screwed joints. Discharge from the air valves shall be piped through an equal sized mild steel or galvanized steel pipe to the nearest drain or sump. These pipes shall be pitched towards drain points.
- **Pressure testing shall be done for piping** at-least 1.5 times the working pressure.

## **F.INSULATION:**

- **Scope:** The scope of this section comprises the supply and application of insulation conforming to these Specifications.
- **Material:** Insulation material shall be TF quality expanded polystyrene. For expanded polystyrene the thermal conductivity shall not exceed 0.034 kcal/(hr-sq.m-deg C/meter) or 0.23 BTU/(hr- sq.ft-deg F/inch at 32 deg C (90 deg F) mean temperature and density shall be not less than 24-kg/ cu.mt. Thickness of the insulation shall be as Specified for the individual application. Each lot of insulation material delivered at site shall be accompanied with manufacturer' test certificate for thermal conductivity values and density. Adhesive used for setting the insulation shall be non-flammable, vapour proof adhesive, Shalimar CPR compound, or approved equal, cold setting compound.
- **Piping Insulation:** All chilled water piping shall be insulated in the manner Specified herein. Before applying insulation, all pipe work and fittings shall be brushed and cleaned, and dust, dirt, mortar and oil removed. All MS pipes shall be provided with a coat of zinc chromate primer, followed by two coats of cold setting adhesive compound. Thermal insulation shall then be applied as follows:

**Pipe size (mm)**                      **Thickness for expanded polystyrene (T F Quality- mm)**

- |               |    |
|---------------|----|
| • 10 to 40    | 25 |
| • 50 to 125   | 50 |
| • 150 & Above | 75 |
- Premoulded pipe sections shall be placed over the pipes, the longitudinal joints of this pipe section shall be sealed with the adhesive compound. The traverse joints shall also be sealed with adhesive compound. The insulation shall be continuous over the entire run of piping, fittings and valves. Clean the surface and fix the insulation tightly with cold elastomeric membraneous bitumen (Eniroof EMB) or hot bitumen as recommended by insulation manufacturer. The joints shall be suitably sealed.

Insulation shall be applied only after the piping system has been satisfactorily tested for leaks at 1.5 times the working pressure or at minimum 10 kg/sq.cm. Test pressure. All insulated pipes shall be covered with layer of thick polythene sheet as vapour barrier. PVC straps at 400 mm centre shall be used to hold insulation and vapour barrier together. Insulation material shall be covered with a continuous sheet of thick polyethylene (for protection from water and moisture), before wrapping with GI chicken wire-mesh and then 15 - 20 mm thick sand-cement plaster / Al cladding will be provided. After Insulation IPR approved paint should be provided on sand cement plaster insulated pipes.

Skilled workmen specially trained in this kind of work shall carry out all insulation work. All insulated pipes shall be labeled (SR or RR) and provided with 300 mm wide band of paint along the circumference at every 1200 mm distance for color coding. Direction of fluid shall also be marked.

**G. Valves and Instruments:**

- **Butterfly valves** shall have CI/CS/WCB/Al body with black Nitrile/EPDM rubber seat. All butterfly valves shall be provided with locking devices.
- **Balancing valves** shall be provided at return chilled & condenser water line. The valves shall have built-in pressure drop measuring facility to compute flow rate across the valves. The test cocks shall be long enough to protrude out of pipe insulation.

**H. ELECTRICAL INSTALLATION:**

**I. Scope**

The scope of this section is to define the specifications for the fabrication, supply, erection testing and commissioning of electric panels; wiring and earthing of all components of the air conditioning system and accessories, including supply installation and wiring, where specified and is in the scope of tender. The following shall be taken as “minimum” requirements. The following specifications shall be considered as additional or supplementary specifications; and the Project’s overall electrical standards and specifications shall prevail wherever the latter are more stringent or demanding.

**General**

The design, materials, construction, manufacture, inspection, testing and performance of Panel shall comply with all currently applicable statutory regulation and safety codes in the locality (Gujarat) where the equipment will be installed. The equipment shall also confirm to the latest applicable standards and codes of practice.

**II. TECHNICAL SPECIFICATIONS**

• **Construction Features:**

- a) The panel shall be sheet steel cabinet for indoor installation, floor mounted type.
- b) The basic enclosure shall be fabricated from Cold rolled sheet steel material, of thickness not less than 2 mm in all sides. For all the load bearing application sheet steel thickness shall not be less than 2 mm. Doors and covers shall be made of cold rolled sheet steel of thickness not less than 1.6mm. Stiffeners shall be provided wherever required. The panel frames shall be fabricated using cold rolled sheet steel of thickness not less than 2.5 mm.
- c) The panel shall be totally enclosed, completely dust and vermin proof and shall be with hinged doors, Neoprene gasket and padlocking arrangement shall be provided. .
- d) Joints of any kind in sheet metal shall be seam welded, all welding slag shall be grounded off and welding pits wiped smooth with plumber metal. All panels and covers shall be properly fitted and square with the frame, and holes in the panel correctly positioned. Fixing screws shall enter into holes tapped into an adequate thickness of metal or provided with wing nuts. Self threading screws shall not be used in the construction of panels.
- e) A base channel of 75 mm x 75 mm x 5mm thick or ISMC 100 or suitable (in accordance with the size of panel board) shall be provided at the bottom for floor mounted panels and shall be painted black.
- f) 1100V-grade rubber mat shall be provided in front of the panel board.
- g) Painting: Seven-tank process treatment shall be followed for treatment of the fabrication parts of the panel. Two coats of epoxy based primer shall be applied before applying two final coats of epoxy paint which shall have good weather resistance and heat transfer properties. Electrostatic epoxy powder coating shall be applied after pre-treatment.



h) Minimum clearance of 300 mm shall be provided between the floor of Control panel and the lowest unit. The control panel shall be of adequate size with a provision of spare space to accommodate possible future switch as specified in SOQ. Switches shall be arranged in multi-tier. Knockout holes of appropriate size and number shall be provided in the Panel in conformity with the location of cable/conduit connections. Removable sheet steel plates shall be provided at the top to drill holes for cable entry at site if required. Every cabinet shall be provided with Trafolyte or engraved metal name plates. All panels shall be provided with circuit diagram engraved on PVC sheet. All live accessible connections shall be shrouded and minimum clearance between phase and earth shall be 20 mm and phase to phase shall be 25mm. All equipment such as meters and indicating lamps etc. Shall be located adjacent to the unit with which it is associated and care shall be taken to achieve a neat and symmetrical arrangement. Facility shall be provided for termination of cables from both above and below the control panel. Where cables enter from below, cable boxes shall be fitted at the rear and arranged in tiers to facilitate making connections to the upper and lower units. Clamps shall be provided to support the weight of the cables. All power wiring inside the control panel shall be colour coded and control wiring ferruled for easy identification. Internal wiring of panel shall be done with minimum 2.5 sqmm tinned copper wires. All incoming and outgoing feeders shall be brought out to a terminal block of adequate size at suitable location inside the control panel. All wiring inside the control panel shall be colour coded and labeled with approved plastic beads for identification. Circuit diagrams showing the arrangement of circuit shall be pasted on the inside of panel door and covered with transparent plastic sheet and all labeling shall be provided on the front face of the panel board.

- **Wiring System:**

All LT power cabling between MCC and motors shall be carried out with 1100 volts grade PVC insulated, overall PVC sheathed aluminum / Cu conductor, steel armoured cables. Cables shall be sized by applying proper derating factor for the service conditions they are required. All control wiring shall be carried out by using 650 volts PVC insulated copper conductor wires in race ways or in conduit. 1100 volts grade PVC insulated copper conductor in conduits or armored power cables suitable for 415+10% volts 50 cycles 3 phase.

- **Circuit Compartment**

Each circuit breaker, contactor and relay shall be housed in a separate compartment and shall have steel sheets on top and bottom of compartment. Sheet steel hinged lockable door shall be duly interlocked with the breaker in the "ON" position. Safety interlocks shall be provided to prevent the breaker from being drawn out when the breaker is in 'ON' position. The door shall not form an integral part of the draw out portion of the panel. Sheet steel barriers shall be provided between the tiers in a vertical section.

- **Instrument Accommodation:**

Adequate space shall be provided for accommodating instruments, indicating lamps, control contactors and control fuses etc. These shall be accessible for testing and maintenance without any danger of accidental contact with live parts of the circuit breaker and bus bar.

- a) Control wiring shall be done using 650 V grade PVC stranded wire 1.5 sq.mm for control and 2.5 sq.mm for CT circuit.
- b) As a standard practice, all control cables shall be neatly bunched together with ferrules at either end of each wire. As per application colour ferrules shall be provided.
- c) For safety and reliability, cable bunch shall be routed through flexible metallic conduit wherever it passes through HV compartments like breaker, PT chamber etc.

- **Bus Bars and Bus Bar Connections:**

- a) The bus bar chamber on the bottom / top shall house the bus bars, which shall be accessed only by special tools.
- b) Bus bars shall be of Electrolytic Copper material and shall comply the requirements of IS: 8130. The bus bars should have rectangular section. **The current density while calculating the size of the bus bars should be 1.2 A/sq.mm.**
- c) The bus bars shall be supported non-hygroscopic, anti-tracking high impact epoxy cast resin insulator. The support shall be rigid and suitable for all thermal and electrodynamic stresses arising out of short circuit current for 3 sec.
- d) Bus bars in the switchgear may be provided with insulating sleeves OR insulating coatings. The sleeves or coating material shall comply with the following requirements:
  1. The insulating material shall safely withstand the hot-spot temperatures of the bus bars.
  2. The material shall be flame retardant in accordance with ANSI-C37.20.
  3. Minimum phase to phase and phase to earth clearance shall be 25 mm.

• **Cable compartments, Terminals, wire ways:**

Cable compartment of adequate size shall be provided in the control panels for all incoming and outgoing cables entering from bottom or top. Adequate and proper supports shall be provided in cable compartments to support cables. The outgoing terminals and neutral links shall be brought out to a terminal block suitably located in the control panel. The current transformer for instruments, metering and for protection shall be mounted on the terminal blocks. Separate cable compartments shall be provided for incoming and outgoing cable. Minimum 20% spare terminals shall be provided in each terminal block. A horizontal wire way with screwed covers shall be provided at the top to interconnecting control wiring between different vertical sections.

• **Labels:**

Aluminum Anodised labels shall be provided on all incoming and outgoing feeder switches. Circuit diagram showing the arrangements of the circuit inside the Control Panel shall be pasted on inside of the panel door and covered with transparent plastic sheet. Cable alley and bus chamber shall be identified on all panels by proper labels.

• **Materials:**

All materials shall be of the best quality complying with the BIS (Bureau of Indian Standards) Specifications. Materials used shall be subject to the approval of the Engineer-in-charge and samples of the same shall be furnished where required.

• **Air Circuit Breakers:** The Air Circuit Breakers shall be sheet metal enclosed flush front, draw out type, and shall be provided with a trip free manual operating mechanism with mechanical “ON” - “OFF” indications. The circuit breaker shall be suitable for continuous rating and of capacity as called for. It shall be possible to switch “ON” and “OFF” the Circuit Breaker without opening the circuit breaker compartment door. The operating handle and the mechanical trip push button shall be at the front of the breaker and integral with the breaker.

- a) Air Circuit Breakers shall fully conform to IS: 13947 part I & III.
- b) ACBs shall be designed for circuit protection of 415 V, three phase four wire AC distribution system. They shall be designed for use in panel boards as main breakers and for protection of feeder circuits and connecting equipment.
- c) The ACB's shall be suitable for installation on multi-tier panel box.
- d) The terminals of the ACBs shall be designed to maintain adequate clearances and to accept Aluminium / Cu cables and busbars.
- e) ACBs shall be of draw-out type, electrically/motor operated. The fully draw out type compartments shall be provided.
- f) All ACBs shall be provided with integrated Microprocessor based trip releases for overload, short circuit and earth fault with multiple characteristic curves and adjustable setting for each characteristic to ensure proper co-ordination with upstream and downstream breakers.
- g) For all air circuit breakers, monitoring of close and trip circuit voltages, trip coil shall be provided.
- h) Each circuit breaker shall be provided with distinct SERVICE/TEST/ISOLATED positions.
- i) Potential free auxiliary contacts shall be provided for ACB's status indication (ON, OFF & TRIP).
- j) Motor for ACBs shall be rated at 230VAC.

• **Protective Devices:** C.T. Operated Electronic Relays for short circuit, over current and earth fault operation shall be provided for all air circuit breakers. Suitable under voltage tripping mechanism for voltage less than + 10% of full rate voltage shall be provided.

• **Selector Switch** Where called for, selector switches of rated capacity shall be provided in control panels, to give the choice of operating equipment in selective mode.

• **Moulded Case Circuit Breakers:** Moulded Case circuit Breaker shall be of motor duty and shall be suitable for continuous load, manufactured in accordance with relevant BIS Codes, well coordinated with the upstream circuit. Molded Case Circuit Breakers shall fully conform to IS: 13947 part II.

- a) MCCB's shall be designed for circuit protection of 415 V, three phase four wire AC distribution system. They shall be designed for use in panel boards as breakers and for protection of feeder circuits and connecting equipment.
- b) The terminals of the MCCB's shall be designed to maintain adequate clearances and to accept Aluminium / Cu cables.

- c) The insulating case and cover shall be made of high strength, heat resistant, flame retardant thermosetting material, providing a very high dielectric strength, high withstand capability against thermal and mechanical stresses, protection against secondary fire hazards and enhanced safety of operating personnel.
- d) All MCCB's shall be provided with integrated static trip releases for overload, short circuit and earth fault with multiple characteristic curves and adjustable setting for each characteristic to ensure proper co-ordination with overload, short circuit and earth fault protection.
- **Starters:** Each motor shall be provided with a starter of suitable rating. Starters shall be in accordance with relevant BIS Codes. All Star Delta and ATS Starters shall be fully automatic. Starter's contactors shall have 3 main and 2 Nos. NO / NC auxiliary contacts and shall be air break type suitable for making and breaking contact. For design consideration of contactors the starting current of connected motor shall be assumed to be 6 times the full load current of the motor in case of direct-on- line starters and 3 times the full load current of the motor in case of Star Delta / Reduced Voltage Starters. The insulation for contactor coils shall be of Class "E". Operating coils of contactors shall be suitable for 220 / 415 + 10% volts AC, 50 cycles supply system. The contactors shall drop out when voltage drops to 90% of the rated voltage. The housing of the contactors shall be heat resistant and having high impact strength. Each starter shall have thermal overload protection on all three phases. Unless otherwise specified, Direct on line starters shall be provided for motors up to 7.5 HP. Star Delta Type starters shall be provided for motors 10 HP and above.
  - **Over Load Relays:** Contactors shall be provided with a three element, positive acting, ambient temperature compensated, time lagged, hand-reset type thermal over load relays with adjustable setting. Relays shall be directly connected for motors up to 30 HP capacities. C.T. operated relays shall be provided for motors above 30 HP capacity. Heater circuit contactors may not be provided with overload relays.
  - **Current Transformers:** Current transformers shall comply with IS: 2705. Construction of CT's shall be bar type, separately mounted type. These shall be resin casted.
  - **Single Phase Preventers:** Single phase preventers shall be current **sensing**. Single Phase preventers shall be in conformity with relevant BIS standards. Single phase preventers shall act when the supply voltage drops down to 90% of the rated voltage or on failure of one or more phases.
  - **Indicating Lamp and Metering:** All meters and indicating lamps shall be in accordance with IEC regulations. The indicating lamps shall be LED type and of low burden. Each phase indicating lamp shall be backed up with 4 amps fuse and toggle switch. Other indicating lamps shall be backed up with fuses as called for.
  - **Toggle Switch:** Toggle switches, where called for, shall be in conformity with relevant BIS Codes and shall be of 5 amps rating.
  - **Push Button Stations:** Push button stations shall be provided for manual starting and stopping of motors / equipment as called for. Green and Red colour push buttons shall be provided for 'Starting' and 'Stopping' operations. 'Start' or 'Stop' indicating flaps shall be provided for push buttons. Push Buttons shall be suitable for panel mounting and accessible from front without opening door, Lock lever shall be provided for 'Stop' push buttons. One set of normally open and one set of normally closed contacts shall be provided in push button stations. The push button contacts shall be suitable for 15 amps current capacity. Outdoor push button stations shall be IP55 protection.
  - **Cables:** MV Cables shall be PVC insulated aluminum conductor and armoured cables conforming to BIS Codes. Cables shall be armoured and suitable for laying in trenches, duct, and on cable trays as required. MV Cables shall be termite resistant. Cable jointing shall not be allowed.

### III. CABLE LAYING

- a) Cables shall be laid generally in accordance with Bureau of Indian Standard Code of Practice. Cables shall be laid in perforated GI/MS cable trays as indicated on the Drawings/BOQ or as approved by the Engineer. Easy access to all cables shall be provided to allow cable withdrawal/replacement in future. Where more than one cable is running proper spacing shall be provided to minimise the loss in current carrying capacity.

- b) Cables shall be suitably supported with wooden cleats when run on wall/floor/ducts. When buried, they shall be covered with a layer of soft sifted sand and protected with cement concrete tiles. Special care shall be taken to ensure that cables are not damaged at bends.
- c) Where cables are run on walls, proper saddling and dressing shall be done. The runs from wall to equipment shall be through suitably sized GI pipes, preferably below the floor surface.

**IV. Wires / Power Cables Sizes:**

For all single phase/ 3 phase wiring, 1100 volts grade PVC insulated copper conductor wires shall be used. All the wires inside the control panel shall be neatly dressed and plastic beads shall be provided at both the ends for easy identification in control wiring.

Minimum power wiring and earthing sizes for different motor ratings shall be as per following table. However, if cable derating is necessitated in any particular situation, suitable higher size cable shall be used.

**Power wiring, cabling shall be of the following sizes:**

Sr. No.	Motors Rating	Power Wiring / Cables Sizes
i.	Up to 5 HP motors/ 5 kW heaters	3C x 4 sq.mm copper conductor wires / armoured cables
ii.	From 6 HP to 7.5 HP motors / 6 kW to 7.5 kW heaters	3C x 6 sq.mm copper conductor wires / armoured cables
iii.	From 10 HP to 15 HP motors	2 x 3C x 6 sq.mm copper conductor armoured cables
iv.	20 HP motors	2 x 3C x 10 sq.mm aluminum conductor armoured cables
v.	From 25 HP to 35 HP motors	2 x 3C x 16 sq.mm aluminum conductor armoured cables
vi.	40 HP motors	2 x 3 ½ C x 25 sq.mm aluminum conductor armoured cables
vii.	50 HP motors	2 x 3 ½ C x 35 sq. mm. aluminium conductor armoured cables
viii.	From 60 HP to 75 HP motors	2 x 3 ½ C x 70 sq.mm aluminum conductor armoured cables
ix.	100 HP motors	3 ½ C x 150 sq.mm aluminum conductor armoured cables
x.	150 HP motor	2 x 3 ½ C x 240 sq.mm aluminum conductor armoured cables
xi.	250 HP motor	2 x 3 ½ C x 400 sq.mm aluminum conductor armoured cables

**Earthing:**

- a) The earth bus shall be robust and capable of carrying full short circuit current for 1 sec.
- b) Doors, covers and all non-current carrying metallic parts shall be earthed through flexible copper wires. This should also include instrument casing and cable armour, which should also be connected to the earth bus.

The earth bus shall have provisions for terminals at each end for connecting to grid earthing

Earthing shall be shall be copper strips / wires. The main panel shall be connected to main earthing system of the power supply. All single phase metal clad switches and control panels are earthen with minimum 3 mm diameter copper conductor wire. All 3 phase motors and equipment shall be earthen with 2 numbers distinct and independent copper wires / tapes as follows:

i. Motors up to and including 10 HP rating.	2 Nos. 3 mm dia copper wires.
ii. Motors 12.5 HP to 40 HP. capacity.	2 Nos. 4 mm dia copper wires.
iii. Motors 50 to 75 HP capacity.	2 Nos. 6 mm dia copper wires.
iv. Motors above 75 HP.	2 Nos. 25 mm 3 mm copper tapes.
All switches shall be earthed with two numbers distinct and independent copper wire's tapes as follows:	
i. 3 phase switches	2 nos. 3 mm dia copper wires.
And control panels up to 60 amps rating.	
ii. 3 phase switches, and	2 Nos. 4 mm dia copper wires.
Control panels 63 amps to 100 amps rating.	
iii. 3 phase switches and control	2 Nos. 6 mm dia copper wires.
panels 125 amps to 200 amps rating.	
iv. 3 phase switches, control	2 Nos. 3 mm X 25 mm copper tapes.
panels, bus ducts above 200 amps rating.	

The earthing connections shall be tapped off from the main earthing of electrical installation. Sweated lugs of adequate capacity and size shall be used for all termination of wires. Lugs shall be bolted to the equipment body to be earthen after the metal body is cleaned of paint and other oily substance and properly tinned.

**V. INSTRUCTION FOR INTERNAL WIRING:**

All wiring shall be carried out with single core multi strand flexible copper conductor wires with P.V.C insulation and shall be vermin and rodent proof. The current carrying capacity of wire shall be adequate for the duty assigned to it and shall have sufficient flexibility to facilitate proper termination at any location.

Panel wiring shall be securely supported, neatly installed by lacing and typing, readily accessible and connected to equipment terminals and terminal blocks.

Wire terminations shall be made with solder less crimping type of tinned copper lugs, which firmly grip the conductor and insulation. Insulated sleeves shall be provided at all the wire terminations. Ferrules shall fit tightly on the wires and shall not fall off when the wire is disconnected.

The VENDOR shall be solely responsible for the completeness and correctness of the internal wiring and for the proper functioning of the connected equipment.

**VI. Testing:**

Refer section: III.

**VII. Painting:**

All sheets steel work shall undergo a process of degreasing, derusting, rinsing, passivation, drying, thorough cleaning, primer application, and painting with a high corrosion-resistant/epoxy primer. All panels shall be baked in an oven. The finishing treatment shall be by application of synthetic Powder coated/ enamel/epoxy paint of approved shade. For other detail, refer section: III.

**SECTION –III****INSPECTION, TESTING & MEASUREMENT OF WORKS****(i) INSPECTION AND TESTING:****1. Inspection (Pre-dispatch & site), Testing & Acceptance.**

Pre-dispatch inspection shall be carried out for certain items. All the system equipments, parts shall be checked for physical damage, before commencing the installation work. Complete fabrication, installation and commissioning work shall be jointly supervised and shall be carried out as per the specifications and instructions of IPR Engineer In-charge. All the rotating equipment shall be checked for static and dynamic balancing, minimum operating vibration and noise.

All the system / equipments shall be checked before / after satisfactory commissioning, at site as may be required for the approved technical specifications, performance data provided by supplier / manufacturer. Actual capacity of equipment shall be calculated based on the test readings, recorded jointly, for design conditions / operating conditions. Performance acceptance is subject to comparison of test results with supplier / manufacturer's performance data and contract specification. Acceptance is subject to satisfactory Installation, commissioning and performance testing with respect to technical specifications. Rejected items must be replaced or rectified for the defects / performance. In case of system modification / rectification complete performance tests are to be repeated. Site test readings shall be jointly recorded.

**2. In general following Inspection / tests are involved. Type of test, duration of test, testing procedure / parameters, will be as per the applicable BIS codes. However the detail Inspection and test procedure shall be worked out jointly by the purchaser and the contractor along with the approval of drawings.**

**2.1 GENERAL**

- a. Pre-dispatch Inspection and testing at manufacturers shop / factory.
- b. Physical Inspection at site.
- c. Welding joint inspection and testing at site.
- d. Pressure testing at site.
- e. Performance testing at site. (Capacity, power consumption, pressure drop, vibration, etc.)

Sr. No.	ITEM/ EQUIPMENT	Inspection /Test Involved.
1.	Water chilling machines	a, b, e
2.	Pumps	b, e
3.	Electrical panel	a, b, e.
4.	Piping and fittings - MS & GI	b, c, d
5.	Valves / Control valves and strainers	b, d

- All the arrangement for the said inspection and testing must be made and contractor shall absorb charges. The purchaser shall be intimated sufficiently in advance for 'a' and 'b'.
- Pre-dispatch inspection and clearance issued by purchaser / representative of purchaser, will not relieve the contractor from responsibility of showing the performance of the integrated system at IPR.

**2.2 PRE-DISPATCH INSPECTION & TESTING OF CHILLER:**

Factory testing of the chiller before dispatch will be done in the presence of IPR engineers as per ARI 550/590 on AHRI certified test bed. Run test, performance test, checking of safety & cutouts will be performed. Performance test shall include capacity & power consumption at 100%, 75%, 50% & 25% load points.

Testing shall be carried out at simulated conditions for ECT and LET. If needed, correction may be applied in specified load points as per ARI 550/590.

Pre-dispatch inspection and testing at manufacturer's place shall be carried out by IPR of Water cooled chiller for routine factory tests.

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**3. Test Certificates :**

Contractor shall furnish following Test certificates.

- Material testing of various components of the equipments/ system parts.
- Fabrication inspection / test certificates
- Performance test certificates carried out by manufacturer.
- Performance curves of pump, along with operation and maintenance manual.

**4. Site Inspection and Testing of equipments and whole cooling system at Site:**

- All the tests shall be carried out in the presence of the representative of IPR. All instruments, services, required for the tests shall be provided by the contractor. All the system components (Including the parts cleared after pre-dispatch inspection and testing) will be physically inspected and tested before and after installation according to approved specifications and drawings.
- Capacity ratings and power consumption with operating points clearly indicated shall be submitted and verified at the time of testing and commissioning of the installation. Manufacturer's tests certificates shall be furnished for all equipment / materials.
- The contractor shall demonstrate the capacity and the power consumed by all the equipments. The contractor shall also demonstrate the proper operation of all controls, Instruments and other equipment. Hydrostatic test for all pressure piping and vessels shall be carried out. Alignment of drives, checking of vibration isolation, running tests for pumps, chillers, cooling towers etc. shall be carried out.
- Water piping, fittings shall be tested to hydraulic test pressure of at-least one and half (1.5) times the maximum operating pressure, but not less than 10 Bar, for a period of not less than 24 hours. Any leaks, defects shall be rectified and re-tested in same manner. After completion of the installation, all water system equipment such as pumps, chillers (including existing working chiller), Cooling towers, valves, instruments etc. Shall be adjusted and balanced to deliver the water as specified. (All piping shall be measured in units of length along the centerline including of all joints, bends, fittings, flanges and other accessories).

**• Acceptance**

System components or system as a whole shall be tested for performance as per the approved technical specifications. System can be accepted and taken-over by IPR for regular operation only after satisfactory performance testing in all respect. All the system components shall meet the guaranteed performance requirements to the satisfaction of IPR. Necessary replacement / modification / rectification shall be carried out with the approval of Engineer In-charge. The installation shall be tested again after removal of defects and shall be commissioned only after approval by the Engineer Incharge. .

The following aspects shall be considered for performance testing.

- Prevailing conditions shall be as close as to design conditions.
- Type, quantity, location, frequency, duration of test parameters shall be decided and recorded accordingly during the test.
- Rated capacity, power consumption, and other operating parameters shall be checked.
- Functional test for all Instruments controls (safety and capacity) and DACS shall be carried out to check for the expected operation / action / accuracy / response time / repeatability parameters.

**4.1 : Water Chilling Machines:**

The unit shall be selected and installed for the lowest operating speed and noise level. Capacity ratings and power consumption with operating points clearly indicated, shall be submitted and verified at the time of testing and commissioning of the installation. Measurements of chilled water flow rate and temperature of chilled water in and out of the chilling unit shall ascertain capacity. Power consumption shall be computed from measurements of incoming voltage & input current to the chilling machine.

**• CHILLER PARAMETERS:**

- Chilled Water Inlet Temperature °C
- Chilled Water Outlet Temperature °C
- Chilled Water Flow Rate (LPM)
- TR
- Power Consumption
- Corresponding Ambient Conditions
- Suction Pressure (PSI)

- Discharge Pressure (PSI)
- Oil pressure (PSI)
- Check Functioning of Unloading/Capacity Control
- Noise Level @ 1.6 M

The integration of existing chiller with two new chillers shall be done.

#### **4.2 : Pumps :**

Pump performance curves and power consumption with operating points clearly indicated shall be submitted and verified at the time of testing and commissioning of the installation.

Pump performance shall be computed from the pump curves provided by manufacturer

**4.3: All automatic controls and instruments** shall be factory calibrated and provided with necessary instructions for site testing. Various items of the same type shall be completely interchangeable.

All automatic controls and instruments shall be tested at site for accuracy and reliability before commissioning the installation.

#### **4.4: PIPING:**

**a.** All piping including equipment installed, shall be tested to hydrostatic test pressure of at least one and half times the Maximum operating pressure, but not less than 10 kg/cm<sup>2</sup> gauge for a period of not less than 24 hours. All leaks and defects in joints revealed during the testing shall be rectified and gotten approved at site.

**b.** Piping repaired subsequent to the above pressure test shall be re-tested in the same manner.

**c.** The Contractor shall make sure that proper noiseless circulation of fluid is achieved through all coils and other heat exchange equipment in the system concerned. If proper circulation is not achieved due to air bound connection, the Contractor shall rectify the defective connections. He shall bear all expenses for carrying out the above rectifications including the tearing up and re- finishing of floors and walls as required.

**f.** The Contractor shall provide all materials, tools, equipment, instruments, and services and labour required to perform the test and to remove water resulting from cleaning and after testing.

#### **Welding: Inspection & Acceptance Standards:**

Following Inspection and testing shall be carried out.

- Root and final run for Butt-welds, Nozzle welds, Structural attachment weld, Hanger, Support welds, socket welds etc. shall be checked with –
  - 100 % Visual examination + 10 % DP ( Dye Penetration) examination (MS piping- 100 NB and above)
- **Visual Checkup Includes :** Base metal identification, Base metal defects rectification, Edge preparation, Joint - Fit-up checking for both longitudinal and circumferential welding, Check of pipe –dia., Cleanliness, Tacking, Root pass & subsequent pass appearance, Cleaning between the passes, Completed weld appearance, Condition of the base metal in the area adjoining the welds, Excessive distortion if any due to welding.
- **DP examination:** It includes: Check for any crack or linear indication, porosity, or slag inclusion.
- **Repair of Welds:** Welds shall be repaired by additional welding in case of dimensional problem, but new weld joint to be done for deficient quality. Cracks can be removed by grinding, chipping, arc or flame gouging with DP test.

#### **4.5: Electrical:**

Necessary pre-dispatch inspection before supply shall be carried out. All tests shall be carried out in the presence of IPR representative.

- Shop testing like High voltage test, Insulation resistance test, checking of circuit, etc shall be carried out. Testing shall be carried out as per IS testing standards.
- For all **electric motors** the current, voltage and power shall be recorded.
- All instruments of the MCC including wiring, earthing and control logics shall be tested at site for accuracy and reliability before commissioning the installation.

#### **(ii) MEASUREMENT OF WORK :**

- **Measurement for Piping :**

Unless otherwise specified, measurement for piping for the project shall be on the basis of centre line measurements described herewith. Piping shall be measured in units of length along the centre line of installed pipes including all pipe fittings, flanges (with gaskets, nuts, and bolts for jointing), unions, bends, elbows, tees, concentric and / or eccentric

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reducers, inspection pieces, expansion loops etc. The above accessories shall be measured as part of piping length along the centre line of installed pipes, and no special multiples of pipe lengths for accessories shall be permitted. The quoted rates for centre line linear measurements of piping shall include all wastage allowances, wooden haunches, nuts, check nuts, vibration isolator suspension where specified or required, and any other item required to complete the piping installation as per the specifications. None of these items will be separately measured nor paid for. However, all valves (gate / globe / check / balancing / purge / butterfly / drain etc), strainers, thermometers, pressure gages shall be separately counted and paid as per their individual unit rates, which shall also include their insulation as per specifications. Piping measurements shall be taken before application of the insulation.

Piping rate shall include cost of testing/radiography as specified. No extra charge will be paid for the same.

**• Measurement for Structural steel work :**

The weight of structure can be assessed from the approved / fabrication / execution drawing, approved Bill of material, calculation on the basis of IS Hand book/ Manufacturer's data book / Formula. Actual weighing of the fabricated items may be done if required. This excludes all welds and fasteners used. No payment shall be made for temporary structure created by contractor for execution purpose.

Piping supports like MS angle, Channel etc. and piping section support shall be paid on weight basis.

**• Measurement for Insulation :**

Unless otherwise Specified measurement for pipe insulation for the project shall be on the basis of centre line measurements described herewith :

**a. Pipe Insulation :** Shall be measured in units of length along the centre line of the installed pipe, strictly on the same basis as the piping measurements described earlier. The linear measurements shall be taken for the insulation. It may be noted that for piping measurement, all valves, orifice plates and strainers are separately measurable by their number and size. It is to be clearly understood that for the insulation measurements, all these accessories including cladding, valves, orifice plates and strainers shall be considered strictly by linear measurements along the centre line of pipes and no Special rate shall be applicable for insulation of any accessories, fixtures or fittings whatsoever.

**b. Plain surface:** Shall be measured based on the surface area as per unit indicated in SOQ.

**c. Equipment Insulation:** Shall be included in the cost of equipment, hence shall not be paid separately.

**• Measurement of Electrical Panel wiring and cabling:**

Panels shall be counted as number of units. Quoted rates shall include as lump-sum (NOT measurable lengths) for all internal wiring, cabling, Bus bars, Connectors etc. The quoted rate of panel shall also include all accessories, switch-gear, fuses, contactors, indicating meters and lights as per the specifications. Control wiring for interlocking, automatic and safety controls, and control wiring for remote start/stop as well as indication as per the Specifications, shall be included as 'LOT' and be included in the Panel board cost.

Power wiring and earthing connections from the control panel to the starter and to the motor, shall be measured in RMT (running meter length). The payment for additional quantity (In excess of quantity or limit as specified in SOQ, if any) of cabling shall be made as per unit rate provided with the SOQ. No wastage measurement shall be allowed.

**iii. PAINTING- COLOUR CODE**

**Refer: IS: 2379- 1963 Colour code for identification of piping.**

All Equipments shall be supplied with approved finish. Shop coat of paint that have become marred during shipment or erection shall be cleaned off with mineral spirits, wire brushed and spot primed over the affected areas, then coated with two coat of synthetic enamel paint. Pump base-plate / piping supports subject to water exposure to be painted with rubber paint using zinc base primer.

All Pipe and structure **steel work** shall undergo a process of degreasing, thorough cleaning, and painting with a high corrosion resistant primer. All panels shall then be baked in an oven. The finishing treatment shall be by application of synthetic enamel paint of approved shade.

**• Standard Colour Code:**

The tentative colour code given below shall be followed. However changes if any will be indicated well in advance. All painting colour code shall be approved before execution.

Item :	Colour:
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<ul style="list-style-type: none"> <li>▪ Electrical panel</li> <li>▪ Chilled water Line – <ul style="list-style-type: none"> <li>In let / Return / &amp; storage tank</li> <li>Out let / Supply</li> </ul> </li> <li>▪ All supports / Stands / drain</li> <li>▪ Condenser water piping <ul style="list-style-type: none"> <li>In let / Return / &amp; storage tank</li> <li>Out let / Supply</li> </ul> </li> <li>▪ Fresh / Raw / Make-up / waste Water</li> </ul>	<ul style="list-style-type: none"> <li>▪ Siemens Grey / RAL 7032 / Approved shade</li> <li>▪ Light Blue</li> <li>▪ Dark Blue</li> <li>▪ Black</li> <li>▪ Light Green</li> <li>▪ Dark Green</li> <li>▪ Approved Shade</li> </ul>
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All “Approved shade” shall be duly approved by Engineer In-charge.

**iv. List of BIS Codes:**

**\*Relevant of the following IS specifications and codes with all amendments will be applicable for the work.**

IS : 3615 – 1967	▪ Glossary of terms used in Refrigeration and Air-conditioning.
IS : 659 - 1964	▪ Safety code for Air conditioning.
IS : 7896 - 1975	▪ Data for outside Summer design conditions for air-conditioning.
IS : 8148 - 1976	▪ Specification for packaged air conditioning units.
IS : 660 - 1963	▪ Safety code for Mechanical Refrigeration.
IS : 732 III - 1982	▪ Inspection and testing of installation.
IS : 2379 - 1963	▪ Colour code for identification of pipelines.
IS : 6272 - 1987	▪ Industrial Cooling Fans
IS : 4894 -1987	▪ Test code for Centrifugal fan.
IS : 3103 -1975	▪ Code of practice for Industrial Ventilation.
IS :778 , 780 - 1980, 210, 318, 5312	▪ Gun metal gate, globe and check valves for general purpose.
IS : 8092 : 1992	▪ Inspection of Steel Castings.
IS : 12992 : 1993	▪ Safety relief Valves
IS : 13095 : 1991	▪ Butterfly valve for general purpose
IS : 9542 : 1980	▪ CF Monobloc pumps
IS : 5659 : 1970	▪ Pumps for process water
IS : 10596 : 1983	▪ Installation , operation and maintenance of pumps
IS : 5111 – 1969	▪ Code of practice and measurement procedure for testing Refrigerant Compressors.
IS : 1520	▪ Horizontal Centrifugal pumps for clear, cold and fresh water.
IS : 1239 I & II - 1982	▪ MS / GI tube, pipes, tubular and other wrought steel fittings. Hot-dip zinc coatings on steel tubes.

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IS : 10773 : 1995	▪ Wrought copper tubes for Ref. & AC purposes.
IS : 4736 - 1968	▪ Code of procedure for manual metal arc welding of MS.
IS : 3589	▪ Electrically welded steel pipe for water, gas and sewage. Above: 200 NB, ANSI B 16.9 for pipe fittings.
IS : 3656	▪ Welds testing by DP
IS : 1536 – 1976	▪ Flanges configuration. (ANSI B 16.5)
IS : 6392 - 1971	▪ Steel pipe flanges.
IS : 210	▪ Standard for CI material.
IS : 1538	▪ CI fittings for Pressure piping
IS : 226	▪ Structural Steel.
IS : 638	▪ Gaskets
IS : 628	▪ Rubber gasket, Teflon gasket for SS piping.
IS : 554 – 1975	▪ Dimensions for pipe threads for pressure tight joints
IS : 3016 - 1982	▪ Code of practice for fire precautions in welding and cutting operations.
IS : 655 – 1963	▪ Metal air Ductwork.
IS : 277 - 1977	▪ Galvanised steel wire sheets.
IS : 3069	▪ Glossary of Items symbols and units relating to thermal materials.
IS : 702	▪ Industrial Bitumin.
IS : 4671 – 1984	▪ Expanded polystyrene for thermal insulation purpose.
IS : 7240 - 1981 7413 - 1981	▪ Code for practice for application and finishing of thermal insulation material at temp. From -80°C to 40°C. & 40°C to 700°C.
IS : 8183 - 1976	▪ Specifications for Bonded Mineral Wool.
IS : 10556 : 1993	▪ Storage and handling of insulation material
IS : 11246 : 1992	▪ Glass fibre reinforced polyester resin.
IS : 12436 : 1988	▪ Preformed rigid polyurethane thermal insulation
IS : 13204 : 1991	▪ Rigid Phenolic foams thermal insulation
IS : 13205 : 1991	▪ In-situ pouring of Rigid Phenolic foams thermal insulation
IS : 3624	▪ Bourden tube pressure and vacuum gauges.
IS : 1367	▪ Bolts, nuts, and studs./ threaded fasteners.
IS : 2825 - 1969	▪ Code for unfired pressure vessels.
IS : 7403	▪ Cooling tower structure.
IS : 875, 1893	▪ V belts, and pulleys for Industrial purpose.

IS : 5141	▪ Code for shell and tube type heat exchanger.
IS : 325- 1970	▪ Specification for three phases Induction motor.
IS : 4029	▪ Testing of three phase Induction motor.
IS : 900	• Code of practice for installation of Induction motor.
IS : 996	▪ Single phase small AC and universal motors.
IS : 4064 1978 –II	▪ Switches for domestic & similar purpose.
IS : 2959 : 1975	▪ Contractors for AC up to 1100 V.
IS : 2516- I &II	▪ ACB
IS : 3854 – 1969	▪ Accessories for electrical wiring
IS : 3837 – 1976	▪ Code of practice for electrical wiring and fitting for building.
IS : 732 –1963 , 1973	▪ <b>Code for practice for installation and Testing of electrical wiring.</b>
IS : 694 - 1977	▪ <b>PVC insulated electric cable for working up to and including 1100 volts.</b>
IS : 1554 : 1981	▪ <b>PVC insulated (HD) electric cable for working up to 1.1 kV and 11kV volts.</b>
IS : 1248	▪ Direct acting electrical indicating instruments.
IS : 1822	▪ Starters.
IS : 8544 - I to IV 1979	▪ Motor starters for voltage not exceeding 1000 Volts.
IS : 2208 - 1979	▪ HRC fuse and links, up to 650 Volts.
IS : 2147 – 1962	▪ Degree of protection provided by enclosures for low voltage switch gear and control gears.
IS : 10118: 1982	▪ Code of practice for installation and maintenance of Switchgear.
IS : 3043 : 1966	• Earthing.
ISO R281	▪ Rolling Bearings - Dynamic Load Ratings and Rating Life.
IS : 4758 : 1968	▪ Methods of measurement of noise emitted by machines.
IS : 14280 : 1995	▪ Mechanical vibration – balancing.
IS : 12065 : 1987	▪ Permissible limits of noise level for rotating electrical machines
<b>Other / Equivalent Applicable Codes:</b>	
ARI 550/590	▪ Air -Conditioning and Refrigeration Institute Standard for Centrifugal or rotary Screw Water Chilling Packages (General) Specifications, Testing and rating.
ASME Code	▪ All applicable / equivalent American Society of Mechanical Engineers'
ANSI - B89.1	▪ American National Standards Institute Safety Code for Unfired Pressure Vessels - Section VIII (Design, construction, testing and certification of pressure vessels).
ANSI - B31.5	▪ American National Standards Institute Safety Code for Mechanical Refrigeration (Overall general safety requirements, relief device sizing, etc.)
ANSI - B31.1	▪ American National Standards Institute- Code for Pressure Piping. Code for Refrigerant Piping.
ANSI - B36.19	▪ Stainless Steel pipe.
TEMA Code	▪ Tubular Exchanger Manufacturer's Association.

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**SECTION - IV**  
**LIST OF MAKES**

**A. MAJOR EQUIPMENTS**

SR.NO.	DESCRIPTION	MANUFACTURERS NAME
1	Screw Compressor Water Chilling Machines	Carrier / Climaveneta / Daikin-McQuay/Trane/York/Kirloskar/ Blue star/ Voltas
2	Cooling Tower	Paharpur /Bell / Mihir / Advance 20-20 / United cooling system / Marley
3	Back - pull out centrifugal pump	KBL / Beacon / CG / Johnson / Grundfoss / C.R.I. / KSB /Mather & Platt / ITT / Wilo/Armstrong

**B. PIPINGS**

SR.NO.	DESCRIPTION	MANUFACTURERS NAME
1	MS class C / GI	ITC/Jindal/Surya/Tata /Ratnamani
2	PVC	Astral/ Finolex /Supreme

**C. VALVES , STRAINERS AND ACCESSORIES**

SR.NO.	DESCRIPTION	MANUFACTURERS NAME
1.	Butterfly Valves	Audco / Advance / Intervalve / C.R.I. / L&T/ Weir-BDK / CRI/ Virgo/ Fisher control / AMRI/ Technova / Saunders / Crescent/ Deltech/kitz
2.	Balancing Valves	L&T/Forbes Marshall/ Advance / Danfoss/ Honeywell/ CRI/ Saunders / Weir-BDK / Trishul / ITT/ Indian/ Crescent/ Unimac
3.	Ball Valves	L&T/ Forbes Marshall/ Virgo/ Velan / Saunders / Accuflow / Weir-BDK /Trishul /Indian / Crescent/ Unimac/ CRI/ Audco/ Aptek / Lodha/ Ped-Lock
4.	Valves and Actuators (2-way on / off valve )	L&T/ Forbes Marshall/ Rotex/ Samson/ Honeywell/ Johnson Control/ MIL/Sauter/ Siemens/ Bellimo/ Kitz / Advance / Intervalve / Crescent/ Deltech / Weir-BDK
5.	Strainers	Trishul / Triveni / Unimac / Rex/ Emerald / Sant/Leader/ Advance / Flowtech/ Crescent valves/ Flairs

**D. INSTRUMENTS AND CONTROLS**

SR.NO.	DESCRIPTION	MANUFACTURERS NAME
1	Dial type temp and pressure gauges	Pricol / Fiebig / Forbes Marshall / Emerald / Star / WIKA/Baumer /Waree
2	Magnetic Flow meter	Honey well / Forbes marshall/ Siemens / Johnsons Controls / Krohne marshall/ Yokogawa / Rosemount / E+H / Emerson rosemount

**E. INSULATING MATERIALS**

SR.NO.	DESCRIPTION	MANUFACTURERS NAME
1	Expanded polystyrene/Nitrile	Lloyds Insulation / Beardsell./ Cooline / Owens/Armacell/ K-flex / Armaflex/Superton / Aeroflex/ Arcoflex/ Navair/ Pyrogard/Supreme

**F. ELECTRICALS**

SR.NO.	DESCRIPTION	MANUFACTURERS NAME
1	Pump Motors	Siemens / NGEF / Kirlosker / ABB / CGL / Havells / Marathon/ Bharat bijlee

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3	Starters, Contactors, Push Button,	Schneider/Siemens/ABB/ L & T
4	ACB	Schneider /Siemens/ABB/ L & T
5	MCCB ( Moulded case circuit breaker)	Schneider /Siemens/ABB/ L & T / Legrand
6	MCB (Miniature circuit breaker)	Schneider /Siemens/ABB/ L & T/ Legrand
7	SPP, OLR	Minilec / Telemechnique / Siemens / Schneider/ABB/ L & T
8	Current Transformers	Automatic Electric/Kappa / G&M
9	Timer	Siemens / L&T / BCH/ Schneidr/ ABB
11	Switches	Kaycee/Sulzer/Siemens /English Electric /ABB/ Siemens / Schneider/ABB/ L & T
12	Rotary switches	Kaycee/Sulzer /Siemens /English Electric /ABB/ Siemens / Schneider/ABB/ L & T
14	Toggle Switches, Selector Switches	Kaycee/Sulzer /Siemens /English Electric /ABB/ Siemens / Schneider/ABB/ L & T
16	Digital Multifunction meter	Schneider/Siemens/ABB / Automatic Electric / Meco / Rishabh / Selec/Conserve
17	Digital Ammeter	Schneider/Siemens/ABB / Automatic Electric/Meco /Rishabh/ Selec/ Conserve
18	LED type Indicating Lamps	Siemens/Teknic / Kaycee / Concorde/Eszen
19	Power Cable	Finolex / Gloster / Universal / Polycab /Incab /RR cable / Havells / Avocab / KEC / KEI
20	Control cables & PVC Insulated wires	Finolex / Gloster / Universal / Polycab /Incab /RR cable / Havells / Avocab / KEC / KEI
21	Copper conductor wires	Finolex / Gloster / Universal / Polycab /Incab /RR cable / Havells / Avocab / KEC / KEI
24	Time Delay Relay	Siemens / Minilec / Telemechnique / Siemens / Schneider/ABB/ L & T

**SECTION – V****TECHNICAL DATA SHEET**

(List of technical information to be furnished by Bidder to IPR)

- **EQUIPMENTS:**
- **TECHNICAL DETAILS :**

**Note:**

- Separate Technical data sheet shall be furnished for different type / model / configuration for any item.
- The entire data sheet shall be endorsed with stamp and signature by bidder.
- Contractor has to provide minimum technical details as enclosed herewith, however shall also provide remaining / additional details for approval. All the Items shall be ordered only after Technical specification approval.
- Attach Technical leaflets, performance curves, etc. for all products / system parts offered.

**1. DATA SHEET TO BE FURNISHED BY CONTRACTOR (Along with tender, Refer tender for technical details):***(ALL DATA AT ACTUAL OPERATING CONDITIONS)***1.1 WATER CHILLING MACHINES**

<b><u>Sr No</u></b>	<b><u>Details</u></b>	<b><u>IPR Requirement</u></b>	<b><u>Details to be filled by vendor</u></b>
1	Type	Semi hermetic Screw	
2	Make / Model	Makes as mentioned in tender	
3	Refrigerant	R-134a	
4	Refrigeration Capacity at entering CT water temp. 32 C and leaving chilled water temp. 7°C		
a.	Nominal (TR)		
b.	Actual (TR)	125 TR	
5	Power consumption (IKW)		
a.	At Full Load :		
b.	75 % Load :		
c.	50 % Load :		
d.	25 % Load :		
6	NPLV:	≤ 0.56	
	COP :	≥ 5	
7	Compressor		
a.	Make:		

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b.	Speed (Minimum / Operating / Maximum) RPM :		
c.	Type of drive, bearing , coupling		
d.	Capacity control : Method :		
e.	Steps / Range of Capacity control (% of full Load) :		
f.	Safety devices included :	Yes	
g.			
<b>8</b>	<b>Compressor Motor :</b>		
a.	Type	Semi hermetic	
b.	Manufacturer / make :		
c.	HP / RPM :		
d.	Electrical supply :	400/415 V $\pm$ 10 %, 50 Hz	
e.	Starter Type / manufacturer ( to be included in the Package)		
f.	Class of Insulation :		
g.	Current: Amp.		
h.	Full Load Amp. / Rated Amp.		
i.	Locked Rotor Amp.		
<b>10</b>	<b>Evaporator :</b>		
a.	Type :		
b.	Manufacturer/ make / model:		
c.	Shell Material / Dia mm / Length mm :		
d.	Tube Material / Gauge – wall thickness mm. :		
e.	Tube Dia. (OD) mm. / No. of tubes / Length mm. :		
f.	No. of passes	Two	
g.	Refrigerant Temp. (SST) °C :		
h.	<b>Water flow rate : LPM</b>		
i.	Water Temp.(Entering) °C		
j.	<b>Water Temp.(Outlet / Leaving)</b>		
k.	Heat rejection capacity ( TR) :		
l.	Pressure drop in MWC :	5 Meter max	
m.	Water side design pressure :	$\geq 10 \text{ kg / cm}^2$	
n.	<b>Refrigerant side design pressure: kg / cm<sup>2</sup></b>		
o.	Safety devices and other accessories included :	Yes	
<b>11</b>	<b>Condenser :</b>		
a.	Type :		
b.	Manufacturer/ make / model:		
c.	Shell Material / Dia mm / Length mm :		
d.	Tube Material / Gauge – wall		



	thickness mm. :		
e.	Tube Dia. (OD) mm. / No. of tubes / Length mm. :		
f.	No. of passes :	Two	
g.	Refrigerant Temp. (SDT) °C :		
h.	<b>Water flow rate : LPM</b>		
i.	Water Temp.(Inlet / Entering) °C :		
j.	<b>Water Temp.(Outlet / Leaving) °C :</b>		
k.	Heat rejection capacity ( TR) :		
l.	Pressure drop in MWC :	5 Meter max	
m.	Water side design pressure : Kg/cm <sup>2</sup>	≥ 10 kg / cm <sup>2</sup>	
n.	<b>Refrigerant side design pressure: kg / cm<sup>2</sup></b>		
o.	Safety devices and other accessories included :	Yes	
<b>12</b>	<b>Others :</b>		
a.	Qty of Refrigerant and oil per chiller package (Initial charge) :		
b.	<b>Overall dimensions of chiller ( Lx W x H) mm.</b>		
c.	Overall Weight : Kg : Shipping :		
d.	Operating (Max.)		
e.	Noise level in dBA (at 1.6 m)		
f.	Vibration isolation (overall)		

**1.2 CHILLED WATER PUMP SETS:**

<u>Sr No</u>	<u>Details</u>	<u>IPR Requirement</u>	<u>Details to be filled by vendor</u>
1.	Make	Makes as mentioned in tender	
2.	Type	Centrifugal Back pullout	
3.	Model		
4.	Water Flow Rate & Head	1450 LPM / 40 MTR (Differential head)	
5.	RPM		
6.	Material of Construction of Impeller	Bronze / SS	
7.	Type of Seal	Mechanical Seal	
8.	Overall Dimensions of Pumpset/Footprint of Baseframe		
9.	Operating Weight		
10.	Pump Efficiency		
11.	Motor HP		
12.	Amp (FLA)		

**1.3 CONDENSER WATER PUMP SETS:**

<u>Sr No</u>	<u>Details</u>	<u>IPR Requirement</u>	<u>Details to be filled by vendor</u>
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1.	Make	Makes as mentioned in tender	
2.	Type	Centrifugal Back pullout	
3.	Model		
4.	Water Flow Rate & Head	2100 LPM / 20 MTR (Differential head)	
5.	RPM		
6.	Material of Construction of Impeller	Bronze / SS	
7.	Type of Seal	Mechanical Seal	
8.	Overall Dimensions of Pump set/Footprint of Base frame		
9.	Operating Weight		
10.	Pump Efficiency		
11.	Motor HP		
12.	Power Consumption		

**1.4 COOLING TOWERS:**

<u>Sr No</u>	<u>Details</u>	<u>IPR Requirement</u>	<u>Details to be filled by vendor</u>
1.	Make	Makes as mentioned in tender	
2.	Type	Induced Draft – Counter flow	
3.	Model		
4.	Flow Rate	<b>≥ 2100 LPM</b>	
5.	Pump Head		
6.	Approach		
7.	Range		
8.	Fan MOC	<b>FRP / Cast Al alloy</b>	
9.	Fan RPM		
10.	Fan Motor HP		
11.	Dimension		
12.	Overall Weight : Kg : Shipping :		
13.	Operating (Max.)	<b>≤ 3500 Kg</b>	

**1.5 BUTTERFLY VALVES:**

<u>Sr No</u>	<u>Details</u>	<u>IPR Requirement</u>	<u>Details to be filled by vendor</u>
1.	Make	Makes as mentioned in tender	
2.	Type	Rubber lined Wafer type	
3.	Media	Soft water/ Raw Water	
4.	Pressure rating	PN 10	
5.	Operating temperature range	0 to 80 °C	
6.	MOC/ type of Body	CI/ CS/ WCB/Al with single piece body	
7.	MOC of disc and wetted parts	CF8M/ SS 316 / CF8/SS 304	
8.	MOC of Seat	EPDM/ Nitrile/ Neoprene	
9.	Seat leakage	Bubble tight shut off (Class VI)	
10.	General design & face to face dimensions	API 609 / ASME B16.10/ EN 593	
11.	Valve testing	API 598	
12.	Flange standard conformity	Class 150, ASME B16.5 SORF flanges	

**1.6 NON RETURN VALVE (CI/CS/WCB):**

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<u>Sr No</u>	<u>Details</u>	<u>IPR Requirement</u>	<u>Details to be filled by vendor</u>
1.	Make	Makes as mentioned in tender	
2.	Valve type	Swing type wafer check valve.	
3.	Media	Soft water/ Raw Water	
4.	Disc type	Single/ double plate with integral hinge pin	
5.	Seat and sealing	Rubber "O" ring/ gasket/ metal seat	
6.	Pressure rating	PN 10	
7.	Seat leakage	Bubble tight shut off (Class VI)	
8.	MOC of Body	CS/ CI/ WCB as per SOQ	
9.	MOC of Disc and wetted parts	ASTM A351 Gr CF8M/ SS 316/ CF8/ SS 304 as per SOQ	
10.	General design & face to face dimensions	API 6D / ASME B 16.10	
11.	Valve testing	API 598	
12.	Flange standard conformity	ASME B16.5, class 150 SORF flanges	

**1.7 Y- STRAINER / Pot strainer (CI/CS/WCB):**

<u>Sr No</u>	<u>Details</u>	<u>IPR Requirement</u>	<u>Details to be filled by vendor</u>
1.	Make	Makes as mentioned in tender	
2.	Media	Soft Water / Raw Water	
3.	Pressure rating	PN 10	
4.	Operating temperature range	0 to 80 °C	
5.	MOC of Body & Cover	CI/ CS/ WCB	
6.	MOC of Screen and perforated sheet	SS 316/ SS 304	
7.	Screen Mesh size	20/ suitable Mesh supported by perforated SS sheet.	
8.	End connection	ASME B16.5, class 150 SORF flanges	

**SECTION – VI**

**SCHEDULE OF QUANTITY**

***(Please refer to Section-D – Part-II of Tender documents)***

**Notes to Bidder:**

- All the items are broadly specified in SOQ, however for detail specifications **refer to tender**.
- This schedule shall be fully priced including NIL quantity (stated as ‘RO’ – Rate only) if any, and the extension and totals duly checked. The rates for all items shall be filled in INK.
- All the system parts, equipments shall be offered strictly as per the approved make only; deviation may be liable for rejection. Prices for each items listed in this schedule must be clearly and completely filed in.
- In the event of error occurring in the amount column of the schedule, as a result or wrong extension of the unit rate and quantity, the unit rate quoted by the Bidder shall be regarded as firm and the extensions shall be amended on the basis of the same rates.
- The rate of each item of work included in the Schedule of quantities shall, unless expressly stated otherwise, includes cost of :
  - a) All materials, fixing materials, accessories, operation, appliances, tools, plant, equipments, transport, labour and incidentals required in preparation for and in the full and entire execution, testing balancing, commissioning and completion of the work called for in the item and as per specifications and drawings.
  - b) Wastage on materials and labour.
  - c) Loading, transporting, unloading, handling/double handling, hoisting to all levels, setting, fitting and fixing in position, protecting, disposal of debris and all other labour, necessary for the full and entire execution and to fully complete the job in accordance with contract documents, good practice and recognized principles.
  - d) Liabilities, obligations and risks arising out of conditions of contract.
- The specifications and drawings wherever available, are to be read as complimentary to and part of the Schedule of quantities and any work called for in shall be taken as required.
- In the event of conflict between Schedule of quantities and other documents including the specifications, the most stringent shall apply and the interpretation of the Engineer In-charge shall be final and binding.
- **All equipments, quantities and technical data indicated in this Schedule (SOQ) are based on the engineering by IPR and shall be indicative and for the Contractor’s guidance. Contractor shall have to submit drawings, specifications with the actual system requirement. Contractor shall be paid for the actual quantity of work executed by him in accordance with the approved shop Drawings at the SOQ rates.**

**SCHEDULE OF QUANTITY****(To be filled in by bidder and returned to IPR)**

Sr No.	Description	Unit	Qty
	<b><u>CHILLERS, PUMPS, VALVES, PIPING AND OTHER EQUIPMENTS ETC. :</u></b>		
1.0	<p><b><u>SCREW WATER CHILLING MACHINES (Flooded Evaporator chiller):</u></b>  Supply, Factory testing, installation, testing and commissioning of microprocessor based water chilling unit (Single compressor model) of <b>125 TR actual Refrigeration capacity at 7°C leaving CHW temperature &amp; 32°C entering Condenser water temperature each complete with Semi – hermetic type Screw compressor</b>, Factory fitted unit mounted <b>motor, Closed transient type Star-Delta / Normal Star-Delta Starter</b> microprocessor based control panel along with required hardware &amp; software for integration with a 3rd party BMS (Open protocol), water cooled condenser, insulated evaporator, integral refrigerant piping, first charge of refrigerant, <b>incomer switchgear</b> with terminations box suitable for terminations of bus duct/Cable , earth terminations etc. all mounted on a steel frame, wiring with all accessories as per tender specification including vibration isolation, differential pressure switches, etc. suitable for 400 / 415 ±10% V, 50 Hz, 3φ, AC power with starter supply for following design conditions:</p> <p><b>Evaporator / Chiller.</b></p> <ol style="list-style-type: none"> <li>Chilled water entering Temp. : ≥ 12 °C</li> <li>Chilled water leaving Temp. : ≤ 7 °C</li> <li>Fouling factor in FPS unit: 0.0001</li> <li>Pressure Drop - 5 Mtr (Max)</li> </ol> <p><b>Condenser:</b></p> <ol style="list-style-type: none"> <li>Condenser water entering Temp. : ≥ 32 °C</li> <li>Condenser water leaving Temp. : ≤ 36 °C</li> <li>Fouling factor in FPS unit: 0.00025</li> <li>Pressure Drop - 5 Mtr (Max)</li> </ol> <ul style="list-style-type: none"> <li><b>Refrigerant: Non CFC, R-134a Refrigerant</b></li> <li>➤ <b>NPLV (IKw/TR) value : ≤ 0.56</b></li> <li>➤ <b>COP : ≥ 5</b></li> <li><b>Water Chilling machine of 125 TR actual Refrigeration capacity (at 7°C leaving CHW) as described above With Semi- hermetic type compressor (Single compressor model) with R-134a Refrigerant.</b></li> </ul> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li><b>The chiller evaporator inlet-outlet and condenser inlet – outlet shall not be at the same side of the chiller. The chiller have 2 pass condenser and evaporator (Evaporator inlet and outlet are at one side of the chiller control panel and condenser inlet and outlet are at the other/Opposite side of the chiller control panel).</b></li> <li><b>Factory testing (Refer section-III {Clause 2.2}) expenses (For one chiller) are inclusive of chiller cost.</b></li> </ul>	Nos.	2
2.0	<p><b><u>COOLING TOWER :</u></b>  Supply, installation, testing and commissioning of FRP Induced draft, counter-flow, cooling tower, for system. Tower shall be complete with FRP basin, casing, ladders, supports, propeller fans, virgin PVC fills, eliminators, HDPE / suitable sump distribution system, IP-55 TEFC induction motor suitable for 415±10% V, 50 Hz, 3φ power supply, weather cover for motor, drain, make up, quick fill , equalizer connection and vibration isolation etc. as per tender specification.</p> <p><b>Tower selection:</b> On following design conditions:</p> <ul style="list-style-type: none"> <li>WBT: 29 °C.</li> <li>Water temperature range of 4 (36 – 32)°C.</li> </ul>		

	<ul style="list-style-type: none"> <li>Water flow rate : 2100 LPM</li> <li><b>FRP Induced Draft Cooling Tower (for Water chilling machines) as described above (2W+1S) and with float valves and all other accessories.</b></li> <li><b>Operating Weight of each cooling tower must not exceed 3500 Kg.</b></li> </ul>	Nos.	3
<b>3.0</b>	<b><u>PUMP SETS</u></b>		
3.1	<p><b><u>CHILLED WATER PUMPS SETS:</u></b> Supply, installation, testing and commissioning of centrifugal back pull out (BPO) type pump with mechanical seal and bronze/SS impeller, complete with hot-dip galvanized or epoxy coated base frame for pump &amp; motor, coupling, coupling guard, vibration isolators and TEFC induction motor, for circulation of chilled water for screw chillers. Pump shall be suitable for 415±10% v, 50 Hz, 3φ AC power supply. Quoted price shall include cost of insulation, vibration isolation and all other associated accessories and works.</p> <p><b>Pump performance characteristics:</b> <b><u>Pump Set for Chilled water system</u></b> Head on pump      <b>40 MWC (Differential)</b> Water flow rate    <b>@ 87 m<sup>3</sup>/hr (1450 LPM)</b> Motor HP            <b>25 or suitable.</b></p> <ul style="list-style-type: none"> <li><b>Pump set as described above: (2W+1S)</b></li> </ul>	Nos.	3
3.2	<p><b><u>COOLING TOWER PUMPS SETS :</u></b> Supply, installation, testing and commissioning of centrifugal back pull out (BPO) type pump with mechanical seal and bronze/SS impeller, complete with hot-dip galvanized or epoxy coated base frame for pump &amp; motor, coupling, coupling guard, vibration isolators and TEFC induction motor, for circulation of Cooling Tower water for screw chillers. Pump shall be suitable for 415±10% v, 50 Hz, 3φ AC power supply. Quoted price shall include cost of insulation, vibration isolation and all other associated accessories.</p> <p><b>Pumps performance characteristics:</b> <b><u>Pump set for cooling tower system</u></b> Head on pump      <b>20 MWC (Differential)</b> Water flow rate    <b>@ 126 m<sup>3</sup>/hr. (2100 LPM)</b> Motor HP            <b>15 or suitable.</b></p> <ul style="list-style-type: none"> <li><b>Pump set as described above: (2W+1S)</b></li> </ul>	Nos.	3
3.3	<p><b><u>DRAIN PUMP:</u></b> Supply, installation, testing and commissioning of self-priming, non clogging monobloc / submersible type Drain /Sump pump with foot valve suitable for 3φ, 415±10%V, 50Hz, AC supply, factory mounted on MS base plate, suction &amp; discharge valve, NRV, level switch / level sensor with cable (for pump auto start) and other accessories.</p> <p>Impeller shall be Bronze/Gunmetal/SS, hydraulically balanced and keyed to shaft. <b>Motor</b> shall be of a size suitable for the pump, drip and splash proof. Motor shall be suitable for 415 ± 10 % volts, 3 phases, 50 cycles AC power supply, and class F insulation.</p> <p><b><u>Pump set for water drain</u></b> Head on pump      <b>15 MWC</b> Water flow rate    <b>@ 120 LPM</b> Motor HP            <b>2 or suitable.</b></p> <ul style="list-style-type: none"> <li><b>Pump set as described above: (1W+1S)</b></li> </ul>	Nos.	2
<b>4.0</b>	<p><b><u>MS CLASS C PIPING – Class 150</u></b></p> <p>Providing and fixing in position the following <b>MS class C (Heavy) pipes</b> cut to required lengths and installed with all welded joints, necessary fittings like flanges, elbows, tees, reducers, fasteners, gasket, purge tapings, drain points, wooden haunches etc.</p> <p><b><u>COOLING TOWER WATER / CHILLED WATER PIPING:</u></b></p>		
4.1	250 mm dia.	RMT	65

4.2	200 mm dia.	RMT	100
4.3	150 mm dia.	RMT	60
4.4	125 mm dia.	RMT	50
4.5	100 mm dia.	RMT	10
4.6	80 mm dia.	RMT	40
4.7	50 mm dia.	RMT	20
<b>5.0</b>	<b><u>GI CLASS B PIPING:</u></b> <b><u>FOR COOLING TOWER MAKE UP / DRAIN WATER PIPING:</u></b> Providing and fixing in position the following <b>GI class 'B' pipes</b> cut to required lengths and installed with all screwed/welded joints, all fittings including necessary size and quantity of flanges, elbows, tees, reducers, nipples, couplings, gaskets, hard wares, purge, drain points with valves, etc.		
5.1	50 mm dia.	RMT	15
5.2	40 mm dia.	RMT	5
5.3	25 mm dia.	RMT	10
<b>6.0</b>	<b><u>BUTTERFLY VALVE:</u></b> Providing and fixing in position the following Class 150 <b>Wafer type Butterfly valves</b> center disc type, with slim seal, CI/WCB/Al body and all SS wetted parts including position indicator, including matching flanges, gaskets and fasteners. <b>BFV (Manual operation)</b> with handle. <b><u>FOR COOLING TOWER WATER / CHILLED WATER PIPING :</u></b>		
<b>6.1</b>	200 mm dia.	Nos.	5
<b>6.2</b>	150 mm dia.	Nos.	18
<b>6.3</b>	125 mm dia.	Nos.	12
<b>6.4</b>	100 mm dia.	Nos.	3
<b>6.5</b>	80 mm dia.	Nos.	3
<b>7.0</b>	<b><u>ELECTRICALLY OPERATED MOTORISED ON/OFF BUTTERFLY VALVE:</u></b> Supply, installation, testing and commissioning of Class 150 motorized ON/OFF butterfly valves. <b>Wafer type Butterfly valves</b> center disc type, with slim seal, CI/WCB/Al body and all SS wetted parts including position indicator, including matching flanges, gaskets and fasteners. Valve should be compatible for operation from SCADA system. Manual ON/OFF operation facility should be available in the valve.		
<b>7.1</b>	150 mm dia.	Nos.	3
<b>7.2</b>	125 mm dia.	Nos.	3
<b>8.0</b>	<b><u>BALANCING VALVE:</u></b> Providing and fixing in position of following flange ended <b>Balancing valves – Class 150, CI/WCB body and all SS 304 wetted parts</b> with flow measurement accessories and position indication, including matching flanges and fasteners. <b><u>FOR COOLING TOWER WATER / CHILLED WATER PIPING:</u></b>		
<b>8.1</b>	150 mm dia.	Nos.	6

8.2	125 mm dia.	Nos.	3
9.0	<b><u>NON RETURN VALVE:</u></b> Providing and fixing in position of following <b>Non return valve – Class -150, CI/WCB body and all SS 304 wetted parts</b> , including matching flanges and fasteners.  <b><u>FOR COOLING TOWER WATER / CHILLED WATER PIPING:</u></b>		
9.1	150 mm dia.	Nos.	3
9.2	125 mm dia.	Nos.	3
10.0	<b><u>BALL VALVE/Air purge valve:</u></b> Providing and fixing in position of following <b>Ball valves</b> , with GM/CI/SS body, SS 304 wetted parts and PTFE seat. Including matching flanges and fasteners. <b><u>FOR COOLING TOWER WATER / CHILLED WATER PIPING:</u></b>		
10.1	<b>Flange end type</b> 50 mm dia. (Gunmetal/CI)	Nos.	3
10.2	<b>Flange/Screwed end type, Three piece</b> 40 mm dia. (Gunmetal /Brass / SS)	Nos.	3
10.3	<b>Screwed end type, Three piece.</b> 25 mm dia. (Gunmetal /Brass / SS)	Nos.	10
10.4	<b>Screwed end type Three piece / Single piece.</b> 15 mm dia. (Gunmetal /Brass / SS)	Nos.	10
10.5	<b>Air vent (Air purge ) with isolation ball valve</b>  15 mm dia	Nos.	4
11.0	<b><u>FLEXIBLE BELOWS</u></b> Providing and fixing in position of Flexible connection (Bellows) with guide rods will be provided at inlet and outlet of each chilled water Pump (size 125NB x 6 Nos.) and condenser pumps (size 150NB x 6 Nos.) including matching flanges and fasteners. •	Nos.	12
12.0	<b><u>POT STRAINER - Size 200 NB:</u></b> Providing and fixing in position of following <b>Class 150 flange ended Pot strainers</b> , with CI/WCB body and SS 304 filter element including matching flanges and fasteners. <b>One spare filter element shall be provided along with strainer.</b> • <b>200 mm</b>	No.	1
13.0	<b><u>Y – STRAINER :</u></b> Providing and fixing in position of following <b>Class 150 flange ended Y- Type strainers</b> , with CI/WCB body and SS 304 filter element including matching flanges and metric standard fasteners.		
13.1	150 mm dia.	Nos.	3
13.2	125 mm dia.	Nos.	3



14.0	<p><b><u>INSULATION:</u></b>  <b><u>FOR CHILLED WATER PIPING :</u></b>  Supply and fixing of insulation (as specified) on Chilled Water Pipelines.</p> <p>Premoulded pipe sections shall be placed over the pipes, the longitudinal joints of this pipe section shall be sealed with the adhesive compound. The traverse joints shall also be sealed with adhesive compound. The insulation shall be continuous over the entire run of piping, fittings and valves. Clean the surface and fix the insulation tightly with cold elastomeric membraneous bitumen (Eniroof EMB) or hot bitumen as recommended by insulation manufacturer. The joints shall be suitably sealed.</p> <p>All insulated pipes shall be covered with layer of thick polythene sheet as vapour barrier. PVC straps at 400 mm centre shall be used to hold insulation and vapour barrier together. Insulation material shall be covered with a continuous sheet of thick polyethylene (for protection from water and moisture), before wrapping with GI chicken wire-mesh and then 15 - 20 mm thick sand-cement plaster / Aluminum cladding will be provided.</p>		
14.1	200 mm dia pipe (75 mm TF quality Expanded Polystyrene {thermocool} with 26G Al cladding) – Inside plant room	RMT	60
14.2	200 mm dia pipe (75 mm TF quality Expanded Polystyrene {thermocool} with 15 - 20 mm thick sand cement plaster) – Outside plant area	RMT	45
14.3	125 mm dia pipe (50 mm TF quality Expanded Polystyrene {thermocool} with 26G Al cladding)	RMT	55
14.4	80 mm dia pipe (50 mm TF quality Expanded Polystyrene {thermocool} with 26G Al cladding)	RMT	45
14.5	200 mm dia pipe (32 mm nitrile with 26G Al cladding)	RMT	5
15.0	<p><b><u>MS STRUCTURE WORK:</u></b>  Design, supply, fabrication, installation of MS structure work for supporting piping, cable tray etc at the site to suit the system requirements, including operating platform (If at all needed) within the building with anti corrosion painting.  MS support structure work including plates / channels / pipes.</p>	Kgs	1200
16.0	<p><b><u>ELECTRICAL PANEL :</u></b></p> <p>Design, manufacture, supply, installation, testing and commissioning of the following integrated cubicle type dead front extensible sheet steel indoor type MCC panels, anchoring the panels to the foundation. The panels shall be suitable for 415V, 4 wire 50 Hz AC supply. Quoted price shall include wiring, cabling (power/control) and copper earthing inside the power panel etc. as LOT.</p> <p><b><u>All the switchgears selected, shall be designed for 50 kA SC current fault level.</u></b></p> <p>The following components and accessories shall be mounted within electrical panel:</p> <p><b>Refer: Single Line Diagram (SLD) of System and Tender specifications.</b></p> <p><b>a. INCOMER</b></p> <ul style="list-style-type: none"> <li>• One no. <b>800 Amps</b> electrically operated drawn-out type incoming <b>TPN ACB (4 pole)</b> with Electronic S/C, O/C &amp; E/F release.</li> <li>• <b>Digital Multi function meter (Amp, Volt, Kwh, f, PF etc.).</b></li> <li>• Under, Over Voltage Relay and SPP/RPP,</li> <li>• a set of indicating lamps,</li> <li>• 4-20 mA voltage and current transducer for remote metering,</li> <li>• Suitable interface scheme for remote monitoring (ON/OFF/TRIP) at SCADA, and</li> <li>• Suitable interface scheme for local operation (ON/OFF/TRIP) with Phase indicating lamps shall be provided.</li> </ul>		

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<p><b>b. OUT GOING FEEDERS</b></p> <p>(i) All the feeders (except F13 to F20) shall be provided with a Suitable interface scheme for remote monitoring (ON/OFF/TRIP) at SCADA. All Suitable interfaces shall be carried out up to marshalling chamber.</p> <p>(ii) Feeders F1-F3 shall be provided with a Suitable interface scheme for 4-20 mA current transducers for remote metering at SCADA for chillers units. All connection shall be carried out up to marshalling chamber.</p> <ul style="list-style-type: none"> <li>• (F1-3) 3 nos. 400 amps. TP+N MCCB with SPP, E/F relay with CBCT, and outgoing feeders to <b>Compressor motor starters</b>. This compartment shall contain Digital multifunction meter with selector switch and indicating lamps with fuse for ON/OFF and TRIP status of Comp. Motor.</li> <li>• (F4-6) 3 nos. 100 amps. TP MCCB, Star / Delta starters, O/L relay with SPP, E/F relay with CBCT and outgoing feeders to <b>Chilled water pump motors</b>. This compartment shall contain Digital ammeter with selector switch, PB switches for ON/OFF and indicating lamps with fuse for ON/OFF and TRIP status of pump motor.</li> <li>• (F7-9) 3 nos. 63 amps. TP MCCB, Star / Delta starters, O/L relay with SPP, E/F relay with CBCT and outgoing feeders to <b>Cooling Tower water pump motors</b>. This compartment shall contain Digital ammeter with selector switch, PB switches for ON/OFF and indicating lamps with fuse for ON/OFF and TRIP status of pump motor.</li> <li>• (F10-12) 3 nos. 32 amps. TP MCCB, starters, O/L relay with SPP, E/F relay with CBCT and outgoing feeders to <b>CT fan motors</b>. This compartment shall contain Digital ammeter with selector switch, PB switches for ON/OFF and indicating lamps with fuse for ON/OFF and TRIP status of fan motor.</li> <li>• (F13-14) 2 nos. TP 100 amps MCCB, 25 HP Star-Delta starters, O/L relay with SPP, E/F relay with CBCT, HRC fuses and outgoing feeders to existing <b>Cryo pump motors</b>. This compartment shall contain Digital ammeter with selector switch, PB switches for ON/OFF and indicating lamps with fuse for ON/OFF and TRIP status of pump motor.</li> <li>• (F15-16) 2 nos. TP 32 amps MCB, DOL starters, O/L relay with SPP, E/F relay with CBCT, HRC fuses and outgoing feeders to <b>drain pump motors</b>. This compartment shall contain Digital ammeter with selector switch, PB switches for ON/OFF and indicating lamps with fuse for ON/OFF and TRIP status of drain pump.</li> <li>• (F17) 01 no. Spare 100 amps TP MCCB feeders with CBCT &amp; E/F Relay, Digital Ammeter for future.</li> <li>• (F-18) 1 no. Spare 63 amps TP MCCB feeder with CBCT &amp; E/F Relay, Digital Ammeter for future.</li> <li>• (F19-20) 2 nos. Spare 32 amps TP+N MCB feeder, Digital Ammeter for future.</li> <li>• (F21) 01 no. feeder for marshalling chamber.</li> </ul> <p><b>Earthing:</b> A Cu bus earth of size not less than 35 X 6 Sqmm continuously runs at the top / bottom of the panel shall be provided.</p> <p><b>c. The scope includes:</b> Necessary cable alleys, space for spare switches, cable glands, terminations, trays, support structure, clamping, internal copper wiring with all accessories, internal power / control wiring / copper earthing between panels for all equipments including all necessary cables and other material.</p> <p><b>(Refer Tender specifications and Single Line Diagram (SLD) of System).</b></p> <ul style="list-style-type: none"> <li>• Only External Power cabling and external earthing shall be paid as per SOQ.</li> </ul>	LOT	1
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	<ul style="list-style-type: none"> <li>1100V-grade rubber mat shall be provided in front of the panel board.</li> <li><b>Electrical panel and associated work/s as described above.</b></li> </ul>		
<b>17.0</b>	<b><u>ELECTRICAL POWER CABLE:</u></b> Supply, Laying, termination, testing and commissioning of 1100 volts grade following Cabling / wiring with suitable lugs, cable glands, as per the system requirements. The scope also includes integration of existing chiller and pumps etc		
<b>17.1</b>	3 ½ C x 150 mm <sup>2</sup> Aluminum conductor Armoured Power Cables	RMT	60
<b>17.2</b>	3C x 4 mm <sup>2</sup> Copper Armoured Power Cables	RMT	60
<b>17.3</b>	3C x 6 mm <sup>2</sup> Copper Armoured Power Cables	RMT	150
<b>17.4</b>	3C x 10 mm <sup>2</sup> Aluminum conductor Armoured Power Cables	RMT	100
<b>17.5</b>	3C x 16 mm <sup>2</sup> Aluminum conductor Armoured Power Cables	RMT	140
<b>18.0</b>	<b><u>EARTHING :</u></b>  Supply, Laying, termination, testing and commissioning of following earthing , as per the system requirements:		
<b>18.1</b>	2 Nos. run x 4 mm dia. Copper wires Note: 2 nos. Run (Meter) earthing = 1 RMT earthing	RMT	100
<b>18.2</b>	25 mm x 3 mm Copper strips	RMT	150
<b>19.0</b>	<b><u>PERFORATED CABLE TRAYS:</u></b>  Supply, Installations and testing of 'C type' cable trays made from 2.0 mm thick hot galvanized GI / MS powder coated perforated sheets, with clamping etc., suitable for power cables laying, of the following sizes:		
<b>19.1</b>	75 mm both side riser x450 mm width	RMT	40
<b>19.2</b>	50 mm both side riser x 300 mm width	RMT	40
<b>19.3</b>	50 mm both side riser x 150 mm width	RMT	30
<b>19.4</b>	50 mm both side riser x 100 mm width	RMT	40
<b>20.0</b>	<b><u>LOCAL PUSH BUTTONS FOR COOLING TOWERS:</u></b> Weather proof local ON-OFF (Local Isolators for Safety (For Cooling towers)): IP 55 - ON-OFF local isolators for equipment located away from the panel boards (e.g. cooling towers).Complete with mounting stand. The scope also includes required Cabling between push-buttons and electrical panel board. Local emergency Stop panel with all controls at cooling tower area with earthing, power and control wiring from electrical panel, shall be included.	Nos.	3
<b>21.0</b>	<b><u>MAGNETIC FLOW METER</u></b>  Supply, Installation, testing and commissioning of flanged end type Electromagnetic type flow meter for Chilled water header and compatible to 4-20 mA output. Media shall be of soft water. The scope includes supply of display unit (going to be fixed in AC control room), Signal cable, power cable and earthing (from field to AC control room). <ul style="list-style-type: none"> <li>Size: 150 NB</li> </ul>	No.	1
<b>22.0</b>	<b><u>PRESSURE GAUGE</u></b>  Providing and fixing in position, water pressure gauges filled with glycerin with all accessories like shutoff valve, siphon pipe, etc. with ±1% accuracy.  Range: 0-10 Bar. Dial 100 mm (dial filled with glycerin / eqv liquid)	Nos.	26
<b>23.0</b>	<b><u>TEMPERATURE GAUGE</u></b> Providing and fixing in position the dial type temperature gauge with SS 304/316 integral parts and SS 304/316 thermo well with all accessories. <b>Range: 0 - 50°C. Dial 100 mm</b>	Nos.	12
<b>24.0</b>	<b><u>PAINTING &amp; TAGS</u></b> Painting of the new piping, existing piping, supports, MS structure etc; equipment identification		

	tags (stickers/Paints/Al tags) for Chiller, Pumps, cooling tower, directional arrows for pipes, Al tags (for cable, one at equipment side and other is panel side) etc. All pipes, its supports and MS structure shall be thoroughly cleaned and given one (Or two, if required) coat of, red oxide paint before painting. <b>The scope also includes painting and tagging of existing insulated chilled water supply and return line (on main building terrace and in Tokamek AC plant). The insulated pipe OD (pipe with insulation) is approx 300 mm and approx total length (supply and return) is 220 meter.</b>	Lot	1
25.0	<p><b><u>MINOR / MAJOR CIVIL WORKS:</u></b> For all equipments covered under Schedule of quantity of this tender, following civil works shall be included.</p> <p>a. Modification and extension of existing RCC foundation of the cooling tower as per new cooling tower dimension with RCC work. Work shall be carried out as per instruction of EIC. Frame of the new cooling tower will be properly grouted / anchored to RCC foundation for stability of the cooling towers.</p> <p>b. RCC Floating / Fixed foundation blocks lined with MS angle on edges, pedestals for all equipments like chillers, pumps, Electrical panel etc.</p> <p>c. One no. RCC Floating / Fixed foundation blocks lined with MS angle on edges should be made for existing working chiller. This included removal of existing chiller from the present foundation, removing foundation, putting existing chiller back on the new RCC foundation without any damage to the chiller.</p> <p>d. Other Civil and associated Works require to be carried-out for the Erections / Installations of all the Equipments.</p> <p>e. Removal of existing chiller and pump foundation and shifting of debris as instructed by EIC.</p> <p>The scope also includes Making, cutting and finishing of hole in roof / floor/ wall, opening for cables, pipe crossings etc. and making good of them. Including digging work/s and minor civil work required for laying / removal of piping or any other equipments. Grouting of supports and finishing good of them. Fixing all equipments with proper arrangements and all civil repairing work with Painting.</p> <p><b>Whole Work shall be carried out as per instruction of EIC.</b></p> <ul style="list-style-type: none"> <li>• Civil work/s as described above.</li> </ul>	LOT	1
26.0	<p><b><u>DISMANTLING OF OLD PLANT EQUIPMENTS AND BRINGING NEW EQUIPMENTS IN:</u></b> Dismantling work of existing old Equipments like chillers, cooling towers (From plant terrace), pumps, piping with and without insulation, Annunciation panel, MCC panels &amp; other accessories of plant including, valves, cables and <b>shifting &amp; storing of these items, to suitable inside IPR campus as directed by IPR.</b></p> <p><b>The Scope also includes bringing in new chillers, pumps, Electrical panel, cooling towers (on plant terrace) and putting all equipment on their foundation including one existing working chiller</b></p> <p><b>This work will be carried out by contractor without damaging any equipment.</b></p> <p><b>The scope also includes Other required necessary civil and other work/s to complete above mentioned work.</b></p> <ul style="list-style-type: none"> <li>• Work as described above.</li> </ul>	Job	1

**SECTION – VII**

**SITE VISIT**

**For site visit the bidder shall contact the following persons. It may please be noted that any clarifications required in this tender either technical or otherwise shall be carried out before submission of bids. Bidder shall not have any right to revise the price bid once submitted.**

Contact Persons at IPR to co-ordinate site visits:

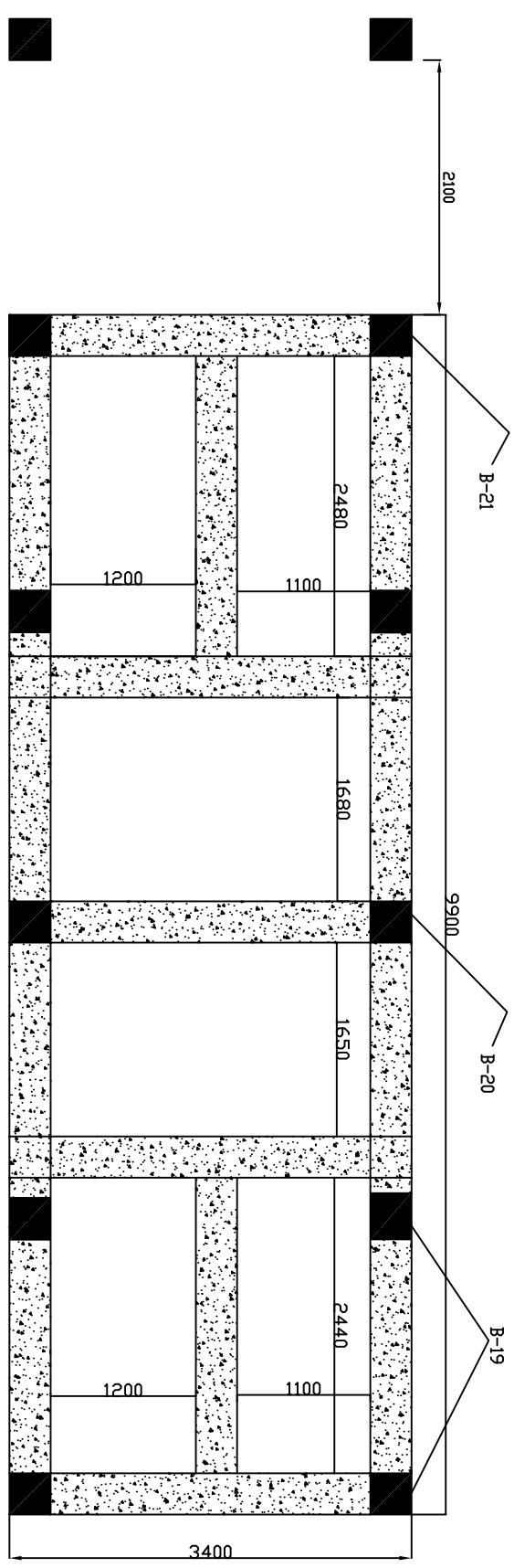
**1. Mr. Yagneshkumar K Trivedi**

Water Cooling Division  
Tel: 079 – 2396 2229/2230  
Email: [yagnesh@ipr.res.in](mailto:yagnesh@ipr.res.in)

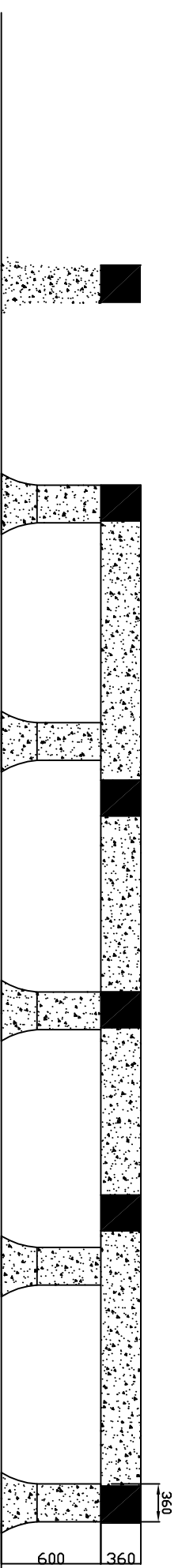
**2. Mr. Manish Vasanni**

Water Cooling Division  
Tel: 079 – 2396 2229/2230  
Email: [mvasani@ipr.res.in](mailto:mvasani@ipr.res.in)

# EXISTING COOLING TOWER FOUNDATION ON PLANT TERRACE



- COOLING TOWER WILL BE INSTALLED ON THE TERRACE OF THE PLANT ROOM WITH RCC FOUNDATION. COOLING TOWER FOUNDATION WILL BE IN CONTRACTORS SCOPE.
- COOLING TOWER FOUNDATION WILL BE MADE AS PER INSTRUCTION OF THE IPR ETC.

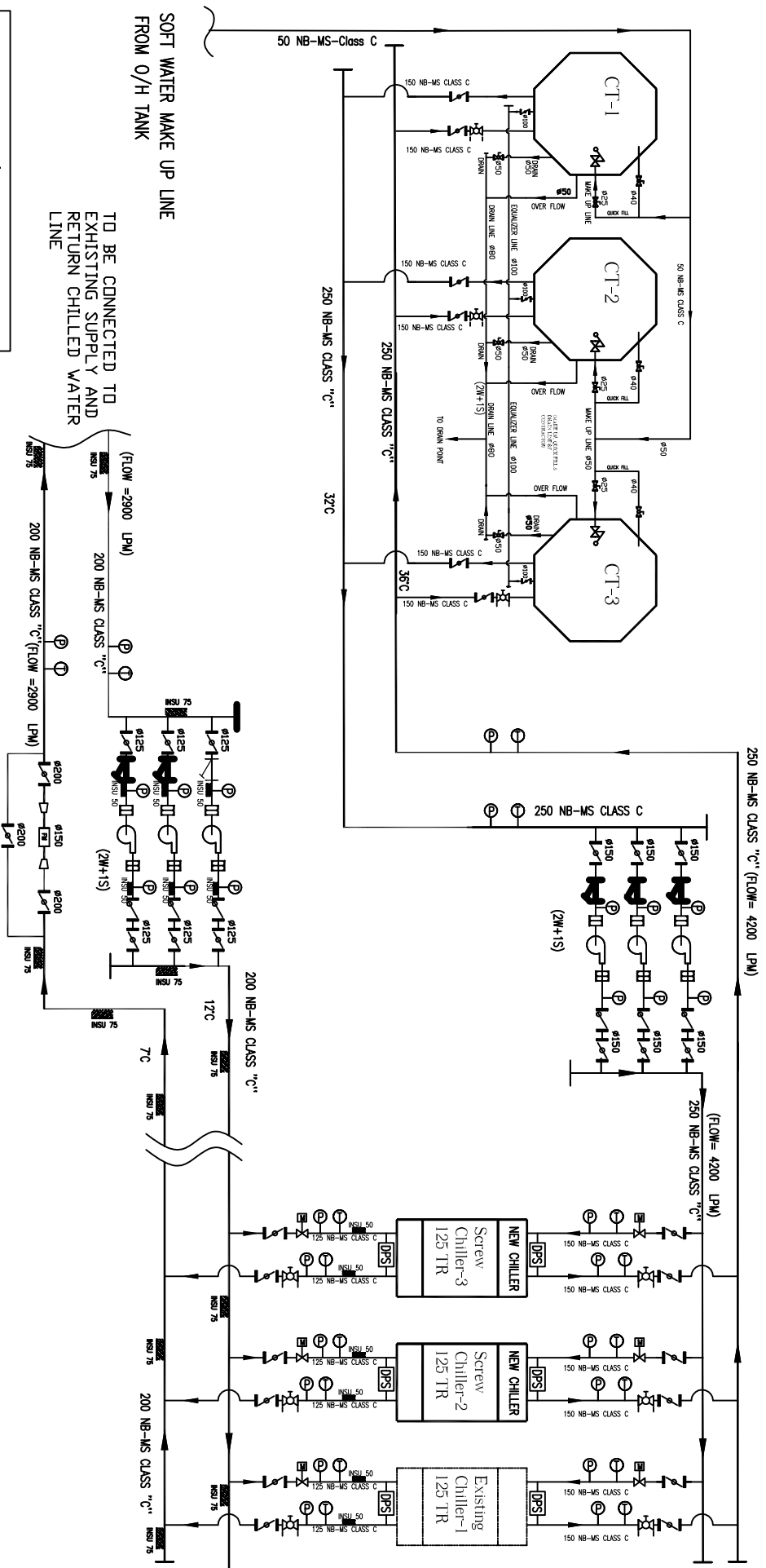


PLANT ROOM TERRACE.

Note: All dimensions are in mm

ASSY GROUP:		INSTITUTE FOR PLASMA RESEARCH	
ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED		BHAAT, GANDHINAGAR-382 428.	
SCALE	M/S	DATE	TITLE
	Y.K.T		EXISTING CT FOUNDATION ON PLANT TERRACE
CHECKED		REF DRG NO: IPR/SST1/7D/01	REV. NO
APPROVED		DRG NO	IPR/SST1/CTFOUNDATION/01
			SHEET 1 OF 1

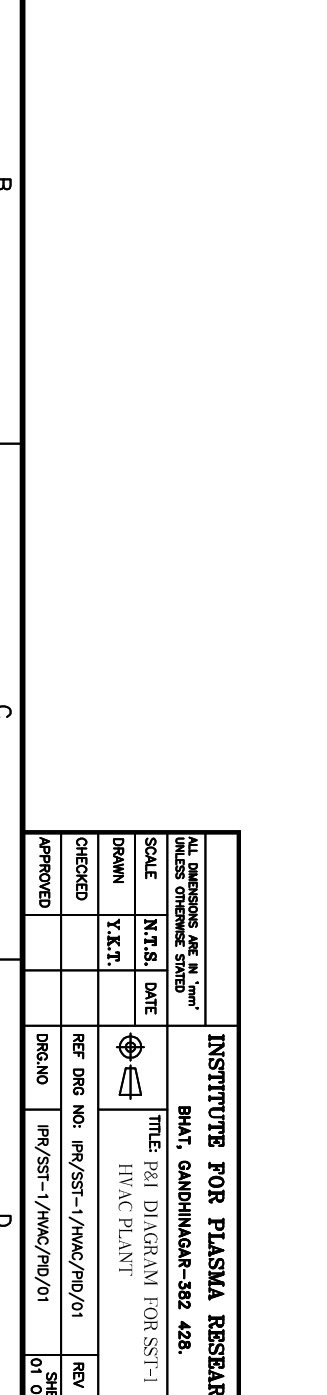
# P&ID FOR SST1 AC PLANT



**LEGEND FOR VALVE / INSTRUMENTATION**

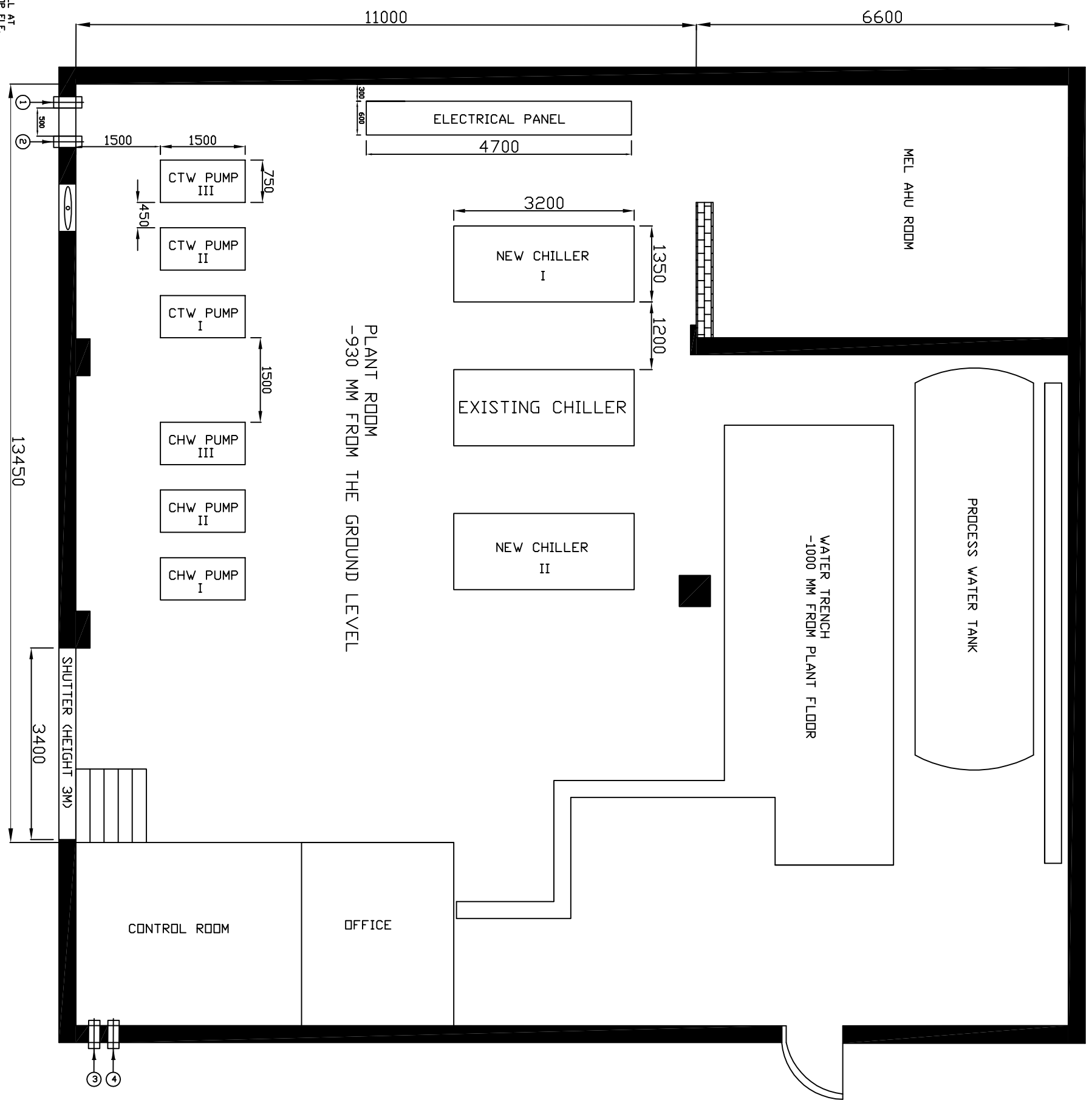
- |             |                         |             |                          |
|-------------|-------------------------|-------------|--------------------------|
| <b>H</b>    | BALANCING VALVE         | <b>TO</b>   | ONLINE TEMPERATURE GAUGE |
| <b>B-1</b>  | PRESSURE REDUCING VALVE | <b>PO</b>   | PRESSURE GAUGE           |
| <b>L-1</b>  | BUTTERFLY VALVE         | <b>PT</b>   | PRESSURE TRANSMITTER     |
| <b>L-2</b>  | ISOLATION VALVE         | <b>TT</b>   | TEMPERATURE TRANSMITTER  |
| <b>B-2</b>  | SOFT WATER VALVE        | <b>TO-2</b> | TEMPERATURE INDICATION   |
| <b>Q-1</b>  | SOLENOID VALVE          | <b>CO-2</b> | CONDUCTIVITY METER       |
| <b>Q-2</b>  | SOLENOID VALVE          | <b>PH-1</b> | PH METER                 |
| <b>Q-3</b>  | SOLENOID VALVE          | <b>FM-1</b> | FLOW METER               |
| <b>Q-4</b>  | SOLENOID VALVE          | <b>TI-1</b> | TEMPERATURE INDICATION   |
| <b>Q-5</b>  | SOLENOID VALVE          | <b>CO-1</b> | CONDUCTIVITY INDICATION  |
| <b>Q-6</b>  | SOLENOID VALVE          | <b>FI-1</b> | FLOW INDICATION          |
| <b>Q-7</b>  | SOLENOID VALVE          | <b>F</b>    | WATER FLOW               |
| <b>Q-8</b>  | SOLENOID VALVE          |             |                          |
| <b>Q-9</b>  | SOLENOID VALVE          |             |                          |
| <b>Q-10</b> | SOLENOID VALVE          |             |                          |
| <b>Q-11</b> | SOLENOID VALVE          |             |                          |
| <b>Q-12</b> | SOLENOID VALVE          |             |                          |
| <b>Q-13</b> | SOLENOID VALVE          |             |                          |
| <b>Q-14</b> | SOLENOID VALVE          |             |                          |
| <b>Q-15</b> | SOLENOID VALVE          |             |                          |
| <b>Q-16</b> | SOLENOID VALVE          |             |                          |
| <b>Q-17</b> | SOLENOID VALVE          |             |                          |
| <b>Q-18</b> | SOLENOID VALVE          |             |                          |
| <b>Q-19</b> | SOLENOID VALVE          |             |                          |
| <b>Q-20</b> | SOLENOID VALVE          |             |                          |
| <b>Q-21</b> | SOLENOID VALVE          |             |                          |
| <b>Q-22</b> | SOLENOID VALVE          |             |                          |
| <b>Q-23</b> | SOLENOID VALVE          |             |                          |
| <b>Q-24</b> | SOLENOID VALVE          |             |                          |
| <b>Q-25</b> | SOLENOID VALVE          |             |                          |
| <b>Q-26</b> | SOLENOID VALVE          |             |                          |
| <b>Q-27</b> | SOLENOID VALVE          |             |                          |
| <b>Q-28</b> | SOLENOID VALVE          |             |                          |
| <b>Q-29</b> | SOLENOID VALVE          |             |                          |
| <b>Q-30</b> | SOLENOID VALVE          |             |                          |
| <b>Q-31</b> | SOLENOID VALVE          |             |                          |
| <b>Q-32</b> | SOLENOID VALVE          |             |                          |
| <b>Q-33</b> | SOLENOID VALVE          |             |                          |
| <b>Q-34</b> | SOLENOID VALVE          |             |                          |
| <b>Q-35</b> | SOLENOID VALVE          |             |                          |
| <b>Q-36</b> | SOLENOID VALVE          |             |                          |
| <b>Q-37</b> | SOLENOID VALVE          |             |                          |
| <b>Q-38</b> | SOLENOID VALVE          |             |                          |
| <b>Q-39</b> | SOLENOID VALVE          |             |                          |
| <b>Q-40</b> | SOLENOID VALVE          |             |                          |
| <b>Q-41</b> | SOLENOID VALVE          |             |                          |
| <b>Q-42</b> | SOLENOID VALVE          |             |                          |
| <b>Q-43</b> | SOLENOID VALVE          |             |                          |
| <b>Q-44</b> | SOLENOID VALVE          |             |                          |
| <b>Q-45</b> | SOLENOID VALVE          |             |                          |
| <b>Q-46</b> | SOLENOID VALVE          |             |                          |
| <b>Q-47</b> | SOLENOID VALVE          |             |                          |
| <b>Q-48</b> | SOLENOID VALVE          |             |                          |
| <b>Q-49</b> | SOLENOID VALVE          |             |                          |
| <b>Q-50</b> | SOLENOID VALVE          |             |                          |

TO BE CONNECTED TO EXISTING SUPPLY AND RETURN CHILLED WATER LINE



INSTITUTE FOR PLASMA RESEARCH	
BHAJ. GANDHINAGAR-382 428.	
SCALE	N.T.S.
DRAWN	Y.K.T.
CHECKED	
APPROVED	
REF DRG NO:	IPR/SST-1/HVAC/PID/01
DRG NO	IPR/SST-1/HVAC/PID/01
SHEET	01 OF 01

# PLANT LAYOUT OF SST1 A.C. SYSTEM



● COOLING TOWER WILL BE INSTALLED ON THE TERRACE OF THE PLANT ROOM. COOLING TOWER FOUNDATION WILL BE IN CONTRACTORS SCOPE.

- ① 200 NB C.V.R. ALL AT TOP ELEV. DF +2.2500
- ② 200 NB C.V.S.
- ③ 200 NB CH.W.R.
- ④ 200 NB CH.W.S.

Note: All dimensions are in mm

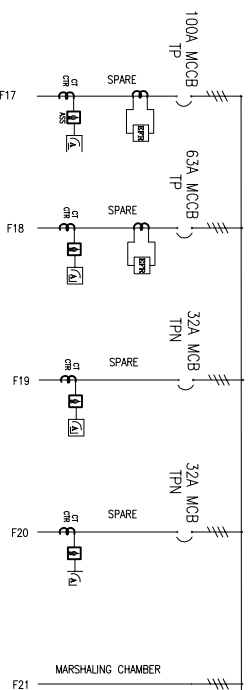
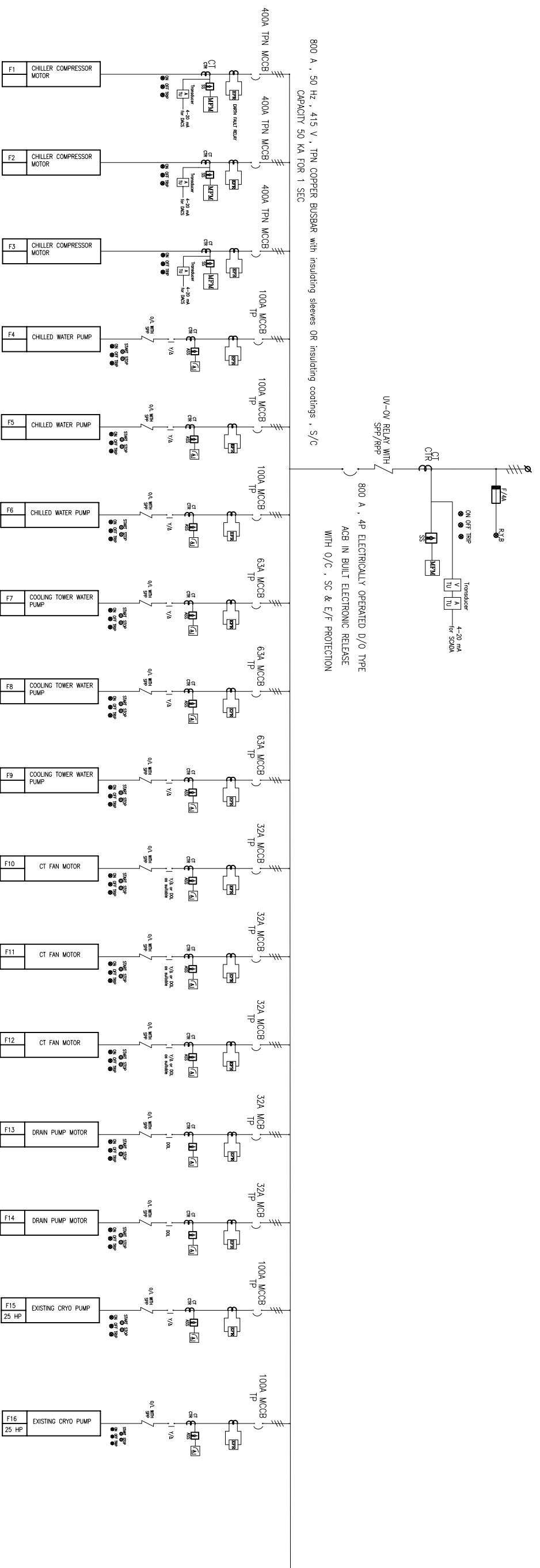
REVISION COLUMN				ASSTY GROUP:				INSTITUTE FOR PLASMA RESEARCH					
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY	SCALE	DATE	DESIGNER	CHECKED	APPROVED	REF DRG NO.	DATE	REV. NO.

TITLE: PLANT LAYOUT OF SST1 AC SYSTEM  
 REF DRG NO: P/R/SST1/PL/01  
 DATE: 10/01/2011  
 REV. NO: 01



# PROPOSED SST1 AIR CONDITIONING SYSTEM ELECTRICAL SINGLE LINE DIAGRAM

INCOMER  
415V AC, 3PH, 4WIRE (R,Y,B,N), 50Hz



- NOTE:**
- This drawing is proposed as per system requirement. Refer tender specifications and BOQ for more detail.
  - The basic enclosure shall be fabricated from Cold rolled sheet steel material, of thickness not less than 2 mm in all sides. For all the load bearing application sheet steel thickness shall not be less than 2 mm. Doors and covers shall be made of cold rolled sheet steel of thickness not less than 1.6mm. Stiffeners shall be provided wherever required. The panel frames shall be fabricated using cold rolled sheet steel of thickness not less than 2.5 mm.
  - Control wiring shall be done using 650 V grade PVC standard wire 1.5 sq.mm for control and 2.5 sq.mm for CT circuit. Internal power wiring of panel shall be done with minimum 2.5 sq.mm Cu wire 1100 V grade.
  - Bus bars shall be of Electrolytic Copper material. The bus bars should have rectangular section. The current density shall not exceed 1.2 A/sq.mm while calculating the size of the bus bars.
  - A copper earth bus of size not less than 35 x 6 mm<sup>2</sup> continuously runs at the top / bottom of the panel shall be provided.
  - Suitable Cu terminals shall be provided for termination of incoming cable to ACB.

- Multifunction Meter
- Selector Switch
- Digital Ammeter

ASSY GROUP: W/C SYSTEM ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE SHOWN	INSTITUTE FOR PLASMA RESEARCH BHAT, GANDHINAGAR-382 428.
SCALE	TITLE: ELECTRICAL SINGLE LINE DIAGRAM FOR SST1 AIR CONDITIONING SYSTEM
DRAWN Y. K. TRIVEDI	REF DRG NO: IPR/SST1/ELE/01
DESIGN Y.K.T.	DRG.NO IPR/SST1/ELE/01
APPROVED	REV:00 SHEET 1 OF 1

**Institute for Plasma Research**  
**(An Autonomous Institute of Dept. of Atomic Energy)**  
**Bhat, Gandhinagar**

**TERMS & CONDITIONS**

ITEM DESCRIPTION	<b>Supply, Installation, testing and commissioning of Screw chiller system including cooling tower, pumps, piping, valves, insulation, electrical panel, cables, earthing, removal of existing plant equipment, bringing new equipment inside the plant and minor civil work as per the specifications mentioned in the tender documents</b>	
Sl. No.	PARTICULARS	REMARKS
I	<b>Name of the Supplier</b>	
II	<b>IPR Enquity NO &amp; Date</b>	IPR/TN/PUR/TPT/ET/19-20/11 DATED 27/6/2019
III	<b>Vendor Offer No &amp; Date</b>	
IV	Postal address	
V	Contact with STD code	
VI	Fax with STD code	
VII	Name of Contact person	
VIII	Mobile No.	
IX	e-mail ID	
X	<b>Currency of offer/quotation</b>	
	<b>SCANNED COPY OF THE BELOW MENTIONED DOCUMENTS NEED TO UPLOAD AT <a href="http://www.tenderwizard.com/DAE">www.tenderwizard.com/DAE</a> AT THE TIME OF PARTICIPATION OF TENDER WITHIN THE PERIOD OF SUBMISSION.</b>	<b>"YES" OR "NO"</b>
1	<b>Certificates:</b>	
	i) Registration Certificate if Any, with DGS&D/NSIC/MSME	
	ii) PAN (Permanent Account Number) Registration	
	iii) Certificates of Registration for Sales Tax/ VAT/ WCT or Service Tax	
	iv) Authorization certificate/ Agency Agreement from Manufacturer (if not manufacturer)	
	<b>Commercial Terms for Quoted items (Please Provide Commercial terms and conditions in the below form)</b>	
2	Price Shall be firm and fixed through out the currency of contract, in the event of placement of purchase order.	
3	Please select the CURRENCY OF OFFER / QUOTATION first	
4	Have you offered Packing and forwarding charges in the price bid (if applicable)?	
5	Goods and Services Tax: Have you specified HSN / SAC Code for Goods and Services Tax in Price Bid?	
6	Have you offered Freight charges in the price bid?	
7	Have you offered Insurance charges in the price bid?	
8	<b>Delivery period (as per Sr. No.31 of Section-A of Form No. IPR_LP_ET_02.V5 (Terms and Conditions) attached with the tender/enquiry). (Also refer document named "Deferred_terms_IPR_LP_ET_02.V5" for amended delivery terms)</b>	
9	Have you offered Installation and commissioning charges?	
10	Liquidated Damages:- as per Sr. No. 22 of Section B of Form No IPR-LP-ET-02.V5 ( Terms and Conditions) attached with the tender/enquiry	
11	Terms of Payment:- as per Sr. No.35 of Section B of Form No. IPR_LP_ET_02.V5 (Terms and Conditions) attached with the tender/enquiry. (Also refer document named "Deferred_terms_IPR_LP_ET_02.V5" for amended payment terms)	
12	Guaranty / Warranty:-as per Sr. No. 34 of Section B of Form No. IPR_LP_ET_02.V5 (Terms and Conditions) attached with the tender/enquiry	
13	<b>Validity of offer/quotation:-</b> 120 days from the date of opening of tender	
	<b>QUESTIONNAIRE TO BE FILLED BY BIDDER IN AND SENT ALONG WITH OFFER DULY SIGNED</b>	
14	In the event of a purchase order/contract vendor has to provide Security Deposit in the form of Bank Guarantee for 10% of contract/ order value from SBI/nationalized banks or any one of the scheduled banks mentioned in the bracket (Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank) valid till final acceptance of the supplied goods at IPR, wherever applicable shall be submitted .	
15	In the event of a purchase order/contract Performance Bank Gurantee for 10% of the contract/order value from SBI/nationalized banks or any one of the scheduled banks mentioned in the bracket (Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank) valid throughout the guarantee period, wherever applicable shall be submitted.	

16	I/We hereby offer to supply the stores detailed in the schedule hereto at the price given in the said schedule and agree to hold this offer open till expiry of quotation. I/We shall be bound to supply the stores hereby offered upon issue of purchase order communicating the acceptance thereof on or before the expiry of the last mentioned date. You will be at liberty to accept any one or more of the items of stores tendered for or portion of any or more of the items of such stores and I/We notwithstanding that the offer in the tender has not been accepted in whole shall be bound to supply to you- such item or items and such portion or portions of one or more of the items as may be specified in the said Purchase Order communicating the acceptance.	
17	I/we have understood the General Conditions of all Contracts and special conditions of contract governing supplies of plant and machinery in the Form No.IPR_LP_ET_02.V5, included in the General Conditions of all Contracts and special conditions of contract governing of plant and machinery applicable to contracts placed by the Institute for Plasma Research and the instructions to Tenderer annexed to the invitation to tender Form and have thoroughly examined the specification / drawing and / or pattern quoted or referred to in the Schedule hereto and am/are fully aware of the nature of the stores required any my/our offer is to supply stores strictly in accordance with subject tender to the terms and conditions stipulated in your above Form No. IPR_LP_ET_02.V5 and also contained in the Purchase Order Communicating acceptance of this Tender.	
18	Whether All Documents Related to tender Viewed?	
19	Vendor should upload the complete technical details (Tehncial specifications with product data sheet	
20	In case of two part tender whether unpriced quotation has been uploaded (Failing which offer will not be considered for technical evaluation)	
21	<b>Free Issue Material:</b> Successful tenderer will have to arrange insurance showing beneficiary as "Institute for Plasma Research" at their risk and cost towards adequate security for the materials/property provided/issued by the Purchaser as Free Issue Material for the due execution of the contract, wherever applicable.	

**Institute for Plasma Research**  
**(An Autonomous Institute of Dept. of Atomic Energy)**  
**Bhat, Gandhinagar**

**Eligibility Criteria (Annexure-A)**

<b>ITEM DESCRIPTION</b>	<b>Supply, Installation, testing and commissioning of Screw chiller system including cooling tower, pumps, piping, valves, insulation, electrical panel, cables, earthing, removal of existing plant equipment, bringing new equipment inside the plant and minor civil work as per the specifications mentioned in the tender documents</b>		
<b>Sl. No.</b>	<b>PARTICULARS</b>	<b>REMARKS</b>	
I	<b>Name of the Vendor</b>		
II	<b>IPR Enquity NO &amp; Date</b>	IPR/TN/PUR/TPT/ET/19-20/11 DATED 27/6/2019	
III	<b>Vendor Offer No &amp; Date</b>		
<b>Sr. No.</b>	<b>Criteria</b>	<b>Documents required to upload</b>	<b>Status of Documents (Uploaded/ Not-Uploaded in e-Tender Portal)</b>
1	Bidder should be Chiller manufacturer (OEM) OR their authorized Dealer / distributor (A certificate should be attached for Manufacturer/Authorized dealer/distributor )	In case the bidder is an OEM, provide company profile for OEM products.  In case the bidder is an authorized dealer of OEM, he should provide copy of valid agreement/dealership/distributorship certificate of OEM	
2	Bidder should have satisfactorily completed HVAC work consisting of Water cooled screw/Centrifugal compressor chiller/s (Each Minimum 125 TR capacity or more) with other associated equipments, its associated piping and other accessories works etc.  Minimum value of project completed within the last five years shall be as per following on or before 31st March, 2019.  I. At least one project with minimum value of Rs. 132 lakhs. OR II. At least two projects with minimum value of Rs. 99 lakhs. OR III. At least three projects with minimum value of Rs. 66 lakhs.	Copy of purchase orders along with technical details and completion certificate duly certified by the Engineer-in-Charge or Owner or Consultant/Architec should be submitted as proof.  <b>Note: Repairing works / Annual Maintenance works shall not be considered.</b>	
3	The average annual turnover for the last 3 years (i.e. 2015-16 to 2017-18) should be INR 4,12,00,000=00 (INR Four Crore twelve Lakhs )	Bidder should submit Audited balance sheet and Profit & Loss Account for the past 3 financial years (i.e. 2015-16 to 2017-18) as a proof	

**NOTE:**

**The Bidders, who fulfill the above requirements on their own (i.e. Works carried under joint ventures shall not be considered), shall only be eligible to submit their offer. Joint ventures for this work are not accepted.**

**Note:**

**The response to tender without submission of proof of above points will summarily be rejected without further communication**  
**The bidder shall not be under a declaration of ineligibility for corrupt or fraudulent practices or blacklisted with any of the Government agencies**  
**Original documents shall be produced for verifications, if required.**

**PRICE SCHEDULE (SECTION-D)**

IPR Enquiry NO & Date : **IPR/TN/PUR/TPT/ET/18-19/11 DATED 27-6-2019**  
From

NAME OF THE CONTRACTOR :  
Offer no & date:

Sl.No	Item Description	Tendered Quantity	Unit of Measurement (UOM)	Rate in INR For Supply					Rate in INR For Installation, testing & Commissioning					Packing and Forwarding Charges Per Unit (In percentage)		Freight Charges Per Unit (In percentage)		Insurance per unit (In percentage)		Remarks
				HSN Code (*1)	Basic Unit Rate	Discount (in amount)	Basic Unit rate after discount	GST rate	SAC Code (*1)	Basic Unit Rate	Discount (in amount)	Basic Unit rate after discount	GST rate	( in % ) Only	Amount	( in % ) Only	Amount	( in % ) Only	Amount	
1	<p><b>SCREW WATER CHILLING MACHINES</b> <b>(Flooded Evaporator chiller):</b> Supply, Factory testing, installation, testing and commissioning of microprocessor based water chilling unit (Single compressor model) of 125 TR actual Refrigeration capacity at 7°C leaving CHW temperature &amp; 32°C entering Condenser water temperature each complete with Semi – hermetic type Screw compressor, Factory fitted unit mounted motor, Closed transient type Star-Delta / Normal Star-Delta Starter microprocessor based control panel along with required hardware &amp; software for integration with a 3rd party BMS (Open protocol), water cooled condenser, insulated evaporator, integral refrigerant piping, first charge of refrigerant, in-comer switchgear with terminations box suitable for terminations of bus duct/Cable , earth terminations etc. all mounted on a steel frame, wiring with all accessories as per tender specification including vibration isolation, differential pressure switches, etc. suitable for 400 / 415 ± 10% V, 50 Hz, 3 phase, AC power with starter supply for following design conditions. <i>(Please refer Section-VI (Schedule of Quantity) Sr.No.1 under Section-C of tender document for more details)</i></p>	2	Nos.				0.00				0.00				0.00		0.00		0.00	
2	<p><b>COOLING TOWER :</b> Supply, installation, testing and commissioning of FRP Induced draft, counter-flow, cooling tower, for system. Tower shall be complete with FRP basin, casing, ladders, supports, propeller fans, virgin PVC fills, eliminators, HDPE / suitable sump distribution system, IP-55 TEFC induction motor suitable for 415±10% V, 50 Hz, 3phase power supply, weather cover for motor, drain, make up, quick fill , equalizer connection and vibration isolation etc. as per tender specification. <i>(Please refer Section-VI (Schedule of Quantity) Sr.No.2 under Section-C of tender document for more details)</i></p>	3	Nos.				0.00				0.00				0.00		0.00		0.00	
3	<p><b>PUMPS SETS:</b></p>																			
3.1	<p><b>CHILLED WATER PUMPS SETS:</b> Supply, installation, testing and commissioning of centrifugal back pull out (BPO) type pump with mechanical seal and bronze/SS impeller, complete with hot-dip galvanized or epoxy coated base frame for pump &amp; motor, coupling, coupling guard, vibration isolators and TEFC induction motor, for circulation of chilled water for screw chillers. Pump shall be suitable for 415±10% v, 50 Hz, 3 phase AC power supply. Quoted price shall include cost of insulation, vibration isolation and all other associated accessories and works. <i>(for details of Pump performance characteristics, please refer Section-VI (Schedule of Quantity) Sr.No.3.1 under Section-C of tender document)</i></p>	3	Nos.				0.00				0.00				0.00		0.00		0.00	

3.2	<b>COOLING TOWER PUMPS SETS :</b> Supply, installation, testing and commissioning of centrifugal back pull out (BPO) type pump with mechanical seal and bronze/SS impeller, complete with hot-dip galvanized or epoxy coated base frame for pump & motor, coupling, coupling guard, vibration isolators and TEFC induction motor, for circulation of Cooling Tower water for screw chillers. Pump shall be suitable for 415±10% v, 50 Hz, 3 phase AC power supply. Quoted price shall include cost of insulation, vibration isolation and all other associated accessories. <i>(for details of Pump performance characteristics, please refer Section-VI (Schedule of Quantity) Sr.No.3.2 under Section-C of tender document)</i>	3	Nos.															0.00	0.00	0.00	0.00	
3.3	<b>DRAIN PUMP:</b> Supply, installation, testing and commissioning of self-priming, non clogging monobloc / submersible type Drain /Sump pump with foot valve suitable for 3 phase, 415±10% V, 50Hz, AC supply, factory mounted on MS base plate, suction & discharge valve, NRV, level switch / level sensor with cable (for pump auto start) and other accessories.  Impeller shall be Bronze/Gunmetal/SS, hydraulically balanced and keyed to shaft. Motor shall be of a size suitable for the pump, drip and splash proof. Motor shall be suitable for 415 ± 10 % volts, 3 phases, 50 cycles AC power supply, and class F insulation.  <b>Pump set for water drain</b> Head on pump     15 MWC Water flow rate    @ 120 LPM Motor HP            2 or suitable. • Pump set as described above: (1W+1S)	2	Nos.																0.00	0.00	0.00	0.00
4	<b>MS CLASS C PIPING – Class 150</b>  Providing and fixing in position the following MS class C (Heavy) pipes cut to required lengths and installed with all welded joints, necessary fittings like flanges, elbows, tees, reducers, fasteners, gasket, purge tapings, drain points, wooden haunches etc.  <b>COOLING TOWER WATER / CHILLED WATER PIPING:</b>																					
4.1	250mm dia	65	RMT																0.00	0.00	0.00	0.00
4.2	200mm dia	100	RMT																0.00	0.00	0.00	0.00
4.3	150mm dia	60	RMT																0.00	0.00	0.00	0.00
4.4	125mm dia	50	RMT																0.00	0.00	0.00	0.00
4.5	100mm dia	10	RMT																0.00	0.00	0.00	0.00
4.6	80mm dia	40	RMT																0.00	0.00	0.00	0.00
4.7	50mm dia	20	RMT																0.00	0.00	0.00	0.00
5	<b>GI CLASS B PIPING: FOR COOLING TOWER MAKE UP / DRAIN WATER PIPING:</b> Providing and fixing in position the following GI class 'B' pipes cut to required lengths and installed with all screwed/welded joints, all fittings including necessary size and quantity of flanges, elbows, tees, reducers, nipples, couplings, gaskets, hard wares, purge, drain points with valves, etc.																					
5.1	50mm dia	15	RMT																0.00	0.00	0.00	0.00
5.2	40mm dia	5	RMT																0.00	0.00	0.00	0.00
5.3	25mm dia	10	RMT																0.00	0.00	0.00	0.00
6	<b>BUTTERFLY VALVE:</b> Providing and fixing in position the following Class 150 Wafer type Butterfly valves center disc type, with slim seal, CI/WCB/AI body and all SS wetted parts including position indicator, including matching flanges, gaskets and fasteners. <b>BFV (Manual operation)</b> with handle. <b>FOR COOLING TOWER WATER / CHILLED WATER PIPING :</b>																					
6.1	200mm dia	5	Nos.																0.00	0.00	0.00	0.00
6.2	150mm dia	18	Nos.																0.00	0.00	0.00	0.00

6.3	125mm dia	12	Nos.							0.00	0.00	0.00	0.00	0.00		
6.4	100mm dia	3	Nos.							0.00	0.00	0.00	0.00	0.00		
6.5	80mm dia	3	Nos.							0.00	0.00	0.00	0.00	0.00		
7	<b>ELECTRICALLY OPERATED MOTORISED ON/OFF BUTTERFLY VALVE:</b> Supply, installation, testing and commissioning of Class 150 motorized ON/OFF butterfly valves. Wafer type Butterfly valves center disc type, with slim seal, CI/WCB/AI body and all SS wetted parts including position indicator, including matching flanges, gaskets and fasteners. Valve should be compatible for operation from SCADA system. Manual ON/OFF operation facility should be available in the valve.															
7.1	150mm dia	3	Nos.							0.00	0.00	0.00	0.00	0.00		
7.2	125mm dia	3	Nos.							0.00	0.00	0.00	0.00	0.00		
8	<b>BALANCING VALVE:</b> Providing and fixing in position of following flange ended Balancing valves – Class 150, CI/WCB body and all SS 304 wetted parts with flow measurement accessories and position indication, including matching flanges and fasteners. <b>FOR COOLING TOWER WATER / CHILLED WATER PIPING:</b>															
8.1	150mm dia	6	Nos.							0.00	0.00	0.00	0.00	0.00		
8.2	125mm dia	3	Nos.							0.00	0.00	0.00	0.00	0.00		
9	<b>NON RETURN VALVE:</b> Providing and fixing in position of following Non return valve – Class -150, CI/WCB body and all SS 304 wetted parts, including matching flanges and fasteners. <b>FOR COOLING TOWER WATER / CHILLED WATER PIPING:</b>															
9.1	150mm dia	3	Nos.							0.00	0.00	0.00	0.00	0.00		
9.2	125mm dia	3	Nos.							0.00	0.00	0.00	0.00	0.00		
10	<b>BALL VALVE/Air purge valve:</b> Providing and fixing in position of following Ball valves, with GM/CI/SS body, SS 304 wetted parts and PTFE seat. Including matching flanges and fasteners. <b>FOR COOLING TOWER WATER / CHILLED WATER PIPING:</b>															
10.1	Flange end type 50 mm dia. (Gunmetal/CI)	3	Nos.							0.00	0.00	0.00	0.00	0.00		
10.2	Flange/Screwed end type, Three piece 40 mm dia. (Gunmetal /Brass / SS)	3	Nos.							0.00	0.00	0.00	0.00	0.00		
10.3	Screwed end type, Three piece. 25 mm dia. (Gunmetal /Brass / SS)	10	Nos.							0.00	0.00	0.00	0.00	0.00		
10.4	Screwed end type Three piece / Single piece. 15 mm dia. (Gunmetal /Brass / SS)	10	Nos.							0.00	0.00	0.00	0.00	0.00		
10.5	Air vent (Air purge ) with isolation ball valve 15 mm dia	4	Nos.							0.00	0.00	0.00	0.00	0.00		
11	<b>FLEXIBLE BELLOWS</b> Providing and fixing in position of Flexible connection (Bellows) with guide rods will be provided at inlet and outlet of each chilled water Pump (size 125NB x 6 Nos.) and condenser pumps (size 150NB x 6 Nos.) including matching flanges and fasteners.	12	Nos.							0.00	0.00	0.00	0.00	0.00		
12	<b>POT STRAINER - Size 200 NB:</b> Providing and fixing in position of following Class 150 flange ended Pot strainers, with CI/WCB body and SS 304 filter element including matching flanges and fasteners. One spare filter element shall be provided along with strainer. • 200 mm	1	Nos.							0.00	0.00	0.00	0.00	0.00		

13	<b>Y – STRAINER :</b> Providing and fixing in position of following Class 150 flange ended Y- Type strainers, with CI/WCB body and SS 304 filter element including matching flanges and metric standard fasteners.																		
13.1	150mm dia	3	Nos.																
13.2	125mm dia	3	Nos.																
14	<b>INSULATION: FOR CHILLED WATER PIPING :</b> <b>Supply and fixing of insulation (as specified) on Chilled Water Pipelines.</b> Premoulded pipe sections shall be placed over the pipes, the longitudinal joints of this pipe section shall be sealed with the adhesive compound. The traverse joints shall also be sealed with adhesive compound. The insulation shall be continuous over the entire run of piping, fittings and valves. Clean the surface and fix the insulation tightly with cold elastomeric membrane bitumen (Eniroof EMB) or hot bitumen as recommended by insulation manufacturer. The joints shall be suitably sealed.  All insulated pipes shall be covered with layer of thick polythene sheet as vapour barrier. PVC straps at 400 mm centre shall be used to hold insulation and vapour barrier together. Insulation material shall be covered with a continuous sheet of thick polyethylene (for protection from water and moisture), before wrapping with GI chicken wire-mesh and then 15 - 20 mm thick sand-cement plaster / Aluminum cladding will be provided.																		
14.1	200 mm dia pipe (75 mm TF quality Expanded Polystyrene {thermocol} with 26G Al cladding) – Inside plant room	60	RMT																
14.2	200 mm dia pipe (75 mm TF quality Expanded Polystyrene {thermocol} with 26G Al cladding) – Inside plant room	45	RMT																
14.3	125 mm dia pipe (50 mm TF quality Expanded Polystyrene {thermocol} with 26G Al cladding)	55	RMT																
14.4	80 mm dia pipe (50 mm TF quality Expanded Polystyrene {thermocol} with 26G Al cladding)	45	RMT																
14.5	200 mm dia pipe (32 mm nitrile with 26G Al cladding)	5	RMT																
15	<b>MS STRUCTURE WORK:</b> Design, supply, fabrication, installation of MS structure work for supporting piping, cable tray etc at the site to suit the system requirements, including operating platform (If at all needed) within the building with anti corrosion painting. MS support structure work including plates / channels / pipes.	1200	Kgs.																
16	<b>ELECTRICAL PANEL :</b> Design, manufacture, supply, installation, testing and commissioning of the following integrated cubicle type dead front extensible sheet steel indoor type MCC panels, anchoring the panels to the foundation. The panels shall be suitable for 415V, 4 wire 50 Hz AC supply. Quoted price shall include wiring, cabling (power/control) and copper earthing inside the power panel etc. as LOT.  <b>All the switchgears selected, shall be designed for 50 kA SC current fault level.</b>  <b>(Please refer Section-VI (Schedule of Quantity) Sr.No.16 under Section-C of tender document for more details)</b>	1	Lot																
17	<b>ELECTRICAL POWER CABLE:</b> Supply, Laying, termination, testing and commissioning of 1100 volts grade following Cabling wiring with suitable lugs, cable glands, as per the system requirements. The scope also includes integration of existing chiller and pumps etc .																		
17.1	3 ½ C x 150 sq.mm. Aluminum conductor Armoured Power Cables	60	RMT																
17.2	3C x 4 sq.mm. Copper Armoured Power Cables	60	RMT																



17.3	3C x 6 sq.mm. Copper Armoured Power Cables	150	RMT				0.00				0.00			0.00			0.00		
17.4	3C x 10 sq.mm. Aluminum conductor Armoured Power Cables	100	RMT				0.00				0.00			0.00			0.00		
17.5	3C x 16 sq.mm. Aluminum conductor Armoured Power Cables	140	RMT				0.00				0.00			0.00			0.00		
18	<b>EARTHING :</b> Supply, Laying, termination, testing and commissioning of following earthing , as per the system requirements																		
18.1	2 Nos. run x 4 mm dia. Copper wires Note: 2 nos. Run (Meter) earthing = 1 RMT earthing	100	RMT				0.00				0.00			0.00			0.00		
18.2	25 mm x 3 mm Copper strips	150	RMT				0.00				0.00			0.00			0.00		
19	<b>PERFORATED CABLE TRAYS:</b>  Supply, Installations and testing of 'C type' cable trays made from 2.0 mm thick hot galvanized GI / MS powder coated perforated sheets, with clamping etc., suitable for power cables laying, of the following sizes:																		
19.1	75 mm both side riser x 450 mm width	40	RMT				0.00				0.00			0.00			0.00		
19.2	50 mm both side riser x 300 mm width	40	RMT				0.00				0.00			0.00			0.00		
19.3	50 mm both side riser x 150 mm width	30	RMT				0.00				0.00			0.00			0.00		
19.4	50 mm both side riser x 100 mm width	40	RMT				0.00				0.00			0.00			0.00		
20	<b>LOCAL PUSH BUTTONS FOR COOLING TOWERS:</b> Weather proof local ON-OFF (Local Isolators for Safety (For Cooling towers)): IP 55 - ON-OFF local isolators for equipment located away from the panel boards (e.g. cooling towers).Complete with mounting stand. The scope also includes required Cabling between push-buttons and electrical panel board. Local emergency Stop panel with all controls at cooling tower area with earthing, power and control wiring from electrical panel, shall be included	3	Nos.				0.00				0.00			0.00			0.00		
21	<b>MAGNETIC FLOW METER</b> Supply, Installation, testing and commissioning of flanged end type Electromagnetic type flow meter for Chilled water header and compatible to 4-20 mA output. Media shall be of soft water. The scope includes supply of display unit (going to be fixed in AC control room), Signal cable, power cable and earthing (from field to AC control room). • Size: 150 NB	1	Nos.				0.00				0.00			0.00			0.00		
22	<b>PRESSURE GAUGE</b> Providing and fixing in position, water pressure gauges filled with glycerin with all accessories like shutoff valve, siphon pipe, etc. with ±1% accuracy.  Range: 0-10 Bar. Dial 100 mm (dial filled with glycerin / eqv liquid)	26	Nos.				0.00				0.00			0.00			0.00		
23	<b>TEMPERATURE GAUGE</b> Providing and fixing in position the dial type temperature gauge with SS 304/316 integral parts and SS 304/316 thermo well with all accessories. Range: 0 - 50°C. Dial 100 mm	12	Nos.				0.00				0.00			0.00			0.00		

24	<b>PAINTING &amp; TAGS</b> Painting of the new piping, existing piping, supports, MS structure etc; equipment identification tags (stickers/Paints/Al tags) for Chiller, Pumps, cooling tower, directional arrows for pipes, Al tags (for cable, one at equipment side and other is panel side) etc. All pipes, its supports and MS structure shall be thoroughly cleaned and given one (Or two, if required) coat of, red oxide paint before painting. <b>The scope also includes painting and tagging of existing insulated chilled water supply and return line (on main building terrace and in Tokamek AC plant). The insulated pipe OD (pipe with insulation) is approx 300 mm and approx total length (supply and return) is 220 meter.</b>	1	Lot				0.00					0.00			0.00		0.00
25	<b>MINOR / MAJOR CIVIL WORKS:</b> For all equipments covered under Schedule of quantity of this tender, following civil works shall be included. • Civil work/s as described under Sr.No.25 of Section-VI (Schedule of Quantity) <i>(Please refer Section-VI {Schedule of Quantity} Sr.No.25 under Section-C of tender document for more details)</i>	1	Lot				0.00					0.00			0.00		0.00
26	<b>DISMANTLING OF OLD PLANT EQUIPMENTS AND BRINGING NEW EQUIPMENTS IN:</b> Dismantling work of existing old Equipments like chillers, cooling towers (From plant terrace), pumps, piping with and without insulation, Annunciator panel, MCC panels & other accessories of plant including, valves, cables and shifting & storing of these items, to suitable inside IPR campus as directed by IPR.  The Scope also includes bringing in new chillers, pumps, Electrical panel, cooling towers (on plant terrace) and putting all equipment on their foundation including one existing working chiller  This work will be carried out by contractor without damaging any equipment.  The scope also includes Other required necessary civil and other work/s to complete above mentioned work. • <b>Work as described above.</b>	1	Job				0.00					0.00			0.00		0.00
27	<b>Other items (if any)</b>																
a	Optional Item/ Accessories						0.00					0.00			0.00		0.00
b	Optional Item/ Accessories						0.00					0.00			0.00		0.00
c	Optional Item/ Accessories						0.00					0.00			0.00		0.00
d	Optional Item/ Accessories						0.00					0.00			0.00		0.00
e	Optional Item/ Accessories						0.00					0.00			0.00		0.00

Place of delivery **IPR Gandhinagar**

NOTES:

- (a) If freight is not shown separately it will be treated as "FREE DELIVERY" (applicable for INR Quote)
- (b) Detailed specifications and scope of work are as per Attached Annexure
- (c) If the rate cells are left blank, it will be treated as "0" (ZERO)
- (e) Kindly enable the Macros if you receive the "Security Warning" message. (Click on options in "Security Warning" and select "Enable this content")

**IMPORTANT NOTES:** 1) Custom Duty Exemption certificate will not be issued to any bidder under any circumstances.  
2) Prices in this bid format alone are acceptable  
3) GST (IGST, CGST, SGST or any form) should not be included in the basic cost (Unit Rate Column) for either goods or services  
4) Evaluated total cost on the basis of bid prices will be calculated by Purchaser after bid opening  
(\*1) HSN/SAC Code: For indigenous goods/services, to be filled by the bidder

(This need to be printed in Tenderer's letter head)

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To  
The Purchase Officer  
Institute for Plasma Research  
Near Indira Bridge  
Bhat  
Gandhinagar-382428 (INDIA)

**Ref: Tender Notice No.IPR/TN/PUR/TPT/ET/19-20/11 dated 27-6-2019**

Dear Sir,

I/We have gone through the tendering conditions pertaining to the Two Part Tender and General Conditions of Contracts and Special Conditions of Contracts contained in Section "B" of Form No: IPR-LP-ET-02.V5. I/We hereby agree to supply the stores conforming to the tender specifications and also agree to abide by your General Conditions of all Contracts and Special Conditions of Contract contained in Section "B" of the Tender document.

- You will be at liberty to accept any one or more of the items of stores offered by us and I/We shall be bound to supply you the stores as may be specified in the Purchase Order/Contract.
- I/We hereby agree to keep the price valid for your acceptance for a period of 120 days from the date of opening of Part-II (Price) of the tender.
- Deviations to technical specifications of the tender documents are detailed in Annexure-A of the tender form while deviations proposed to the General/Special Conditions of Contract are detailed in Annexure "B" to this tender.
- I/We are also uploaded all the leaflets/catalogue, etc. pertaining to the stores offered.

Yours faithfully  
Stamp and Signature of the Tenderer