



प्लाज़्मा अनुसंधान संस्थान  
Institute for Plasma Research

Bhat, Gandhinagar 382 428, Gujarat, (India)  
भाट, गांधीनगर ३८२ ४२८, गुजरात, (भारत )



## Notice Inviting Tender (NIT)

निविदा सूचना TENDER NOTICE NO: IPR/TN/PUR/ET/22-23/001  
दिनांकित DATED 12-04-2022

Head-Purchase and Stores Department, Institute for Plasma Research, for and on behalf of Director, Institute for Plasma Research (IPR) invites online tenders in **SINGLE PART** for execution of contract in accordance with the purchaser's tender specifications. The invitation to tender, tendering conditions, general conditions of contract, special conditions of contract and additional conditions of contract, if any, which will govern the contract pursuant to tender are attached.

Bidders interested to submit bid are requested to go through the contents of this document and ensure that the bid is submitted online on or before the due date and time indicated in NIT and as per technical specifications and terms and condition indicated herein and upload digitally signed or ink signed undertaking of Form No. **e\_IPR-PUR-102A** appended herewith.

Offline bids including hard copy in any form will not be accepted.

Head-Purchase Section  
For and on behalf of Director, IPR  
(The Purchaser)

Encl: as above.



An Aided R&D Institute of the Department of Atomic Energy, Government of India  
Tel : 079-2396 2000 Fax : 079-2396 2277 Web : www.ipr.res.in

**निविदा सूचना TENDER NOTICE NO: IPR/TN/PUR/ET/22-23/001**  
**दिनांकित DATED 12-04-2022**

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

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

Work/Item Description	Design, Manufacturing, Factory Acceptance Test, Supply (including Unloading and storage), Installation, Commissioning, Site Acceptance Test and Training of -65kV, 40A High voltage DC power supply for Klystron at Institute for Plasma Research, Gandhinagar as per the detailed specifications mentioned in the tender documents
Tender Fee	Not Applicable
Earnest Money Deposit (EMD)	Not Applicable
Publishing Date	<b>12-04-2022 at 18:00 Hrs.</b>
Document Download / Sale Start Date	<b>12-04-2022 at 18:00 Hrs.</b>
Bid Submission Start Date	<b>12-04-2022 at 18.00 Hrs</b>
Bid Submission Closing Date	<b>04-05-2022 at 13.00 Hrs</b>
Time and Date of online Opening of Tender	<b>05-05-2022 at 14.00 Hrs</b>

It may please be noted that any clarifications required in this tender either technical or otherwise shall be carried out before submission of bids.

Detailed tender notice along with Eligibility criteria and Tender Document is available on website <https://eprocure.gov.in/eprocure/app> 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, bidders may go through the **“Instructions for Online Bid Submission”** provided as under.

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

## **Instructions for Online Bid Submission**

The bidders are required to submit soft copies of their bids electronically on the CPP Portal, using valid Digital Signature Certificates. The instructions given below are meant to assist the bidders in registering on the CPP Portal, prepare their bids in accordance with the requirements and submitting their bids online on the CPP Portal.

More information useful for submitting online bids on the CPP Portal may be obtained at: <https://eprocure.gov.in/eprocure/app>.

### **REGISTRATION**

- 1) Bidders are required to enroll on the e-Procurement module of the Central Public Procurement Portal (URL: <https://eprocure.gov.in/eprocure/app>) by clicking on the link “**Online bidder Enrollment**” on the CPP Portal which is free of charge.
- 2) As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts.
- 3) Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the CPP Portal.
- 4) Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (Class III Certificates with signing key usage) issued by any Certifying Authority recognized by CCA India (e.g. Sify / nCode / eMudhra etc.), with their profile.
- 5) Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSC's to others which may lead to misuse.
- 6) Bidder then logs in to the site through the secured log-in by entering their user ID /password and the password of the DSC / e-Token.

### **SEARCHING FOR TENDER DOCUMENTS**

- 1) There are various search options built in the CPP Portal, to facilitate bidders to search active tenders by several parameters. These parameters could include Tender ID, Organization Name, Location, Date, Value, etc. There is also an option of advanced search for tenders, wherein the bidders may combine a number of search parameters such as Organization Name, Form of Contract, Location, Date, Other keywords etc. to search for a tender published on the CPP Portal.
- 2) Once the bidders have selected the tenders they are interested in, they may download the required documents / tender schedules. These tenders can be moved to the respective ‘My Tenders’ folder. This would enable the CPP Portal to intimate the bidders through SMS / e- mail in case there is any corrigendum issued to the tender document.
- 3) The bidder should make a note of the unique Tender ID assigned to each tender, in case they want to obtain any clarification / help from the Helpdesk.

## PREPARATION OF BIDS

- 1) Bidder should take into account any corrigendum published on the tender document before submitting their bids.
- 2) Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bid. Please note the number of covers in which the bid documents have to be submitted, the number of documents - including the names and content of each of the document that need to be submitted. Any deviations from these may lead to rejection of the bid.
- 3) Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document / schedule and generally, they can be in PDF / XLS / RAR / DWF/JPG formats. Bid documents may be scanned with 100 dpi with black and white option which helps in reducing size of the scanned document.
- 4) To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents (e.g. PAN card copy, annual reports, auditor certificates etc.) has been provided to the bidders. Bidders can use "My Space" or "Other Important Documents" area available to them to upload such documents. These documents may be directly submitted from the "My Space" area while submitting a bid, and need not be uploaded again and again. This will lead to a reduction in the time required for bid submission process.

**Note:** *My Documents space is only a repository given to the Bidders to ease the uploading process. If Bidder has uploaded his Documents in My Documents space, this does not automatically ensure these Documents being part of Technical Bid.*

## SUBMISSION OF BIDS

- 1) Bidder should log into the site well in advance for bid submission so that they can upload the bid in time i.e. on or before the bid submission time. Bidder will be responsible for any delay due to other issues.
- 2) The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document.
- 3) Bidder has to select the payment option as "offline" to pay the tender fee / EMD as applicable and enter details of the instrument.
- 4) Bidder should prepare the EMD as per the instructions specified in the tender document. The original should be posted/couriered/given in person to the concerned official, latest by the last date of bid submission or as specified in the tender documents. The details of the DD/any other accepted instrument, physically sent, should tally with the details available in the scanned copy and the data entered during bid submission time. Otherwise the uploaded bid will be rejected.
- 5) Bidders are requested to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. If the price bid has been given as a standard BoQ format with the tender document, then the same is to be downloaded and to be filled by all the bidders. Bidders are required to download the BoQ file, open it and complete the white coloured (unprotected) cells with their respective financial quotes and other details (such as name of the bidder). No other cells should be changed. Once the details have been completed, the bidder should save it and submit it online, without changing the filename. If the BoQ file is found to be modified by the bidder, the bid will be rejected.

- 6) The server time (which is displayed on the bidders' dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission.
- 7) All the documents being submitted by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of bid opening. The confidentiality of the bids is maintained using the secured Socket Layer 128 bit encryption technology. Data storage encryption of sensitive fields is done. Any bid document that is uploaded to the server is subjected to symmetric encryption using a system generated symmetric key. Further this key is subjected to asymmetric encryption using buyers/bid opener's public keys. Overall, the uploaded tender documents become readable only after the tender opening by the authorized bid openers.
- 7) The uploaded tender documents become readable only after the tender opening by the authorized bid openers.
- 8) Upon the successful and timely submission of bids (i.e. after Clicking "Freeze Bid Submission" in the portal), the portal will give a successful bid submission message & a bid summary will be displayed with the bid no. and the date & time of submission of the bid with all other relevant details.
- 9) The bid summary has to be printed and kept as an acknowledgement of the submission of the bid. This acknowledgement may be used as an entry pass for any bid opening meetings.

### **ASSISTANCE TO BIDDERS**

- 1) Any queries relating to the tender document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contact person indicated in the tender.
- 2) Any queries relating to the process of online bid submission or queries relating to CPP Portal in general may be directed to the 24x7 CPP Portal Helpdesk.

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प्लाज्मा अनुसंधान संस्थान  
INSTITUTE FOR PLASMA RESEARCH  
(भारत सरकार के परमाणु ऊर्जा विभाग का सहायता प्राप्त संस्थान)  
(An Aided Institute of Dept. of Atomic Energy, Govt. of India)  
इंदीरा ब्रिज के पास, भाट, गांधीनगर – 382428,  
NEAR INDIRA BRIDGE, BHAT, GANDHINAGAR-382428

**INVITATION TO TENDER**

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Head-Purchase Section  
For and on behalf of Director, IPR  
(The Purchaser)

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## **DEFINITIONS AND INTERPRETATION**

In the invitation to tender, tendering condition, contract, general conditions of contract and special conditions of contract, unless the context otherwise require the following interpretation shall be valid.

- 1.1 “BID” shall mean the quotation in response to the NIT submitted with EMD, if applicable and within the period mentioned in the NIT.
- 1.2 “BIDDER” means an individual, a firm, a limited liability partnership, a company whether incorporated or not, an association of person or joint venture who has submitted a bid to execute the contract and shall be deemed to include his successors, heirs, executors, administrators and permitted assignees, as the case may be.
- 1.3 “CONSIGNEE” shall mean the authorised representative or officer of the purchaser at the site to whom the stores are required to be delivered in the manner indicated in the contract.
- 1.4 “CONTRACTOR” means a successful bidder with whom a contract agreement has been entered to by the purchaser and shall be deemed to include his successors, heirs, executors, administrators and permitted assignees, as the case maybe.
- 1.5 “CONTRACT” or “PURCHASE ORDER” means and comprises of a letter or e- mail or ink signed or digitally signed document issued/sent by the purchaser conveying acceptance of bidder’s/contractor’s bid submitted in response to the invitation to tender, tendering conditions, general and special conditions of contract specified in the NIT within the validity of the bid and any subsequent amendments/alterations thereto made on the basis of mutual agreement.
- 1.6 “DELIVERY DATE” means date of completion of contract excluding warranty period and its obligations as stipulated in the contract.
- 1.7 “DIRECTOR, INSTITUTE FOR PLASMA RESEARCH” means the Director, Institute for Plasma Research, for the time being in the administrative charge of the Purchase and Stores Department, IPR and includes Head- Purchase & Stores Department, Head-Purchase Section, Purchase Officer-II, Purchase Officer-I, Dy. Officer (Purchase) or Assistant Purchase Officer of the said Institute for Plasma Research or any other officer authorized in writing to execute the contract on behalf of the purchaser.
- 1.8 “EARNEST MONEY DEPOSIT (EMD)” means the deposit made in the form and manner specified in the NIT by the participating bidder towards bid security.
- 1.9 “HINDRANCE” means an event resulting in stoppage or delay of work because of the purchaser as recorded by the contractor and authenticated by the purchaser.
- 1.10 “INSPECTOR” or “QUALITY SURVEYOR” means any engineer/officer nominated and deputed by the purchaser or their appointed consultants or quality surveillance agency or any other person authorized by the purchaser from time to time to act as his representative for the purpose of inspection of stores under the contract.
- 1.11 “Notice Inviting Tender (NIT)” means invitation to tender, tendering condition, general conditions of contract, special conditions of contract, additional conditions of contract, if any, and any other document mentioned thereto.



- 1.12 “PARTIES” mean the parties to the contract, i.e., the contractor and the purchaser named in the contract.
- 1.13 “PERFORMANCE SECURITY DEPOSIT BANK GUARANTEE (PSDBG)” means the deposit made in the form and manner specified in this document by the contractor towards satisfactory performance of the contract till completion of the warranty period.
- 1.14 “PURCHASER” means Director, Institute for Plasma Research for the time being the Head- Purchase and Stores Department or any other authorized officer and includes his successor or assignees.
- 1.15 “STORES” or “PLANT” means the materials, goods, machinery, plants, equipment or parts thereof specified in the contract which the contractor has agreed under the contract.
- 1.16 “SUB-CONTRACTOR” means any contractor engaged by the contractor with the prior approval of the purchaser in relation to the contract.

**SECTION – A**  
**Invitation to Tender and Tendering Conditions**

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## **1. INVITATION TO TENDER**

- 1.1 Head-Purchase and Stores Department, Institute for Plasma Research, for and on behalf of Director, Institute for Plasma Research (IPR), invites bids for execution of contract in accordance with the purchaser's technical specifications. The conditions of contract which will govern the contract pursuant to this tender are available in the NIT. Bidders who are in a position to submit their bid for the same as per the conditions stipulated in the NIT are requested to submit their bid in a manner and method specified in the NIT.

## **2. EMD**

- 2.1 EMD where called for will have to be submitted by the participating bidder in the form and manner specified in the NIT so as to reach the purchaser at the address mentioned in the NIT on or before the due date and time mentioned in the NIT.
- 2.2 Non receipt of EMD as per Clause no. 2.1 above, will result in rejection of bid without any reference to the bidder, except in cases given under Clause no. 2.3 below.
- 2.3 The following categories of bidders are exempted from submission of EMD:
- 2.3.1 Bidders having valid registration with Directorate of Purchase and Stores, Department of Atomic Energy;
- 2.3.2 Micro and Small Enterprises having valid registration with MSME or NSIC or Udyog Aadhaar/ Udyam Aadhar in respect of procurement of goods and services, produced and provided by MSE and startups recognized by Department of Industrial Policy & Promotion (DIPP) are eligible for exemption according to government policies.
- 2.3.3 Foreign Bidder directly submitting bid (not through their Indian Agent or Indian Counterpart or Indian subsidy) in the currency other than INR.

## **2.4 Forfeiture of EMD**

- 2.4.1 EMD shall be forfeited if the bidder withdraws or amends impairs or derogates from the tender in any respect within the validity of his bid.
- 2.4.2 If the successful bidder fails to furnish the required Security Deposit, the EMD furnished shall be forfeited.

## **2.5 REFUND OF EMD**

- 2.5.1 EMD of unsuccessful bidders will be returned within thirty days after finalisation of the tender or after expiry of validity of their bid, whichever is later.
- 2.5.2 EMD of successful bidders will be returned within thirty days of submission of security deposit as called for in the contract.

## **3 MANNER AND METHOD FOR SUBMISSION OF BIDS**

- 3.1 All bids in response to this invitation shall be submitted online in English as under:
- 3.2 The bid shall include/contain all technical details, technical specifications, drawings, literature, reference to earlier supplies of similar equipment along with quantity, time required for submission and approval of drawings, manufacturing and delivery period, inspection/testing procedure, itemized list of spares and quantity recommended by the bidder for purchase, term of price, mode and payment terms, mode of despatch, including all price details thereof.
- 3.3 The price bid shall be submitted strictly online in accordance with the format provided by the Purchaser.

3.4 The bidder shall indicate lump sum cost of essential accessories and spares in the price bid format, wherever applicable, to make their bid complete in all respect as per purchaser's technical specifications, in the tender. The price break-up of main equipment, list of accessories and spares with quantity and unit price, if any, should be uploaded as a separate document if required as per tender document.

3.5 Tender should be submitted online on or before the time and date specified for its submission.

#### **4 PRICE**

4.1 The prices quoted must be FIRM during the currency of the contract.

#### **5 PAYMENT TERMS**

5.1 Standard payment terms for supplies made against this invitation of tender will be as indicated in form number IPR-P-100.

#### **6 CONDITIONAL DISCOUNT**

6.1 In case the bidder offers any conditional discount with regard to acceptance of the bid within a specific period or specific payment terms, delivery date, quantity, etc., the purchaser will not take into consideration such conditional discount while evaluating the bid.

#### **7 VALIDITY OF BIDS**

7.1 Bids shall be kept valid for acceptance for a period as mentioned in the NIT. Bids with shorter validity period shall be rejected without any notice to the bidder.

#### **8 ONE BID PER BIDDER**

8.1 Each bidder shall submit only one bid for a tender. All bids of the bidder who submits more than one bid for the same tender; will be rejected without any notice to the bidder.

8.2 If a bidder submits bid on behalf of two principals or if the bidder and his sister concern participates in the same tender or such instances where participation of any bidder leads to conflict of interest, the bid will be rejected without any notice to the bidder.

#### **9 QUALIFYING REQUIREMENTS**

9.1 The bidder is required to upload all supporting documents/information on the e- tender portal necessary for establishing their qualification as mentioned in the NIT.

#### **10 OPENING OF BID**

10.1 Unless otherwise preponed or postponed, tender will be opened online on the date and time indicated in the NIT.

10.2 All the bidders who have submitted valid bids within the due date and time specified for its submission can view the list of bidders and price bid of bidders who have participated in the tender online after opening of the bid.

#### **11 DECLARATION OF HOLIDAY**

11.1 If the date(s) specified for opening of the bid is/are declared as holidays due to any administrative reasons, then the due date(s) for receipt/opening of bid will get postponed to the next working day.

## **12 EVALUATION OF BIDS**

### **12.1 TECHNICAL CLARIFICATIONS**

After opening of the bid, if it becomes necessary for the technical authorities/user department of the purchaser to seek clarifications from the bidder, the same will be sought for from the bidder by the Purchase Section. In such an event, the bidder shall furnish all techno-commercial information/clarification to the Purchase Section to reach them on or before the due date and time fixed by the Purchaser. If the techno-commercial clarifications/details sought for by the Purchase Section from the bidder do not reach them on or before the due date and time fixed for its receipt, such bid will be liable for rejection at the discretion of the purchaser without any further notice. The bidder shall not, however, furnish a new bid at this stage. A new bid at this stage will be rejected by the purchaser.

12.2 Evaluation of bids shall be based on technical specification attached with tender and on the basis of total landed cost considering taxes/duties as applicable without any concession/exemption.

### **12.3 DETERMINATION OF TOTAL LANDED COST FOR COMPARISON (AIR/SEA SHIPMENTS)**

12.3.1 The following will be the loading for air/sea freight

12.3.1.1 FCA/FOB price + air/sea freight @10% of FCA/FOB price = CFR price

12.3.1.2 CFR price + insurance @ 1% of CFR price= CIF price

12.3.1.3 CIF price + taxes & duties as applicable=DDP

12.3.1.4 [DDP + clearing charges @ 1% of CIF price + inland freight @ 1% of CIF price] x exchange rate = total landed cost in INR

Exchange rate means Purchase price of the quoted currency as intimated by State Bank of India and as applicable on the date of opening of bid.

### **12.4 CAPACITY AND FINANCIALCAPABILITY**

12.4.1 In case it is found that the bidder does not possess the requisite infrastructure, capacity, capability and their financial capability satisfactory or not meeting the qualification criteria indicated in the NIT or not complied with warranty obligations; such bids are liable to be rejected by the purchaser during evaluation of bid.

### **12.5 PAST PERFORMANCE**

12.5.1 In case the past performance of the bidder is not found to be satisfactory with regard to quality, delivery date, warranty obligation and compliance of terms and conditions of the contract, their bid is liable to be rejected by the purchaser during evaluation of bid.

### **12.6 POST SUPPLY INSPECTION**

12.6.1 The bidder should clearly mention requirement of post supply inspection in the bid. The purchaser reserves the right to deny access to the contractor or its representative or any third party to the Stores supplied by the contractor after its supply. Bids which are not complying with this post supply inspection requirement are liable to be rejected by the purchaser during evaluation of bid.

### **13 QUANTITY**

- 13.1 Quantities mentioned in the NIT are approximate. 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 by the purchaser. A bidder shall be bound to supply to the purchaser such an item or items or such portion or portions of one or more of the items as may be accepted by the purchaser.

### **14 INSTALLATION/ERECTION AND COMMISSIONING**

- 14.1 Wherever, the purchaser's NIT includes installation and commissioning or supervision of installation and commissioning or erection and commissioning of the stores by the bidder, the bidder must clearly and separately quote the prices for the supply of the Stores and the charges for installation and commissioning or its supervision or erection and commissioning, as the case maybe.
- 14.2 The bidder should not include charges towards installation and commissioning or its supervision or erection and commissioning in the price of the stores offered. In case of failure to quote separately, purchaser will deduct taxes as applicable on full contract value.
- 14.3 In respect of contracts involving installation and commissioning or its supervision or erection and commissioning by the contractor where identifiable charges for the same have been quoted, the contractor shall bear the tax liability as per the rates prevailing at the time of undertaking the job in accordance with the relevant Act/Laws in force in India.
- 14.4 When 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.

### **15 TEST CERTIFICATE**

- 15.1 Wherever the tests and test certificates are required by the purchaser, test shall be conducted and test certificate shall be furnished by the contractor as per the requirement of technical specification.

### **16 OPERATION/INSTRUCTION MANUAL:**

- 16.1 In respect of stores where instruction/operation manual is essential to enable the purchaser to put the stores into proper use, the contractor shall furnish such instruction/operation manual in English language along with the stores free of cost.

### **17 LEAFLET/CATALOGUE:**

- 17.1 Bidder shall upload all necessary catalogues/drawings technical literature data sheet as are considered essential for full and correct evaluation of their technical bid. The bids are liable to be ignored if this condition is not complied with.

### **18 ACCEPTANCE OF BID**

- 18.1 The purchaser shall be under no obligation to accept the lowest or any other bid and shall be entitled to accept or reject any bid in part or full without assigning any reasons whatsoever.
- 18.2 The purchaser also reserves the right to reject the bid, which is not in conformity with the conditions contained in this document or the instructions to bidders attached in NIT, if any including non-acceptance of submission of securities as called for in the NIT.

**Clauses 20.0 to 24.0 are applicable only for bids quoted in INDIAN RUPEES.**

**19 STATUTORY LEVIES SUCH AS GOODS AND SERVICE TAX**

19.1 Statutory levies at rate applicable for the purchaser within original delivery date will be admitted by the purchaser.

**19.2 GOODS AND SERVICE TAX**

19.2.1 The purchaser is entitled for GST at the concessional rate as per notifications issued by the Government, as amended from time to time, in respect of purchases made for certain stores.

19.3 Decision to avail concession/exemption, in each case will be at the sole discretion of the purchaser. Wherever concession/exemption is mentioned in the contract, purchaser will provide the relevant certificate to the contractor. It would be the responsibility of the contractor to obtain the same from the purchaser before effecting the delivery of stores failing which the excess tax paid by the contractor shall not be reimbursed by the purchaser.

**20 CUSTOMS DUTY**

20.1 In case an Indian bidder submits a bid for supply of out rightly imported stores in Indian Rupees, they should quote price for free and safe delivery of stores at destination. The name of their foreign contractor and country of origin shall also be indicated. However, purchaser will neither provide any certificate for availing concession/exemption from payment of customs duty nor will reimburse the same.

20.2 Bids on High Sea sales basis will not be considered.

**21 FLUCTUATION IN THE STATUTORY LEVIES**

21.1 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 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 purchaser.

**22 AUTHENTICATION**

22.1 The person digitally signing and uploading the bid or any other document in respect of the tender on behalf of the bidder shall be deemed to warrant that he has the authority to do so and the action will be binding on the bidder. The bidder shall indemnify the purchaser from any consequences arising thereof.

22.2 Overseas bidder should also refer Clause No. 46.1 of this Section for details on obtaining digital signature certificate valid in India.

22.3 If, on enquiry or later on, it appears that the persons so signing had no authority to do so, the purchaser may, without prejudice to other civil and criminal remedies, cancel the contract and hold the bidder and signatory liable jointly and severally for all costs and damages.



## **23 DELIVERY FOR CONTRACT IN INDIAN CURRENCY**

- 23.1 Bidder should note that the bid is liable for rejection by the purchaser unless the bidder offers to complete the contract within the delivery date specified by the purchaser. The prices quoted by the bidder should include all charges involved for direct and safe delivery of the stores to the place of delivery indicated by the purchaser. Purchaser will neither undertake responsibility for transit insurance nor pay for it separately. No other delivery term than stated in the NIT will be accepted by the purchaser.
- 23.2 The stores shall neither be despatched under 'purchaser's risk' nor consigned to 'self', but only to the consignee indicated in the contract. Non-adherence to this condition shall make the contractor liable to bear all consequential penalties/expenses such as demurrage, wharfage, etc. which the purchaser may incur.
- 23.3 The consignee will, as soon as possible, but not later than thirty 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 stores as is appropriate, free of all charges. In case it is desired by the contractor for returning of the stores to them, all expenses towards transportation, etc. will be borne by the contractor and the contractor will also furnish bank guarantee as per format in Annexure for the payment already made by the purchaser to the contractor on this account, if any.

## **24 DOCUMENTS TO BE UPLOADED BY INDIAN BIDDER**

- 24.1 Indian bidders are required to upload a copy of the PAN card/letter and copy of the factory registration/licence or shop establishment certificate/GSTIN etc. as applicable with the bid.

## **25 PURCHASE/PRICE PREFERENCE**

- 25.1 Purchase/price preference to industries will be given as per the policy of the Government of India in force at the time of opening of bids provided their bid is in compliance with the conditions of the policy.
- 25.2 **PURCHASE PREFERENCE FOR MICRO & SMALL ENTERPRISES (MSE's):**
- 25.2.1 Benefits, as prescribed by the MSME Policy of the Government of India shall be provided to MSE vendors registered as manufacturers for the goods procured or for the service providers for services to this Department. The procuring Entity reserves its option to give price preference to Micro and Small Industries in comparison to the large-scale industries as per policies of the Government from time to time.
- 25.3 **MAKE IN INDIA:**
- 25.3.1 As defined under the Public Procurement (Preference to Make in India), order 2017, Revised order dated: 16/09/2020 or as being revised from time to time, in procurement of goods or services in respect of which the Nodal Ministry/Department has communicated, that there is sufficient local capacity and local competition, only "Class-I local supplier", as defined under the said order, shall be eligible to bid irrespective of purchase value.
- 25.3.2 Only "Class-I local supplier" and "Class-II local supplier", as defined under the above said order, shall be eligible to bid in procurements under taken by this Directorate, except where the mode of procurement is by issue of Global Tender Enquiry. The bidding supplier shall indicate the percentage of local content for the item being offered in their bid.
- 25.3.3 Where the procurement is by issue of Global Tender enquiry, Non local suppliers, shall also be eligible to bid along with "Class-I local suppliers and Class-II local suppliers". Suppliers/bidders offering imported products will fall under the category of Non-local suppliers.
- 25.3.4 Subject to the provisions of the above said order, and to any specific instructions issued by the Nodal Ministry or in pursuance of the said order, purchase preference shall be given to "Class-I local Suppliers" in procurements under taken by this

Directorate, in the manner specified there in the order.

- 25.3.5 The bidders along with their bid/tender shall be required to provide a self-declaration certificate of the local content (where the procurement value is Rs.10 crore or less) for the item offered and their status as Class-I/Class-II/Non-Local supplier and their eligibility to participate in the tender as per Annexure-XI failing which bid will be rejected. In cases of procurement for a value in excess of Rs.10 crores, the “Class-I local supplier”/“Class-II local supplier” shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of Contractors other than companies) giving the percentage of local content.
- 25.3.6 Self-declaration certificate should quantify the percentage of local content of the offered product only. It should also indicate the location. However, claiming the services such as transportation, insurance, installation & commissioning, training and after sale service support like AMC/CMC etc., shall not be considered as local content as per OM N.P- 45021/102/2019-BE-II-Part(1)(E-50310) dated: 04/03/2021 issued by Ministry of Commerce and Industry, DPIIT.
- 25.3.7 False declarations/violation of this order terms shall be deemed to be breach of code of integrity resulting in debarment of the firm for a period up to 2 years. Under such circumstances, the supplier shall not be considered for any preferences as proposed in the order.
- 25.3.8 Wherever the bids are received without accompanying the above said requisite certificate such offers shall be treated as incomplete and not considered.
- 25.3.9 Bidders/contractor are divided into three categories based on Local Content (The total value of the item procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties) as a proportion of the total value, in percent):
- 25.3.9.1 Class-I local supplier is with local content equal to or more than as prescribed by the Nodal Ministry/ NIT, if prescribed, for the item being procured or 50% whichever is higher.
- 25.3.9.2 Class-II Local supplier is with local content more than as prescribed by the Nodal Ministry/NIT, if prescribed, for the item being procured or 20% whichever is higher, but less than that applicable for class-I local supplier.
- 25.3.9.3 Non-local supplier is with local content less than that applicable to class-II local supplier, as stated above.

Note: Where the estimated value of the procurement is less than Rs.5 Lakhs (or as being amended by the competent authority from time to time) is exempted from the provisions of the above Make in India policy as stated therein the order.

25.4 **GLOBAL TENDER:**

The currency of the price quoted in the bid can be in foreign currencies, in addition to the Indian rupees, except for expenditure incurred in India (Including incidental services rendered in India and agency commission, if any) which should be stated in Indian Rupees.

25.5 **ELIGIBILITY OF BIDDERS FROM SPECIFIED COUNTRIES:**

25.5.1 Orders issued by the Government of India restricting procurement from bidders of certain countries which shares a land border with India shall apply to this procurement.

25.5.2 Any bidder from a country which shares a land border with India ( <https://mea.gov.in/india-and-neighbours.htm> ), excluding countries as listed in the website of Ministry of External Affairs ( <https://meadashbaord.gov.in/indicators/92> ), to which the Government of India has extended lines of credit or in which the Government of India is engaged in development projects – hereinafter called “Restricted countries”) shall be eligible to bid in this tender only if the bidder is registered ( <https://dipp.gov.in/sites/default/files/Revised-Application-Format-for-Registration-of-Bidders-15Oct2020.pdf> ) with the Registration committee constituted by the Department for promotion of Industry and Internal Trade(DPIIT) . The bidders shall enclose valid registration certificate along with their offer. Wherever the bids are received without accompanying the above said requisite certificate such offers shall be treated as incomplete and not considered.

Furthermore, every bidder participating against this Department tender shall invariably enclose along with the Bid, a self-declared undertaking “Annexure to Bid Form: Eligibility Declarations” (Annexure-XII), failing which Bid will be rejected.

26 **FREE ISSUE MATERIAL: (This clause shall apply only to contract for supply of fabricated stores with purchaser's Free Issue Materials (FIM))**

26.1 Wherever the contract envisage supply of FIM by the purchaser to the Indian contractor for fabrication of the stores, such FIM shall be safeguarded by a Bank Guarantee as per format in Annexure or insurance policy to be provided by the Indian contractor at his own cost for the full value of FIM and the insurance policy or Bank Guarantee shall cover, the following risks specifically and shall be valid for six months beyond the delivery date.

26.2 **RISKS TO BE COVERED:** Any loss or damage to the FIM 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 objects falling on FIM while in his possession including transit period.

Insured by:	(Name of the contractor)
Beneficiary:	Head- Purchase and Stores Department, Institute for Plasma Research, (On behalf of Director, Institute for Plasma Research), Near Indira Bridge, Bhat Gandhinagar-382428
Amount for which insurance Policy/Bank Guarantee has to be furnished	The amount will be indicated in the respective contract.

26.3 Notwithstanding the insurance cover taken out by the Indian contractor as above, the contractor shall indemnify the purchaser and keep the purchaser indemnified to the extent of the value of FIM 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 FIM for any job other than the one contracted out in this case and also not indulge in any act, commission or

omission or negligence which may cause/result in any loss/damage to the purchaser and in which case, the contractor shall be liable to pay full compensation to the purchaser to the extent of damage/loss as assessed by the purchaser. The decision of the purchaser will be final and accepted by the contractor. The contractor shall be responsible for the safety of the FIM after these are received by him and all through the period during which the materials remain in his possession/control/custody. The FIM on receipt at the contractor's works shall be inspected by him for ensuring safe and correct receipt of FIM. The contractor shall report the discrepancies, if any, to the purchaser immediately but not later than five working days from the date of receipt of FIM. The contractor shall take all necessary precautions against any loss, deterioration, damage or destruction of the FIM from whatever cause arising whilst the said FIM remain in his possession/custody or control. The FIM shall be inspected periodically at regular intervals by the contractor for ensuring safe preservation and storage and maintain inspection report. The contractor shall also not mix up the FIM in question with any other goods and shall render true and proper account of the FIM actually used and return balance/remaining/unused FIM on hand and scrap within the delivery date. If it is not possible to return balance remaining unused FIM on hand and scrap within the delivery date, the contractor hereby authorizes the purchaser to deduct the difference between the cost of FIM supplied and the cost of FIM actually used from the amount payable to the contractor. The contractor shall also indemnify the purchaser to compensate the difference in cost between the actual replacement cost of FIM lost/damaged and the claim settled in favour of the purchaser by the insurance company. The decision of the purchaser, as to whether the contractor has caused any loss, destruction, damage or deterioration of FIM while in his possession, custody or control from whatever cause arising and also on the quantum of damage suffered by the purchaser, shall be final and binding upon the contractor.

- 26.4 Wherever the contract envisage supply of FIM by the purchaser to the foreign contractor for fabrication of the stores, such FIM shall be safeguarded by a Bank Guarantee to be provided by the contractor at his own cost for the full value of FIM and the Bank Guarantee shall cover, the risks mentioned in Clause 26.2 and 26.3 above and shall be valid for six months beyond the delivery date.
- 26.5 FIM will be issued to the contractor only after receipt of the insurance policy/Bank Guarantee 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.

## **27 BIDS FROM INDIAN AGENTS ON BEHALF OF FOREIGN CONTRACTOR**

- 27.1 Indian agents are allowed to quote on behalf of only one foreign contractor against this tender.
- 27.2 In case the bid is submitted by an Indian bidder or Indian agent on behalf of their foreign contractor, following documents is required to be uploaded with the bid, failing which, bid is liable to be rejected without further notice to the bidder.
- 27.2.1 Copy of the agency agreement between the principal and the Indian agent showing the percentage or the quantum of agency commission payable and included in the price quoted and a valid letter of authority from the principal authorizing the Indian agent to submit the bid on their behalf should be uploaded with the bid. The agency agreement shall be valid on the date of opening of bid and shall remain valid throughout the currency of contract.
- 27.2.2 The type and nature of after sales services to be rendered by the Indian agent.

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

28.1 Any contravention of the above-mentioned provisions by the bidder or contractor or its sub-contractor, consultant, adviser or its employees will invite penal consequences under the aforesaid legislations as amended from time to time.

**29 PROHIBITION AGAINST USE OF THE NAME OF INSTITUTE FOR PLASMA RESEARCH WITHOUT PERMISSION FOR PUBLICITY PURPOSES**

29.1 The bidder or contractor or its sub-contractor, consultant, adviser or its employees or any one claiming on behalf of them shall not use the name of Institute for Plasma Research for any publicity purpose through any public media like Press, Radio, T.V. or Internet without the prior written approval of the purchaser.

**30 CONFIDENTIALITY**

30.1 The 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 bidder or contractor as the case may be, and should not be disclosed or passed on to any other person/firm without prior written consent of the purchaser. This clause shall also apply to anyone claiming through bidder or contractor, i.e., the sub-contractors, consultants, advisers of the contractor and its employees, etc.

**31 CANVASSING**

31.1 Canvassing in any form with regard to this tender will lead to rejection of the bid

**32 EXPORT LICENCE/EXPORT PERMISSION**

32.1 It is entirely the responsibility of the bidder or contractor to obtain export permission/licence/authorisation for stores of foreign origin as required from the respective Government before arranging shipment.

32.2 The contractor shall reimburse all cost to the purchaser towards establishment of letter of credit or similar payment instruments in case of failure to obtain export licence/export permission, if applicable or failure to execute the contract.

32.3 The contractor 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 Stores, while seeking export permission/licence. It is, therefore, necessary that the contractor offering stores from foreign countries shall have thorough knowledge of export contract regulations prevalent in those countries.

32.4 Post supply inspection by the contractor or his representative or any third party at purchaser's site, contrary to the terms and conditions of purchaser's contract shall not be permitted.

**33 END USE CERTIFICATE**

33.1 Whenever an End Use Certificate is desired by the bidder, the same shall be clearly mentioned in the bid and the purchaser shall provide an End Use Certificate as per

the format given below. The purchaser will not provide any other document/declaration in this regard.

**END USE STATEMENT**

*“We hereby certify that the item/s i.e ..... being procured from M/s..... against our Purchase Order No. IPR/..... 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”.*

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

34.1 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 purchaser’s premises, wherever authorised by the purchaser.

**35 COUNTRY OF ORIGIN**

35.1 Wherever the tenders are for imported stores, the country of origin of the stores must be clearly specified in the bid.

**36 TERMS AND CONDITIONS OF THE CONTRACT**

36.1 It must be clearly understood that any contract concluded pursuant to this NIT shall be governed by the General, Special and Additional Conditions of the Contract as contained in the NIT. Bidder must, therefore, take special care to go through the NIT. It should also be realized that the General Conditions of Contract, Special Conditions of Contract and Additional Conditions of Contract, if any, contained in NIT is binding and the bidder is willing to execute the contract as per the purchaser’s terms and conditions of contract.

**37 SAMPLES**

37.1 Samples of the offered stores, if called for in the NIT, shall be submitted by the bidder free of all charges indicating purchaser’s tender number so as to reach the authorized person on or before the last date of submission of bid and without any obligation of the purchaser as regards acceptance/approval, safe custody or safe return thereof. Each sample submitted must be clearly labeled with the bidder’s name and address and tender number. In the event of non-acceptance of the bid, the bidder shall collect the samples at his own expenses within fifteen days from the date of intimation. In case bidder fails to collect such samples within the designated time, the same will be disposed-off by the purchaser and no claim will be entertained from the bidder for the same. Bids without samples shall be rejected, where these were asked for submission in the NIT.

37.2 If the bidder submits the sample with his bid; the same shall not be considered to be part of the stores unless it has been specifically stated in the NIT.

37.3 In case supplies of tendered goods are required as per sample available with the purchaser, the purchaser will provide the sample on submission of a deposit as indicated in the NIT, as a standard for bidding and supply, on request. The contractor may send their representative at an address indicated in the NIT for collection of the sample. The purchaser will not be responsible for any delay in receipt/collection of sample by the bidder. It will be the responsibility of the bidder to return the sample without any damage/deterioration as indicated in the NIT. In the event of non-return of the sample in the desired condition within fifteen days from the date of intimation, the purchaser reserves the right to forfeit the deposit of the bidder.

### **38 DETAILS OF BANKERS**

38.1 The bidder shall submit along with the bid account details, IFSC code, the name and address of his bankers for refund of EMD and payment as applicable.

### **39 SUBMISSION OF DRAWINGS**

39.1 The bidder shall upload all drawings pertaining to the stores, wherever called for in the NIT along with the bid for correct understanding and evaluation of the bid. Bidder's drawing will form part of the contract only after these are approved by the purchaser.

### **40 SUB-CONTRACTING**

40.1 The contractor in the event of his bid being accepted by the purchaser shall not assign/sublet or delegate the contract or any part thereof without the prior written consent of the purchaser. The contractor may without the purchaser's consent purchase such parts, accessories, raw materials etc. from any of the leading and reputed manufacturers in case he does not normally manufacture such items provided these items comply with the technical specifications. However, the contractor shall be solely responsible for the satisfactory execution of the contract irrespective of the fact whether a part or a portion of the contract has been assigned or sublet by him to a sub-contractor even when such sub-contracting has been done with the prior written consent of the purchaser.

### **41 SHOP/FACILITY EVALUATION, QUALITY SURVEILLANCE/ INSPECTION AND SUBMISSION OF PROGRESS REPORT**

41.1 The purchaser or his technical authorities may at his option and prior to evaluation of the bid depute his inspector or any quality surveillance agency to the factory/workshop/premises of the bidder or contractor to assess and establish the manufacturing capability etc. of the bidder. Similarly, the purchaser may also depute his inspector/quality surveillance agency for inspection of the stores during the various stages of manufacture. In such an event the contractor shall 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 contract.

### **42 PACKING**

42.1 Contractor shall note that packing for shipment shall be in accordance with the instructions outlined in this NIT. Each package shall be limited to the size and weights that are permissible under the existing air, sea or road cargo limits, as the

case may be. Even when no packing specification is included in the NIT, it will be contractor's responsibility to provide appropriate packing depending upon the nature of the supply and the transportation and handling hazards.

42.2 The stores shall be so packed and protected as not to suffer deterioration, damage or breakage during shipment and storage in a tropical climate.

42.3 Each package shall be properly labeled to indicate the type and quantity of stores it contains, the purchase order number, its dimensions and weight and any other necessary data to identify the stores and relate it to the contract.

42.4 In case of damage of the stores due to inadequate/poor packaging, the purchaser's decision will be final and binding on the contractor. In such cases, the contractor will arrange replacement of such stores at his risk and cost within the delivery date on receipt of written intimation from the purchaser.

#### **43 DEVIATIONS TO PURCHASER'S TECHNICAL SPECIFICATIONS**

43.1 If any deviation or substitution from the technical specifications contained in Section "D" to this tender document is involved, such details should be clearly indicated by the bidder and it should be uploaded as an Annexure to the bid as otherwise it shall be an admission on the part of the bidder that he will supply the stores as specified by the purchaser. Price should be submitted online in the bid format provided by the purchaser.

#### **44 SETTLEMENT OF COMMERCIAL TERMS AND CONDITIONS OF CONTRACT**

44.1 The commercial terms and conditions of sale/contract of the bid submitted by the bidder should be in line with the purchaser's terms and conditions stipulated in the NIT. In case, the bidder does not accept the purchaser's terms and conditions stipulated in the NIT, their bid will be outrightly rejected. The bidder should note that the authority to settle the commercial terms and conditions of contract rests only with the purchaser and any agreement/understanding reached between the bidder and any other authorities will not be valid and binding.

#### **45 PARTICIPATION OF INDIAN/OVERSEAS BIDDER IN THE TENDER**

45.1 Indian and overseas bidder can participate in the tender by using digital signature certificate/encryption certificate issued by any licenced certifying authority authorized by Controller of Certifying Authority, India.

#### **46 TERMS OF DELIVERY**

46.1 Indian bidders quoting in INR should quote only for safe delivery of stores to the purchaser's consignee.

46.2 Overseas/foreign/Indian bidder quoting in foreign currency should quote on the following INCOTERM basis:-

46.2.1 For air shipment: FCA at the specified 'Gateway Airport', as per list given



46.2.1.1 List of Gateway Airports

Sl. No.	Country	Gateway Airport
1	Argentina	Buenos Aires
2	Australia	Melbourne
3	Austria	Vienna
4	Belgium	Antwerp
5	Canada	Toronto / Montreal
6	China	Beijing
7	Czech Republic	Prague
8	Denmark	Copenhagen
9	Finland	Helsinki
10	France	Paris
11	Germany	Frankfurt
12	Hong Kong	Hong Kong
13	Ireland	Dublin
14	Italy	Rome
15	Japan	Tokyo / Osaka
16	Netherlands	Amsterdam
17	Norway	Oslo
18	Poland	Warsaw
19	Russia	Moscow
20	Singapore	Singapore
21	South Africa	Johannesburg
22	South Korea	Seoul
23	Spain	Barcelona/Madrid
24	Sweden	Stockholm
25	Switzerland	Zurich
26	United Kingdom	London
27	U.S.A.	JFK

46.2.1.2 Since the purchaser has authorized consolidation agents, they will arrange for air-freight from the respective Gateway Airport.

46.2.2 For sea shipment: FOB (Port of despatch)

46.2.2.1 The price quoted shall include the cost of the stores, packing charges, inland transportation charges up to the port of despatch, i.e., major sea ports in country of despatch and loading of the stores on to the ship. The name of the sea port from where the shipment will be made shall also be indicated.

**47 AGENCY COMMISSION**

47.1 Agency commission payable to the contractor's agents in India, if any, shall be included in the price. Name and address of Indian agent and the percentage of commission payable to them and included in the price shall be clearly indicated. The commission will be paid in INR directly by the purchaser to the Indian agents after final acceptance. The manner and method of payment of agency commission is indicated in the General Conditions of Contract/ Special Conditions of Contract.

**SECTION 'B'**  
**FORMAT FOR SUBMISSION OF**  
**TENDER**

**DECLARATION**

Tender No. \_\_\_\_\_

Contractor's Bid No. \_\_\_\_\_ Date \_\_\_\_\_

FROM

M/s \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

To,  
Head- Purchase and Stores Department  
Institute for Plasma Research  
Near Indira Bridge; Bhat  
Gandhinagar-382428 (INDIA),

Dear Sir,

I/We have gone through the tendering conditions pertaining to the Tender and General Conditions of Contract, Special Conditions of Contract and Additional Conditions of Contract, if any.

2. I/We hereby agree to execute the contract in accordance with the tender specifications incorporated in Section "D" of the tender document and also agree to abide by General Conditions of Contract, Special Conditions of Contract contained in Section "C" of the Tender document and Additional Conditions of Contract, if any.
3. Purchaser 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 the stores as may be specified in the purchase order/contract.
4. I/We hereby agree to keep our above mentioned bid valid for the period mentioned in the NIT.
5. Deviation to technical specifications contained in Section "D" of the tender documents are detailed in Annexure "A" of the tender form while deviations proposed to the General/Special Conditions of Contract/Additional Conditions of Contract are detailed in Annexure "B" to this tender.
6. Prices applicable are indicated in the price bid format of the tender.
7. I/We are also uploading herewith all the leaflets/catalogue, etc. pertaining to the stores offered.
8. If I/We withdraw or modify the bid during the period of validity or if I/We are awarded the contract and I/We fail to submit a PSDBG before the deadline mentioned in the contract, I/We shall be suspended for a period of one year from being eligible to submit bids for contracts with Institute for Plasma Research.

Yours faithfully  
(Signed by Bidder)

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**SECTION 'C'**

**General Conditions of Contract  
and  
Special Conditions of Contract**

**INSTITUTE FOR PLASMA RESEARCH**  
**(An Aided Institute of Dept. of Atomic Energy, Govt. of India)**  
**NEAR INDIRA BRIDGE, BHAT**  
**GANDHINAGAR-382428**

General Conditions of Contract  
and Special Conditions of  
Contract

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## PREAMBLE

While the conditions contained in General Conditions of Contract will apply to all types of contracts, whereas General Conditions of Contract as well as Special Conditions of Contract will apply to contracts for design/manufacture, supply installation and commissioning of the plant/machinery/equipment/instrument as the case may be.

## PART-A

### GENERAL CONDITIONS OF CONTRACT

#### 1. AUTHORITY OF PERSON SIGNING THE CONTRACT ON BEHALF OF THE CONTRACTOR

The person/s signing or digitally signing the bid or any other document in respect of the bid or contract on behalf of the bidder or contractor shall be deemed to warrant that he has the authority to bind the contractor.

#### 2. DRAWINGS AND SPECIFICATIONS

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

In case any discrepancy is noted in the drawings and/or specifications and 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 his sub-contractor(s).

In case any difference or dispute arises with regard to the true intent and meaning of drawings or specification or in case 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.

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 smaller scale drawings.

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 in writing or as specified in the NIT.

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 etc. what so ever in the drawings or other specifications supplied by him whether such drawings etc. whatsoever have been approved by the purchaser or not, provided that such discrepancies, errors or omissions etc. is not due to inaccurate information or specifications furnished to the contractor on behalf of the purchaser.



**3. GENERAL WARRANTY**

The stores supplied by the contractor under the contract shall be of best quality and workmanship. The contractor shall execute the contract in accordance with the technical specifications unless any deviation has been expressly specified in the contract and any amendments agreed thereto in writing.

The contractor's bid to execute the contract in accordance with the technical specifications shall be deemed to be an 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 technical specifications of the contract.

**4. ALTERATIONS**

The purchaser may, in exceptional circumstances, make changes in the drawings, technical specifications and issue additional instructions without altering the contract in any manner provided that the changes will be as far as possible not materially alter the character and scope of the contract.

It shall be lawful for the parties to the contract to alter by mutual consent at any time, the drawings and technical specifications of stores. The stores to be supplied shall be in accordance with such altered drawings and technical specifications from the dates specified by the parties; 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 delivery date 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.

**5. PACKING**

The contractor shall pack the stores at his own cost sufficiently and properly for transit by air/sea/road as the case may be so as to ensure their being free from loss or damage while in transit to the ultimate destination specified in the contract.

Unless otherwise provided in the contract all containers (including packing cases, boxes, tins, drums and wrappings etc.) 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.

**6. INSPECTION**

The contractor shall be responsible for and perform all testing required in accordance with the contract and technical specifications included therewith.

The purchaser may at his option depute inspector(s) for inspection of the stores at contractor's works. The contractor shall facilitate such inspection of stores manufactured by him.

The contractor shall give notice of readiness for inspection to the inspector (deputed under Clause 6.2 above) so that the inspector can be present at the requisite time. The contractor shall dispatch stores only after inspector deputed by the purchaser has issued shipping release.

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

The contractor shall provide the drawings, tooling, gauges, instruments etc. and extend all the help required for carrying out the inspection work. The contractor shall produce an inspection plan to the purchaser's satisfaction notifying check points on the plan. The final inspection shall be conducted as per the approved quality assurance plan.

The contractor shall not supply or deliver the stores unless and until a shipping release or an authorisation for despatch is obtained in the format provided by the purchaser if Pre Despatch Inspection is mentioned in Technical specification. Failure to comply with this instruction as applicable will not only make the contractor ineligible for payment for the supply, but also hold the contractor liable for payment of compensation to the purchaser due to delay in clearance of the stores from the carriers.

If the contractor dispatches stores without obtaining shipping release or authority to dispatch, he will not be entitled to get any payment for such supply, in addition the contractor will pay damages for delayed clearance of the stores from the carrier.

## **7. SECURITIES**

The contractor shall provide the securities in favour of the purchaser in the form of bank guarantees as stated in sub-clauses indicated herein below for a period covering sixty days beyond the completion period mentioned in the contract or such extended period as may be agreed to between the parties, subject to the following conditions:

### **7.1. Applicable for contracts in INDIAN RUPEE**

The bank guarantee should be executed by State Bank of India or any Indian nationalized banker Scheduled Banks as appearing in the second schedule of Reserve Bank of India (other than co-operative and Grameen Banks), on a non-judicial stamp paper of appropriate value as per the purchaser's format.

### **7.2. Applicable for contracts other than in INDIAN RUPEE having condition for submission of Bank Guarantee by Foreign Contractor.**

The bank guarantee should be executed by State Bank of India or any Indian Nationalized banker Scheduled Banks as appearing in the second schedule of Reserve Bank of India (other than co-operative and Grameen Banks) or any Foreign Bank acceptable to the Purchaser. Bank Guarantee drawn from any bank in India shall be on a non-judicial stamp paper of appropriate value whereas Bank Guarantee drawn from Overseas Bank shall be on the Letter Head of the Bank, as per the purchaser's format.

The bank guarantees shall be submitted as per the format available in Annexure.

All bank guarantees are to be sent by the bankers of the contractor directly to the purchaser.

Where the contractor fails to complete the contract within the delivery date, the contractor shall apply to the purchaser for extension of delivery

date of the contract. Such application shall be made before the last date of completion of the contract. The purchaser may at his discretion extend delivery date of the stores under such condition as he may deem fit. All Bank Guarantees so submitted shall also be suitable extended well in time, failing which the purchaser shall have the right to invoke the bank guarantee without prejudice to the terms and conditions of the contract. The contractor shall not supply the material unless the purchaser has extended delivery date of stores in writing

### **7.3. PERFORMANCE SECURITIES**

Contractor shall furnish Performance Security Deposit in the form of bank guarantee for three percent of the value of the contract, including statutory levies, for due performance of the said contract till expiry of warranty period, as per Annexure-I within thirty days from the date of issue of contract in case of Indian Rupee contracts or within thirty days from the date of receipt of Export License by the contractor from respective Government in case of contracts having currency other than Indian Rupee, as the case may be. The Bank Guarantee shall be valid till satisfactory completion of the contract till expiry of warranty period pursuant to General Conditions of Contract, plus a claim period of sixty days from the completion period mentioned in the contract for lodging of claims, if any.

If the contractor fails to provide PSDBG as stated herein above, within thirty days from the date of issue of contract such failure shall constitute a breach of contract and action as deemed fit may be initiated against the contractor.

In case, the contractor fails to fulfill the obligations under the contract; the purchaser shall have the right to invoke and appropriate the PSDBG. This right shall be in addition to and without prejudice to the rights of the purchaser under the terms and conditions of contract

### **7.4. BANK GUARANTEE FOR FREE ISSUE MATERIAL**

Bank Guarantee for Free Issue Material (hereinafter referred to as FIM) (for fabrication of stores at contractor's works outside purchaser's site): The contractor shall submit a Bank Guarantee as per Annexure VIII as applicable to the extent of full value of FIM as security of free issue material issued to the contract or till such time the entire contract is executed and proper account for the FIM is rendered by the contractor to the Purchaser.

## **8. DELIVERY DATE – TIME IS THE ESSENCE OF CONTRACT**

The delivery date stipulated in the contract shall be deemed to be the essence of the contract and the contract must be completed not later than date(s) stipulated therein.

### **PHASED DELIVERY/MILESTONE**

Where the contract envisages phased delivery or completion of milestone, the delivery date for each phase or milestone shall be deemed to be the essence of contract.

Acceptance beyond the delivery date is at the sole discretion of the purchaser and subject to Section C Part A Clause No.10. The contract shall be deemed to be terminated after the expiry of delivery date and subjected to Section C Part A Clause 32.2 and Clause 32.3.

**9. ADVANCE INTIMATION OF DELIVERY**

Contractors shall send advance intimation to the consignee preferably by e-mail regarding intended delivery of material at least five days prior to the date of delivery of stores to the consignee so as to make proper arrangements for receipt of the stores. If delivery of stores is being carried out by a vehicle, the contractor shall confirm that the driver carries, as on date of delivery, all valid documents, viz., driving license, vehicle registration documents, insurance cover for the vehicle etc. in addition to delivery challan in duplicate along with other documents if any, as per the contract. Failure to carry the valid documents by the driver will result in denial of entry of vehicle inside consignee’s premises and the consignee will not be responsible for any consequences thereof.

**10. EXTENSION OF DELIVERY DATE**

The purchaser will without prejudice to the other rights of the purchaser invoke the following damages for extension of delivery date:

Sl. No.	Delivery Period	Liquidated Damages, Rate per Week	Maximum Amount of Liquidated Damages
1.	Delivery period (as originally stipulated) not exceeding one year	@0.5% of the value of the stores, per week or part thereof	5% of the value of stores.
2.	Delivery period (as originally stipulated) exceeding one year but not exceeding two years.	@ 0.25% of the value of the stores, per week or part thereof.	5% of the value of stores.
3.	Delivery period (as originally stipulated) exceeding two years	@ 0.1% of the value of the stores, per week or part thereof.	5% of the value of stores.

Delivery Period means “The time from date of release of the contract to the date of delivery of stores”.

However, the payment of liquidated damages shall not in any way absolve the contractor from any of its obligations and liabilities under the contract.

**11. FORECLOSURE OF CONTRACT OR REDUCTION IN SCOPE OF WORK BEFORE DELIVERY DATE**

If before the delivery date, the purchaser may at its discretion, decide to abandon or reduce the scope of the contract for any reason whatsoever and does not require the whole or part of the contract to be executed, the purchaser shall give notice of four weeks in writing to that effect to the contractor and the contractor shall act accordingly in the matter. The

contractor shall have no claim for any payment of compensation or otherwise whatsoever, on account of any profit or advantage which he might have derived from the execution of the contract in full but which he did not derive in consequence of the foreclosure of the whole or part of the contract.

The contractor shall be paid at contract rates, full amount for part of contract executed and delivered to the purchaser. In addition, a reasonable amount as certified by the purchaser will be paid to the contractor for the stores hereunder mentioned which could not be utilized in the contract to the full extent in view of the foreclosure.

Purchaser shall have the option to take over contractor's materials or any part thereof either bought for execution of the contract or of which the contractor is legally bound to accept delivery from its contractor (for use in the contract). For materials taken over or to be taken over by purchaser, cost of such materials as calculated by purchaser shall be paid. The cost shall, however, take into account purchase price, cost of transportation and deterioration or damage which may have been caused to materials whilst in the custody of the contractor.

If any materials supplied by purchaser are rendered surplus, the same except normal wastage shall be returned by the contractor to purchaser at rates not exceeding those at which these were originally issued, less allowance for any deterioration or damage which may have been caused whilst the materials were in the custody of the contractor. In addition, cost of transporting of such materials from contractor's site to consignee, if so required by purchaser, shall be paid.

The contractor shall, if required by the purchaser, furnish books of accounts and other relevant documents and evidence as may be necessary to enable the purchaser to certify the reasonable amount payable under Clause 11.2 above.

The reasonable amount payable for the stores shall not be in excess of the cost of the contract remaining incomplete on the date of closure, i.e. total stipulated cost excluding taxes of the contract as per accepted tender less the cost of stores actually delivered and also less the cost of contractor's materials at site taken over by the purchaser as above. Provided always that against any payments due to the contractor on this account or otherwise, the purchaser shall be entitled to recover or be credited with any outstanding balances due from the contractor for advance paid in respect of this contract and any other sums which on the date of termination were recoverable by the purchaser from the contractor under the terms of this contract.

## **12. INSPECTOR'S AUTHORITY**

The inspector, wherever deputed by the purchaser under relevant Clauses of the Contract shall have the power:

to certify that the stores are not in accordance with the specifications provided in the contract owing to the adoption of any unsatisfactory method of manufacture, before any Stores or parts thereof are inspected.

to reject any Stores submitted for inspection or part thereof as not being in accordance with the technical specification provided in the contract.

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

If the inspector finds that the contractor has executed any unsound or

imperfect work, the inspector shall notify such defects to the contractor in writing with thirty days from the date of delivery 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 between the parties as reasonably necessary, proceed to alter, reconstruct or remanufacture the stores to the requisite standard and technical specifications according to the contract.

In case repair/replacement of defective/rejected stores is necessary and becomes essential to return the stores, to the contractor, where full or part payment has already been made by the purchaser, the contractor shall submit bank guarantee for the value of stores so found defective/rejected as per Annexure-V or VI as may be applicable and valid till receipt and acceptance of repaired/replaced/entire stores within fifteen days of intimation. However, the contractor will not be absolved from his responsibility as specified under Section C Part-A Clause No.8.

**14. CONSEQUENCE OF REJECTION**

If the stores are rejected by the inspector or consignee at the destination and the contractor fails to make satisfactory supplies within the delivery date, then the purchaser may:

Allow the contractor to submit for inspection of fresh stores in replacement of the rejected, within extended delivery period subject to Section C Part A Clause No. 10, the contractor bearing the cost of freight on such replacement without being entitled to any extra payment on that account. OR

Purchaser may take recourse to Section C Part A Clause 8.4.

**15. RECOVERY OF SUMS DUE**

Whenever any claim for payment arises out of or under this contract against the contractor, the purchaser shall be entitled to recover the sum by appropriating, in part or whole, the security deposited by the contractor or any payment which at any time may become due to the contractor under this or any other contract with the purchaser. If this sum is 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 amount payable to the contractor under the contract including the security deposit shall be withheld till such claims of the purchaser are finally adjudicated upon and paid by the contractor

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

It is agreed that 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 purchaser 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.

It is further 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 the purchaser until the 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.

**17. WARRANTY**

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 and acceptance of the last lot of stores under the contract at the ultimate destination stipulated in the contract.

In case any defect or deficiency in the stores supplied by the contractor under the contract appear to be discovered within twelve months from the date of receipt and acceptance of the stores in India, the contractor upon notification of such defects or deficiency by purchaser, shall forthwith take measure to rectify every such defect, deficiency or failure without any cost to the purchaser.

In case the contractor opts for return of stores for rectification/repair at their works, contractor shall furnish bank guarantee for the cost of stores as per Annexure-V or VI (as applicable) valid till acceptance of rectified/repared Stores. Further the warranty period will get extended for the period the Stores were not available to the purchaser for his use. If the contractor, after such notification, makes default or delay in rectifying all such defects, deficiencies or failure to the satisfaction of the purchaser, the purchaser may take recourse to the remedies provided for in Section C Part-A Clause no. 11 and 14.

**18. PERMIT AND LICENSES**

The contractor shall secure and pay for all licenses and permit at his end which he may be required to comply with all laws, ordinances and regulations etc. 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 from against all claims for damages and liability which may arise out of the failure of the contractor to secure and pay for any such licenses and permits and/or to comply fully with any and all applicable laws ordinances and regulations etc.

**19. PATENT INDEMNIFICATION**

The contractor shall indemnify and keep the purchaser indemnified from and against any and all claims, actions, costs, charges and expenses arising from or for infringement of patent rights, copyright or other protected rights, etc. of any design plans, diagrams, drawings in respect of the stores supplied by the contractor or any of the manufacturing methods or process adopted by contractor for the Stores supplied under the contract.

In the event of any claim being made or action being taken against the purchaser in respect of the matter referred to in Clause No. 19.1 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 there from.

In the event of any designs, drawing, plans or diagrams or any manufacturing methods or process furnished by the contractor etc. constituting infringement of patent or any other protected rights etc. 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.

The provision of the Clause remains effective and binding upon the contractor even after the completion, expiration or termination of the contract.

## **20. MODE AND DOCUMENTATION OF PAYMENT**

### **20.1. Payment for contracts in currency other than INDIAN RUPEES**

Unless otherwise specified elsewhere, payment in full (excluding the amount of the commission included in the price payable directly by the purchaser to the Indian agent) shall be made by wire transfer within thirty days of final acceptance of stores.

The following documents are required to be sent to the purchaser immediately after shipment of consignment:

- 20.1.1. Bill of Lading/Negotiable Airway Bill evidencing shipment
- 20.1.2. Invoice for the shipment : Four copies
- 20.1.3. Packing list : Four copies
- 20.1.4. Shipping release from inspector or quality surveillance agency nominated by the purchaser for the purpose of inspection: Four copies, if applicable.
- 20.1.5. Shipping authorization from purchaser wherever required.

The contractor shall send invoice only for the net amount payable to him after deducting the amount of agency commission included in the invoice which would be paid to the Indian agents directly by the purchaser. However the contractor's invoice should separately reflect the amount of commission payable to his Indian agent.

### **20.2. PAYMENT FOR CONTRACTS IN INDIAN RUPEE**

Unless otherwise mentioned elsewhere, payments for the contract will be made after final acceptance of stores and within a reasonable time on submission of following documents.

- i) GST compliant invoice in favour of paying authority duly pre-receipted.
- ii) Receiving voucher from Stores (RV).

Normally thirty days will be allowed for inspection and payment after receipt of the stores.

## **21. STATUTORY DEDUCTIONS**

The purchaser has the right to make statutory deductions from the payments made to the contractor as applicable on the date of making such payment as per the provisions of relevant Act or Rules made there under. Appropriate certificate to that effect will be provided by the purchaser's paying authority.



**22. AGENCY COMMISSION**

The amount of commission included in the price and payable to the Indian agents of the contractor shall be paid in INR directly to the Indian agents by the purchaser on the basis of an Invoice from the Indian agent. "Payment will be released to the Indian agents after receipt and final acceptance of the goods by the purchaser".

**INSURANCE FOR CONTRACTS IN CURRENCY OTHER THAN INDIAN RUPEE**

Transit insurance from warehouse to warehouse will be arranged by the purchaser through his underwriters unless this responsibility is specifically entrusted to the contractor in any particular case.

**23. MARKING**

The marking shall generally be as under:

Name and address of the consignee	Head - Stores Section, INSTITUTE FOR PLASMA RESEARCH (An Aided Institute of Dept. of Atomic Energy, Govt. of India) NEAR INDIRA BRIDGE, BHAT GANDHINAGAR-382428
Contract Number and Date	No. _____ Date _____
Brief Description of Goods	
Weight	
Dimension	
Ultimate Destination	
Port of Discharge	
Package Number	

Each package shall contain a packing note specifying the name and address of the contractor, the number and date of the contract, name and address of the consignee, description of the stores and the quantity contained in such package.

The inspector, wherever deputed by the purchaser under Section C Part-A Clause No. 6 may reject the stores if the same is not packed and/or marked as aforesaid and in case where the packing materials are specifically prescribed, if such materials are not in accordance with the terms of the contract.

**24. CODE OF INTEGRITY**

No official of a procuring entity or bidder or contractor shall act in contravention of the codes which include

- (i) Prohibition of
  - (a) making offer, solicitation or acceptance of bribe, reward or gift or any material benefit, either directly or indirectly, in exchange for an unfair advantage in the procurement process or to otherwise influence the procurement process.
  - (b) any omission, or misrepresentation that may mislead or attempt to mislead so that financial or other benefit may be obtained or an obligation avoided.
  - (c) any collusion, bid rigging or anticompetitive behavior that may impair the transparency, fairness and the progress of the

- procurement process.
- (d) improper use of information provided by the procuring entity to the bidder with an intent to gain unfair advantage in the procurement process or for personal gain.
  - (e) any financial or business transactions between the bidder and any official of the procuring entity related to tender or execution process of contract; which can affect the decision of the procuring entity directly or indirectly any coercion or any threat to impair or harm, directly or indirectly, any party or its property to influence the procurement process.
  - (f) obstruction of any investigation or auditing of a procurement process.
  - (g) making false declaration or providing false information for participation in a tender process or to secure a contract;
- (ii) Disclosure of conflict of interest.
  - (iii) Disclosure by the bidder of any previous transgressions made in respect of the provisions of sub-clause (i) with any entity in any country during the last three years or of being debarred by any other procuring entity.

- (iv) Institute for Plasma Research, after giving a reasonable opportunity of being heard, comes to the conclusion that a bidder or prospective bidder, as the case may be, has contravened the code of integrity, may take appropriate measures as deemed fit, including rejecting his bid and forfeiting EMD and/or debarring him from participating in future bidding.

## **25. LAW GOVERNING THE CONTRACT**

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

## **26. JURISDICTION**

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

## **27. SETTLEMENT OF DISPUTES**

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.

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.

## **28. Arbitration**

In the event of any dispute or difference arising out of or 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.

## **29. TRANSFER OF OWNERSHIP**

- 29.1 Ownership of the stores supplied by the foreign contractor shall be transferred to the purchaser in accordance with the payment terms or INCOTERMS accepted.
- 29.2 Ownership of the stores supplied by the Indian contractor shall be transferred to the purchaser when the stores are delivered and accepted by the purchaser
- 29.3 Transfer of title shall not in any way absolve the contractor from his responsibilities and liabilities under the contract. Notwithstanding the

transfer of ownership of the stores, the responsibility for care and custody thereof together with the risk of loss or damage thereto shall remain with the contractor until safe delivery of the stores to the purchaser' site.

**INTELLECTUAL PROPERTY RIGHTS**

All rights of design documents and drawings, if paid by the purchaser separately or compositely included in the contract cost, will remain with the purchaser and the contractor shall have no claim whatsoever on these rights.

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

Director, Institute for Plasma Research is the authorized person to deal with, exercise, negotiate on behalf of the purchaser having all the rights, discretions and powers of the purchaser under this contract and any reference to the opinion of the purchaser in the terms and conditions contained in these General Conditions of Contract/Special Conditions of Contract shall mean and be construed as reference to the opinion of any of the persons authorized by him as mentioned in this Clause. All notices on behalf of the purchaser shall be issued by Director, Institute for Plasma Research.

**31. TERMINATION OF CONTRACT**

In case of non-compliance of any of the Terms and Conditions of the Contract, Purchaser reserves the right to terminate the contract after serving notice to the contractor.

Performance Security, if any, already available shall be forfeited.

In addition to the above, the contractor will be liable to be debarred and/or banned from participation against any tender issued by Institute for Plasma Research, including its regional units, and/or the bid of defaulting contractor is being considered for award of contract of stores.

## **PART-B**

In addition to the General Conditions of Contract contained in Section C Part-A the following Special Conditions of Contract shall apply to contracts for design/manufacture, supply, installation and commissioning of plant/ machinery/equipment/instrument as the case may be . These Special Conditions of Contract in Part-B shall override the General Conditions of Contract, wherever there is any ambiguity/conflict.

### **SPECIAL CONDITIONS OF CONTRACT**

#### **1. RESPONSIBILITY FOR COMPLETENESS**

All fittings or accessories which may not be specifically mentioned in the tender specifications of the contract but which are necessary are to be provided by the contractor without any extra charge and the stores comprising plant/machinery/equipment/instruments must be completed in all respect within the delivery date.

#### **2. FINAL TEST**

The final tests to ascertain the performance and guarantee shall commence within one month of completion of installation. The contractor will inform the purchaser well in advance the services/facilities required to start the final test, as mentioned in the contract.

#### **3. REJECTION OF DEFECTIVE PLANT**

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 during the currency of the contract including warranty period, 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 it comply with the requirement of the contract at the earliest and in any case not later than thirty days from the date of such intimation of the incident. In case the contractor fail to do so within the abovementioned 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 to the same specifications as far as possible and under competitive conditions. The contractor shall be liable to pay to the purchaser the extra cost, if any, of such replacement procured and/or erected as provided for in the contract, such extra cost being the difference between the price paid by the purchaser under the contract for such replacement and the original price admitted in the contract placed with the contractor or the cost as determined by the purchaser out of the price admitted in the original contract, where separate price for such defective/rejected stores is not available in the contract. Contractor shall refund to purchaser any sum paid by the purchaser to the contractor in respect of such defective plant when rejected and no replacement is procured by the purchaser.

#### **4. WARRANTY**

The contractor shall provide warranty of stores supplied for a minimum period of twelve calendar months after the stores comprising 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 stores comprising plant/machinery/equipment/instrument) the contractor shall be responsible for any defects that may develop under conditions provided for in 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.

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 until 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 is later. If any defect is not rectified within a reasonable time, the purchaser may cancel the contract or part thereof whose decision will be final and binding on the contractor and the contractor will refund the money so paid to the contractor forthwith without any demur.

All inspections adjustments, replacements or renewals carried out by the contractor during the warranty period shall be subject to the same conditions as in the contract.

The contractor shall, give advance notice of not less than twelve months to the purchaser whenever spare parts of the stores are going out of production so that the purchaser may order requirement of spares in one lot or more lots if so desired.

The contractor shall further guarantee up to the plant/equipment/instrument/stores life that if spare parts go out of production, the contractor will make available blue prints, drawings of spare parts and specifications of stores at no cost to the purchaser, if and when required in connection with the stores to enable purchaser to fabricate or procure spare parts from other sources.

The provision of this Clause shall remain effective and binding upon the contractor even after the completion and fifteen years of expiration of the contract or till the stores supplied under the contract is in use by the purchaser, whichever is earlier.

## **5. ERECTION AND COMMISSIONING**

In all cases where contract provide for supervision of erection and commissioning or for test at the purchaser's premises, the contractor shall indicate in advance the services required for installation and commissioning and the purchaser except where otherwise specified, shall provide free of charge, such labour, materials, fuels, apparatus and instruments as may be required from time to time and as may reasonably be demanded by the contractor to carry out efficiently such supervision of erection and commissioning and for the requisite test. In case of contract requiring electricity or services for the completion of erection, commissioning and testing at site, such electricity or services shall be supplied free of cost to the contractor or as specified in the NIT.

Action by the purchaser under the Clause shall not relieve the contractor of his warranty obligations under the contract.

## **6. TRAINING**

The contractor shall, if required by the purchaser, provide facilities for the practical training of purchaser's engineering or technical personnel and for their active association on the manufacturing process through the manufacturing period of the contract/stores, number of such personnel shall be mutually agreed upon.

## **7. PAYMENT TERMS**

### **7.1.FOR CONTRACTS IN INDIAN RUPEE ONLY**

90% of total contract value exclusive of charges for installation and commissioning, if applicable after delivery of all consignment and preliminary inspection by purchaser's inspector on submission of the following:

- 7.1.1.1. GST compliant invoice in favour of paying authority duly pre-receipted.
- 7.1.1.2. Original shipping release containing the stamp and signature of the purchaser's inspection authority.
- 7.1.1.3. Preliminary Inspection Report alongwith Material receipt confirmation documents from Stores.

And balance payment will be released against following documents:

- i) Installation, commissioning and training certificate if applicable
- ii) Receiving voucher receipt from Stores.

### **7.2.FOR CONTRACTS IN CURRENCIES OTHER THAN INDIAN RUPEE**

Unless otherwise specified elsewhere in the NIT, payment for the stores will be made as follows

90% of total contract value exclusive of charges for installation and commissioning, if applicable by Irrevocable Letter of Credit on submission of the following documents:

- i. Bill of Lading/Negotiable Airway Bill evidencing shipment
- ii. Invoice for the shipment : Four copies
- iii. Packing List : Four copies
- iv. Shipping authorization from purchaser wherever required. if applicable,
- v. Any other document(s) as specified in the contract.

An advance copy of invoice along with details of documents forwarded through bank should be sent to the Paying Authority mentioned in the contract to enable him to verify the documents and honor the claim without delay.

The contractor shall be responsible to make available to the purchaser the documents which are essential for arranging customs clearance in India. The contractor shall arrange through his bank to have the documents air mailed to the purchase's bank without any delay. He shall also arrange to forward directly to the purchaser, three copies of Airway Bill, along with a copy of the invoice and packing list. If the purchaser incurs any extra expenditure by way of penalty payable to the Airport authorities in India or any other such expenditure due to delay in receipt of shipping documents specified by purchaser, the contractor shall be responsible for making good such extra expenditure incurred by the purchaser.

While the purchaser shall bear the bank charges payable to his bankers in India (State Bank of India) the contractor shall bear all the bank

charges payable outside India including the charges towards advising/amendments, commission.

The contractor shall send invoice only for the net amount payable to him after deducting the amount of agency commission included in the invoice which would be paid to the Indian agents directly by the purchaser in Indian Rupee. However the contractor's invoice should separately reflect the amount of commission payable to his Indian agent.

Balance payment will be made by wire transfer after final inspection, testing, installation, commissioning (where applicable), final acceptance and submission of PSDBG acceptance letter from the Purchaser against following documents.

- i. Acceptance Report
- ii. Receiving voucher from Stores

## **8. FORCE MAJEURE**

### **DEFINITION OF FORCE MAJEURE**

Force Majeure shall mean any event which is beyond the control of the contractor or the purchaser, as the case may be, which they could not foresee or with a reasonable amount of diligence could not have foreseen and which substantially affects the performance of the contract, such as

war, hostilities or warlike operations (whether a state of war be declared or not), invasion, act of foreign enemy and civil war.

rebellion, insurrection, mutiny, usurpation of civil or military government, civil commotion.

embargo, import restriction, confiscation, nationalization, mobilization, commandeering or requisition by or under the order of Central, State Government or Local Authority in India or any other act or failure to act, of any local, state or national government in India

riot

state/region/country wide transporters strike

earthquake, landslide, volcanic activity, fire, flood or inundation, tidal wave, typhoon or cyclone hurricane, storm, lightning and pressure waves or other natural disaster

nuclear event causing nuclear radiation, radioactive

contamination

**NOTICE OF FORCE MAJEURE**

If either party is prevented, hindered or delayed from or in performing any of its obligations under the contract by an event of force majeure, then it shall notify the other in writing of the occurrence of such event and the circumstances thereof within fourteen days after the occurrence of such event. A party shall give notice to the other party when it ceases to be affected by the force majeure. Failure to notify the purchaser about occurrence of such event within the time frame specified, the contractor shall have no right to claim any provisions under clause 8.4 below (consequences of force majeure)

### **DUTY TO MINIMISE THE EFFECT**

The party or parties affected by the event of force majeure shall use reasonable efforts to mitigate the effect thereof upon its or their performance of the contract and to fulfill its or their obligations under the



contract

### **CONSEQUENCES OF FORCE MAJEURE**

The party who has given notice of force majeure shall be excused from the performance or punctual performance of its obligations under the contract for so long as the relevant event of force majeure continues and to the extent that such party's performance is prevented, hindered or delayed. The delivery time shall be re-fixed in accordance with Section C Part-A Clause 10, even though such force majeure event may occur after contractor's performance of his obligations has been delayed for other cause. No delay or non-performance by either party hereto caused by the occurrence of any event of force majeure shall

Constitute a default or breach of the contract give rise to any claim for damages or additional cost or expense occasioned thereby; if and to the extent that such delay or non-performance is caused by the occurrence of an event of force majeure. If the performance of the contract is substantially prevented, hindered or delayed for a single period of more than sixty days or an aggregate period of more than one hundred and twenty days on account of one or more events of force majeure during the currency of the contract, the parties will attempt to develop a mutually satisfactory solution.

### **FORCE MAJEURE AFFECTING SUB-CONTRACTOR**

Conditions as enumerated in Section C Part B Clause 8 will be applicable to sub-contractor.

If any sub-contractor is entitled under the contract for Force Majeure on terms additional to or broader than those specified in this Clause, such additional or broader Force Majeure events or circumstances shall not excuse the Contractor's non-performance or entitle him to relief under this Clause.

## **9. LIMITATIONS**

Anything in this Contract to the contrary notwithstanding

The affected party shall not be relieved from obligations under this contract to the extent any gross negligence of the affected party aggravates the force majeure event; and

Force majeure shall not apply to obligations of either party to make payments to the other party under the contract.

## **10. HINDRANCES**

The contractor is required to maintain hindrance register for reporting hindrance if any, while executing the work, as per Annexure-X

. The contractor shall get record of hindrances in the hindrance register(s) approved/ endorsed by the purchaser. Such hindrance in the work endorsed by the purchaser will only be taken into consideration for granting delivery date re-fixation.

ANNEXURE

BANK GUARANTEE/ HINDRANCE  
REGISTER FORMAT

## ANNEXURE-I: PERFORMANCE SECURITY BOND

[Note: Bank Guarantee shall be got executed from a Nationalised / Scheduled commercial Bank (Except Co-operative Bank and Grameen Banks) only on non-judicial stamp paper of appropriate value]

Institute for Plasma Research  
(Acting through) Director/ Head- Purchase and Stores Department/ Head-Purchase Section  
Institute for Plasma Research

1. WHEREAS on or about the (Date of the Purchase Order) M/s. \_\_\_\_\_ a Company incorporated under the Companies Act 1956 and having its registered office at \_\_\_\_\_ (hereinafter referred to as 'The Contractor') entered into an agreement bearing No. \_\_\_\_\_ (hereinafter referred to as 'The Contract'), with Institute for Plasma Research acting through Director/ Head- Purchase and Stores Department/ Head-Purchase Section, Institute for Plasma Research, Bhat, Near Indira Bridge, Gandhinagar-382428. (hereinafter referred to as (Purchaser) for supply of \_\_\_\_\_ (hereinafter referred to as 'The Equipment').
2. AND WHEREAS under the terms & conditions of the contract, the Contractor shall furnish Performance Security Bond for an amount of Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_ only) representing 3% of the total value of the contract in the form of a bank guarantee, in a manner herein contained duly executed by a scheduled/nationalised bank towards satisfactory performance of the contract and performance of the equipment and against any loss or damage caused to or suffered or would be caused to or suffered by the Purchaser by reason of any breach by the said Contractor(s) of any terms and conditions contained in the said agreement. The Performance Security Bond shall be valid till satisfactory completion of Defect Liability Period covering the Warranty/Guarantee period of the equipment as per the terms & conditions of the said agreement.
3. NOW WE, the \_\_\_\_\_ (Bank) in consideration of the promises do hereby agree and undertake to pay to the Institute for Plasma Research, (the purchaser) on behalf of the Contractor, the said sum of Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_ Only), the amount due and payable under the guarantee without any demur, merely on a demand from the Institute for Plasma Research stating that the amount claimed is due by way of loss or damage caused to, or suffered by, the Purchaser by reason of any breach by the said Contractor of any of the terms and conditions contained in the said agreement or by reason of the contractors failure to perform the said agreement or by reason of unsatisfactory performance of the equipment during the Warranty period. Any such demand, made on the bank, shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_ only).
4. WE undertake to pay to the Purchaser the said sum of ₹ \_\_\_\_\_ (Rupees \_\_\_\_\_ Only), demanded notwithstanding any dispute or disputes raised by the Contractor(s), in any suit on proceedings pending before any Court or Tribunal relating thereto, our liability under this presents being absolute irrevocable and unequivocal. The payment so made by us under this bond shall be a valid discharge of our liability for payment thereunder and the Contractor shall have to no claim against us for making such payment.
5. WE HEREBY further agree that the decision of the Institute for Plasma Research as to the amount of damages suffered by the Purchaser by reasons(s) of any breach by the said Contractor or whether the said equipment is giving satisfactory performance or not during ~~the Warranty Period as per the terms and conditions of the said agreement, shall be final~~

and binding on us.

6. AND WE, the \_\_\_\_\_(Bank) do hereby further agree that our liability hereinunder shall not be discharged by virtue of any agreement between the Purchaser and the Contractor whether with or without our knowledge and/or consent and shall remain in full force and effect during the period that would be taken for the performance of the said agreement or by reason of the Purchaser showing any indulgence or forbearance to the Contractor whether as to payment, time for performance, or any other matter whatsoever relating to the contract, which but for this provision, would amount to discharge of the surety under the law.
7. THIS guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor.
8. OUR Guarantee shall remain in force until \_\_\_\_\_and unless a claim under the guarantee is lodged with us within three months from the said date, all rights of the Purchaser under the guarantee shall be forfeited and we shall be relieved and discharged from all our liabilities hereunder.
9. Notwithstanding anything contrary contained in any law for the time being in force or banking practice, this guarantee shall not be assignable or transferable by the beneficiary. Notice or invocation by any person such as assignee, transferee or agent of beneficiary shall not be entertained by the bank. Any invocation of the guarantee can be made only by the beneficiary directly.

Dated the \_\_\_\_\_ day of \_\_\_\_\_ 202\_

For \_\_\_\_\_

(Indicate the Name of bank)

ANNEXURE-V: BANK GUARANTEE FORMAT FOR RE-EXPORT/RETURN OF  
REJECTED FOR EQUIPMENT REPAIRS / REPLACEMENT.  
(By Indian/Foreign Contractor)

Head-Purchase and Stores Department, Institute for Plasma Research  
On behalf of The Director, Institute for Plasma Research  
Bhat, Near Indira Bridge,  
Gandhinagar, Gujarat, India  
Pin- 382428

Whereas on or about the \_\_\_\_\_ day of \_\_\_\_\_ 20 , M/s. \_\_\_\_\_ a company having incorporated their office at \_\_\_\_\_ (hereinafter referred to as 'the Contractor') entered into an Contract No. \_\_\_\_\_ dt. \_\_\_\_\_ (hereinafter referred to as 'the Contract') with the Head-Purchase and Stores Department, Institute for Plasma Research, on behalf of the Director, Institute for Plasma Research (Hereinafter referred to as 'the Purchaser') for manufacture and supply of \_\_\_\_\_ Nos. of (hereinafter referred to as the instrument') at a cost of \_\_\_\_\_ (in words).

Whereas as per the terms and conditions of the Contract, the Contractor had delivered to the consignee all the \_\_\_\_\_ Nos. of instruments, out of which \_\_\_\_\_ No./s. of the instrument costing \_\_\_\_\_ (in figure and words) was found defective and not working satisfactorily after its receipt by the consignee and therefore the instrument received from the Contractor was rejected by the Purchaser.

Whereas as per the terms and conditions of the Contract, the Contractor has agreed to either repair or replace the instrument, as is deemed fit, free of cost, to the purchaser within a period of \_\_\_\_\_ months from the date of receipt of the rejected instrument by the Contractor, under the warranty conditions of the Contract.

Whereas, as per the Purchaser policy, the Contractor was required to furnish a Bank Guarantee for full value of the defective instrument/s amounting to \_\_\_\_\_ (in figure and words) as a safeguard to the Purchaser on account of any damage/loss that may be caused or suffered by the Purchaser due to the Contractor's inability/failure to return the instrument duly repaired or supply a new instrument in replacement of the defective instrument within the specified time and also when the instruments lie under the Contractor's custody, control or possession.

Whereas the Contractor, based on the Purchaser's requirement has agreed to furnish such a Bank Guarantee as a safeguard to the Purchaser interest as indicated in para 4 above, valid till the return of the repaired instruments or a replacement thereof, to the Purchaser.

Whereas, we, \_\_\_\_\_ (name and address of the Bank) (herein after referred to as 'the Bank'), in consideration the Purchaser having agreed to despatch the defective instrument to the Contractor's works on freight to pay basis and Contractor having agreed to repair and return the defective instrument duly repaired or arrange free replacement of the defective instrument on freight paid/CIF \_\_\_\_\_ basis, do hereby agree and undertake to indemnify the Purchaser and keep the Purchaser indemnified to the extent of a sum not exceeding \_\_\_\_\_ (in figure and words.) against any loss or damage that may be caused or suffered by the Purchaser by reason of the Contractor either no returning the repaired instrument or arrange free replacement within a specified time and also when the instrument lie under the custody, control or possession of the Contractor.

We, the Bank, do hereby undertake to pay to the Purchaser, the amount due and payable under this Guarantee, without any demur, merely on a demand from the Purchase Officer, Institute for Plasma Research on behalf of the Purchaser, stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Purchaser by reason of the Contractor either not returning the instrument duly repaired or arrange free replacement to the Purchaser and also when the instrument lie under the custody, control or possession of Contractor. Any such demand on the Bank shall be conclusive as regards the amount due and payable by the Bank under this Guarantee. However, our liability under this Guarantee shall be restricted to an amount not exceeding \_\_\_\_\_ (in figure and words).

We, the Bank, undertake to pay to the Purchaser any money so demanded notwithstanding any dispute or disputes raised by the Contractor/s or by agents in any suit or proceeding pending before any court or tribunal relating thereto our liability under this present being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our liability for payment thereunder and the Contractor/s and the agents shall have no claim against us for making such payment.

And we, the Bank, hereby further agree that the decision of the said Head-Purchase and Stores Department, Institute for Plasma Research as to whether the Contractor has committed breach of any such terms and conditions of the Contract or not and as to the amount of damage or loss assessed by the said Head-Purchase and Stores Department, Institute for Plasma Research on account of such breach would be final and binding on us.

We, the Bank, further agree with the Purchaser that the Purchaser shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time for performance by the said Contractor from time to time or to postpone for any time or from time to time, any of the powers exercisable by the Purchaser against the said Contractor/s and to forbear or enforce any of the terms and conditions relating to the said Contract and we shall not be relieved from our liability by reason of any such variation or extension being granted to the said Contractor/s or for any forbearance, act or commission on the part of the Purchaser or any indulgence by the Purchaser to the said Contractor/s or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

This Guarantee will not be discharged due to the change in the constitution of the Bank, the Contractor or the agent.

Our Guarantee shall remain in force until and unless a claim under the Guarantee is lodged with us within three months from that date, all rights of the Purchaser under the Guarantee shall be forfeited and we shall be relieved and discharged from all liabilities thereunder.

Dated the \_\_\_\_\_ day of \_\_\_\_\_ 202\_

For \_\_\_\_\_

(Indicate the Name of bank)

ANNEXURE VI: BANK GUARANTEE FORMAT FOR RE-EXPORT OF REJECTED EQUIPMENT FOR REPAIRS / REPLACEMENT.

(By local agents of foreign Contractor)

Head-Purchase and Stores Department, Institute for Plasma Research  
On behalf of The Director, Institute for Plasma Research  
Bhat, Near Indira  
Bridge, Gandhinagar,  
Gujarat, India  
Pin-382428

Whereas on or about the \_\_\_\_\_ day of \_\_\_\_\_ 20 , M/s. \_\_\_\_\_, a company having incorporated their office at \_\_\_\_\_ (hereinafter referred to as 'the Contractor') entered into a Contract bearing No. \_\_\_\_\_ dt. \_\_\_\_\_ (hereinafter referred to as 'the Contract') with the Head-Purchase and Stores Department, Institute for Plasma Research, on behalf of the Director, Institute for Plasma Research, Gandhinagar, Gujarat, (Hereinafter referred to as 'the Purchaser') for manufacture and supply of Nos. \_\_\_\_\_ of (hereinafter referred to as the instrument') at a cost of \_\_\_\_\_ (in figures and words). The Contract recognizes M/s. \_\_\_\_\_ (name and address) as the Indian agent of the Principals M/s. \_\_\_\_\_ in India.

Whereas as per the terms and conditions of the Contract, the Contractor had delivered to the consignee all the \_\_\_\_\_ instrument costing \_\_\_\_\_ (in figure and words) was found defective and not working satisfactorily after its receipt by the consignee and therefore the instrument received from the Contractor was rejected by the Purchaser.

Whereas as per the terms and conditions of the Contract, the Contractor has agreed to either repair or replace the instrument, as is deemed fit, free of cost, to the purchaser within a period of \_\_\_\_\_ months from the date of receipt of the rejected instrument by the Contractor, under the warranty conditions of the Contract.

Whereas, as per the Purchaser policy, the Contractor was required to furnish a Bank Guarantee for full value of the defective instruments amounting to (in figure and words) as a safeguard to the Purchaser on account of any damage/loss that may be caused or suffered by the Purchaser due to the Contractor's inability/failure to return the instrument duly repaired or supply a new instrument in replacement of the defective instrument within the specified time and also when the instruments lie under the Contractor's. custody, control or possession. As the Indian agent has agreed to furnish the Bank Guarantee on behalf of the Principal in this Contract, M/s. \_\_\_\_\_ is required to execute the Bank Guarantee.

Whereas the Contractor, based on the Purchaser's requirement has agreed to furnish such a Bank Guarantee as a safeguard to the Purchaser interest as indicated in para 4 above, valid till the return of the repaired instruments or a replacement thereof, to the Purchaser.

Whereas, we, (the name and address of the Bank) (herein after referred to as 'the Bank'), in consideration of the Purchaser having agreed to despatch the defective instrument to the Contractor's works on freight to pay basis and Contractor having agreed to repair and return the defective instrument duly repaired or arrange free replacement of the defective instrument \_\_\_\_\_ on \_\_\_\_\_ freight paid \_\_\_\_\_ /CIF \_\_\_\_\_ basis, do hereby agree and undertake to indemnify the Purchaser and keep the Purchaser indemnified to the extent of a sum not exceeding \_\_\_\_\_ (in figure and words) against any loss or damage that may be caused or suffered by the Purchaser by reason of the Contractor either not returning the repaired instrument or arrange free replacement within a specified time and also when the instrument lie under the custody, control or possession of the Contractor.

We, the Bank, do hereby undertake to pay to the Purchaser, the amount due and payable under this Guarantee, without any demur, merely on a demand from the Purchase Officer, Institute for Plasma Research, stating that the amount claimed is due by way of loss or damage caused to

or would be caused to or suffered by the Purchaser by reason of the Contractor either not returning the instrument duly repaired or arrange free replacement to the Purchaser and also when the instrument lie under the custody, control or possession of Contractor. Any such demand on the Bank shall be conclusive as regards the amount due and payable by the Bank under this Guarantee. However, our liability under this Guarantee shall be restricted to an amount not exceeding\_\_\_\_\_ (in figure and words).

We, the Bank, undertake to pay to the Purchaser any money so demanded notwithstanding any dispute or disputes raised by the Contractor/s or by agents in any suit or proceeding pending before any court or tribunal relating thereto our liability under this present being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our liability for payment thereunder and the Contractor/s and the Indian agents shall have no claim against us for makingsuch payment.

And we, the Bank, hereby further agree that the decision of the said Head-Purchase and Stores Department as to whether the Contractor has committed breach of any such terms and conditions of the Contract or not and as to the amount of damage or loss assessed by the said Head-Purchase and Stores Department, Institute for Plasma Research on account of such breach would be final and binding on us.

We, the Bank, further agree with the Purchaser that the Purchaser shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time for performance by the said Contractor from time to time or to postpone for any time or from time to time, any of the powers exercisable by the Purchaser against the said Contractor/s and to forbear or enforce any of the terms and conditions relating to the said Contract and we shall not be relieved from our liability by reason of any such variation or extension being granted to the said Contractor/s or for any forbearance, act or commission on the part of the Purchaser or any indulgence by the Purchaser to the said Contractor/s or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

This Guarantee will not be discharged due to the change in the constitution of the Bank, the Contractor/s or the agents.

Our Guarantee shall remain in force until\_\_\_\_\_ and unless a claim under the Guarantee is lodged with us within three months from that date, all rights of the Purchaser under the Guarantee shall be forfeited and we shall be relieved and discharged from all liabilities thereunder.

Dated the \_\_\_\_\_ day of \_\_\_\_\_ 202\_

For \_\_\_\_\_

(Indicate the Name of bank)



ANNEXURE-VII: BANK GUARANTEE FORMAT FOR SUPPLY OF FREE ISSUE MATERIAL  
(By Indian/Foreign Contractor)

Head-Purchase and Stores Department, Institute for Plasma Research  
On behalf of The Director, Institute for Plasma Research  
Bhat, Near Indira  
Bridge, Gandhinagar,  
Gujarat, India  
Pin-382428

Whereas on or about the \_\_\_\_\_ (date), the Head-Purchase and Stores Department, Institute for Plasma Research, on behalf of the Director, Institute for Plasma Research, (hereinafter referred to as the Purchaser) has entered into a Contract bearing No. \_\_\_\_\_ Dated \_\_\_\_\_ for manufacture, inspection, testing and safe delivery of \_\_\_\_\_ (herein after referred to as the equipment) with M/s. \_\_\_\_\_ having their office at \_\_\_\_\_ (hereinafter referred to as the Contractor.)

And whereas in terms of the above said agreement, the Purchaser is required to supply free issue materials costing Rs. \_\_\_\_\_ as listed out in the agreement for the manufacture of the equipment at the Contractor's site, and that the Purchaser has agreed to authorise the Contractor to collect the free issue materials from the Purchaser's site subject to the Contractor furnishing a Bank Guarantee for Rs. \_\_\_\_\_ in a manner herein specified towards the safeguard of free issue materials.

Now, we \_\_\_\_\_ (bank) in consideration of the Purchaser having agreed to authorise issue of free issue material for collection by the Contractor, hereby undertake to indemnify the Purchaser and keep the Purchaser indemnified to the extent of the full value of the free issue material till such time the materials are lying under the custody/possession/control of the Contractor and till the equipment along with balance material, if any, are received by the Purchaser after manufacture of the equipment.

We, \_\_\_\_\_ (bank) do hereby undertake to pay to the Head-Purchase and Stores Department, Institute for Plasma Research, the amount due and payable under this Guarantee without any demur, merely on a demand from the Head-Purchase and Stores Department, Institute for Plasma Research, on behalf of the Purchaser stating that the amount claimed is due by way of loss, destruction, deterioration or damage caused to or suffered by the Purchaser to the purchaser's material thereby resulting in a loss to the Purchaser while they are lying under the Contractor's custody, possession or control or on account of the Contractor's failure to fulfill any of the contractual obligations.

Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this Guarantee. However, our liability under this Guarantee shall be restricted to an amount not exceeding Rs. \_\_\_\_\_

We, \_\_\_\_\_ (Bank) undertake to pay to the Purchaser any money so demanded

notwithstanding any disputes raised by the Contractors in any suit or proceeding  
dispute or any pending before any court of Tribunal relating

thereto our liability under this present being absolute and unequivocal. They payment so made by us under this Bond shall be a valid discharge of our liability for payment thereunder and the Contractors shall have no claim against us for making such payments.

We, \_\_\_\_\_(Bank), also agree that the decision of the Purchase Officer, Institute for Plasma Research, Gandhinagar, Gujarat as to whether the Contractor has caused any loss/destruction or deterioration or damage to the Purchaser's material while these are lying under his custody/possession/control from whatever cause arising as also on the quantum of damage suffered by the Purchaser shall be final and binding on us.

We, \_\_\_\_\_(bank) further agree with the Purchaser that the Purchaser shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time for performance by the said Contractors from time to time or to postpone for any time or from time to time any of the powers exercisable by the Purchaser against the said Contractors and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation or extension being granted to the said Contractors or for any forbearance, act or omission on the part of the said Purchaser or any indulgence by the Purchaser to the said Contractors or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision, have the effect of so relieving us.

This Guarantee will not be discharged due to change in the constitution of the Bank or the Contractors.

Our Guarantee shall remain in full force until \_\_\_\_\_and unless a claim under the guarantee is lodged with us within six months from that date all rights of the Purchaser under the guarantee shall be relieved and discharged from all liabilities thereunder.

Dated the \_\_\_\_\_ day of \_\_\_\_\_ 202\_

For \_\_\_\_\_

(Indicate the Name of bank)

ANNEXURE-VIII: BANK GUARANTEE FORMAT FOR FIM  
(Foreign Currency Contract)  
(to be executed by the Indian Agent)

Head-Purchase and Stores Department, Institute for Plasma Research  
On behalf of The Director, Institute for Plasma Research  
Bhat, Near Indira  
Bridge, Gandhinagar,  
Gujarat, India  
Pin-382428

Whereas on or about the \_\_\_\_\_ day of \_\_\_\_\_ 200 , M/s. \_\_\_\_\_, a company having incorporated their office at \_\_\_\_\_ (hereinafter referred to as 'the Contractor') entered into a Contract bearing No. \_\_\_\_\_ dt. \_\_\_\_\_ (hereinafter referred to as 'the Contract') with the Head-Purchase and Stores Department, Institute for Plasma Research, on behalf of the Director, Institute for Plasma Research (Hereinafter referred to as 'the Purchaser') for manufacture and supply of Nos. \_\_\_\_\_ of (hereinafter referred to as the instrument') at a cost of \_\_\_\_\_ (in figures and words). The Contract recognises M/s. \_\_\_\_\_ (name and address) as the Indian agent of the Principals M/s. \_\_\_\_\_ in India.

And whereas in terms of the above said agreement, the Purchaser is required to supply free issue materials ~~costing Rs.~~ \_\_\_\_\_ as listed out in the agreement for the manufacture of the equipment at the Contractor's site, and that the Purchaser has agreed to authorise the Contractor to collect the free issue materials from the Purchaser's site subject to the Contractor furnishing a Bank Guarantee for Rs. \_\_\_\_\_ in a manner herein specified towards the safeguard of free issue materials. As the Indian agent has agreed to furnish the Bank Guarantee on behalf of the Principal in this Contract, M/s. \_\_\_\_\_ is required to execute the Bank Guarantee.

Now, we \_\_\_\_\_ (bank) in consideration of the Purchaser having agreed to authorise issue of free issue material for collection by the Contractor, hereby undertake to indemnify the Purchaser and keep the Purchaser indemnified to the extent of the full value of the free issue material till such time the materials are lying under the custody/possession/control of the Contractor and till the equipment along with balance material, if any, are received by the Purchaser after manufacture of the equipment.

We, \_\_\_\_\_ (bank) do hereby undertake to pay to the Head-Purchase and Stores Department, Institute for Plasma Research, the amount due and payable under this Guarantee without any demur, merely on a demand from the Head-Purchase and Stores Department, Institute for Plasma Research, on behalf of the Purchaser stating that the amount claimed is due by way of loss, destruction, deterioration or damage caused to or suffered by the Purchaser to the purchaser's material thereby resulting in a loss to the Purchaser while they are lying under the Contractor's custody, possession or control or on account of the Contractor's failure to fulfill any of the contractual obligations.

Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this Guarantee. However, our liability under this Guarantee shall be restricted to an amount not exceeding Rs. \_\_\_\_\_

We, \_\_\_\_\_(Bank) undertake to pay to the Purchaser any money so demanded notwithstanding any dispute or any disputes raised by the Contractors in any suit or proceeding pending before any court of Tribunal relating thereto our liability under this present being absolute and unequivocal. They payment so made by us under this Bond shall be a valid discharge of our liability for payment thereunder and the Contractors shall have no claim against us for making such payments.

We, \_\_\_\_\_(Bank), also agree that the decision of the Head-Purchase and Stores Department, Institute for Plasma Research, Gandhinagar, Gujarat as to whether the Contractor has caused any loss/destruction or deterioration or damage to the Purchaser's material while these are lying under his custody/possession/control from whatever cause arising as also on the quantum of damage suffered by the Purchaser shall be final and binding on us.

We, \_\_\_\_\_(bank) further agree with the Purchaser that the Purchaser shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time for performance by the said Contractors from time to time or to postpone for any time or from time to time any of the powers exercisable by the Purchaser against the said Contractors and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation or extension being granted to the said Contractors or for any forbearance, act or omission on the part of the said Purchaser or any indulgence by the Purchaser to the said Contractors or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision, have the effect of so relieving us.

This Guarantee will not be discharged due to change in the constitution of the Bank or the Contractors.

Our Guarantee shall remain in full force until \_\_\_\_\_and unless a claim under the guarantee is lodged with us within six months from that date all rights of the Purchaser under the guarantee shall be relieved and discharged from all liabilities thereunder.

Dated the \_\_\_\_\_ day of \_\_\_\_\_ 202\_

For \_\_\_\_\_

(Indicate the Name of bank)

ANNEXURE-X: FORMAT FOR HINDRANCE REGISTER

Sl. No.	From	To	Nature of Hindrances in execution of Contract	Remarks with signature of Contractor	Remarks with Signature of Purchaser's representative

(To be printed in letter head)

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**Annexure-XI**

**Self-Certification under preference to Make in India order  
Certificate**

In line with Government Public Procurement Order No. P-45021/2/2017-PP (BE-II) dated 04.06.2020 and its amendments, we hereby certify that we M/s. \_\_\_\_\_ are local supplier meeting the requirement of minimum local content i.e., \_\_\_\_\_% excluding transportation, insurance, installation, commissioning, testing, training and after sales service support like AMC/CMC etc. as defined in above orders for the material against IPR Enquiry/Tender No **IPR/TN/PUR/TPT/ET/21-22/012** dated **31-08-2021**. Details of location at which local value addition will be made as follows: \_\_\_\_\_.

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

Thanking You,

\_\_\_\_\_  
**Signature with date:**

**Name:**

**Designation:**

**Official Seal**

(To be printed in letter head)

**ANNEXURE-XII**

**Annexure to Bid Form: Eligibility Declarations**

(To be submitted as part of tender/Technical Bid)  
(on company letter head)  
(Along with supporting documents, if any)

Tender No. IPR/

Tender Title:

Bidder's Name: \_\_\_\_\_

(Address and contact details)

Bidder's Reference No. \_\_\_\_\_ Date: \_\_\_\_\_

**Restrictions on procurement from Bidders from a country or countries, or a class of countries under Rule 144(xi) of the General Financial Rules 2017.**

“We have read the clause regarding restrictions on procurement from a Bidder of a country which shares a land border with India; and solemnly certify that we are not from such a country or, if from such a country, we are registered with the Competent Authority (copy enclosed). We hereby certify that we fulfill all requirements in this regard and are eligible to be considered.”

Penalties for false or misleading declarations:

We hereby confirm that the particulars given above are factually correct and nothing is concealed and also undertake to advise any future changes to the above details. We understand that any wrong or misleading self-declaration by us would be violation of Code of integrity and would attract penalties as mentioned in this tender document, including debarment.

\_\_\_\_\_  
(Signature with date)

\_\_\_\_\_  
(Name and designation)  
Duly authorized to sign Bid for and on behalf of

\_\_\_\_\_  
(Name & address of the Bidder and Seal of Company)

SECTION 'D' :

TECHNICAL SPECIFICATIONS OF STORES  
AND  
DRAWINGS

Please see attachment to the tender



**SECTION 'E' :**  
**PRICE SCHEDULE**

Please see attachment to the tender

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

**ADDITIONAL CONDITIONS OF CONTRACT against**

**IPR Tender No: IPR/TN/PUR/ET/22-23/001 Dated: 12-04-2022**

**The offered price should be FIXED AND FIRM DURING THE CONTRACT PERIOD**

**Following clauses are deleted in Form No. e IPR-P-102**

**(Section-A)**

- a) 2
- b) 46.2

**Following clause is modified in Form No. e IPR-PUR-102**

**7 VALIDITY OF BIDS**

- 7.1 Bids shall be kept valid for acceptance for a period till **120 Days** from the date of **Opening**. Bids with shorter validity period shall be rejected without any notice to the bidder.

**Following clauses are deleted in Form No. IPR-P-100**

**PART-A**

- a) 7.2
- b) 20.1
- c) 22
- d) 29.1

**PART-B**

- a) 7.2

**Following clause is modified in Form No. IPR-P-100**

**PART-A**

29.2 Ownership of the stores supplied by the contractor shall be transferred to the purchaser when the stores are delivered and accepted by the purchaser.

**PART-B**

**7.1** The Clause Sr. No. 7.1 under heading Payment Terms of **PART-B** “General Conditions of Contract” of Form No. **IPR-P-100** (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.

**For Supply Portion (i.e., Si. No 1 & 2 of Price Schedule):**

- 10% of basic price of Item Sr. No. 1 and 2 of Price-Schedule (Supply Portion) will be paid as an advance against signing of contract and on submission of Bank Guarantee/ Corporate Guarantee for an equivalent amount from State Bank of India or any Indian Nationalized / Scheduled Banks as appearing in the second schedule of Reserve Bank of India (other than Co-Operating and Grameen Banks) on a non-judicial stamp paper of appropriate value valid till acceptance of the system
- 10% of basic price of Item Sr. No. 1 and 2 of Price-Schedule (Supply Portion) will be paid as an advance against approval of engineering drawings and documentation (list of documents mutually agreed between IPR and ECIL) and on submission of Bank Guarantee/ Corporate Guarantee for an equivalent amount from State Bank of India or any Indian Nationalized / Scheduled Banks as appearing in the second schedule of Reserve Bank of India (other than Co-Operating and Grameen Banks) on a non-judicial stamp paper of appropriate value valid till acceptance of the system.
- 20% of basic price of Item Sr. No. 1 and 2 of Price-Schedule (Supply Portion) will be paid as an advance against proof of placement of PO's for supply of major equipments viz., Transformers and SPS modules and on submission of Bank Guarantee/ Corporate Guarantee for an equivalent amount from State Bank of India or any Indian Nationalized / Scheduled Banks as appearing in the second schedule of Reserve Bank of India (other than Co-Operating and Grameen Banks) on a non-judicial stamp paper of appropriate value valid till acceptance of the system
- 50% of basic price of Item Sr. No. 1 and 2 of Price-Schedule + 100% of all other charges (pertaining to supply portion) will be paid after delivery and receipt of material at IPR, Gandhinagar Site, its physical verification by representative of IPR and on receipt of Invoice in maximum 3 lots on pro-rata basis.
- Balance 10% of basic price of Item Sr. No. 1 and 2 of Price-Schedule (Supply Portion) of Price Schedule will be paid within 30 days after satisfactory completion of installation and commissioning of the system, and on receipt of final invoice.

**For Installation, commissioning, site acceptance test and training (i.e., Si. No 3 of Price Schedule):**

- 20% of basic price of Item Sr. No. 3 of Price-Schedule will be paid as an advance on submission of proof of mobilization or resources, requisite items and on submission of Bank Guarantee/ Corporate Guarantee for an equivalent amount from State Bank of India or any Indian Nationalized / Scheduled Banks as appearing in the second schedule of Reserve Bank of India (other than Co-Operating and Grameen Banks) on a non-judicial stamp paper of appropriate value valid till acceptance of the system
- Balance 80% of basic price of Item Sr. No. 3 of Price-Schedule of Price Schedule will be paid within 30 days after satisfactory completion of installation and commissioning of the system, and on receipt of final invoice.

**Following Annexures are deleted in Form No. IPR-P-100**

**Following Annexures are added in FormNo. IPR-P-100**

Annexure-XIII (**COMMERCIAL TERMS & CONDITIONS**)

Vendor/ Bidder should upload the duly filled (signed and stamped) copy of commercial bid (unpriced) as per Annexure-XIII

**IMPORTANT NOTE:**

- 1) **QUOTATIONS ARE INVITED IN INDIAN CURRENCY ONLY.**
- 2) **QUOTATIONS RECEIVED OTHER THAN “INR” QUOTE SHALL SUMMARILY BE REJECTED.**
- 3) **OFFERED PRICE SHOULD BE EXCLUSIVE OF APPLICABLE GST.**
- 4) **PARTIAL OFFER IS NOT ACCEPTABLE. OFFER RECEIVED FOR THE PARTIAL ITEM SHALL BE SUMMARILY BE REJECTED**
- 5) **RATE MENTIONED AS “0” IN PRICE SCHEDULE SHALL BE CONSIDERED AS “WITHOUT ANY CHARGE/ FREE OF COST”.**
- 6) **CUSTOMS DUTY EXEMPTION CERTIFICATE SHALL NOT BE ISSUED TO THE VENDOR.**
- 7) **PERFORMANCE SECURITIES HAS TO BE SUBMITTED BY THE VENDOR AS PER THE CLAUSE NO. 7.3 OF PART- A OF THE GENERAL CONDITIONS OF CONTRACT OF THE TENDER.**

## COMMERCIAL TERMS &amp; CONDITIONS

<b>IPR Enquiry/Tender No</b>	<b>IPR/TN/PUR/ET/22-23/001 Dated 12-04-2022</b>
<b>Item Description</b>	Design, Manufacturing, Factory Acceptance Test, Supply (including Unloading and storage), Installation, Commissioning, Site Acceptance Test and Training of -65kV, 40A High voltage DC power supply for Klystron at Institute for Plasma Research, Gandhinagar as per the detailed specifications mentioned in the tender documents

Sl. No.	PARTICULARS	REMARKS
I	<b>Name of the Bidder</b>	
II	<b>Bidder Bid No &amp; Date</b>	
III	<b>Postal address</b>	
IV	<b>Contact with STD code</b>	
V	<b>Fax with STD code</b>	
VI	<b>Name of Contact person</b>	
VII	<b>Mobile No.</b>	
VIII	<b>e-mail ID</b>	
IX	<b>Currency of offer/quotation</b>	INR
	<b>Commercial Terms for Quoted items (Please Provide Commercial terms and conditions in the below form)</b>	
1	Price Term for Supplies offered in Indian Currency	FOR IPR Gandhinagar
3	<p><b>Goods and Services Tax:</b></p> <p><b>Goods and Service Tax for Supply Items only:</b> IPR is entitled to avail GST Concessional Rate as per Ministry of Finance Notification No. 47/2017 Integrated Tax (Rate) dated 14/11/17 (for IGST) and (CGST @ 2.5% and SGST @ 2.5%) as per Notification No. 45/2017-Central Tax (Rate) dated 14/11/17 and Notification No. 45/2017-State Tax (Rate) dated 15/11/17</p> <p><b>Confirm that in the event of issuance of GST Concessional Certificate you shall charge GST on Supply Portion @5% only</b></p> <p><b>Goods and Service Tax for Service items: As applicable</b></p>	

4	<b>Delivery period:</b> Refer tender terms	
5	<b>Installation and commissioning charges:</b> Have you offered Installation & Commissioning Charges? <b>(if applicable)</b>	
6	<b>Liquidated Damages:-</b> Please confirm that the Liquidated Damages as per Sr. No. 10 of Form No. IPR-P-100 attached with the tender/enquiry is acceptable to you	
7	Terms of Payment:- Please confirm payment terms mentioned in the tender document is acceptable to you  Refer " <b>Annexure-IV</b> " for details	
8	Guaranty / Warranty:- Refer tender terms	
9	<b>Validity of offer/quotation:-</b> Refer tender terms	
	<b>QUESTIONNAIRE TO BE FILLED BY BIDDER IN AND SENT ALONG WITH OFFER DULY SIGNED</b>	Accepted/ Not Accepted
10	<b>Performance Security:</b> In the event of a purchase order/contract vendor has to provide Performance Security (PSDBG) as per tender terms, wherever applicable shall be submitted.	
11	<b>Free Issue Material:</b> Successful tenderer will have to arrange insurance/ Bank Guarantee 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.	

Yours faithfully  
Bidder  
(Digitally signed or ink signed)

SECTION 'D':

TECHNICAL SPECIFICATIONS  
OF STORES

AND

DRAWINGS

**Technical specifications**  
**For**  
**-65kV, 40A High voltage DC power supply for Klystron**



**INSTITUTE FOR PLASMA RESEARCH**  
**BHAT, GANDHINAGAR 382 428**  
**GUJARAT, INDIA**



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## Abbreviations:

<b>SST</b>	Steady-state Superconducting Tokamak
<b>LHCD</b>	Lower Hybrid Current Drive
<b>LHCD HVPS</b>	Lower Hybrid Current Drive High Voltage Power Supply
<b>IPR</b>	Institute for Plasma Research
<b>PWM</b>	Pulse Width Modulation
<b>PSM</b>	Pulse Step Modulation
<b>IGBT</b>	Insulated Gate Bipolar Transistor
<b>SPS</b>	Switched Power Supply
<b>HVPS</b>	High Voltage Power Supply
<b>HVAC</b>	Heating, Ventilation & Air Conditioning
<b>CWS</b>	Cooling Water System
<b>CW</b>	Continuous Wave
<b>ECC</b>	Equipment Control Cubicle
<b>IEC</b>	International Electro technical Commission
<b>THD</b>	Total Harmonic Distortion
<b>EMI/EMC</b>	Electromagnetic Interference/ Electromagnetic Compatibility
<b>HMI</b>	Human Machine Interface
<b>FDP</b>	Final Design Report
<b>CWS</b>	cooling water system

## [1] Introduction

A 2 MW, 3.7 GHz, CW lower hybrid current drive (LHCD) system aims to drive plasma current non-inductively for continuous operation of steady state superconducting tokamak (SST1) machine. The LHCD system comprises of low power RF drive, klystron amplifier, transmission line and grill antenna. The typical layout of SST-1 LHCD system is shown in below Fig.1.

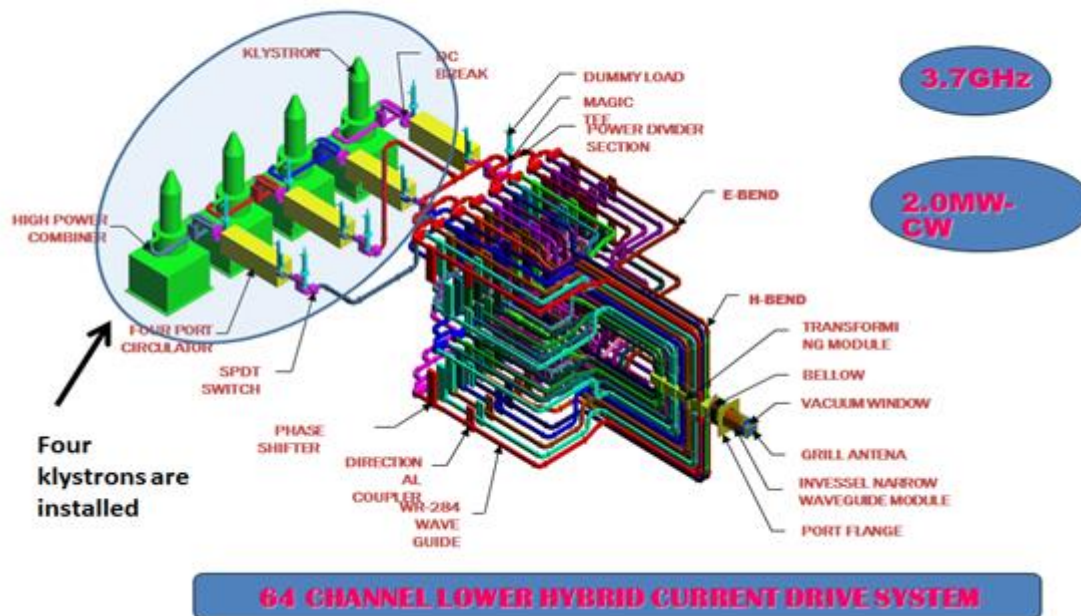


Fig.1 Layout of LHCD system

The Lower Hybrid Current Drive (LHCD) is based on four klystron each rated for 500kw CW rf operation. Two klystrons will be powered in parallel by this single LHCD HVDCPS. The positive terminal of the LHCD HVDCPS shall be connected to the Ground at load side and the negative terminal to the cathode of the klystron with a series resistor inline. The LHCD HVPS electrical requirement is (-) 65 kV, 40 A for powering two klystron. This LHCD HVPS draws the required power from the 11 kV electrical network. This LHCD HVPS is used to bias klystron tubes that will generate a RF Power for Plasma Heating and current drive.

The klystron system is integrated with the auxiliary systems for high power CW operation. It is integrated with different power supplies (like magnet power supply system, filament power supply, ion pump power supply, anode modulator power supply with control unit, high voltage DC power supply system, etc.), crowbar unit, monitoring, control and protection system.

The operation of high-power klystron tube is very complex and employs various conditioning techniques before the tube is ready to deliver rf power to tokamak. The various conditioning techniques employed to prepare klystron tube for high power CW operation is briefly described in Appendix-1 which provides a good understanding of klystron operation and conditioning with HVDC power supply.

Present inquiry describes the scope, roles and responsibility for detail design, manufacturing, component testing, supply, installation and acceptance testing of 1 number of LHCD HVPS.

## [2] Description of HVPS and suggested topology

LHCD HVPS shall feed Klystron. The positive terminal of the LHCD HVDCPS shall be connected to the Ground at load side, the negative terminal to the cathode of the klystron with series resistor inline.

The range of the operational voltage shall be 30-65 kV and current drawn by the load in the range from 15 - 40 A. The maximum power demanded will be 2600kW.

The total efficiency of the LHCD HVPS, defined as the ratio between the power supply output dc power and the input ac active power at the nominal conditions, shall be  $\geq 95\%$  in steady state operation.

The LHCD HVPS should be able to support load modulation governed by Anode Modulator Power Supply with response time of nearly 50ms. During load modulation, overshoot / Undershoot must be limited within acceptable levels (2kV).

In case of a severe fault, e.g., arcing in the klystron tube or in the transmission line, the HVPS shall be able to fast switch-off ( $\sim 10\mu\text{s}$ ) which can limit the energy dumped into the load to a maximum of 10Joules.

The harmonic content rejected in the 11 kV distribution network by the LHCD HVDCPS rectified currents should comply with the IEC guidelines. Vendor /supplying firm shall adopt all the actions necessary to minimize the harmonic distortion (e.g., phase shift of the transformers' 3-phase voltages, management of the modules switch-on/off).

The power transformers' inrush current could entail the need of soft-start units. The vendor shall evaluate the inrush current problem and, in case of need of soft-start units, which will be in that case under vendor's procurement scope.

The LHCD HVPS shall be able to provide a set of measurements concerning its internal status and parameters. The characteristics of such measurements (in terms of accuracy, resolution, times, etc.) shall be adequate to verify all the specifications reported in Table 1.

Considering specifications of HVPS, modular based supply may be preferred i.e., PWM or PSM technology. However, other design topology may be proposed that can fulfill the requirement of specifications and functioning of HVPS. This is for reference only and the vendor may explore it further.

An introductory representation of LHCD HVPS is shown in Figure 2. Here 2 Multi secondary transformers are used which feed 120 nos. of SPS Modules. LHCD HVPS shall utilize Pulse step modulation technique to achieve the voltage control.

The LHCD HVPS will convert the electrical power coming from the 11 kV ac electrical networks into dc power. The LHCD HVPS will be able to supply up to 2600kW of DC power to klystron based LHCD system. LHCD HVPS will be able to regulate the voltage independently and also limits the energy to fault in case of arcing in the load.

Number of transformer secondary windings and their respective modules depend on the final design of the HVPS. The mentioned topology consists of many pulsating dc low-voltage modules placed in series. These are supplied by cast resin dry type power transformers with multiple secondary windings. The ac input to the SPS module is rectified, filtered and the output dc is pulse modulated. All the SPS modules are connected in series in such a way that

they form HVDC output voltages with fast dynamic responses, minimum ripple and good accuracy.

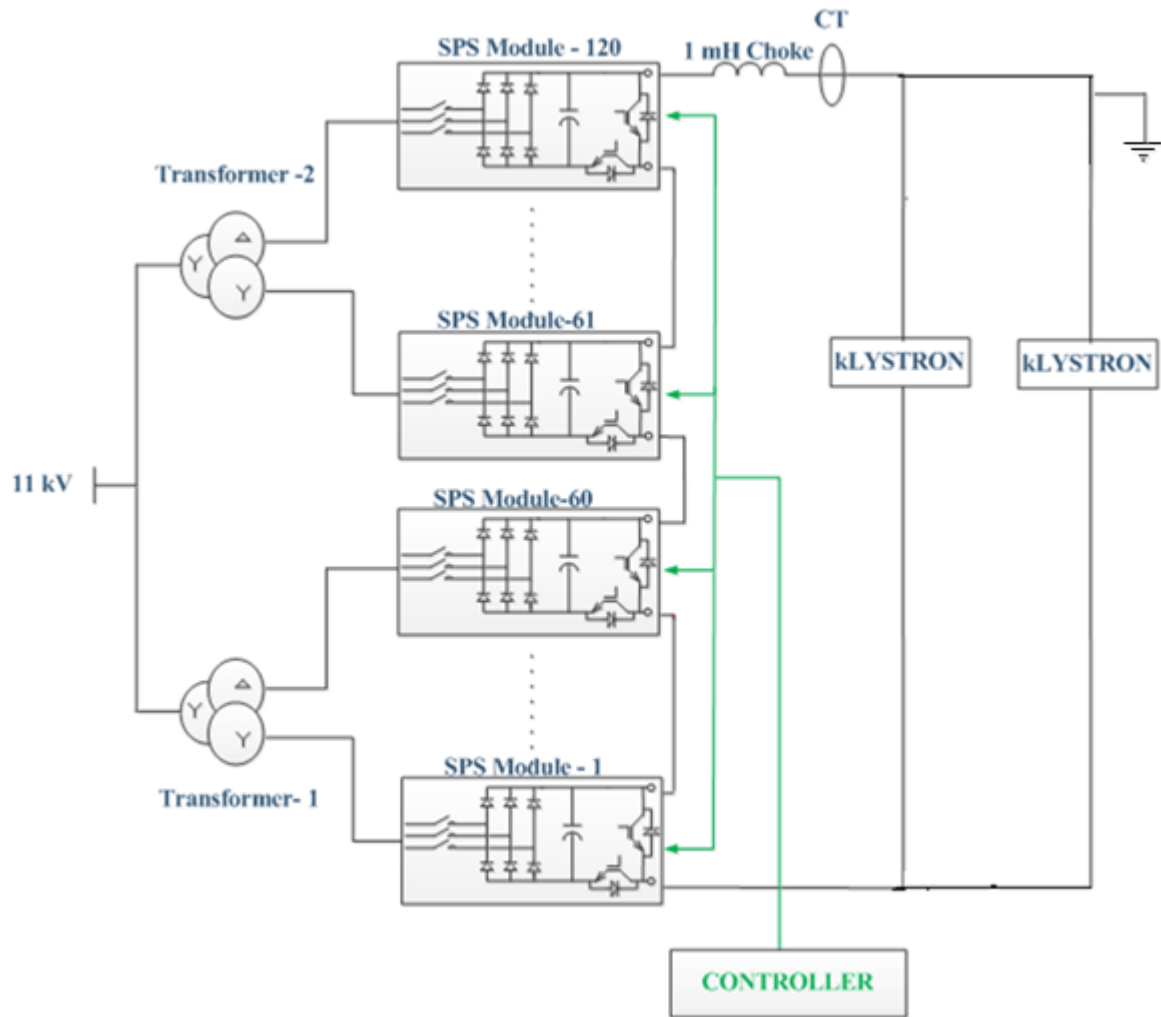


Fig.2 Representation of LHCD HVPS

### [3] Single line diagram

A single line diagram is shown in below of LHCD HVPS in figure 3 along with proposed location at R & D building where LHCD & ICRH both the power supplies are to be placed. Total 6 nos. of CBs will be used in which CB1 and CB2 will be common CBs to be used to feed the both the power supplies. CB1 is known as supplying CB to be located in utility building and remaining 5 nos. CBs will be placed tentatively at first floor R & D building (separate place will be provided other than power supply location). CB5 & CB6 circuit breaker will be used to feed multisecondary transformers of LHCD HVPS. The ICRH HVPS line diagram is not covered in below figure.

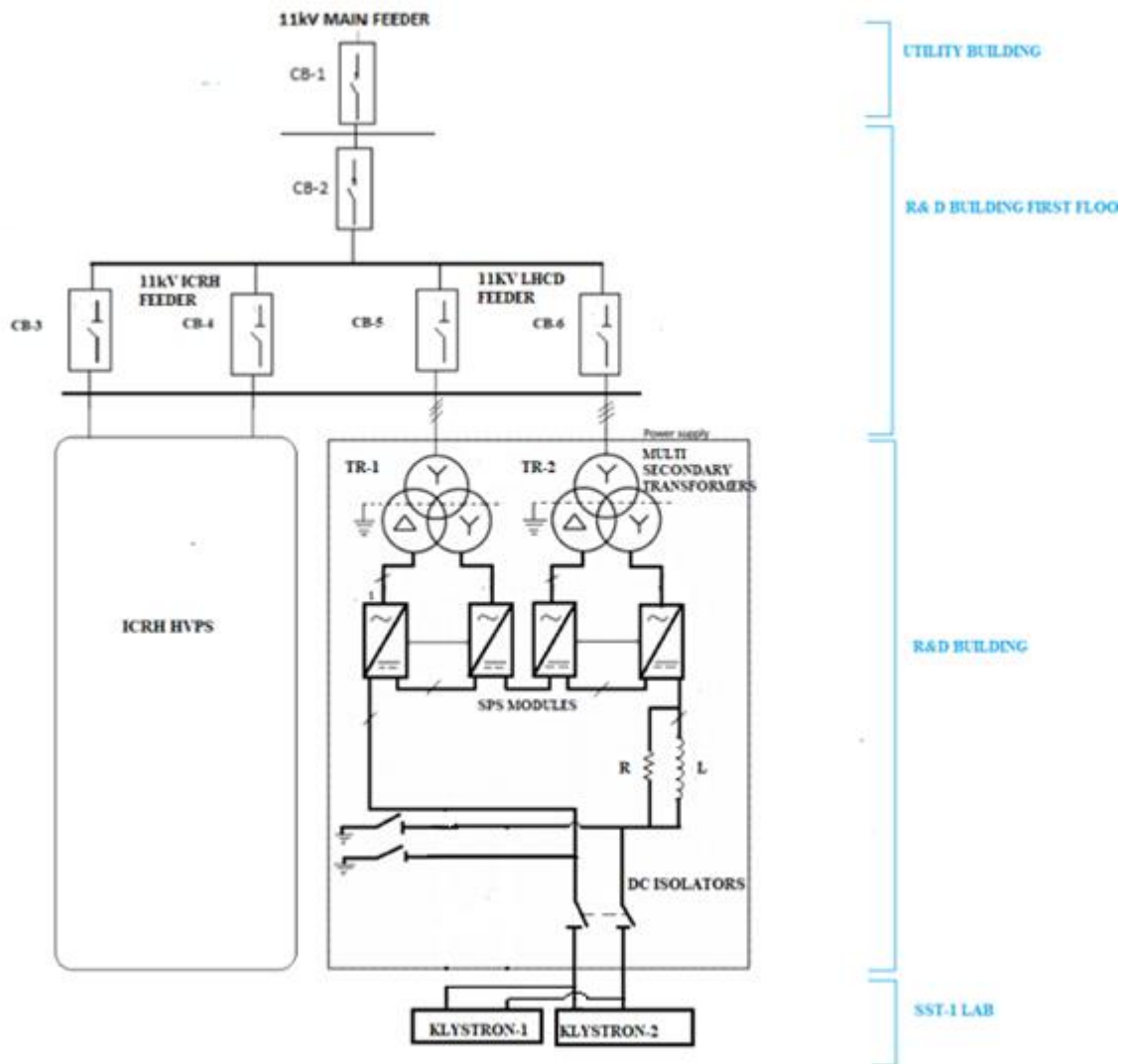


Fig.3 Single line diagram of LHCD HVPS

#### [4] Scope of the Work

The scope of work includes detail design, manufacturing, component testing, supply, installation and acceptance testing of 1 no. of LHCD High Voltage Power Supply (LHCD HVPS) at Purchaser's site (IPR, Bhat, Gandhinagar, Gujarat) according to the terms and conditions and specifications defined in the inquiry. Roles and responsibility under the contract shall be followed as:

- (1) Supply: To offer 1nos. of LHCD HVPS complete in all aspects with required documentation at IPR at R & D building, IPR, Bhat, Gandhinagar.
- (2) Installation and acceptance testing at IPR lab: Vendor to provide prescription for Site preparation, Installation of various equipment, standalone testing, integrated testing. Vendor to perform supervision of site works; engage services required for site preparation, installation, demonstrate standalone testing, integrated testing of LHCD HVPS under its responsibility.

- (3) QA reports: Vendor shall submit QA reports at all stages of work to IPR. To facilitate inspection by IPR, vendor shall allow access at all reasonable times during manufacture, assembly and testing to the premises in which the work is carried out.
- (4) Documentation: Vendor shall furnish the latest drawings, instruments, testing equipment etc. required for inspecting the job. Prints of all the latest required drawings and approved procedures shall be made available for inspection and retention, if so desired. All documents including operation and service manuals shall also be provided. Vendor shall comply with the specification without any deviation from the technical and quality assurance requirements stipulated in this document.
- (5) The scope of the contractor shall be deemed to include all such items which although are not specifically mentioned in the tender documents and/or in bidder's proposal but are needed to make the system complete in all respects for its safe, reliable, efficient and trouble-free operation and the same shall be supplied and erected unless otherwise specifically excluded. The vendor must provide technical support as per warranty clause.

**Table 1. Rating of Power Supply**

Power Supply	Rating	Reference section
LHCD HVPS (PSM based topology)	-65kV, 40 A, 2600 kW	Section 5 of present document presents detailed specifications

**[5] Specification of LHCDHVPS**

**Table 2: Main requirements for LHCD HVPS system**

	Parameters	Value
LHCD HVDCPS Input	Main Input voltage	11kV±10%;3Phase;50Hz; 3.5MVA
	Min Power Factor at full output power	≥ 0.9
LHCD HVDCPS Output	Max pulse duration	≥ 1000sec
	Duty cycle	1000second ON, 5000second OFF
	Maximum absolute voltage	- 65kV
	Maximum current	40 A
	Total continuous power Requirement	2600 kW(maximum)
	Operating Voltage Range	(-) 30kV to (-) 65 kV
	Voltage rise time (10% to 90% of flat top value)	1msec typical, 50ms (through external reference)
	Voltage setting resolution	±1% of the maximum value
Voltage Ripple (Peak to Peak)	± 1% of the Maximum value	

	Accuracy of the voltage control	$\pm 1\%$ of the Maximum value
	Efficiency	$\geq 95\%$
	Total Harmonic Distortion (THD) % at supply line	as per IEEE 519-1992
	Cooling	<ul style="list-style-type: none"> <li>▪ DM water cooling to be used for the SPS modules.</li> <li>▪ HVAC cooling to be used for the transformers, series inductors and other components</li> </ul>
	<b>Load fault</b>	
	Fault energy (short circuit energy in case of load fault)	$\leq 10 \text{ J}$
	Shutdown time	$\leq 10 \mu\text{s}$
	Operation	Remote (PC)/Local (HMI)
	Max overshoot and max undershoot	2kV of the maximum nominal value
DC Isolators	Motor operated offline isolator with earth switch	2-Pole isolator should be used
Protections	(1) DC Over Voltage (2) DC Over current (3) Arc fault/Short circuit fault (4) IGBT short, DC bus over/under voltage, over current, over temperature, charging fault etc. in SPS module	(1) to (3) Settable for entire range
Control System and interface	LHCD HVPS Controller (ECC)	To be interfaced with LHCD controller (Upper-level controller).

## [6] Definition/Estimation of parameters of HVPS

### [6.1] Fault energy of HVPS:

The HVDC Power Supply should be short circuited at rated voltage through 38 SWG, 15cm long copper wire. The wire should remain intact. This ensures that total energy delivered to the fault is less than 10Joules. The fault energy includes energy from the storage devices and the power supply follow through before tripping. The wire burn test to be performed on HVPS at load end of the HVDC output cable of about ~ 400 meters, procured and laid by IPR. This is to ensure that the wire-burn test includes HVDC cable capacitance that stores energy and delivers it to the fault.



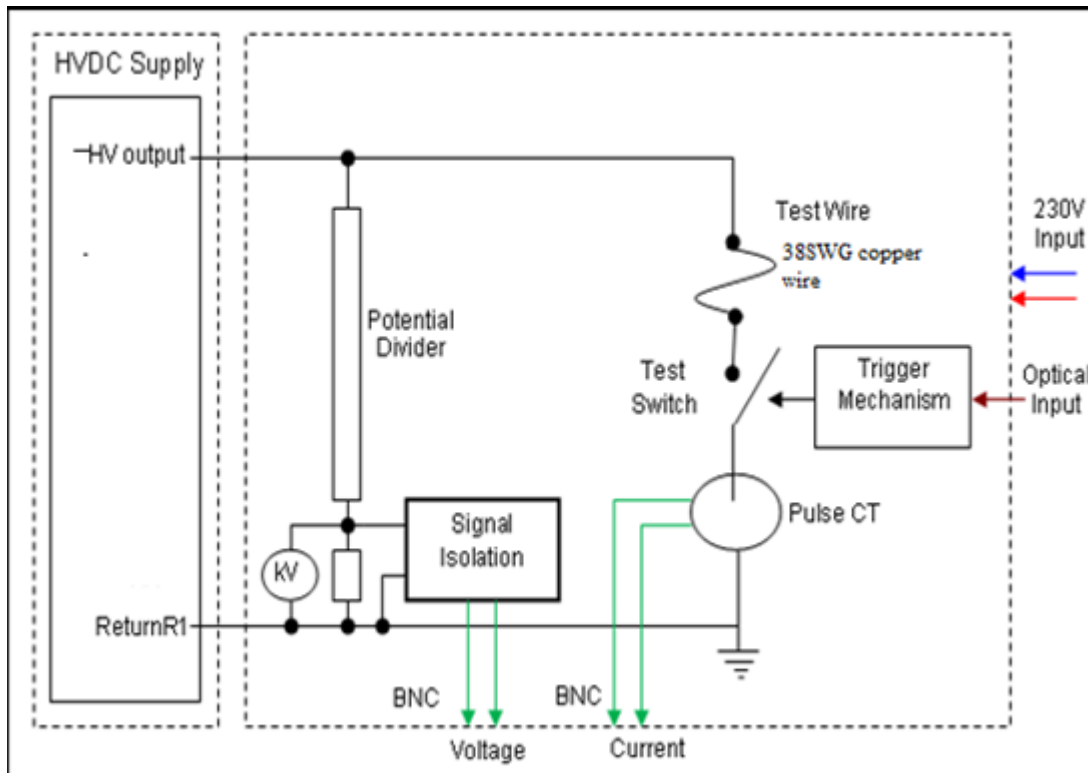


Fig.4 Wire Burn Test setup

**[6.2] Overshoot/Undershoot:** When load is removed suddenly, voltage spikes appeared that should be in permissible limit. Terms “overshoot” and “undershoot” are defined with respect to ground. The Cathode Voltage being negative with respect to ground, a cathode voltage overshoot means an increment of its absolute value. The maximum operating voltage for HV will be -65kV so maximum overshoot and under shoot of 2kV of maximum nominal value can be considered as it will be below the trip level (i.e., HV trip setting -70 kV).

**[6.3] Accuracy Bandwidth:** range in which the average achieved voltage deviates from the set voltage

**[6.4] Resolution:** value of the smallest step in which the voltage can be controlled

**[6.5] Ripple:** Level of instantaneous voltage variation arising mainly from the module switching and line voltage.

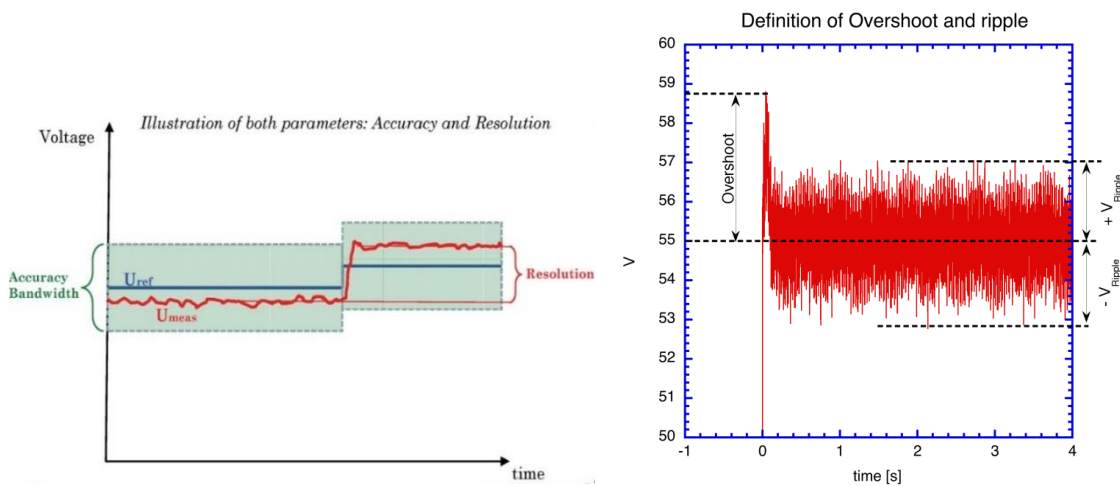


Fig.5 Definition of Accuracy, Resolution, Overshoot and Ripple

**NOTE:** Fig.5 is a graphical representation and values are not to be considered

### [6.6] Protection Scheme:

In case of any fault, power supply should be switched off within few tens of  $\mu\text{s}$ . So that more than 10 Joules energy should not dump inside the tube. For Power Supply and Load Protection, a coordinated scheme shall be required. Voltage and current sensors with high bandwidth, low response time and with high accuracy shall be used. Protection coordination among downstream and upstream devices/stages is depicted in Table 3 and Table 4 given below.

Speed of protections	Stream	Particulars
Fast	↓	Load end At the output of HVPS: Current sensor to be used at Output with response time of few $\mu\text{s}$ .
Moderate		SPS end At SPS module: Current sensor to be used with response time $\sim 10\mu\text{S}$
Slow		Supply end Fuse to be used for Transformer Secondary winding, response time of few ms

**Table 3. Over Current Protections in downstream manner**

Speed of protections	Stream	Particulars
Primary Response	↓	Fast response High Accuracy HV Probe to be used for Measurement & Protection, Response time few $\mu$ s.
Secondary Response		Programmable Over Voltage protection setting in HMI, Response time of $\sim$ 100 ms.

**Table 4. Over Voltage Protections in downstream manner**

The SPS module shall be able to identify internal faults e.g., IGBT short, DC link under/over voltage, over current, over temperature, charging fault, external trip (IGBT inhibited from LHCD HVPS controller) and shall take necessary actions to manage the faults. The fault information shall be communicated to LHCD HVPS controller. SPS modules should have inherent overload as well IGBT driver short circuit detection. Additional HV probe (low accuracy) to be deployed for detecting failure of Primary HV probe (high accuracy). Failure of controller shall be detected using Heart beat signal.

#### **[6.7] System cooling requirements**

System cooling can be divided in two parts namely Water-cooling system and HVAC (Air) cooling system.

##### **(a) Water cooling system (WCS)**

The LHCD HVPS maximum duty cycle is 1000sec ON and 5000sec OFF based on those final specifications of water-cooling system to be provided by the vendor. The inlet and outlet cooling water header up to the converters compartment shall be provided by IPR.

##### **(b) HVAC cooling system**

The AC cooling system for the building shall be capable of removing all heat lost by the LHCD HVPS directly to air.

#### **[6.8] Control system (ECC) and Interface:**

The PSM based Power Supply controller requires a greater number of control channels and hence could be handled as a standalone ECC (Equipment Control Cubicle). The LHCD HVPS ECC will control the HVPS itself and also communicate with the upper-level controller. For isolation purpose, fiber optic cables may be used to control the High voltage power supplies. The LHCD HVPS will be having direct interface with klystron load. Controller should provide the performance of 1 kHz of update rate for each signal. ECC cubicle shall be EMC compatible IEC 61000-4.

Power supply should be operated in Local (HMI) and remote (PC) mode independently. ECC should be based on HMI concept featuring State Machine, Faults /Alarm, Configurable parameters, Status of associated field devices, Reset, data log. These features shall be elaborated during detailed design phase by the vendor.

## **Control channel requirement**

Numbers of signals will be interfaced to various sub-systems and external systems by LHCD HVPS Controller. Dedicated fiber optic links for PWM, communication shall be identified between each SPS module and LHCD HVPS Controller. Controller shall communicate with various field devices e.g., Switchgears, Transformers, cooling water instrumentation etc. to ensure healthy state of the system. LHCD HVPS controller shall have hardwired links for interlocks, Safety etc. LHCD HVPS controller (ECC) shall be able to communicate over fibre optic cable with LHCD controller (upper-level controller). The F/O cable will have at least 12 optical links that would be used for signals communication i.e., start, stop, emergency off, on/off status output voltage and current measurement signals for regulation and protection purpose of LHCD HVPS. Establishing communication from LHCD HVPS controller (ECC) to LHCD controller (upper-level controller) is a part of this contract.

**Note:** Procurement of compatible Transmitter and Receiver card for interfacing HVPS controller and LHCD controller (upper-level controller) will be discussed with vendor and shall be finalized after mutual agreement.

### **[6.9] Enclosures and fences:**

To avoid access to hazardous parts, all the parts of the LHCD HVPS shall be housed in a metallic enclosure (fences) and cabinets in compliance with the IEC Standard 60529. This is included within the scope of this supply contract. All access doors are to include locks and compliant with the safety procedures.

Fences and cabinets shall have emergency push buttons connected to the LHCD HVPS controller (ECC) to switch off the electrical supplies, for safety reasons. The fences and the mechanical cabinets must be connected to the ground grid of the Site; all their metallic parts (frame, doors, panels etc.) will be linked to the ground bolt. All the ground connections shall be easily identifiable.

All the SPS modules shall be installed in the HV rack. The structure should mechanically support the SPS modules with required isolation. In addition, HV enclosure should have integrated Hydraulic circuit and instrumentation, Inductors, Current Limiting resistors, voltage and current measurement system, and DC Isolators/earthing switch.

### **[6.10] DC Isolator / Earthing Switch**

To isolate LHCD HVPS from load side 2-pole Isolators shall be utilized as shown in Fig.3. The device to be operated by motor with safety interlocks viz. position indicators. The isolator shall be interlocked with earth switch. Hence, when isolator gets open, load gets disconnected and power supply terminal would be grounded. LHCD HVPS requires 1 No. of 2-pole isolators with earth switch as shown in fig. 3.

### **[6.11] RH control**

Humidity affects both thermal comfort and indoor air quality. The ideal relative humidity for health and comfort of components is somewhere between 30-50% humidity. This means that the air holds between 30-50% of the maximum amount of moisture what it can contain. As air temperature increases, its capacity to hold moisture also increases, so if air temperature rises

and its moisture contents remain same, the RH decreases. The vendor shall submit the RH control requirement, if needed.

#### [7] HVPS standards

The table provides information on major component and their product standards.

Table 5. Applicable Codes & Standards

Sr. No.	Components	Relevant Standard
1	Multi Secondary Transformers	IEC 60076, IEC 61378
2	LV Cables (AC)	IEC 60502
3	SPS Modules	IEC 60146
4	Output Filter	IEC 60076-6
5	Enclosures and Fences	IEC 60060-1
6	DC Co-axial Cable	IEC 60502, IEC 60840
7	DC Isolators / Earthing Switch	IEC 60060-1, IEC 62271-102
8	Local Control Cubicles	IEC 61000-4 & IEC 61010-1
9	Overall power supply	IEC 60146-1-2

#### [8] Scope of Bidder

The scope for Pulse step modulation (PSM) based LHCD HVPS foresees supply of the following components. The scope of work also includes detail design, manufacturing, component testing, supply, installation, commissioning and acceptance testing of one number of LHCD High Voltage Power Supply (LHCD HVPS) at **IPR, Bhat, Gandhinagar, Gujarat** according to the terms and conditions and specifications defined in the inquiry. Roles and responsibility under the contract shall be as follows:

- (1) To offer one number of LHCD HVPS complete in all aspects with required documentation at IPR. The scope of PSM based LHCD HVPS foresees supply of the following components
  - (a) Multi Secondary Transformers (Dry type, Cast Resin)
  - (b) LV Cables (AC)
  - (c) SPS Modules
  - (d) HV Voltage Rack
  - (e) Output DC Filter
  - (f) DC Isolators / Earthing Switch
  - (g) Equipment Control Cubicles ECC (Inclusive of monitoring and protection equipment).  
Instrumentation, Fiber Optic Cables, Hydraulic circuit, Relay blocks for transformer protection, associated cable works, access platforms, spare parts covering 1-year

operational life, any specific handling tool, test zigs, etc., shall be the integral part of the LHCD HVPS.

- (2) Design, Topology, Drawings, Layout, Physical arrangement of equipment, Calculations, Simulation results, FAT and SAT procedures to be provided in initial stage after placing PO.
- (3) Detailed civil work drawings to be provided.
- (4) Technical and Quality Documentation.
- (5) Vendor has to provide Prescription for Site preparation, Installation of various equipment, standalone testing, integrated testing etc.
- (6) Vendor has to perform supervision of site works, engage services required for site preparation, installation; demonstrate standalone testing, integrated testing of LHCD HVPS under its responsibility.
- (7) Installation and acceptance testing at IPR lab.
- (8) Water cooling to be interfaced with the power supply from main header through feeder extended up to the SPS modules with suitable size of hoses.
- (9) HVPS local controller should have interface compatibility with upper-level controller. Supply of suitable analog/digital transmitters and receivers on both the sides along with the terminations to be provided (to be decided with mutual discussion).
- (10) Acceptance tests i.e., Fat and SAT of the LHCD HVPS to be performed as per applicable standards and Quality System.
- (11) Warranty as per Sr. No. 16.
- (12) If facilities for any of the required test/s are not available at vendor, vendor shall arrange to have these test/s carried out at third party facilities.
- (13) Management of the contract and sub contracts if any
- (14) Safety interlock related to human access being an integral part of LHCD HVPS. i.e., Door Interlocks, Emergency trip to AC/DC side from LHCD HVPS controller.

#### **[9] Scope of Purchaser (IPR)**

This list indicates the equipment which are not included in the contract and to be provided at IPR site

- (1) The infrastructures needed to accommodate the LHCD HVPS device. This includes all civil works in addition to the buildings where the LHCD HVPS system and the relevant control systems will be located and in general for every civil work needed for proper installation of the electric devices. Two Tier Structure (Mezzanine Floor) will be provided by IPR.
- (2) The 11kV, 3phase, 3.5MVA input power at HVPS input. AC switchgears, HVAC cables with terminations extending up to LHCD HVPS transformers.
- (3) The 400V AC distribution system.
- (4) Civil works to accommodate transformers as per detailed drawings supplied by the vendor.
- (5) Water cooling for Power supply as specified by the vendor. Only Main water header with isolation valve to be provided up to the SPS modules racks/compartments inside the HVPS room.
- (6) Air conditioning (HVAC) to be provided as specified by vendor.
- (7) Space as required to accommodate transformers, converters, switchgears, controller and isolator etc.
- (8) Location to be finalized and construction/ structure to be provided as per system requirement.
- (9) HVDC Coaxial cable to be procured and provided. The cable required is about ~~~350~~400 meters from output of power supply to actual load and ~~~270~~300 meters from output of power supply to dummy load for testing.

- (10) HVDC cable to be laid as per system requirement from HVPS (R & D lab) to SST1 and HVPS to ITER-INDIA lab to energize the actual load and dummy load testing respectively.
- (11) Fibre optic hard clad silica (HCS) cable to be procured and laid from LHCD HVPS controller to LHCD controller in SST1 building. About ~~~360~~ 400 meters for remote operation with required number of cores is needed to interface the LHCD HVPS controller (ECC) to the LHCD controller.
- (12) Arrangement of Dummy load for load testing.
- (13) Arrangement of short-circuiting device for wire burn test purpose at site.
- (14) Structure and Load end ground points as per vendor requirement.
- (15) Grounding grids with copper plates for structure grounding, if required
- (16) Fire protection, detection and intervention systems.
- (17) Utilities during installation, commissioning and testing.
- (18) Safety interlock related to human access being an integral part of LHCD HVPS. i.e., Door Interlocks, Emergency trip to AC/DC side from LHCD controller (upper-level controller).

### **[10] Boundaries and Interfaces**

The main boundaries between the LHCD HVPS and the IPR facilities are summarized below.

- (1) Building and respective facilities.
- (2) The 11kV AC distribution with cables extending up to LHCD HVPS transformer
- (3) 400V/ 230V auxiliary supply inside HVPS room as required.
- (4) Grounding pits required for the system and structure.
- (5) Main water header for components cooling water system (CCWS) extended up to the SPS module racks.
- (6) HVAC will be provided as per the requirement.
- (7) HVDC cables will be laid from HVPS room up to the actual load in SST1 i.e., klystron (~400meters) and dummy load (~ 300meters) in ITER-India lab.
- (8) Fibre optic control cables will be laid from HVPS control room (R & D lab) up to the LHCD controller in SST1.
- (9) Fire protection, detection and intervention systems
- (10) Utilities during installation, commissioning and testing.
- (11) Integration of interfacing cables/signals from HVPS local controller to LHCD controller.

**Note:** Supply of suitable glass fibre-based transmitter and receiver cards required for interfacing LHCD HVPS controller and LHCD controller on both the sides will be decided after mutual discussion with the vendor

### **[11] Testing**

#### **[11.1] Factory Acceptance Test**

Component tests will be accomplished at the manufacturer's site. These tests will include Routine type and type tests prescribed by the relevant IEC recommendations. Factory test of LHCD HVPS will be done according to the Factory Acceptance Test (FAT) procedure to be prepared by the vendor and approved by IPR before starting the tests. The factory tests shall demonstrate that the performance specifications are met.

The factory tests shall include but not limited to following tests,

- (1) Visual inspection for Dimension, finish and verification of BOM as per approved drawings.

- (2) Individual routine or type testing of major components (e.g., power transformers, SPS modules, Equipment control cubicles etc.) procured from any third party must be performed in presence of IPR representatives. These components shall be inspected at various manufacturing stages at manufacturing site based on approved manufacturing and Inspection plan.
- (3) Commercially off the shelf (COTS) items i.e., LV cables, DC isolators and DC output filters, Manufacturer's Test Certificate (TC) must be submitted.
- (4) No load test for observation of parameters i.e., rise time, fall time, voltage setting resolution, minimum and maximum DC output voltage, test of protections and interlocks etc.
- (5) Voltage to ground withstand test: The test shall be performed according to the IEC Standard 60146-1-1. The requirements of the test are satisfied if no discharge occurs on the test object. The LHCD HVPS output terminals shall be tested at least at 95kV for one minute.
- (6) Load test i.e., output voltage, power, ripple, rise time, fall time, voltage setting, resolution, dynamic response, stability and efficiency etc. at mutually agreed percentage load and duration.
- (7) Functional tests under LHCD HVPS controller to verify the performance specifications on dummy load at mutual agreed load and duration.  
The test reference and output voltages shall be recorded and analyzed to verify the following performances of the LHCD HVPS:
  - ✓ Accuracy
  - ✓ Resolution
  - ✓ Ripple
  - ✓ Ramp-up/down
  - ✓ Efficiency & Power Factor (Analytically or at rated current with lower voltage)
  - ✓ Test of Protection functions
  - ✓ End to End interface checks

Note: IPR is already having dummy load for testing of similar kind of power supplies. Therefore, under extension of factory acceptance test vendor may test LHCD HVPS at IPR with prior consent and terms. Active part of the load bank shall consist of various resistor strings put in series/parallel combination for different current selection. The specifications are as follows.

Table 6: Dummy Load Specifications

Parameter	Output
Value of Resistance of load	4 No. of 5.2k $\Omega$ available
Possible combinations for testing of HVPS)	Three set of load resistor each of value 5.2k $\Omega$ will be connected in parallel that makes dummy load equivalent to 1733 $\Omega$
Operating duty cycle of load	1 sec ON/ 600 sec OFF
Type of cooling	Forced Air



- (8) Wire burn test
- (9) Protection and Trip
- (10) Shielding effectiveness in terms of EMI/EMC within and outside the HVPS Supply. Testing of one module for relevant EMI/EMC standard compliance or as mutually agreed terms.
- (11) Current harmonics test: The spectrum of the current at the LHCD HVPS AC side shall be acquired. The magnitude of the harmonics up the 37<sup>th</sup> order shall be observed and it should be as per standards.

It is recommended to test the LHCD HVPS at vendor's facility (factory test) as per specifications before dispatch. In case of constraints if any, vendor may bring the components of LHCD HVPS directly to IPR. In such a scenario, vendor under its responsibility shall assemble and test LHCD HVPS at IPR lab on dummy load, this shall be considered as extension of factory acceptance test and corresponding payment milestones shall be dealt accordingly. The detailed test report including the test results shall be prepared by the supplier and submitted to purchaser for approval/ acceptance for dispatch clearance.

**Note:** The detailed FAT would be finalized at mutually agreed terms and factory conditions at later stage

#### **[11.2] Site Acceptance Test**

LHCD HVPS shall be installed and commissioned at the Purchaser's site (IPR). The tests will be done according to the Site Acceptance Test (SAT) procedure to be prepared by the vendor and approved by IPR before starting the tests. The acceptance tests shall demonstrate that the performance specifications are met. The tests will also be carried out at the Institute for Plasma Research during commissioning subject to prevailing site conditions.

Before starting SAT, bidder may inspect all the interfaces including the laid HVDC cable and fibre optic control cable from HVDC power supply (R & D lab) upto klystron Load and LHCD controller respectively at LHCD Lab in SST1, to the satisfaction.

The acceptance tests shall include but not limited to following tests,

- (1) Visual inspection for Dimension, finish and verification of BOM as per approved drawings.
- (2) No load test for observation of major parameters i.e., rise time, fall time, voltage setting resolution, minimum and maximum DC output voltage, test of protections and interlocks etc.
- (3) Load test without performance degradation along with major technical parameters i.e., output voltage, power, ripple, rise time, fall time, voltage setting, resolution, dynamic response, stability and efficiency etc. at mutually agreed percentage load and duration. (e.g., with rated load at 65kV for 1 seconds).
- (4) Voltage to ground withstand test: The test shall be performed according to the IEC Standard 60146-1-1. The requirements of the test are satisfied if no discharge occurs on the test object. The LHCD HVPS output terminals shall be tested at least at 95kV for one minute.
- (5) Functional tests under LHCD HVPS controller to verify the performance specifications on dummy load. Different faults like over voltage, over current, over temperature and regulation errors shall be checked.

- (6) End to End Interface checks
- (7) Trip test & interlocks test.
- (8) Wire burn test shall be performed to verify the behavior of LHCD HVPS during the dynamic condition created using an adjustable short circuit switch simulating the arc. Wire burn test is a physical verification of the energy that LHCD HVPS pumps during the fault. The experimental set has an LHCD HVPS connected to the using coaxial cable (~ 400m) and a HV switch with fuse element (with predetermined joule capacity) which replaces actual load. A current limiting inductor (Output Filter) or snubber may be the integral part of the HVPS. Fig.6 shows the experimental set up. Short circuit shall be created using vacuum switch; the fuse element with 10J energy should not blow during the test.

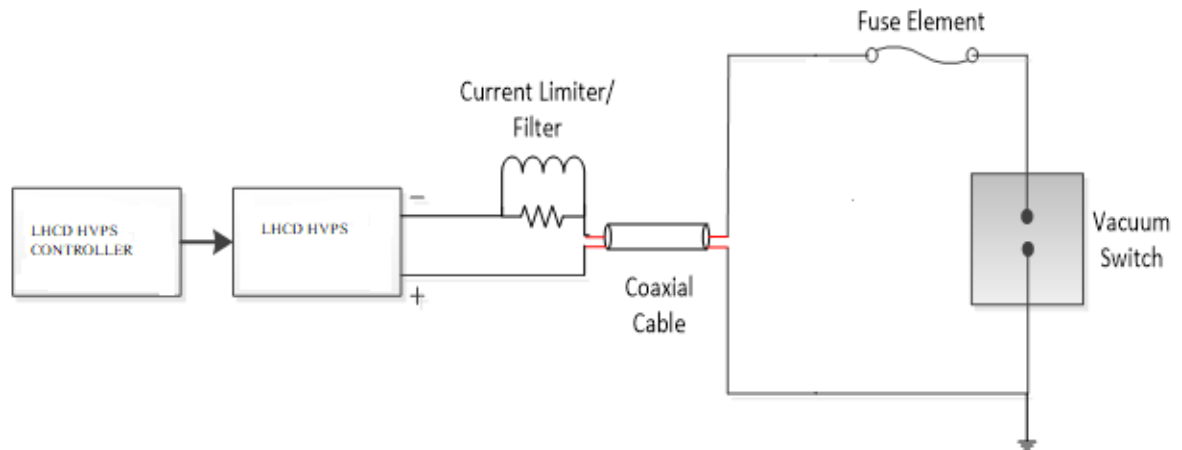


Fig.6: Test set up for wire burn Tests

- (9) Functional tests under upper level LHCD controller to check fibre optic communication and interface with LHCD HVPS controller for remote control operation from load end. The test reference and output voltages shall be recorded and analyzed to verify the following performances of the LHCD HVPS:
  - ✓ Accuracy
  - ✓ Resolution
  - ✓ Ripple
  - ✓ Ramp-up/down
  - ✓ Efficiency & Power Factor (Analytically or at rated current with lower voltage)
  - ✓ Test of Protection functions
  - ✓ End to End interface checks

After the completion of SAT, the detailed test report including the test results shall be prepared by the supplier. The representative IPR and Supplier shall jointly sign the SAT test reports. Final acceptance will be effective upon successful testing as above and delivery of all relevant documentation.

## **[12] Functional test of LHCD HVPS on actual (klystron) load**

The vendor should witness the actual load i.e., klystron testing. Tests for compliance of major technical parameters viz. output voltage, power, ripple, rise time, fall time, efficiency and interlocks with other sub systems etc. at maximum possible actual load i.e., with klystron load. **This is not a part of the acceptance tests.** However, it is expected from the vendor to put their expertise in the co-operating effort to make this test successful. A maximum of five working days are expected to be necessary for this test. This test will be carried out after successful completion of all other site acceptance tests at IPR.

Functional tests under LHCD HVPS controller and upper level LHCD controller to verify the performance specifications on actual load i.e., klystron load. The test reference and output voltages shall be recorded and analyzed.

## **[13] Layout and Space**

LHCD HVPS shall be arranged in a two-tier concept; Lower level or ground level shall have Transformers while upper level or mezzanine shall accommodate HV enclosure housing SPS modules, Equipment control cubicle (ECC), DC isolators etc. Civil works including mezzanine structure shall be provided by IPR, however vendor needs to provide the details of final layout, weight of the equipment during detailed design. Feed through providing electrical isolation from ground structure, for LV cables from Transformer secondary to SPS modules shall remain in the scope of vendor.

Proposed location of the HVPS is situated at R & D building near ITER-INDIA lab in IPR. The total foot space available to accommodate components of the HVPS is about 40m<sup>2</sup> and height is about 6.9 meters. The mezzanine floor will be made available at 4.2meters height shall have foot space area of about 40m<sup>2</sup> and height is about 2.7meters. The multi secondary transformers and AC low voltage distribution panel will be placed at ground floor. The SPS modules, Controller and DC isolator will be placed at mezzanine floor. A control room for operating personnel is proposed at separate first floor (above mezzanine) that has 14m<sup>2</sup> area. The size of space available for components accommodation at GF (Ground floor), MF (Mezzanine floor) and FF (First floor) are 40m<sup>2</sup>, 40m<sup>2</sup> and 14m<sup>2</sup> respectively.

## **[14] Documentation to be supplied**

The final documentation shall include all the documents described in the following

### **[14.1] Design Report**

The Design Report may be either a single document covering the whole scope of the Contract or an assembly of separate and well-identified documents. This report shall cover all the technical aspects related to the procurement and shall demonstrate the full compliance with the technical specification.

The contents of the Design Report shall include at least:

- (1) Detailed design description of the power section and the selection of rating and type of the major components, including voltage and current transducers, passive components and cables, their main data or data sheets (for standard components) and relevant tolerances.

- (2) Layout drawings shall be provided showing the location of the various components of HVPS and the position of the components inside each enclosure/cabinet. The layout shall comprise all the dimensions, weights and description of the enclosures.
- (3) Detailed design description of the LHCD HVPS control system, with block diagrams showing the main functional blocks, the signal flow, the data of the main components used in the control, the list of the signals exchanged with the Upper-level Controller.
- (4) Analyses of the LHCD HVPS System operation in normal conditions showing all the calculations and studies on the integration of the various components. In particular, the report shall describe the calculations used to estimate the transient voltages and currents during modulation, start up/down, fast switch off and the maximum temperature reached by all the temperature critical devices.
- (5) Analyses of the HVPS operation in anomalous condition. Vendor shall provide a Table of Fault Conditions listing faults, detection strategies, related protections (main and back-up), related alarms and monitoring. An analysis of the stresses on the components shall be provided for every severe fault and shall include all the related calculations and simulations. The effectiveness of the protective actions shall be demonstrated.
- (6) A preliminary list of tests to be performed at factory, including individual tests on the components, type tests, routine tests, acceptance tests to be performed on site and a description of the test facilities.
- (7) Vendor shall indicate which tests cannot be performed at its premises and shall propose alternative arrangements for their execution.
- (8) Preliminary information regarding the site installation requirements.
- (9) Preliminary information regarding the maintenance requirements and procedures.
- (10) A list of reference standards used for the design of the system including manufacturing codes used.

**Only after approval of Design Report by IPR, vendor can commence manufacturing.**

#### **[14.2] Factory Test Plan and Procedures**

Vendor shall complete and update the list of Factory Tests included in the Design Report. Vendor shall provide a detailed description of the test procedures to be performed, the acceptance criteria and the time schedule for each test. The characteristics of test equipment shall be indicated in the test plan. If tests outside the Supplier premises are foreseen, they shall be included in the overall test schedule.

#### **[14.3] Site Installation Plan**

Vendor shall provide a Site Installation Plan elaborating sequence of assembly, installation and commissioning activities with related detailed time schedule. The final version of the plan shall be issued at least six months before starting the works and shall be approved by IPR before dispatching the equipment.

#### **[14.4] Site commissioning program**

Vendor shall provide a Site Commissioning Program detailing the test procedures to be performed, the acceptance criteria and the time schedule.

#### **[14.5] As built Design Report**

Vendor shall issue As-built Design Report at completion of the Procurement, reviewing and updating as necessary all the information requested in the Design Report. A set of reproducible drawings of the equipment “as built” shall be included in the Report, integrating all the modifications and amendments resulting from the installation and commissioning activities. A complete cable and connection scheme shall complete the report.

#### **[14.6] Test Reports**

Vendor shall provide written records of all the performed factory, site and acceptance tests. The test reports shall clearly report the results of the tests and a comparison between them and the requirements contained in the technical specifications.

#### **[14.7] Operation and Maintenance Manual**

Vendor shall provide an Operation and Maintenance Manual including, but not limited to operation procedures and maintenance instructions, including calibration and adjustment procedures. The final version of the Manual shall be provided not later than one month after the completion of the SAT.

#### **[15] Periodic meeting and reports**

Vendor shall provide to IPR a monthly progress report on all works under this contract. The report shall be prepared using the standard template. Progress meetings shall be conducted on quarterly basis as required upon mutual agreement.

#### **[16] Warranty**

Vendor shall provide a warranty for the scope of supply covering repair or replacement up to one year after Final Acceptance Test at site. This service shall be provided for all equipment under the contract, at no extra cost. Sales/services beyond warranty period shall be provided by vendor whenever required by IPR, on payment basis.

#### **[17] Documents to be submitted along with bid**

The bidder shall submit following documents along with time schedule to meet the targeted delivery time.

1. Technical bid including,
  - a) Topology, block diagram and layout of components of LHCD HVPS. The layout shall comprise approximate dimensions and weights and a description of the enclosures.
  - b) Probable components to be used and list of all the accessories.
  - c) Engineering designs, drawings and their proposed calculations i.e., electrical, mechanical, thermal capability of HVPS to withstand short circuit forces etc.
  - d) Simulation results report, including selection and sizing of components.
  - e) Block diagram of controls
  - f) Tentative or proposed FAT & SAT procedures
  - g) HVAC cooling requirements

- h) RH control requirement of the environment, if needed
- i) Water cooling requirements
- j) Detailed PO execution schedule along with delivery milestones
- k) Mentioning agreement on present enquiry by filling the GTP (as per section 23).

## 2. Commercial, & Price Bid

### **[18] Purchase Order Management**

#### **[18.1] PO Execution Schedule**

The required delivery schedule for all the deliverables is on or before 18 months from the date of approval of design and drawings submitted by the bidder after the award of PO. Contractor should submit a detailed project execution schedule which meets the targeted delivery time after award of PO. This project execution schedule may include; design, component procurements, manufacturing, FAT, delivery milestone, installation and SAT etc.

#### **[18.2] Design and Drawings submission**

After the award of purchase order, within 2 months the supplier must submit an Engineering Design and Drawings for the HVPS based on the technical proposal submitted during the bid for IPR approval. This report shall include following minimum submission documents.

- (1) Design calculations (electrical, thermal, capability of HVPS to withstand short circuit forces, mechanical etc.) and simulation reports including selection, and sizing of components shall be submitted.
- (2) Engineering design and drawings including general arrangement drawings and electrical schematic drawings.
- (3) Control block and schematic diagrams indicating Local/Remote controller interface etc.
- (4) Cabling diagram and cable schedule with proper terminal block numbering.
- (5) List of all accessories, and bill of materials (BOM).
- (6) Data sheets/Catalogue of all the selected bought-out major components viz. semiconductor devices; heat sinks, passive components like capacitors, resistors, inductors; current/voltage measuring sensors, protective elements, etc. used for making of the HVPS shall be provided.
- (7) FAT & SAT procedures
- (8) PO execution schedule.

#### **[18.3] Factory Acceptance Tests (FAT)**

FAT shall be performed by the supplier to demonstrate compliance of the HVPS as per technical specifications.

#### **[18.4] Operating and Instruction Manual**

The supplier shall submit three sets of document / technical literature in English language with complete layout, GA Drawings, detailed block diagrams and circuit diagrams of its assembly with test voltages at different test points of the unit. All aspects of installation, operation, maintenance and troubleshooting instructions shall be covered in this manual.

### **[18.5] Material Dispatch/Packing and Delivery**

After the review and approval of FAT report, a Dispatch Clearance Note shall be issued to supplier by IPR. All the deliverables (hardware and documents) shall be dispatched only after receiving a dispatch clearance note from IPR. However, a mere clearance issued by IPR will not relieve the contractor from the liability of proper functioning of the HVPS at IPR Laboratory. Appropriate safe packing, transportation (including Insurance) to IPR site are under the scope of the contractor, which shall include (but not limited to) a necessary list of documentation and appropriate packing, markings, labelling for the deliverables items. It must be noted that IPR shall not be liable for any of the damages cause during transit of the deliverables. The detailed packaging and transportation scheme shall be submitted to IPR well in advance.

### **[18.6] Site Description**

The laboratory/delivery site is located in the Institute for Plasma Research, Near Indira Bridge, Bhat, Gandhinagar – 382 428, Gujarat, India. The laboratory, where the HVPS is to be installed is situated at ground floor level at IPR in R & D building which will have mezzanine floor as well.

### **[18.7] Unloading and Storage**

Contractor is responsible for unloading of the HVPS and accessories at proper locations at the site and verification of unit for damages and short supplies, making good all such damages and short supplies. The HVPS and accessories shall be stored at contractor's responsibility until final acceptance and taking over by IPR.

### **[18.8] Installation**

The scope of work includes the installation of the following items,

- (1) Multi Secondary Transformers
- (2) AC/DC Converter units along with compartments/racks
- (3) Output DC Inductor Filter
- (4) Isolator with earthing switch
- (5) Equipment Control Cubicle (ECC)
- (6) Cable connections between Transformers and Converters
- (7) Structure grounding grids
- (8) Water cooling connection from main provided header
- (9) Laying and termination of all type of interface cables viz. PVC insulated control cables, fibre optic cable, communication cables etc. between the converters and Local Control Panel
- (10) Any material or accessory which may not have been specifically mentioned but which is necessary shall be supplied at no extra cost to IPR.

### **[18.9] Site Acceptance Tests (SAT)**

SAT shall be performed by the supplier to demonstrate compliance of the HVPS as per mutually agreed SAT specifications.

### **[18.10] Final Acceptance**

A final acceptance note shall be issued by IPR to the supplier after successful completion of SAT (and after resolving issues completely, if any) at site and submission of “As-built” marked-up drawings incorporating all modifications/changes made during manufacturing, testing and installation of the HVPS. The date of issuance of final acceptance note shall be considered as the date of final acceptance.

### **[18.11] Training**

The contractor has to arrange technical training for two representatives from IPR either at manufacturing site or at IPR mutually agreed upon to familiarize about various sub-systems, operation and maintenance of this High voltage power supply.

### **[19] List of Spares**

Following recommended list of spares shall be supplied along with the LHCD HVPS system

- a) SPS module: 12 Nos.
- b) Semiconductor fuses 100 nos. (to be used at input of SPS modules)
- c) Any other component/item recommended by the vendor
- d) Necessary control or other cards as recommended by the vendor.

**Note:** Against (c) and (d), vendor should specify the items to be supplied as spares.

### **[20] List of tools and measurement equipment.**

IPR would provide following tool and measurement equipment that would be required at the time of Installation and commissioning.

- a) Dummy load
- b) Mechanical/Ignitron switch for wire burn test
- c) Oscilloscope with HV probes
- d) Multi meter
- e) General tools i.e., Plier, Cutter, Hammer, Screw driver etc.
- f) Hi-Pot

### **[21] Time scale and Delivery**

The time scale for preparing LHCD HVPS is given below.



**Table7.Time Scale**

<b>Sr. No.</b>	<b>Stages of LHCD HVDC PS -65kV, 40A, 2600 kW for LHCD system</b>	<b>Time scale</b>
1	Design and Drawing submission as section per 18.2 of HVDC power Supply for LHCD system.	2 Months (from the date of PO placement)
2	Approval of design and drawing docs by IPR	1 Month (From the date of design and drawing submission)
3	Factory acceptance test of HVDC power supply for LHCD System.	17 Months (from the date of design approval)
4	Dispatch clearance	15 Days (From the date of receiving successful FAT results)
5	Delivery of HVDC power supply for LHCD System at IPR	15 Days (From the date of getting dispatch clearance certificate from IPR)
6	Installation and commissioning of the HVDC power supply for LHCD system.	3 Months from delivery

## **[22] General requirements**

This section outlines general requirements for construction of the required power supply.

### **(1) Design and construction**

The design and construction of the equipment shall conform to the best current engineering practice. The essence of design shall be simplicity and reliability in order to give long continuous service with minimum maintenance requirements.

All components and cables shall be securely braced against mechanical forces during shipment, and against electromagnetic forces occurring during normal operation and fault conditions.

### **(2) Redundancy and safety factors**

The design of the equipment should aim adequate redundancy and safety factors. This is considered particularly important for all the power converter equipment and the protective devices. In case of redundant components, the failure of one component shall result in the exclusion/by-passing of that component without affecting the operation of the system that shall continue to the normal completion of the pulse. An alarm shall be generated to warn about the failure.

### **(3) Transmission and insulation of signals**

The transmission of signals between components placed inside high voltage areas and components/equipment placed in low voltage (accessible) areas (e.g., local control cubicles) shall be as much as possible via fibre optics, ensuring also the insulation of the signals.

Where signal transmission via cable is selected, the signals shall be suitably isolated for the relevant test voltage applicable to the particular HV component. Alternatively, a screen may be provided between high voltage circuits and low voltage parts. The screen will in general be

connected to the local ground system of the supply. The screen shall be able to withstand the relevant fault current for the time required to clear the fault.

(4) Combustible materials

Material that would support combustion or that would release hazardous fumes in the event of a fire shall not be used without prior approval. The vendor or supplying firm shall list all such materials, together with their purposes, locations, chemical composition, flammability, nature of any toxic fume and the IEC standard to which they conform (where applicable).

(5) Cables

All used cables shall be selected, sized and laid according to applicable IEC standards. All power, measurement, control and auxiliary cables shall be made of copper. Cable insulation shall be LSOHFR (Low Smoke Zero Halogen Fire Retardant). In particular, it shall meet the following requirements:

- Insulation material: XLPE preferred, PVC not accepted;
- External sheath: zero halogen material;
- Maximum permissible conductor temperature: - continuous 90°C; - under short circuit conditions 250°C;
- Acid gas content: zero halogen, according to IEC 60754;
- Fire retardancy: according to IEC 60332.

(6) Cleaning and painting

All interior and exterior surfaces shall receive a suitable inhibitive primer treatment and two coats of finish paint.

(7) Use of oil

Oil filled equipment shall not be installed indoors. PCB (polychlorinated biphenyl) type materials shall not be used in any component.

(8) Earthing

All earth leads shall be sized to carry the fault current without large voltage rises. All power earth leads for HV equipment shall not be less than 50 mm<sup>2</sup>.

(9) Electromagnetic noise

All equipment shall be designed and manufactured to minimize susceptibility to both internal and external electro-magnetic interference and also to minimize the generation of such interference in line with IEC 61000.

(10) Safety requirements for the use of capacitors

Following provision shall be applied to installations with capacitors rated for voltage above 50 V, unless differently agreed.

- Capacitor units and capacitors bank with energy  $\leq 50$  J, a bleeder resistor shall be installed across the terminal of each capacitor unit able to discharge the capacitor to less than 72 V within 10 minutes after switching OFF the source of power.
- Capacitor units and capacitors bank with energy between 50 J and 1000 J, two independent bleeder resistors, each of them capable to discharge the capacitor to less than 72 V within 10 minutes from the removal of power, shall be installed across the terminals of each capacitor unit.

- Capacitor banks with energy higher than 1000J, they should have additional discharging, short-circuiting and earthing mechanism.

### [23] Guaranteed Technical Particulars (GTP)

- (1) Since this is high value item, most of the parameters are considered to be guaranteed technical particulars.
- (2) Below datasheet presents GTP, fill all details i.e., remarks in the “offered value” against each specification.
- (3) Quotations with “Complied” / “OK” /” Yes” / “Tick” mark etc. in the data sheets are not acceptable. The offered values must be in numbers as specified. Submit “filled in data sheets” along with the quotation.

**Table 8: GTP**

	Parameters	IPR Value	Offered Value
LHCD HVDCPS Input	Main Input voltage	11kV±10%;3Phase;50Hz; 3.5MVA	
	Min Power Factor at full output power	≥ 0.9	
LHCDHVD CPS Output	Max pulse duration	≥1000sec	
	Duty cycle	1000second ON, 5000second OFF	
	Maximum absolute voltage	-65 kV	
	Maximum current	40 A	
	Total continuous power Requirement	2600 kW(maximum)	
	Operating Voltage Range	(-) 30kV to (-) 65 kV	
	Voltage rise time (10% to 90% of flat top value)	1msec typical, 50ms (through external reference)	
	Voltage setting resolution	±1% of the Maximum value	
	Voltage Ripple (Peak to Peak)	± 1% of the Maximum value	
	Accuracy of the voltage control	± 1% of the Maximum value	
	Efficiency	≥ 95%	
	Total Harmonic Distortion (THD) % at supply line	as per IEEE 519-1992	
Cooling	<ul style="list-style-type: none"> <li>▪ DM water cooling to be used for the SPS modules.</li> </ul>		

		<ul style="list-style-type: none"> <li>▪ HVAC cooling to be used for the transformers, series inductors and other components</li> </ul>	
	<b>Load fault</b>		
	Fault energy (short circuit energy in case of load fault)	$\leq 10 \text{ J}$	
	Shutdown time	$\leq 10 \mu\text{s}$	
	Operation	Remote (PC)/Local (HMI)	
	Max overshoot and max undershoot	2kV of the maximum nominal value	
DC Isolators	Motor operated offline isolator with earth switch	2-Pole isolator should be used	
Protections	(1) DC Over Voltage (2) DC Over current (3) Arc fault/Short circuit fault (4) IGBT short, DC bus over/under voltage, over current, over temperature, charging fault etc. in SPS module	(1) to (3) Settable for entire range	
Control System and interface	LHCD HVPS Controller (ECC)	To be interfaced with LHCD controller (Upper-level controller).	

**The bidder must submit documents as per section 17 along with the bid.**

#### [24] Appendix-1

The operation of klystron under different conditions are outlined in this annexure for better understanding of its operation with auxiliary systems and high voltage DC power supply.

##### **1. Conditioning mode:**

It involves 4 different types of conditioning for the klystron and are listed below:

- 1.1** Cold / Vacuum conditioning
- 1.2** Filament conditioning
- 1.3** High Voltage (HV) conditioning
- 1.4** RF conditioning.

##### **1.1 Cold conditioning:**

The klystron is first checked for its cold/vacuum condition periodically (at least once in a month). In cold / vacuum conditioning, the klystron ion-pump is connected with the ion-pump

power supply which is typically rated for 5kV, 20mA. Each klystron has two ion-pumps, one in each arm of the klystron output waveguides. Once the ion pump power supply is applied to the ion pump, it draws ion pump current and initially its peak current normally exceeds 1.0 mA but it immediately decreases to less than 50  $\mu$ A within 2 minutes as the vacuum of the tube improves due to pumping. The ion pump power supply current normally reaches the value indicated on the klystron test report (generally  $\leq 5 \mu$ A) within 15 minutes and the tube is said to be cold conditioned.

### **1.2 Filament conditioning:**

After successful cold/vacuum conditioning, the klystron filament/heater conditioning is initiated. The rating of filament power supply is 14V, 40 A. The cooling system is turned on along with magnet power supplies and ion pump power supplies. During the filament conditioning the filament current is gradually increased (say up to 5 A or so) and ion pump current is monitored and ensured that ion pump current never exceeds the set threshold value (typically 20 $\mu$ A). Over a certain period of time, the ion pump pumping, improves the klystron vacuum condition and ion pump current falls below 5 $\mu$ A. Thereafter the filament current is further increased (say to 10A) which again degasses the klystron tube and ion pump current increases again. The increase of the filament current should be controlled in such a way that the ion pump current never exceeds the set threshold limit. In case the ion pump current crosses the threshold value, the filament current is appropriately reduced to ensure that the ion pump remains within the set threshold value. The above filament conditioning technique is repeated until the filament current reaches the nominal value (Operating value as per the tube datasheet) mentioned in the test report. The typical warm up time for the heater is about 15 minutes. Once the ion pump current reduces to <5 $\mu$ A for rated filament current, filament conditioning is said to be completed. After this filament conditioning, HV conditioning is carried out.

### **1.3 High Voltage conditioning:**

Refer fig.7, initially the cathode voltage is raised to about -30kV, which raises the anode voltage also to around -32 kV. This bias of -2kV prevents klystron from conducting dark current through the klystron. The tube is allowed to conduct beam current by reducing the anode voltage below the cathode voltage with the help of AMPS control system, which controls its pulse length. The voltage pulse duration is adjustable from 50m Sec. to 1000 Sec. by the LHCD control system. The minimum response time of modulator power is nearly 50mSec. The conduction of the tube leads to degassing which increases the ion pump current momentarily. The pulse length is so chosen that the ion pump current never exceeds set limit of 20 $\mu$ A. Once the conduction pulse is over, the ion pump improves the tube vacuum and its current gradually returns to its initial value and then the next pulse is initiated from the AMPS control system. A typical graphical representation of cathode voltage, anode voltage, ion pump current and beam current is shown in Fig.8 (a). In the beginning, the duty cycle of conduction pulses is very large (80ms ON and few seconds OFF) but after launching thousands of such pulses the deflection observed in the ion pump drastically decreases (much less than 20 $\mu$ A) and its representation is shown in Fig.8(b). Once this condition is realized, the duty cycle is increased further by decreasing the gap between successive conduction pulses and several thousands of such pulses are launched till the ion pump current falls below desired limit. Typically, it takes several hours of operation when tube is conditioned to operate with 50% duty cycle with ion pump current below 20 $\mu$ A. Once this condition is reached cathode voltage is increased in step of 5kV and above procedure is repeated till cathode voltage reaches -65kV. During HV conditioning beam current anode voltage and beam voltage is also monitored. Fig.8(c) shows a typical graph where the tube is nearly conditioned around 60kV and beam pulse length of about a second is obtained

with beam current around 13A. It should be noted that the ion pump current remains within limits throughout the pulse operation suggesting that the tube is conditioned for HV operation.

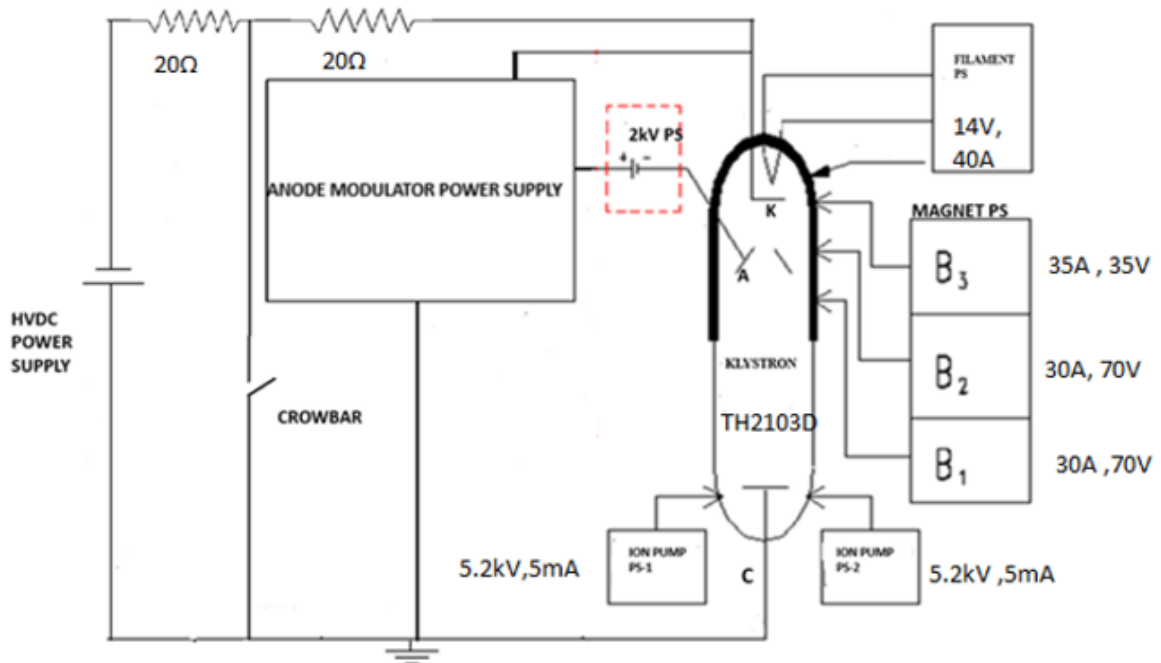


Fig.7 schematic of klystron power supplies

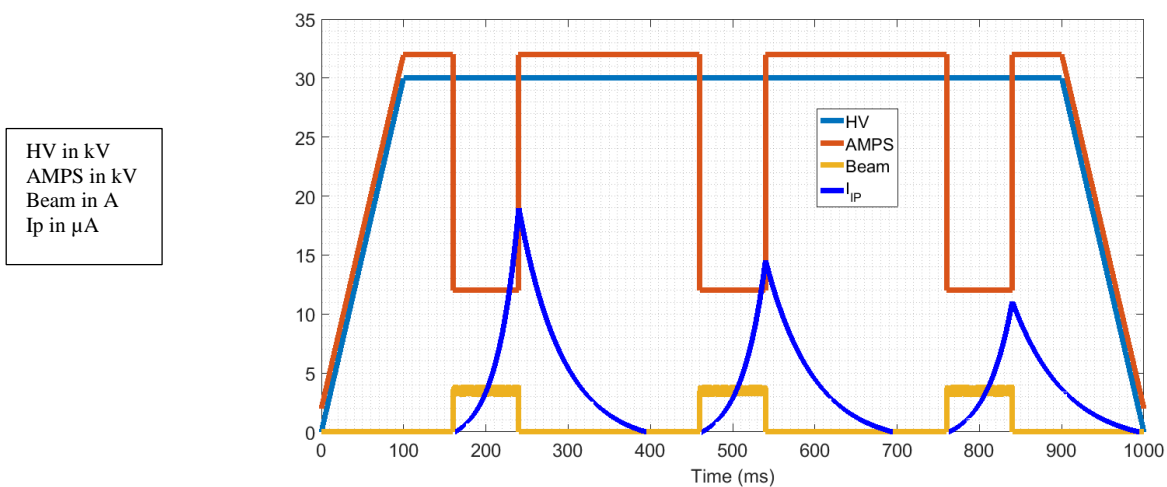


Fig8 (a) typical response of ion pump when anode pulse is given. During this condition the tube conducts the beam current which results in degassing and hence deflection in the ion pump current is observed

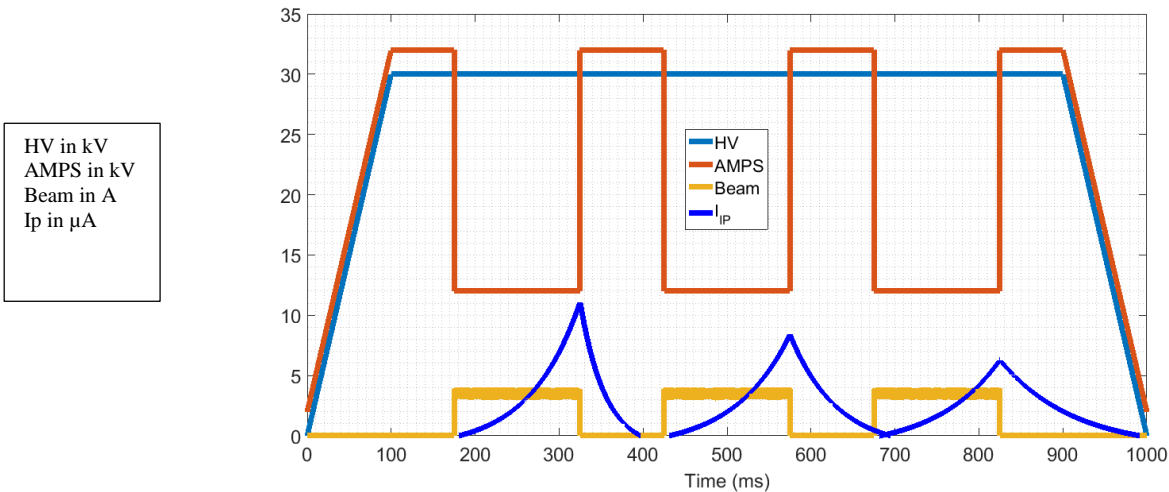


Fig.8 (b) Typical response of ion pump with increased duty cycle of anode pulsing

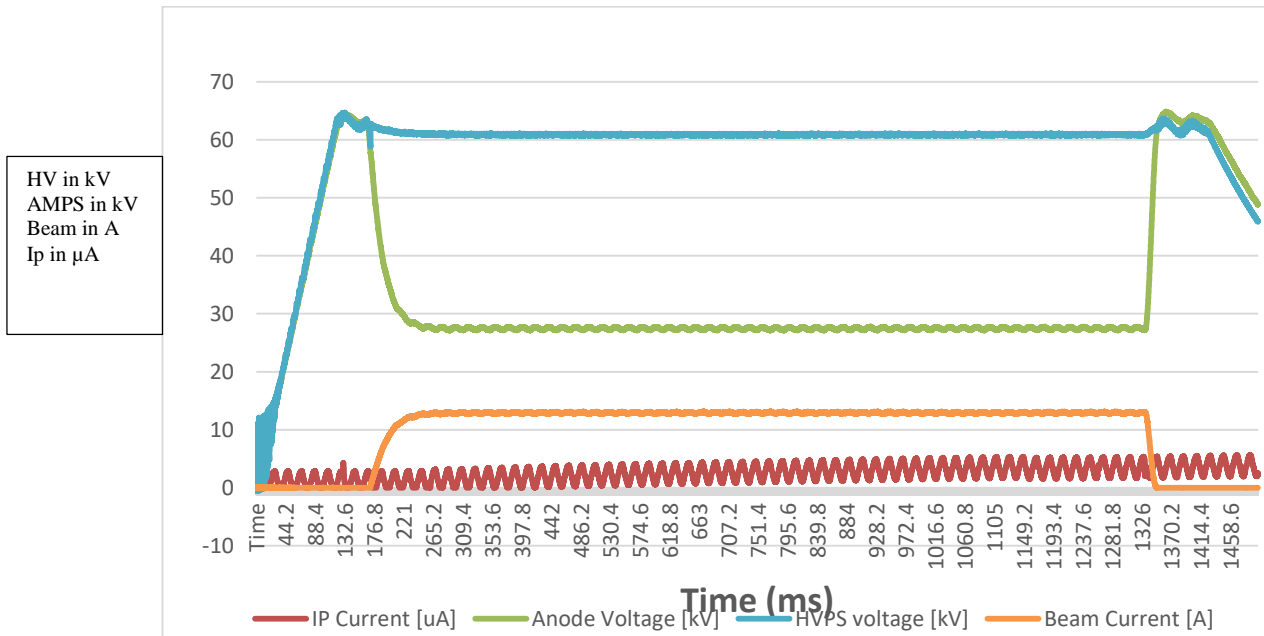


Fig.8(c). A typical graph of cathode voltage, anode voltage, beam current and ion pump current is shown when the tube is nearly conditioned around 60kV and beam pulse length of about a second is obtained with beam current around 13A.

**1.4 RF conditioning:**

Once HV conditioning is completed, the rf conditioning is started. The rf transmission line system is pressurized with dry nitrogen up to the 3.0 bar and it is terminated with matched water cooled rf dummy load. The RF conditioning is carried out by applying short pulses of RF drive power to the klystron, which drives the klystron amplifier and generates the high power rf waves. Here also the ion pump current is monitored and the pulse length of rf input is decided by the deflection observed in ion pump current. Gradually the duty cycle and pulse length of rf input is increased, restricting the ion pump current below the set threshold limit. After the successful conditioning the tube becomes ready for operation. (Generally, it happens when there is high reflection at high rf power operation and rf input is made off during arcing).

**Note: Conditioning of klystron will be in IPR scope.**





SECTION 'E':  
PRICE SCHEDULE

Validate

Print

Help

**Item Rate BoQ**

Tender Inviting Authority: Head-Purchase Section

Name of Work: Design, Manufacturing, Factory Acceptance Test, Supply (including Unloading and storage), Installation, Commissioning, Site Acceptance Test and Training of -65kV, 40A High voltage DC power supply for Klystron at Institute for Plasma Research, Gandhinagar as per the detailed specifications mentioned in the tender documents

Tender No: IPR/TN/PUR/ET/22-23/001 dated 12/04/2022

Name of the Bidder/ Bidding Firm / Company :						
<b>PRICE SCHEDULE</b>						
(This BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevant columns, else the bidder is liable to be rejected for this tender. Bidders are allowed to enter the Bidder Name and Values only )						
NUMBER #	TEXT #	NUMBER #	TEXT #	NUMBER #	NUMBER #	TEXT #
Sl. No.	Item Description	Quantity	Units	BASIC RATE In Figures To be entered by the Bidder in Rs. P	TOTAL AMOUNT Without Taxes in Rs. P	TOTAL AMOUNT In Words
1	2	4	5	13	53	55
1	<b>Design, Manufacturing, Factory Acceptance Test, Supply (including Unloading and storage) of -65kV, 40A High voltage DC power supply for Klystron at Institute for Plasma Research, Gandhinagar as per the detailed specifications mentioned in the tender documents</b>					
1.01	Design, manufacturing, component testing and supply of one no. of complete LHCD HVDC power supply (excluding Sl. no.1.02, 1.03 and 2 of Price Schedule) as per the detailed specifications mentioned in the tender documents	1.000	Job		0.00	INR Zero Only
1.02	Supply of multisecondary high voltage (11kV input) transformers as per the detailed specifications mentioned in the tender documents	1.000	Set		0.00	INR Zero Only
1.03	Supply of SPS modules as per the detailed specifications mentioned in the tender documents	1.000	Set		0.00	INR Zero Only
2	<b>Spares</b>					
2.01	Supply of Spare SPS modules (12 No.=1Set) as per the detailed specifications mentioned in the tender documents	1.000	Set		0.00	INR Zero Only
2.02	Supply of other spares and accessories as mentioned in Sr. no.19(b)(c)(d) excluding cost of spares SPS modules of technical specifications (Section-D) (list of quoted spares and accessories included in the quoted cost should be provided separately)	1.000	Set		0.00	INR Zero Only
3	<b>Installation, Commissioning, Site Acceptance Test and Training of -65kV, 40A High voltage DC power supply for Klystron at Institute for Plasma Research, Gandhinagar as per the detailed specifications mentioned in the tender documents</b>					
3.1	Installation, Commissioning, Site Acceptance Test and Training of -65kV, 40A High voltage DC power supply (including shifting, and handling of equipment) for Klystron at Institute for Plasma Research, Gandhinagar as per the detailed specifications mentioned in the tender documents	1.000	Job		0.00	INR Zero Only
<b>Total in Figures</b>					<b>0.00</b>	INR Zero Only
<b>Quoted Rate in Words</b>		<b>INR Zero Only</b>				