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

Notice Inviting Tender
(NIT)

निविदा सूचना TENDER NOTICE NO: IPR/TN/PUR/TPT/ET/21-22/008
दिनांकित DATED 09-08-2021

Head-Purchase and Stores Department, Institute for Plasma Research, for and on behalf of Director, Institute for Plasma Research (IPR) invites online tenders IN **TWO PART (INR quote only)** 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 the tender are attached.

Bidders interested to submit bid are requested to go through the contents of the NIT 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 conditions indicated herein and upload digitally signed or ink signed undertaking of Form No. **IPR-LP-ET-02.V5.**

Off line 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.

निविदा सूचना TENDER NOTICE NO: IPR/TN/PUR/TPT/ET/21-22/008
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निम्नलिखित के लिए प्रतिष्ठित और योग्य पार्टियों से ई-निविदा विधि के माध्यम से दो भाग में ऑनलाइन निविदा आमंत्रित की जाती है।

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

Work/Item Description	Fabrication of Vacuum Vessel, Integration with vacuum equipment, Large Size 1250 mm (50 inch) UHV Gate Valve and Vacuum Instrumentation, Factory Acceptance Tests, Supply and Installation at Institute for Plasma Research, Gandhinagar as per the detailed specifications mentioned in the tender documents
GeM Availability Report ID No. & Date	GEM/GARPTS/14072021/BIDATKQO68WU dated 14-07-2021
Tender Fee	Not Applicable
Earnest Money Deposit (EMD)	Not Applicable. In place of EMD, vendor should upload sealed and signed **"Bid Security Declaration"** as per ANNEXURE-V
Publishing Date	**09-08-2021 at 17:30 Hrs.**
Document Download / Sale Start Date	**10-08-2021 at 10:00 Hrs.**
Seek Clarification Start Date	**10-08-2021 at 10:00 Hrs.**
Seek Clarification End Date	**26-08-2021 by 17:00 Hrs.**
Pre-bid Meeting Date	**02-09-2021 at 10:30 Hrs**
Response to Clarification by IPR	**16-09-2021** by **17.00 Hrs**
Bid Submission Start Date	**17-09-2021** at **10.00 Hrs**
Bid Submission Closing Date	**05-10-2021** at **13.00 Hrs**
भाग-I के ऑनलाइन खोलने का समय और तिथि (तकनीकी बोली) Time and Date of online Opening of PART-I (Technical Bid)	**06-10-2021** at **14.00 Hrs**
भाग-II के ऑनलाइन खोलने का समय और तिथि (मूल्य बोली) Time and Date of online Opening of PART-II (Price Bid)	**Will be declared later on**

Pre-bid meeting with the vendors will be held through **Video Conference** on **02/09/2021 10:30 Hrs onwards** after receipt of pre-bid queries. The interested vendors are required to register themselves for participation in the pre-bid meeting through the following link on or before **27/08/2021:**

https://docs.google.com/forms/d/e/1FAIpQLSdx8-s2Tr6qrSHSQcOzNlzLACQzlkQ-fuJF1RZjoO9WevDpQg/viewform?vc=0&c=0&w=1&flr=0

The web link to join the scheduled pre-bid meeting through Video Conference along with password will be shared with the vendors who have **registered themselves through the above link only (for pre-bid meeting participation)** by 31st Aug 2021. In case, if they do not receive the link to join the video Conference, they may contact the Tender Inviting officer at nodalofficer.et@ipr.res.in

It may please be noted that any clarifications required in this tender either technical or otherwise shall be carried out before submission of bids through the e-Tendering portal only.

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** . 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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Form No: IPR-LP-ET-02.V5

TWO-PART TENDER
SECTION – A

Invitation to Tender and Tendering Conditions

1.0 INVITATION TO TENDER

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

2.0 MANNER AND METHOD FOR SUBMISSION OF TENDERS

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

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

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

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

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

3.0 EARNEST MONEY DEPOSIT (EMD)

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

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

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

3.2 The EMD of unsuccessful Tenderer will be discharged/returned after finalizing award of the Contract/placement of Purchase order.

3.3 The successful Tenderers EMD shall be discharged upon the Bidder submitting the Security Deposit as specified in the contract/purchase order, without any interest.

3.4 **Exemption from payment of EMD:** The firms registered with DGS&D, NSIC, DPS or Micro & Small Enterprises (MSEs) which are actual producers/manufacturers of tendered items are exempted from payment of EMD provided valid registration certificate is uploaded along with the offer. In the case of foreign bidders, payment of EMD is exempted if they submit their bid directly or through their Indian agent in **foreign currency** against the tender document bought by them, so that the order can be placed directly on their Principals.

3.5 **The EMD may be forfeited:**

3.5.1 If a Tenderer withdraws or amends or modifies or impairs or derogates its bid during the period of bid validity specified by the Bidder on the Bid Form; or

3.5.2 In case of a successful tenderer, if the tenderer fails to furnish order acceptance within 15 days of the order or fails to submit the Security Deposit within 21 days from the date of contract/order.

4.0 LATE/DELAYED TENDERS

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

5.0 OPENING OF TENDERS

5.1 Unless otherwise pre-opened or postponed with advance intimation to the tenderers, tender will be opened in two stages on the date and time indicated on e-Tendering portal.

5.2 Part-I (Techno-commercial) of the tender will be opened at the first stage on the due date and time indicated for opening on the e-Tendering portal while the Part-II (Price) will be opened at the second stage after completion of the evaluation of the Techno-Commercial Part (Part-I) of the tender.

5.3 While all the tenderers who uploaded tenders within the due date and time will be permitted to participate in the opening of Part-I (Techno-Commercial) of the tender on the due date and time indicated on e-Tendering portal, opening of the Part-II (Price) of the tender can be attended to only by such of those tenderers whose Part-I (Techno-Commercial) of the tenders are found to be technical suitable/

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

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

6.0 AUTHORITY LETTER

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

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

7.0 EVALUATION OF TENDER

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

8.0 PURCHASER'S RIGHTS TO REJECT QUOTATION

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

9.0 TECHNICAL CLARIFICATIONS

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

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

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

11.0 HOLIDAYS

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

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

12.0 **VALIDITY OF OFFERS**

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

13.0 **CATALOGUES/TECHNICAL LITERATURE**

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

14.0 **TERMS AND CONDITIONS OF THE CONTRACT**

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

15.0 TENDERING CONDITIONS FOR BIDS

15.1 The prices quoted must be FIRM and preference will be given to such tenders. In exceptional cases (e.g. items involving substantial use of raw materials susceptible to sharp fluctuations in prices) if prices quoted subject to variation it shall be on the basis of a standard 'Price Variation Formula'. The basis for calculation shall be very clearly stated. The responsibility for furnishing the documentary evidence for price variation lies with the vendor. Here again preference will be given to the tenders with a specific ceiling on escalation.

15.2 Prices quoted by the tenderer should include all charges involved for direct and safe-delivery of the stores to the consignee/place of delivery indicated in the tender document. If a tenderer so desires, separate lump sum charges for safe-delivery of the stores to the consignee/purchaser’s site, could be furnished. However, the purchaser reserves the right to call for break-up. The purchaser will neither undertake responsibility for transit insurance nor pay for it separately.

15.3 In respect of tenders on Ex-works basis, in case the tenderer has not mentioned in the offer packing, forwarding and transportation charges for safe delivery up to Purchaser's site, 2% of the price quoted towards packing (in respect of both local and outstation firms), 1% of the basic price quoted towards safe delivery charges in respect of local tenderer and 3% of the basic price quoted towards safe delivery charges in

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

15.4 The stores shall neither be despatched under 'owner's risk' nor consigned to 'self', but only to the consignee's name and address indicated in the Purchase order. Non-adherence to this condition shall make the contractor liable to bear all consequential penalties/expenses such as demurrage, wharf age, etc. which the Purchaser may incur.

15.5 The consignee will, as soon as possible, but not later than 45 days from the date of arrival of stores at destination notify the contractor of any loss or damage to the stores that may have occurred during transit to enable the contractor to repair/rectify the defects/damages or replace the goods as is appropriate, free of all charges. In case it is desired by the contractor for returning of the material to them all expenses towards transportation etc. will be borne by the supplier and also will furnish bank guarantee towards the cost of material.

15.6 In case an Indian supplier/Agent furnishes an offer for supply of out-rightly imported stores, the price of such stores shall be quoted in Indian Rupees for delivery to the consignee's premises exclusive of import duties and on firm price basis.

15.6 **Conditional Discount:** In case the tenderer offers any conditional discount with regard to acceptance of their offer within a specific payment terms, delivery, quantity etc. the purchaser will not take into consideration such conditional discount while evaluating their offer.

16.0 SPARES AND ACCESSORIES

16.1 Tenders for plant/machinery/equipment/component shall also indicate prices for essential accessories, optional accessories and spares necessary for satisfactory operation of the plant/machinery/ equipment.

16.1.1 for a period of two years and

16.1.2 for a period of five years

16.2 Prices for accessories and spares shall be itemized. Tenders where only lumpsum prices are indicated are liable to be ignored. Particular care must be taken to list out each item of spare and quantity recommended and also the individual price for these items. These details should be included only in Part-II (Price) of the tender. However, a list of spares and accessories without Price should be included in Part-I (Techno-Commercial) of the tender.

17.0 QUANTITY

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

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

18.1 **CUSTOMS DUTY**

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

certificate from the appropriate authority.

18.1.2 In case an Indian vendor/agent submits an offer for supply of outrightly imported stores in Indian Rupees, they should quote price for free and safe delivery of stores at destination.

18.1.3 Wherever, against a requirement, both indigenous as well as imported offers are received, the offers for imported stores will be evaluated on the basis of the total landed cost after loading the custom duty and other levies as may be applicable from time to time for taking purchase decision.

18.1.4 High Seas sale will not be considered.

18.2 **FLUCTUATION IN THE CUSTOMS DUTY**

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

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

18.3.1 Photocopy of the Agency Agreement between the Principals and the Indian Agent showing the percentage or the quantum of agency commission payable and a Letter of Authority from the Principals authorizing the Indian Agents to submit the tender on their behalf.

18.3.2 The type and nature of after sales services to be rendered by the Indian Agent.

18.3.3 Both Indian Agent and Principal/OEM cannot bid simultaneously for the same item/product in the same tender.

18.3.4 The Indian Agents are allowed to quote on behalf of only one foreign Principal/ Supplier against this tender.

18.3.5 Copy of Registration Certificate with DGS&D or DPS.

18.4 **GOODS AND SERVICE TAX**

18.4.1 GOODS AND SERVICE TAX where legally leviable as per relevant HSN code will be admitted and reimbursed at the rate applicable during original delivery date.

18.4.2 GOODS AND SERVICE TAX intended to be claimed should be distinctly shown separately along with the price quoted. Where this is not done, no claim for GOODS AND SERVICE TAX will be admitted at any later stage and on any ground whatsoever.

18.4.3 The Purchaser is entitled for assessment of GST at the Concessional rate as per Notifications issued by the Government, as amended from time to time, in respect of purchases made for the Research and Development applications under the Department of Atomic Energy and other R&D units.

18.4.4 **GST for R&D Unit:** Goods and Service Tax (GST) wherever applicable will be paid extra at actual during the delivery period stipulated in the Purchase order. In terms of notifications issued by the Central Government and Statement Governments, R&D units of Department of Atomic Energy are entitled for IGST @ 5% or CGST @ 2.5% and SGST @ 2.5% as applicable for stores covered under the Purchase Order.

18.4.5 **GST for Services:** As applicable. Specify the SAC codes wherever services are involved.

18.4.6 It would be the responsibility of the contractor to ensure that relevant certificate is obtained from the Purchaser before effecting the delivery of goods ordered failing which the excess tax paid by the contractor shall not be reimbursed by the Purchaser.

18.4.7 When GOODS AND SERVICE TAX is claimed as extra by the vendor in general and on packing charges in particular, the following certificates should be submitted by the vendor to the Paying Authority on the bills itself.

18.4.8 Certified that the goods and packing charges on which GOODS AND SERVICE TAX has been charged have not been exempted under the Central Sales Tax or the State Sales Tax Act or the rules made there-under and the amount charged on account of GST on these goods and packing charges are not more than what is payable under the provision of relevant Act or the rules there-under.

18.4.9 Certified further that we have actually paid GOODS AND SERVICE TAX and are being assessed to GST on packing charges and also that where there are statutory exemption under the Relevant Act/Law of the State Government concerned, we have availed ourselves of it and certified non-availability of such a provision for GST on packing charges wherever claimed.

18.4.10 Certified further in respect of amount claimed into the bill no claim is pending for refund/or admissible. Certified that in the event of our getting refund in whole or in part of the element of GOODS AND SERVICE TAX on packing charges claimed from Government, we shall pass on the benefit to the Purchaser by remitting to Government the amount equivalent to the amount of refund obtained by us.

18.4.11 Further certififed that we abide by the all the provisions of Acts of Governemnt and rules made thereunder especially regarding anti-profiteering provisions.

18.4.12 Certified further that we (our Branch or agent) _____ _____ (address) are registered as dealers in the State of _____ under Local Regn. No._____ and in the State of _____ under Central Regn. No. _____ for the purpose of State/Central Tax.

(Stamp & Signature of the Vendor)

18.4.13 The vendor shall solely be responsible for declaration of Goods and Service Tax made in his invoice and shall indemnify the purchaser from any claim or its liability from concerned authorities at any stage.

18.4.14 Certificate with each bill to the effect that no refund has been obtained in respect of the reimbursement of GST made to vendor during three months immediately preceding the date of the claim covered by the relevant bill.

18.4.15 AN UNDERTAKING to the effect that in case any refund of GST is granted to the vendor by concerned authorities in respect of stores supplied under the contract, they shall pass on the credit to the purchaser immediately alongwith a certificate from their Director/Manager/Proprietor/ Accountant to the effect that the credit so passed on relates to the GST originally paid for the stores

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

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

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

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

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

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

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

Important Note:

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

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

19.0 FLUCTUATION IN STATUTORY LEVIES

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

20.0 **SAMPLES/PROTOTYPES**

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

21.0 **QUANTITIES**

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

22.0 **SUBMISSION OF DRAWINGS**

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

23.0 **INSTALLATION AND COMMISSIONING**

23.1 Wherever, the purchaser's invitation to tender calls for installation and commissioning or supervision of installation and commissioning of the instrument/equipment by the tenderer, the tenderer must clearly and separately quote the prices for the supply of the stores and the charges and the terms for installation and commissioning or supervision of installation and commissioning, as the case may be. The charges towards installation and commissioning should not be included in the price of the stores.

23.2 In respect of contracts involving installation and commissioning by vendors including overseas vendors where identifiable charges for the same has been quoted by the vendor, he shall bear the Income-tax liability as per the rates prevailing at the time of undertaking the job in accordance with the Income-tax Act in force in India.

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

24.0 **INSPECTION**

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

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

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

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

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

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

26.0 **PRODUCTS WITH ISI MARK**

26.1 Products with ISI mark will be preferred.

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

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

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

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

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

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

27.1.3 Produce an inspection plan to the Purchaser's satisfaction notifying him when check points on the plan are imminent.

27.1.4 Not supply or deliver the plant/machinery/equipment/ component unless and until a Shipping Release or an authorisation for despatch is obtained in a format provided by the Purchaser. Failure to comply with this instruction will not only result in with holding of the payment to the contractor/supplier, but also hold the tenderer/contractor liable for payment of compensation to the Purchaser due to delay in clearance of the Equipment/plant/machinery/ component from the carriers.

28.0 **INSTRUCTION MANUAL**

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

29.0 **PACKING**

29.1 Tenderers shall note that packing for shipment shall be in accordance with the instructions outlined in this tender document, each package shall be limited to the size and weights that are permissible under the existing Air and Sea limitations. Even when no packing specification is included in the invitation to tender, it will be Supplier's responsibility to provide appropriate packing depending upon the nature of the supply and the transportation and handling hazards.

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

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

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

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

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

31.0 **DELIVERY**

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

32.0 **ACCEPTANCE OF TENDERS**

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

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

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

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

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

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

35.0 **PAST PERFORMANCE**

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

36.0 CAPACITY & FINANCIAL STANDING

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

37.0 **CONFIDENTIALITY**

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

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

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

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

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

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

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

- **Risk to be covered:** Any loss or damage to the Purchaser's material due to fire, theft, riot, burglary, strike, civil commotion, terrorist act, natural calamities etc. and any loss or damage arising out of any other causes such as other materials falling on purchaser's materials.

- **Insured by:** (Name of the Contractor)

- **Beneficiary:** Institute for Plasma Research, Near Indira Bridge, Bhat, Gandhinagar-382428.

- **Amount for which insurance policy to be furnished:** The amount will be indicated in the respective contract.

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

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

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

41.0 EXPORT LICENCE/EXPORT PERMISSION

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

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

42.0 **END USE CERTIFICATE**

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

END USER STATEMENT:

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

43.0 **COUNTRY OF ORIGIN**

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

44.0 **LIABILITY**

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

45.0 RIGHT TO REJECT QUOTATION

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

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

46.0 **PRICE / PURCHASE PREFERENCE**

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

47.0 **PERMANENT ACCOUNT NUMBER (PAN**

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

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

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

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

SECTION ‘B’

GENERAL CONDITIONS OF CONTRACT

INSTITUTE FOR PLASMA RESESARCH
PURCHASE SECTION

GENERAL CONDITIONS OF ALL CONTRACT
&
SPECIAL CONDITIONS OF CONTRACT GOVERNING SUPPLIES OF PLANT AND MACNHINERY

GENERAL CONDITIONS OF CONTRACT

1. DEFINITIONS

1.1 The term 'PURCHASER" means the Institute for Plasma Research or its successors or assigns.

1.2 The term 'PARTICULARS' means the following:

1.2.1 Specification

1.2.2 Drawing

1.2.3 Sealed pattern denoting a pattern sealed and signed by the Inspector

1.2.4 Proprietary make denoting the produce of an individual firm

1.2.5 Any other details governing the construction manufacture and/or supply as existing for the contract.

1.3 The term 'CONTRACTOR' or 'SUPPLIER' means, firm or company with whom or with which the order for the supply of stores is placed and shall be deemed to include the Contractors/Successors (approved by the Purchaser), representatives, heirs, executors and administrators unless excluded by the contract.

1.4 The term 'CONTRACT' or 'PURCHASE ORDER' means and comprises of a Letter or Email or ink signed or digitally signed document conveying acceptance of Contractor's offer and invitation to tender, tender containing offer, advance acceptance of offer, general and special conditions of contract specified in the acceptance of offer and any subsequent amendments/alterations thereto made on the basis of mutual agreement.

1.5 The term 'STORES' or 'MATERIAL' means, the goods specified in the contract/purchase order which the contractor has agreed to supply under the contract.

1.6 The term 'SUB-CONTRACTOR' or 'SUB-SUPPLIER' means any contractor or supplier engaged by the contractor or the supplier with the prior approval of the Purchaser in relation to the contract/purchase order.

1.7 The term 'INSPECTOR' or 'QUALITY SURVEYOR' means any person nominated and deputed by the purchaser or their appointed Consultants or Quality Surveillance Agency or any other person from time to time authorized by the Purchaser to act as his representative for the purpose of inspection of stores under the contract/purchase order.

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

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

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

3.1 The Contractor shall not sublet, transfer or assign the Contract or any part thereof or bills or any other benefits, accruing therefrom or under the contract without the prior written consent of the Purchaser (All Sub-contractors are required to be appraised and approved by the Purchaser before placement of orders by the Contractor/Supplier). However, such consent shall not be unreasonably withheld by the Purchaser, if such stores are not normally manufactured by the Contractor, such assignment or subletting shall not relieve the Contractor from any contractual obligation or responsibility under the Contract.

3.2 Any breach of this condition shall entitle the Purchaser to cancel the Contract or any part thereof and to purchase from other sources at the risk and cost of the Contractor and shall recover from the Contractor damages arising from such cancellations.

3.3 In case the Contractor sublets, transfers or assigns any part of the Contract with the prior written consent of the Purchaser, all payments to the Sub-Contractor shall be the responsibility of the Contractor and any requests from such sub-Contractor shall not be entertained by the Purchaser.

4. SECURITY DEPOSIT

4.1 On acceptance of tender, the Contractor shall at the option of the Purchaser and within the period specified by him, submit a Bank Guarantee from SBI or any one of the nationalized banks or reputed private banks, viz. AXIS Bank, ICICI Bank, IDBI Bank and HDFC Bank towards Security Deposit not exceeding 10% (ten percent) of the tendered value of the contract/purchase order valid till at least 2 months beyond the acceptance date of the material, as the Purchaser shall specify.

4.2 If the Contractor is called upon by the Purchaser to submit Security Deposit and the contractor fails to provide the same within the period specified such failure shall constitute a breach of the Contract and the Purchaser shall be entitled to make other arrangements for the repurchase of the stores contracted for at the risk and expenses of the Contractor in terms of clause 9.2.4 hereof and/or recover from the Contractor damages arising from such cancellation. No claim shall lie against the purchaser either in respect of interest if any due on Security Deposit or depreciation in value.

4.3 Offers wherein contractors declined to submit Security Deposit are liable to be rejected.

5. DRAWINGS & SPECIFICATIONS

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

5.2 Should any discrepancy be noted in the drawings and/or specifications and should any interpretation of the same be required, the matter shall be referred to the Purchaser for clarification which shall be binding upon the contractor. Otherwise, the contractor shall assume responsibility for the interpretation of the drawings and specifications including interpretation by his sub-contractors.

5.3 Should any difference or dispute arise with regard to the true intent and meaning of drawings or specification or should any portion of the same be obscure or capable of more than one interpretation, the same shall be decided by the Purchaser whose decision shall be final.

5.4 All lettering on the drawings is t be considered as part of the specification and contract. In all cases figured dimensions are to be followed rather than those indicated by scale. Large scale drawings will take precedence over small scale drawings.

5.5 The contractors drawings shall, when approved by the Purchaser, be deemed to be included in the list of drawings which form part of the contract. The Contractor shall not proceed with fabrication until all drawings associated therewith have been duly approved by the Purchaser.

5.6 The Contractor shall be responsible for and shall pay for any alterations of the stores and shall indemnify the Purchaser for any consequential expenditure incurred by the Purchaser due to any discrepancies, errors, omissions in the drawings or other particulars supplied by him whether such drawings or specifications have been approved by the Purchaser or not, provided that such discrepancies, errors or omissions be not due to inaccurate information or specifications furnished to the contractor on behalf of the Purchaser.

5.7 **General Warranty**

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

5.7.2 The contractor's offer to supply stores in accordance with the tender specifications shall be deemed to be in admission on his part that he has fully acquainted himself with the details thereof and no claim shall lie against the Purchaser on the ground that the contractor did not examine or acquaint himself fully with the tender specifications.

5.8 **Contractor's Liability for Defective Stores**

5.8.1 For a period of twelve months after the stores have been accepted by Purchaser the Contractor shall be responsible for any defects that may be discovered therein notwithstanding that such defects could have been discovered at the time of inspection or any defects therein are found to have developed under proper use, arising from faulty materials, design or workmanship and the Contractor shall remedy all such defects as aforesaid at his own cost provided he is called upon within a period of 14 months from the date of acceptance thereof to do

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

6. ALTERATIONS

6.1 The Purchaser may, from time to time, make changes in the drawings specifications and issue additional instructions without altering the purchase order in any manner provided that no changes shall have been ordered which materially alter the character and scope of the supply under the contract.

6.2 It shall be lawful for the parties to the contract to alter by mutual consent at any time and from time to time the drawings and specifications and as from the dates specified by him stores to be supplied shall be in accordance with such altered drawings and specifications provided that if any such alterations involve increase or decrease in the cost of or in the period required for production, a revision of the contract price and/or the period prescribed for delivery shall be made by mutual agreement in respect of the stores to which the alteration applies. In all other respects, the contract shall remain unaltered.

7. SAMPLES

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

8. PACKING

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

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

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

9. DELIVERY:

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

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

9.2 **EXTENSION OF DELIVERY SCHEDULE**

9.2.1 If any delay in delivery shall have arisen from any cause such as strike, Lock-outs, fire, accidents, riot or the like which the purchaser may admit as reasonable ground for grant of extension of delivery schedule, the purchaser will allow such additional period for the purpose as he may consider necessary taking the circumstances into consideration.

9.2.2 If the contractor fails to deliver the stores or any instalment or part thereof within the period fixed for such delivery or such additional period allowed by the purchaser in accordance with foregoing paragraphs or any time before the expiry of such period repudiates the contract, the Purchaser may without prejudice to the rights of the purchaser.

9.2.3 Recover from the contractor as Liquidated Damages and not by way of penalty as detailed under clause No.222 given herein below for any stores which the contractor has failed to deliver within the period fixed for delivery in the contract or such additional period as mentioned in paragraph 9.2.1. during which the delivery of such stores, may be in arrears where delivery thereof is accepted after expiry of the aforesaid period. (For the purpose of computing the damages for delayed supplies under the clause, the cost of the entire plant/machinery/equipment/instrument will be taken into consideration if the plant/machinery/equipment/instrument cannot be put to the intended use for want of delayed portion of supply).

9.2.4 Purchase or authorise the purchase elsewhere without notice to the contractor, on account and at the risk of the contractor of the stores not so delivered or others of a similar description (where stores exactly complying with the contract specification are not in the opinion of the Purchaser, which opinion shall be final, readily procurable) without cancelling the contract in respect of the portion instrument not yet due of delivery, OR

9.2.5 Cancel the contract or portion thereof and if so desired purchase or authorise purchase of the stores not so delivered or others of a similar description (where stores exactly complying with the contract specification are not in the opinion of the Purchaser, which opinion shall be final, readily procurable) at the risk and cost of the contractor, if the contractor had defaulted in the performance of the original contract, the purchaser shall have the right to ignore his offer in response to risk purchase enquiry even though the lowest.

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

10. INSPECTION

10.1 The contractor shall be responsible for and perform all inspection and testing required in accordance with the contract/purchase order and specifications included herewith.

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

10.3 The contractor shall give notice of readiness for inspection to the Inspector (deputed under clause 10.2 above) so that the Inspector can be present at the requisite time. In such an event delivery shall not be effected until an authorization or shipping release is obtained from the Purchaser's Inspector.

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

11. RECTIFICATION AND REPLACEMENT OF DEFECTIVE STORES

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

12. INSPECTION AND REJECTION

12.1 **Inspection and Rejection**: The stores shall be tendered by the Contractor for inspection at such places as may be specified by the Inspector, at the Contractor's own risk, expenses and costs and shall lie at such places of inspection at the risk of the Contractor and the stores will be subject to inspection and test as may be considered necessary by the inspector and his decision as regards rejection of goods shall be final and binding on the Contractor. If any goods are rejected as aforesaid, then without prejudice to the foregoing provision, the Purchaser shall be at liberty to

12.1.1 Allow the Contractor to re submit without prejudice to the Purchaser's right to claim and recover Liquidated damages as provided in clause 9.2.3 hereof, stores in replacement of those rejected within a time specified by the Purchaser (which time shall be essence of the contract), the contractor bearing the

cost of freight for such replacement without being entitled to any extra payment, or

12.1.2 Buy the quantity of stores rejected or others of a similar nature elsewhere at the risk and cost of the Contractor in accordance with the provisions contained in second paragraph of clause 9.2.4 thereof without effecting the Contractor's liability as regards the supply of any further consignments due under the Contract, or

12.1.3 Terminate the Contract and recover from the Contractor the loss Purchaser thereby incurred

12.2 **Removal of rejection**: Any stores submitted for inspection and rejected by the Inspector must be removed by the Contractor within fourteen days from the date of receipt of intimation of rejection, provided that in the case of dangerous infected or perishable stores, the Inspector (whose decision shall be final) shall notify the Contractor to remove such stores within 48 hours of receipt of intimation of rejection and it shall be the duty of the Contractor to remove them accordingly. Such rejected stores shall lie at the Contractor's risk from the time of such rejection and if not removed within the aforementioned time, the Purchaser shall have the right either to return the rejected stores to the Contractor at the Contractor's risk by such mode of transport as Purchaser may select or to dispose off or segregate such stores as he thinks fit at the Contractor's risk and on his accounts and to appropriate such portion of the proceeds as may be necessary to cover any loss or expenses incurred by the Purchaser in connection with the said sale. Freight to destination of stores rejected after examination at destination shall be recoverable from the Contractor at the Tariff Rate.

12.3 **Test Certificate and Guarantees:** Test Certificate Guarantees, if required by the Inspector shall be obtained and furnished by the Contractor free of costs.

13. RECOVERY OF SUMS DUE

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

13.2 All demurrage, wharfage and allied expenses incurred by the Purchaser, if any, due to delayed clearance of Stores in view of non receipt, incomplete or delayed receipt of documents by the Purchaser, shall be recovered from the payment due to the Contractor.

14. BAR/PERT CHART

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

15. PERFORMANCE BANK GUARANTEE

15.1 In the event of acceptance of the offer in respect of plant, machinery, equipment, instrument, etc. the tenderer will be required to submit a performance bank guarantee for 10% of the total value of the stores inclusive of all statutory levies and other charges admitted in the contract, from SBI/any nationalized bank or private sector banks, namely, ICICI Bank, IDBI Bank, HDFC Bank and AXIS Bank, on a non-judicial stamp paper of appropriate value valid till 2 months beyond the expiry date of warranty period as per the Purchaser's format towards satisfactory performance of the plant, machinery, equipment, instrument, etc. during the warranty period. In case of bids in currency other than INR performance bank guarantee shall be furnished from any bank of international repute.

15.2 In case of non-submission of performance bank guarantee by the Contractor, an amount equivalent to 10% of the total value of the stores and other charges admitted in the contract will be retained by the purchaser till the expiry of the warranty period of the stores.

15.3 Offers of the tenders who are not agreeable to furnish performance bank guarantee or retaining of an equivalent amount by the purchaser as per clause No.15.1 and 15.2 above, are likely to be rejected.

16. PERMIT AND LICENCES

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

17. PATENTS & PATENT RIGHTS INDEMNIFICATION

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

17.2 In the event of any claim being made or action being taken against the purchaser in respect of the matter referred to clause 17.1 above, the contractor shall promptly be notified thereof and he shall at his own expense, conduct all negotiations for the settlement of the same and any litigation that may arise therefrom.

17.3 In the event of any designs, drawing, plans or diagrams or any manufacturing methods or process furnished by the contractor constituting infringement of patent or any other protected rights and use thereof is restrained, the contractor shall procure for Purchaser, at

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

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

18. LAW GOVERNING THE CONTRACT

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

19. JURISDICTION

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

20. SETTLEMENT OF DISPUTES

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

20.2 If the parties have failed to resolve their dispute or difference by such mutual consultation, then either the Purchaser or the Supplier may give notice to the other party of its intention to commence arbitration, as hereinafter provided, as to the matter in dispute, and no arbitration in respect of this matter may be commenced unless such notice is given. Any dispute or difference in respect of which a notice of intention to commence arbitration has been given in accordance with this Clause shall be finally settled by arbitration. Arbitration may be commenced prior to or after delivery of the Goods under the Contract.

21. ARBITRATION

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

22. LIQUIDATED DAMAGES

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

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

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

23. EXERCISING THE RIGHTS AND POWERS OF THE PURCHASER

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

24. TRAINING

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

25. RISK PURCHASE

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

26. LIEN IN RESPECT OF CLAIMS IN OTHER CONTRACTS

26.1 Any sum of money due and payable to the Contractor under any contract may be withheld or retained by way of lien by the purchaser or any other person or persons contracting through the Director, IPR against any claim of the Purchaser or such other person or persons in respect of payment of a sum of money arising out of or under any other contract made by the contractor with the Purchaser or with other such person or persons.

26.2 It is an agreed term of the contract that the sum of money so withheld or retained under this clause by the Purchaser will be kept withheld or retained as such by purchaser till this claim arising out of in the same

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

SPECIAL CONDITIONS OF CONTRACT GOVERNING SUPPLIES OF PLANT AND MACHINERY

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

27. DEFINITION OF PLANT

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

28. MISTAKES IN DRAWING

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

29. RESPONSIBILITY FOR COMPLETENESS

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

30. REJECTION OF DEFECTIVE PLANT

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

31. INSPECTION AND FINAL TESTS

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

one month of completion of erection.

32. TRANSPORT AND RESPONSIBILITY FOR BREAKAGES EN-ROUTE

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

33. ERECTION AND COMMISISONING

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

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

34. WARRANTY

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

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

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

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

34.5 Contractor shall, spare parts of equipment before going out of production, give adequate advance notice to the purchaser so that the latter may order requirement of spares in one lot if so desires.

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

34.7 The provision of this clause shall remain effective and binding upon the Contractor even after the completion or expiration of the contract and till the plant/machinery/equipment supplied under the contract is in use by the Purchaser.

35. MODE OF PAYMENT

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

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

35.1.1 In case any of the vendors seek advance or progressive payment prior to delivery of the material, such requests can be considered only in exceptional cases of large value items, in which case the vendor will be required to furnish a bank guarantee for an equivalent amount of the advance/progressive payment sought for, valid till the execution of the contract. The bank guarantee shall be got executed as per the Purchaser's format from the State Bank of India (SBI)/nationalized banks or any one of the scheduled banks mentioned in the bracket (Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank).

35.1.2 Besides, the offers of the vendors seeking advance/progressive payment will be evaluated by loading 12% interest charges per annum on the amount of advance desired up to the delivery period quoted.

35.1.3 In case any of the vendors seek pro-rata payment for the stores to be supplied they should clearly mention in their offer the maximum number of installments of supply. However, such installment delivery and pro-rata payment will be considered only in respect of contract involving large value and sizeable quantity of the item and the maximum number of installments shall be normally restricted to four. Acceptance or otherwise of this condition is reserved by the purchaser.

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

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

35.1.6 **Interest for delay in supply beyond the contractual delivery date:** Wherever advance payments are sought for by the contractor and

admitted in the contract, against Bank Guarantee for equivalent amount, in the event of any delay in supply beyond the contractual delivery date for reasons attributable to the contractor, interest charges @ 12% shall be levied for the period beyond the contractual delivery date, on the amount of balance advance payment to be adjusted.

36. DELAY IN ERECTION

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

SECTION 'C'

TECHNICAL SPECIFICATIONS OF STORES AND DRAWINGS

Please refer tender document

SECTION ‘D’

FORMAT FOR SUBMISSION OF PART-II (PRICE)

Please refer tender document

DEFERRED TERMS

TENDER FORM

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

Following terms are **replaced** in our Form for Tender No. **IPR/TN/PUR/TPT/ET/21-22/008** dated **09-08-2021**.

1) Sr.No.3 (Sub-clause No. 3.1) of Section-A under heading **"Earnest Money Deposit (EMD)"** of Form No.IPR-LP-ET-02.V5 (Terms and Conditions) is replaced with the following:

Earnest Money Deposit (EMD) is not applicable as per Office Memorandum No. F.9/4/2020-PPD dated 12/11/2020 issued by Ministry of Finance, Department of Expenditure, Procurement Policy Division, Government of India. In place of submission of EMD, vendor may upload a signed **"Bid Security Declaration"** as per the attached **Annexure-V** accepting that if they withdraw or modify their bids during the period of validity etc., they will be suspended for future requirements of IPR.

2) Sr. No. 15.3 (Section-A) under heading **"TENDERING CONDITIONS FOR BIDS"** of Form No.IPR-LP-ET-02.V5 (Terms and Conditions) is replaced with the following:
Quotation/ offer should be on FOR, IPR Gandhinagar basis only. Quotation/offer received in any other terms/ conditions shall not be considered.

3) Sr. No. 15.6 (Section-A) under heading **"TENDERING CONDITIONS FOR BIDS"** of Form No.IPR-LP-ET-02.V5 (Terms and Conditions) is deleted

4) Sr.No.18 (Section-A) under heading **"Statutory Levies such as Customs Duty, Goods and Service Tax"** of Form No.IPR-LP-ET-02.V5 (Terms and Conditions) is replaced with the following:

Clause Nos.18.1, 18.2, 18.3, 18.5.2 and its sub-clauses deleted from Form No: IPR-LP-ET-02.V5.

5) Sr. No. 46 (Section-A) under heading "**Price/Purchase Preference"** of Form No.IPR-LP-ET-02.V5 (Terms and Conditions) is replaced with the following:
Purchase/Price preference: Purchase/Price preference benefits under MSME/NSIC including benefits under PPP-Make India policy will be provided to the industries as per the policies of the Government of India in force at the time of evaluation of the offers provided their offer is in compliance with the terms and conditions of the tender.

DEFERRED TERMS

6) Sr. No. 4.1 (Section-B) under heading **"Security Deposit"** of "General Conditions of Contract of Form No.IPR-LP-ET-02.V5 (Terms and Conditions) is replaced with the following:

On acceptance of tender, the Contractor shall at the option of the Purchaser and within the period specified by him, submit a Bank Guarantee from State Bank of India or any Indian Nationalized/ 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 towards Security Deposit not exceeding **3% (three percent)** of the tendered value of the contract/purchase order valid till at least 2 months beyond the acceptance date of the material, as the Purchaser shall specify. Bank Guarantees submitted other than from banks approved by IPR will not be accepted.

7) (a) Sr. No. 15.1 (Section-B) under heading **"Performance Bank Guarantee"** of "General Conditions of Contract of Form No.IPR-LP-ET-02.V5 (Terms and Conditions) is replaced with the following:

In the event of acceptance of the tender, the Contractor will be required to submit a performance bank guarantee for **3% of the total value of the stores inclusive of all statutory levies and other charges** admitted in the contract, 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-operative and Grameen Banks), on a non-judicial stamp paper of appropriate value valid till 2 months beyond the expiry date of warranty period as per the Purchaser's format towards satisfactory performance of the Stores during the warranty period. Bank Guarantees submitted other than from banks approved by IPR will not be accepted.

8) Sr. No. 22.1 (Section-B) under heading **Liquidated Damages** of "General Conditions of Contract" of Form No.IPR-LP-ET-02.V5 (Terms and Conditions) is replaced with the following:

Liquidated Damages: As per Standard Terms & conditions, the Purchaser reserves the right to levy the Liquidated Damages, for delay in supply beyond the contractual delivery date at the rate of half percent (0.5 percent) of the total Contract price (Basic price) for each calendar week of delay. **GST @ 18% will be applicable on LD charges**. The total liquidated damages shall not exceed five percent (5%) of the contract price (Basic price). Stores/Goods will be deemed to have been delivered only when all its component parts are also delivered. If certain components are not delivered in time, the Stores/Goods will be considered as delayed until such time as the missing parts are delivered.

DEFERRED TERMS

9) Sr. No. 34.2 (Section-B) under heading "Warranty of "General Conditions of Contract" of Form No.IPR-LP-ET-02.V5 (Terms and Conditions) is replaced with the following:

Warranty:

(a) Integrated Vacuum Vessel Assembly (Fabrication) inclusive of Accessories / Equipment of Vacuum Vessel Assembly: All manufactured items should be covered under warranty for one year from the date of final acceptance against all sorts of manufacturing defects, faulty material and poor workmanship. During this period, if any fault occurs, vendor shall rectify at no extra cost.

10) Sr. No. 35 (Section-B) under heading Mode of Payment of "General Conditions of Contract" of Form No.IPR-LP-ET-02.V5 (Terms and Conditions) is replaced with the following:

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

a) 10% of supply portion of Item Sr. No. 1.01 of Price-Bid will be paid as an advance payment after approval of 3D Model, 2D Manufacturing Drawings, Quality Assurance Plan and Bill of Material (BOM), on submission of Advance Bank Guarantee for an equivalent amount from SBI/nationalized banks or any one of the scheduled banks mentioned in the bracket (Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank) as per IPR format, valid till delivery of the system and on receipt of Proforma Invoice triplicate.

b) 10% of supply portion of Item sr. no. 1.01 of Price-Bid will be paid as an advance payment against procurement of bulk raw material and on submission of material test certificate report (MTCR) alongwith Invoices of raw material procured for this project, approval of Manufacturing of inspection plan (MIP) and on submission of Advance Bank Guarantee for an equivalent amount from SBI/nationalized banks or any one of the scheduled banks mentioned in the bracket (Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank) as per IPR format, valid till delivery of the system, and on receipt of Proforma invoice in triplicate.

c) 60% of supply portion of Item Sr. No. 1.01 of Price-Bid + 100% of all other charges will be paid after carrying out Factory Acceptance Tests (FAT), receipt of material at IPR site, its verification by IPR representative and on receipt of invoice in triplicate.

d) Balance 20% of supply portion of Item sr.no. 1.01 and 100% of sr. no 1.02 of Price-Bid will be paid within 30 days from the date of final acceptance and on receipt of Performance Bank Guarantee for 3% of the order value inclusive of all statutory levies and other

charges from SBI/ nationalized banks or any one of the scheduled banks mentioned in the bracket (Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank) valid throughout the warranty period **(Plus additional 2 months grace period)** and on receipt of final invoice**.**

Following **ADDITIONAL CLAUSES** are **added to** our Form No. IPR-LP-ET 02.V5 for Tender No. **IPR/TN/PUR/TPT/ET/21-22/008** dated **09-08-2021**.

1. MAKE IN INDIA

i. 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.

ii. 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 Institute, 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.

iii. 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.

iv. 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 Institute, in the manner specified there in the order.

v. 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. 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.

vi. 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:4/03/2021 issued by Ministry of Commerce and Industry, DPIIT.

vii. 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.

viii. Wherever the bids are received without accompanying the above said requisite certificate such offers shall be treated as incomplete and not considered.

ix. 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):

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.

2. Class-II 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 20% whichever is higher, but less than that applicable for class-I local supplier.

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.

Self-certification under preference to "Make in India" order as per **Annexure-I** should be uploaded on e-tender portal along with other documents.

2. ELIGIBILITY OF BIDDERS FROM SPECIFIED COUNTRIES:

i. 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.

ii. Any bidder from a country which shares a land border with India (https://mea.gov.in/india-and- neighnours.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.

Self-certification under **ELIGIBILITY DECLARATIONS FROM SPECIFIED COUNTRIES** order as per **Annexure-II** should be uploaded on e-tender portal along with other documents.

3. **UNDERTAKING:** Acceptance of tender condition as per **Annexure-III** should be uploaded on e-tender portal along with other documents.

4. **CODE OF INTEGRITY**

No official of a procuring entity or bidder or contractor shall act in contravention ofthe 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.

5. **Commercial Bid (Unpriced)** : Vendor/ Bidder should upload the duly filled (signed and stamped) copy of commercial bid(unpriced) as per Annexure-IV

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

IMPORTANT NOTE:

[1] QUOTATIONS ARE INVITED IN INDIAN CURRENCY ONLY.

[2] QUOTATIONS RECEIVED OTHER THAN "INR" QUOTE SHALL SUMMARILY BE REJECTED.

(To be printed in letter head)

ANNEXURE-I

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/21-22/008** dated **09th Aug 2021** Details of location at which local value addition will be made as follows: _____.

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

ANNEXURE-II

Annexure to Bid Form: Eligibility Declaration

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

Tender No: **IPR/TN/PUR/TPT/ET/21-22/008** dated **09th Aug 2021**
Tender Tile: **Fabrication of Vacuum Vessel, Integration with vacuum equipment, Large Size 1250 mm (50 inch) UHV Gate Valve and Vacuum Instrumentation, Factory Acceptance Tests, supply and Installation at Institute for Plasma Research, Gandhinagar as per the detailed specifications mentioned in the tender documents**
Bidder's Name: _____
(Address and contact details)
Bidder's Offer No._____ Date:_____

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

"We have read the clause regarding restrictions on procurement from 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 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 further changes to the above details. We understood 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)

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

Annexure-III

Undertaking

To,

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

Ref: Tender Notice No. IPR/TN/PUR/TPT/ET/21-22/008 dated **09th Aug 2021**

Dear Sir,

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

- You will be at liberty to accept any one or more of the items of stores offered by us and I/We shall be bound to supply you the stores as may be specified in the Purchase Order/Contract.
- I/We hereby agree to keep the price valid for your acceptance for a period of 120 days from the date of opening of the tender.
- Deviations to technical specifications of the tender documents are detailed in Annexure-A of the tender form while deviations proposed to the General/Special Conditions of Contract are detailed in Annexure "B" to this tender.
- Standard equipments / accessories included in the bids shall be procured from OEM or their authorised agents. Any of the offered standard bought out equipment is not refurbished.
- I/We have also uploaded all the leaflets / catalogue, etc. pertaining to the stores offered.

Yours faithfully

Stamp and Signature of the Tenderer

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

Annexure - IV

IPR Enquiry NO & Date	**IPR/TN/PUR/TPT/ET/21-22/008 Dated 09th Aug 2021**

COMMERCIAL TERMS & CONDITIONS

ITEM DESCRIPTION	**Fabrication of Vacuum Vessel, Integration with vacuum equipment, Large Size 1250 mm (50 inch) UHV Gate Valve and Vacuum Instrumentation, Factory Acceptance Tests, supply and Installation at Institute for Plasma Research, Gandhinagar as per the detailed specifications mentioned in the tender documents**

Sl. No.	PARTICULARS	REMARKS
I	**Name of the Bidder**	
II	**Bidder Offer No & Date**	
III	**Postal address**	
IV	**Contact with STD code**	
V	**Fax with STD code**	
VI	**Name of Contact person**	
VII	**Mobile No.**	
VIII	**e-mail ID**	
IX	**Currency of offer/quotation**	INR
	Commercial Terms for Quoted items (Please Provide Commercial terms and conditions in the below form)	
	Confirm the offered Price shall be firm and fixed through out the currency of contract, in the event of placement of purchase order.	
1	Price Term for Local Supplier	FOR IPR Gandhinagar
2	**Goods and Services Tax**: **Goods and Service Tax <u>for Supply Items</u> only**: 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 **Confirm that in the event of issuence of GST Concessional Certificate you shall charge GST on Supply Portion @5% only** **Goods and Service Tax for Service items: As applicable**	
3	**Delivery period:** Refer tender terms	
4	**Installation and commissioning charges :** Have you offered Installation & Commissioning Charges? **(if applicable)**	

5	**Liquidated Damages**:- Please confirm that the Liquidated Damages as per Sr. No. 22 of Section B of Form No IPR-LP-ET-02.V5 (Terms and Conditions) attached with the tender/enquiry is acceptable to you	
6	Terms of Payment:- as per Sr. No. 35 of Section B of Form No. IPR_LP_ET_ 02.V5 (Terms and Conditions) attached with the tender/enquiry. **(Also refer document named "Deferred_terms_IPR_LP_ET_02.V5" for amended payment terms)**	
7	Guaranty / Warranty:-as per Sr. No. 34 of Section B of Form No. IPR_LP_ET_ 02.V5 (Terms and Conditions) attached with the tender/enquiry. **(Also refer document named "Deferred_terms_IPR_LP_ET_02.V5" for amended payment terms)**	
8	**Validity of offer/quotation**:- Refer tender terms	
	QUESTIONNAIRE TO BE FILLED BY BIDDER IN AND SENT ALONG WITH OFFER DULY SIGNED	
9	In the event of a purchase order/contract vendor has to provide Security Deposit in the form of Bank Guarantee for 3% of contract/ order value 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-operative and Grameen Banks) on a non-judicial stamp paper of appropriate value valid till at least 2 months beyond the final acceptance of the supplied goods at IPR, wherever applicable shall be submitted .	
10	In the event of a purchase order/contract Performance Bank Guarantee for 3% of the contract/order value 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-operative and Grameen Banks) on a non-judicial stamp paper of appropriate value till 2 months beyond the expiry date of warranty period , wherever applicable shall be submitted.	
11	I/We hereby offer to supply the stores detailed in the schedule hereto at the price given in the said schedule and agree to hold this offer open till expiry of quotation. I/We shall be bound to supply the stores hereby offered upon issue of purchase order communicating the acceptance thereof on or before the expiry of the last mentioned date. You will be at liberty to accept any one or more of the items of stores tendered for or portion of any or more of the items of such stores and I/We notwithstanding that the offer in the tender has not been accepted in whole shall be bound to supply to you- such item or items and such portion or portions of one or more of the items as may be specified in the said Purchase Order communicating the acceptance.	
12	Whether All Documents Related to tender Viewed?	
13	Vendor should upload the complete technical details (Technical specifications with product data sheet	
14	**Free Issue Material:** Successful tenderer will have to arrange insurance showing beneficiary as “Institute for Plasma Research” at their risk and cost towards adequate security for the materials/property provided/issued by the Purchaser as Free Issue Material for the due execution of the contract, wherever applicable.	

(To be printed in letter head)

ANNEXURE-V

BID SECURITY DECLARATION

IN LIEU OF SUBMISSION OF EARNEST MONEY DEPOSIT (EMD)

Ref: (1) Our Offer No.....dated.....
(2) Your Tender No. IPR/TN/PUR/TPT/ET/21-22/008 dated **09th Aug 2021**

In the event of withdrawing or modifying our offer within the validity or extended validity period, we hereby accept the suspension of our company for a period of two years from the date publication of this tender for your future requirement.

_____

Signature with date:

Name:

Designation:

Official Seal

SECTION ‘C’

TECHNICAL SPECIFICATIONS OF STORES AND DRAWINGS

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

Eligibility Criteria (Annexure-A)

ITEM DESCRIPTION	**Fabrication of Vacuum Vessel, Integration with vacuum equipment, Large Size 1250 mm (50 inch) UHV Gate Valve and Vacuum Instrumentation, Factory Acceptance Tests, Supply and Installation at Institute for Plasma Research, Gandhinagar as per the detailed specifications mentioned in the tender documents**

Sr. No.	Criteria	Documents required to submit / upload
1	The Vendor must be a company registered in India for at least ten years from the date of publication of Tender notice	Registration certificate from registrar of companies (ROC) **or equivalent competent authority. Provide copy of the company registration.**
2	The Vendor shall have valid ISO 9001:2015 or equivalent certification at the time of submitting the bid online	Copy of certificate with validity period mentioned
3	The vendor shall have minimum of five (5) years *(from the date of publication of tender notice)* experience in the field of design, manufacturing, vacuum testing and **supply of minimum of 1 cu. m size chamber made up of stainless steel** operating either in high vacuum (HE) or in Ultra-High-Vacuum (UHV)	Provide copy of supporting documents. **Include -** Copy of work order/PO, highlighting included scope of work, certificate issued for satisfactory completion of acceptance tests / work, **highlighting volume of supplied equipment(s)**.
4	Vendor must have executed work order having requirements of using Computer Aided Drafting. In case Vendor himself does not have such experience or facility, submit the proof of work order executed using services of sub-contractor.	Provide documents - Copy of PO; work completion certificate of executed order(s) with mention of CAD in work scope. Provide copy of work order placed on sub-contractor if work is outsourced related to PO included in submission. Include details of hardware, software and manpower engaged in CAD (in-house / with subcontractor).
5	Vendor should have necessary resources to demonstrate his capability to undertake scope of work included in this tender - Vendor should have access (in-house / subcontractor) to the facility for large size machining, inspection (metrology), fabrication, assembly and testing covered in scope of work of this tender. In case of outsourced (subcontracted) activities, they shall be highlighted with details of agencies, from whom they are outsourced. Include details listed in A, B, C and D in support of availability of necessary resources for execution of work	**Provide details -** **Include particulars of availability / access to resources with capacity of machinery, shop floor area, inspection & testing instruments, skilled manpower highlighting which are in-house and which are outsourced** **A.** Machining, fabrication, material handling & lifting facilities with details of capacity. **B.** Details of Metrology, inspection & testing facilities used for dimension inspection, NDT, vacuum leak testing with details of instruments & equipments with technical specifications, capacity and precision. **C.** Details of outsourced services with supporting documents establishing the access to them. **D.** Vendor shall demonstrate that he has skilled and experienced manpower to manage scope of work and operate the equipments included in the submitted documents suitably including the relevant details.
6	The vendor shall have executed single order in value not less than Rs. 1.0 Crores, comprising of **manufacturing, testing and supply of vacuum vessel with operating pressure ≤ 1e-6 mbar.**	Provide copy of supporting documents - **Include:** Copy of P.O./Work Order, copy of certificate for satisfactory completion of acceptance test / work; copy of invoice for PO referred and any other document in support in this criteria.

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

Technical Specifications

For

Procurement of

Integrated Vacuum Vessel

Along with vacuum equipments and Large size UHV gate valve

For

LI-VISTA Facility

INSTITUTE FOR PLASMA RESEARCH

BHAT, GANDHINAGAR

GUJARAT-382428

Ph: 079-23960-2000

Fax: 079-2396-2277

Table of Contents

1. Introduction

This section of the tender document contains Technical Specifications and Scope of Work applicable for procurement of integrated Vacuum Vessel assembly for LI-VISTA facility at IPR Gandhinagar. The integrated vessel assembly is as shown in supplied guide line drawings (for drawing lists refer section 5.9). The VENDOR shall refer this section of the tender document to prepare bid.

2. Scope

Technical specification covers the minimum requirements for engineering, material, manufacture fabrication, assembly & integration, inspection & testing, preparations for shipping & shipment of vacuum vessel with vacuum equipments for the LI-VISTA facility. The Vendor shall include these requirements in their procedures and applicable purchase orders. At the start of the contract VENDOR shall prepare a detail schedule for execution of scope of work covered herein this specifications. Any add-on attachments incorporated herein by reference are a part of this specifications.

The Institute for Plasma Research (IPR) is the Buyer for this procurement. The VENDOR is the successful bidder who is awarded this contract at the culmination of successful tender process. When the VENDOR procures the bought out items pertinent to this tender, he shall be the purchaser for those bought out items.

The VENDOR shall be responsible for coordination of their subcontractors and for overall guarantees relating to mechanical, material and functional compatibility. It is the specific responsibility of the VENDOR to invoke all reference specifications as applicable on each subcontractor purchase order. VENDOR shall ensure to obtain necessary documents pertaining to the specifications, quality, and inspection of procured articles and outsourced work as agreed between VENDOR and Buyer in approved documents.

It is the responsibility of the VENDOR to follow requirements specified herein in accomplishment of scope of work or to propose alternate procedures and specifications to meet the requirements. All alternate approaches must be approved by the Buyer before use.

The scope of supply include installation at IPR site and testing to demonstrate compliance with functional requirements of integrated vacuum vessel assembly. Integrated vacuum vessel with equipments and control instrumentation display unit, dimension inspection, alignment checks, Helium leak test and demonstration of vacuum shall be performed complying site acceptance specifications.

Supplies which are imported by VENDOR forming scope of supply under this procurement, IPR will not provide custom duty exemption certificate.

2.1. Scope of Work

Vendor shall perform design verification as mentioned in **section 5.3** and submit the report to Buyer for consideration to incorporate suggested changes.
VENDOR shall prepare Fabrication/ Engineering drawings based on the input reference 2-D drawings of major components indicating tolerances proposed by them and agreed with buyer in alignment with the numbers provided in **section 5.2** and all associated minor components (essential) of vacuum vessel assembly. (Refer **Section 5.9** input 2-D drawings)

A. Vacuum Vessel, with ports and end flanges
B. End covers (dished end) with specified ports
C. Stiffeners - Vacuum and Support

D. Bellows with end flanges
E. Support structure (vessel) – Guided, Saddle and Roller (Vessel centre elevation 1070 mm)
F. Support structure (equipments) – not included in the supplied 2-D drawings
G. Structure to raise the floor elevation at vessel supports by 708 mm to align vessel CL at 1778 mm elevation

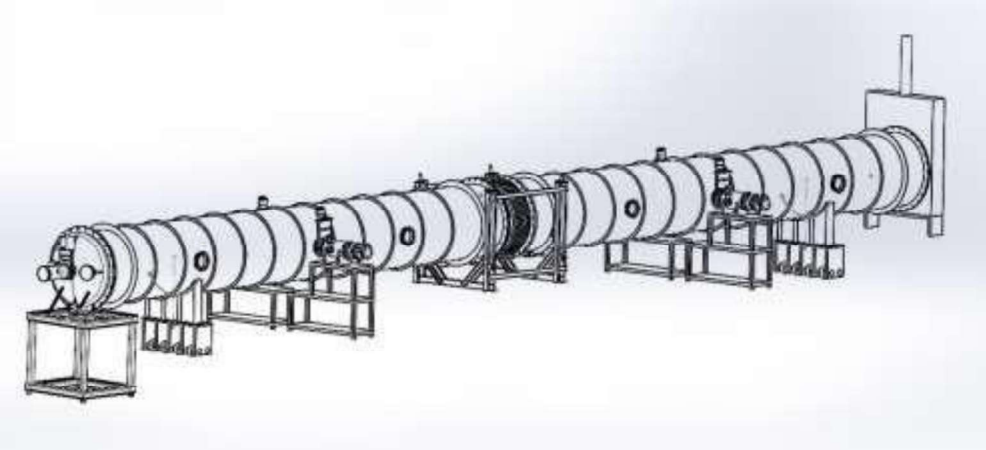


Figure 1: Schematic of Raised support for Equipments and Vessel Assembly

Schematic of Vessel assembly with its axis elevation at 1778 mm is shown in fig. 1.

Fabrication drawings of parts, sub-assembly and assembly shall include dimensions with desired tolerances (necessary to accomplish assembly dimension specifications) in the metric unit. A soft copy of the drawings shall be submitted to the Buyer for approval before commencing fabrication.
SOLIDWORKS CAD tool shall be used for preparation of 3-D models and 2-D drawings. The 3-D model and 2-D drawings prepared and supplied to Buyer, shall be compatible with latest version of the SOLIDWORKS.
Vacuum vessel, support structure and other components used in assembly are designed following ASME Pressure Vessel Code (latest edition). VENDOR must follow the specified standards and codes wherever applicable during design verification, fabrication and testing.

- After awarding the contract, the successful VENDOR shall be provided details of REVIEW, WITNESS and HOLD point, before commencing fabrication, testing and integration of the vessel assembly, as guideline in preparation of manufacturing and inspection plan
- VENDOR shall prepare 2-D drawings of Vacuum Vessel integrated with vacuum equipments and its support structure.
- Geometrical tolerances for individual component shall be specified in 2-D drawing considering assembly dimension requirements in long length vessel fabrication. During fabrication, vendor need to pay special attention towards dimensions with critical / stringent tolerances
- VENDOR shall procure necessary material for the fabrication of major and minor components of vessel assembly. Material test certificate shall be submitted before fabrication begins
- VENDOR shall prepare entire sequence covering stages of manufacturing, welding, assembly and final integration of the components (in consultation with the Buyer) in completing integrated vessel assembly. VENDOR shall present step-by-step sequence (including manufacturing) of component assembly using 3D CAD-model / 2-D drawings for review by the Buyer. This stepwise details will help in analysing the accomplishment of tolerances of final vessel assembly

- Stainless steel sheet material used in the fabrication of vacuum vessel shall be air-baked. The recommended air baking parameters – 36 hours soaking at 440 ± 8 deg. C, in electric operated baking oven. Use of any other type of oven for air baking need prior permission from the Buyer. After soaking, the sheets shall be cooled down in oven up to 100 deg. C before opening the oven and removal of sheets. (VENDOR may propose baking of fabricated items to the Buyer)
- VENDOR shall design and manufacture essential tools & fixtures (covering scope) in manufacturing, welding, cleaning, assembly and testing of major/minor components). VENDOR shall design guide-rails (or any other self-guiding mechanism) for roller and saddle supports.
- VENDOR shall fabricate all major/minor components of the vacuum vessel assembly as per approved fabrication drawings, conforming to the drawing dimensions with tolerances.
- VENDOR shall procure the essential vacuum equipments conforming to scope of supply and the guideline specifications provided (refer **Section 5.7 & Appendix - 01)**.
- VENDOR shall procure all standard bought out items (refer **section 4.2**) necessary for the assembly of vessel & equipments included in scope and seek their approvals prior to beginning of vacuum vessel assembly
- The scope of work includes stage wise inspection and testing (refer **Section -5.13**) necessary at the VENDOR site. The VENDOR will conduct all required tests for acceptance of the performance and get necessary approval at defined review / hold points identified in MIP
- Vendor shall establish the procedure (including necessary capacity) for cleaning of the components as well as assembly in consultation with the Buyer
- After fabrication of individual parts, subassemblies is completed, each of them go through cleaning procedure, before they are assembled
- **Clean parts of vacuum Vessel are assembled and assembly is further integrated with vacuum equipments & accessories. Assembly shall be performed in Cleanroom (Class ISO 8 or better). VENDOR shall include details of the existing / proposed clean room demonstrating the floor space (more than 20 m long) can accommodate integrated assembly. Include cleanroom details of overall floor size, technical parameters, location etc. in the bid.**
- Vendor shall assemble vacuum vessel and integrate with equipments to demonstrate integrated performance at factory. Subsequently after acceptance of test results, the assembled equipments shall be detached and prepared for dispatch in delivery configuration agreed with the Buyer
- Set of deliverables (**refer section 10**) shall be packed and transported (**refer section 8**) to delivery site (IPR, Gandhinagar) by the VENDOR
- VENDOR shall unload the delivered items at IPR site, move them to designated location in the laboratory. Assemble and integrate vessel with equipments on site and demonstrate stated integrated performance (**refer section 5.13.7**).
- Entire support structure made up of carbon steel, shall be painted with spray paint preferably after completion of the assembly (the colour of spray paint may be confirmed at appropriate stage). If VENDOR propose to use galvanised steel sections for support structure, he may include it in his proposal. This option will be an alternate to the painted carbon steel
- VENDOR shall provide guarantee of all the components as per **section-12**.
- Step by step procedure followed in integration of vacuum vessel assembly including photographs and/or drawings shall be defined and documented by VENDOR. This procedure will help in reassembly at IPR for future reference.
- VENDOR shall consider following points in preparation of technical bid for submission:

- In the event where VENDOR is unsure of how to interpret the specification/2-D drawings/ 3-D models or want any technical clarifications on specifications, the VENDOR shall notify IPR to obtain required information
- The VENDOR is responsible for the suitable packing of components during shipment to IPR.
- It is the VENDOR responsibility to repair components in case of any physical damage during shipment / transit.

2.1.1. Scope of work at Delivery Site

1. Unload the deliveries from the transporter at site.
2. Complete following checks of deliverables received on site
   - Inspection of gauge readings, tilt meter /accelerometers / shock / impact sensors mounted on deliverable (whichever is applicable)
   - Unpack and perform visual inspection of items delivered, to assess physical damage
   - Dimension inspection to rule out distortion to finish dimensions during transit.
3. Install and assemble vacuum vessel assembly and integrate with vacuum equipments and control instrument display unit.
4. Assess integrated system for dimensions and all connections
5. Test integrated system as defined in the inspection and test plan to demonstrate functional performance in compliance with acceptance criterion specified for site acceptance testing (**section 5.13.7.1**).

2.1.2. Provision of services to the contractor for site work

Buyer shall provide following services to support scope of work at site by VENDOR. He shall bring it to the notice of the Buyer if any other provisions are necessary to accomplish site activities specified in his scope of work

1. Space for installation of Vacuum Vessel, equipments and control instrument display system
2. Civil works, if any necessary for foundation (Vendor shall provide requirement details)
3. Overhead Crane for handling inside the laboratory (arrangement for required lifting tools, shackles. Slings, spreader bar etc. shall be made by VENDOR)
4. 230/240 V 50 Hz single-phase and 415 V 50 Hz, three-phase Electric power supply (vendor shall specify details of power requirements)
5. Compressed air for operation of instruments (vendor shall specify need if any)
6. MSLD for helium leak detection and helium gas cylinder
7. Cooling water if required (vendor shall specify need if any)

2.1.3. Guidelines to prepare supplementary documents

In accomplishing scope of work, to formulate essential specifications and procedures, covering steps and instruction in the form of documents need to be prepared. List includes manufacturing drawings; procurement specifications; procedures for manufacturing, welding, inspection & testing, packing, delivery configuration; identified templates for recording communication, deviation request, non-conformance, inspection and test results; format for end of manufacturing report, factory acceptance testing etc.

Following guideline list for type of documents (its not exhaustive list) –

1. Timeline schedule – Schedule covering scope of supply with identified milestones
2. CAD documents – 3-D model, 2-D assembly drawings, 2-D manufacturing drawings, BoM
3. Quality plan – Manufacturing & Inspection Plan (MIP), document management, material identification & traceability, Incoming material inspection, Weld qualification,

4. Templates for recording dimensions, NDT and other test results, deviation requests, non-conformance etc.
5. Procurement Specifications- SS Sheets, Forged rings, Fasteners, O-ring, Vacuum equip., etc.
6. Procedures – rolling, dished end forming, lifting / handling, welding, machining, repairs, inspection, cleaning, leak testing, vacuum demonstration, packing, delivery configuration etc.
7. Procedure for Deviation requests, Non-conformance,

3. Reference Schedule time chart

The VENDOR shall develop a detailed schedule and submit it in two weeks after contact award. VENDOR shall include a proposal for preliminary schedule in his bid.

Below **table #1** include list of tasks as guideline in preparation of time schedule.

Sr. No.	Tasks	Weekly / Monthly schedule									
1.	T0- Awarding LOI / P.O.										
2.	Contract Kick off Meeting										
3.	Design verification and preparation of Fabrication drawings										
4.	Fabrication drawings app										
5.	MIP and supporting documents preparation										
6.	Tools and fixture design details										
7.	Manufacturing plan										
8.	Weld procedure qualifications										
9.	Manufacturing readiness review (MRR)										
10.	Material procurement										
11.	Vacuum equipment procurement										
12.	Fabrication of tools and fixtures										
13.	Fabrication of vacuum vessel assembly parts										
14.	Vacuum Vessel Assembly & integration of equipments & control system										
15.	Testing at vendor site										
16.	FAT / PDI										
17.	Packing & Shipping to IPR										
18.	Receiving at IPR										
19.	Integration at IPR										
20.	Site Testing										
21.	Site acceptance										

Sr. No.	Tasks	Weekly / Monthly schedule									
22.	Completion of the contract scope of work										

Table 1: Guidelines for preparation of Schedule

The VENDOR shall prepare a weekly/ monthly timeline chart, highlighting major milestones, identified (but not limited to) in guideline chart, to complete scope of work. A tentative time schedule to be submitted with the Tender. Vendor need to consider following in planning schedule timeline chart:

a) Set of 3-D model with 2-D fabrication drawings of vacuum vessel components, fixtures necessary for VENDOR site / on-site fabrication, integration and assembly.
b) The schedule should include time for inspection and testing of bought out/ standard components by the VENDOR.
c) Schedule shall include duration of Factory Acceptance Test (FAT) at the VENDOR site.
d) The schedule should include duration for disintegration after FAT
e) The schedule should include duration for the packing and shipping of the deliverables.
f) The VENDOR needs to prepare the execution plan very meticulously to meet the timeline. IPR would provide required support in achieving the scheduled timelines.
g) Schedule should include durations of third party inspection (if any) wherever applicable during the fabrication. A test/inspection report should be submitted to IPR, Refer **Appendix-03**

4. Materials

The VENDOR shall procure required material (specified) for components of the vessel, tools, jigs, fixtures, etc. in fabrication, assembly, testing & handling of vacuum vessel referred in this specification.

- Raw materials used for vacuum vessel fabrication shall be new and unused.
- All standard/ bought-out components shall be procured from reputed sources. (**Sec- 4.2**).
- The certified material test reports (CMTR) of procured materials (wherever asked) shall be submitted to the Buyer for review prior to commencement of fabrication of vessel.
- The material specification requirements for Vacuum Vessel assembly constituent part (including support structure) shall be followed as listed in **Section 4.2, Table-2**.
- Manufacturing of Vacuum vessel assembly and all its support structure shall be in compliance with the ASME Boiler & Pressure Vessel Code, Section VIII, Division 1, latest edition and subsequent addenda. Furnished components need not be code "U" stamped.

4.1. Applicable Standards & Codes

1. ASME Boiler & Pressure Vessel Code, Section II, "Materials", latest Edition and all published Addenda.
2. ASTM A-480 / A480M, "Standard Specification for General Requirements for Flat-Rolled Stainless & Heat-Resisting Steel Plate, Sheet, and Strip", latest Edition, all published Addenda.
3. ASTM A36 / A36M, "Standard Specification for Carbon Structural Steel".
4. ISO 3669 Vacuum Technology – Bakable flanges – Dimensions of knife-edge flanges (CF)
5. ASTM A-700, "Standard Packages for Packaging, marking, and Loading Methods for Steel Products for Domestic Shipment", latest Edition and all published Addenda.

Priority of Codes and Documents: 1) This Specification, 2) Referenced Code and Standards, 3) Fabrication drawings.

Any discrepancies between documents shall be brought to attention of the Buyer for resolution.

4.2. Material Grade selection guidelines

The material specification requirements for Vacuum Vessel assembly constituent parts shall be followed as listed in **table #2** below

Sr. No.	Vacuum Vessel Assembly Components	Material Grade
	Raw Material	
1.	Vacuum vessel	ASME SA-240 Type 304L, HRAP finish sheet
2.	Vacuum stiffener and support stiffener	ASME SA-240 Type-304L, Strip / Flat
3.	Port Nozzle Welded to Shell	ASME SA-312 TYPE 304L
4.	ConFlat flanges (E/A size)	ASME SA-240 Type 316L
5.	Groove and Flat Flange	ASME SA-182 Grade F Type 304L
6.	Tori spherical dished Head	ASME SA-240 Type 304L, HRAP, or Dual certification Grade 304 / 304L
7.	Bellows	ASME SA 240 Type 304L, HRAP
8.	Guided Support / Saddle Support	ASTM A36 mild steel or Low Carbon / IS 2062 (equivalent)
9.	Support for vacuum equipments/ structure (raised platform)	ASTM A36 mild steel or Low Carbon / IS 2062 (equivalent)
	Standard / Bought out items	
10.	O-ring	Viton 500 / PerfluroElastomer
11.	Oxygen Free Copper Gasket (During shop testing aluminum gaskets can be used in CF flange connections)	ASTM B 152 M Oxygen free electronic (OFE) grade-1 (UNS NO.: C10100)
12.	Fastener set of Nut, Bolt, Washer	Stainless Steel 316 / ISO 3506-1 Grade A4-70 / A4-80
	Welding Consumable	**Designation**
13.	Filler Wire Stainless steel –SS Welding	AWS, ER308L
14.	Filler wire Carbon steel-Stainless steel	AWS, ER 309L
	Vacuum equipments and accessories	
15.	Roughing Pump, Turbo Molecular Pump, Ion Pump, RGA, UHV gate valves (regular and large size), vacuum gauges, vent valve etc.	Refer Appendix - 01 for guideline specifications
16.	Four way adaptor	Stainless steel 304L

Table 2: Guidelines for selection of Material

4.3. Material Test Certificate

Certified material test report (CMTR) supplied by raw material manufacturer shall be obtained and supplied to Buyer, for plates, forged rings, weld consumables, and other items where it is made available as required.

100% ultrasonic testing shall be performed on the plates (following ASTM A578 / A578M) and forged rings (ASTM A388 / A388M) as a part of incoming material inspection.

VENDOR shall add a test coupon of size 2” x 2” x 10” in the procurement of forged material rings for flanges.

Independent testing of coupons cut from each lot having same heat number for chemical and mechanical properties shall be done by VENDOR at NABL accredited laboratory. Copy of the test reports obtained after lab testing shall be submitted to the BUYER.

After air baking of stainless-steel sheet, sample coupons shall be subjected to IGC (ASTM A262 practice E) testing before sheets are used in the fabrication.

The material used in vacuum vessel fabrication, may be tested independently by Buyer. Specified material coupons required from each heat number, lot and thickness shall be provided by the vendor. Coupons shall be cut from raw material in as received condition and after air baking, **in specified size and locations on the sheet**.

Coupon in 2" x 2" size taken from sheet material, permanently marked/stamped with heat number, lot, etc., shall also be provided additionally for positive identification.

Total 300 Coupons cut from the sheet material procured for fabrication of vacuum vessel, shall be supplied to Buyer, divided in two lot in given size (50 mm (w) X 3.2* mm (thk.) x 250 mm (l)); 150 nos. cut from as received sheet and 150 nos. cut from air baked sheets. (*sheet thickness used in VV fabrication)

4.4. Fabrication Requirements

4.4.1. Material Cutting and machining

Water jet cutting shall not be used to cut raw material, as sand particles may get embedded in the surface. Laser cutting process is best suited for the purpose.

The following processes are not allowed: grinding, honing, lapping, polishing, buffing, sanding, blasting, or any other process that disturbs the concentric machining lay, imbeds material into the surface, or smears the surface.

O-Ring Grooves and Sealing Surfaces Requirements

All flange O-ring and sealing surfaces shall meet the following requirements:

Basic finish required: 0.8 Ra, concentric lay (finish tolerance 0.2 Ra)

In addition to out of tolerance dimensions, the following machining problems will be cause of piece rejection: ridges, chatter, waviness, scratches or marks along or across the concentric lay, tool marks, dents, gouges, burrs, sharp edges.

Machining Fluids

No iron, carbon steel or other contaminants (such as grease, oil or hydrocarbons) to come in contact with Parts during machining, material handling and fabrication. Machining, cleaning fluids or any other materials or fluids contacting the raw material or finish component shall be water soluble, and vendor shall submit the specifications for content of Sulfur, chlorides and oil in the machining fluids before they are used. The efforts to use machining fluids which are almost free of these contaminants shall be made.

4.4.2. Rolling of Shells

Carbon steel rollers shall be covered with heavy (paper or carpet) or thin Stainless Steel sheet during the rolling process to prevent carbon steel contamination of the stainless steel

The seam edges of plates to be rolled are to be pre-worked to assure roundness of the final cylinder

Final bevels are to be made with carbide cutting tools only. Optional methods must be approved by the Buyer before use.

Moving of plates shall be performed so as not to contaminate the plate with carbon steel. Covering carbon steel forks, hooks, lifting mechanisms with SST or heavy paper or carpet shall be done. Moving of plates with suction cups are permissive as long as they are carbon and oil free

5. Technical and Functional Requirements of Vacuum Vessel

Vacuum Vessel:

'Vacuum vessel' is a cylindrical metallic enclosure to perform the following functions:

- Provide Ultra High Vacuum environment (envelope)
- Provide necessary openings for attachment of vacuum equipments & instruments
- Sustain gravity load and operational loads (pressure and thermal) during operation.

Vacuum Vessel assembly include following:

A. Two nos. of 10 m long horizontal cylindrical vessel (ID 1240 mm, preferred wall thickness @3.2 mm) with pumping ports & end flanges having double "O" rings & interspace pumping provision.
B. Two numbers of demountable flanged Torispherical dished ends
C. One number bellows (ID 1240 mm, preferred wall thick. @2.6 mm) with end flanges
D. Six number of 250 CF port nozzles with end flanges, covering blank flange in 10 m vessel section
E. Vacuum seals of suitable material and size at flange connection
F. Stiffeners – Vacuum and Support, welded externally over vacuum vessel periphery
G. Suitable support structure for vessel assembly (includes intermediate saddle supports, guided support and roller supports supporting dished end covers)

Note:

Height of the centre of vacuum vessel assembly on the supports, from the ground shall be 1070 mm (reference for factory assembly).
This assembly will be installed at IPR site, on a platform which is raised (at support locations) by 708 mm from the ground floor level. (Raised platform in scope of VENDOR)
Vessel axis alignment shall be +/- 1.0 mm – at support location, when installed at IPR site.

5.1. Functional Requirements of vacuum vessel and support structure

Vacuum Vessel assembly is expected to fulfil specified functional parameters. At room temperature, Vacuum Vessel assembly shall satisfy parameters listed in **Table #3** –

Requirements	Vacuum Vessel assembly	Acceptance fulfilment Parameter
Dimensions and Tolerance	As specified in Approved fabrication drawings	Comply with the dimensions in drawing
Surface Finish	As specified in Approved fabrication drawing / specification	Comply with the drawings / Specs
Cleanliness of Vacuum exposed surface	As specified in Approved cleaning procedures document	Comply with the Mutually agreed test results.
Individual Leak rate Gross Leak rate	*Individual He Leak Rate* Gross leak rate	• ≤ 1 x 10^{-9} mbar.l/s. • ≤ 5 x 10^{-7} mbar. l/s.
Vacuum Demonstration	At vendor site – At IPR site – (After Site installation)	• ≤ 1.0 x 10^{-7} mbar • ≤ 1.0 x 10^{-7} mbar

Vacuum in Annulus Space between O- rings (TMP + Ion Pump)	At Vendor Site At IPR site	• ≤ 1 x 10^{-5} mbar • ≤ 1 x 10^{-5} mbar

Table 3: Functional requirements of vacuum vessel with Support structure

Functional requirements in Vacuum Vessel operation -

I) Ultra-high Vacuum (1e-07 mbar) at 150 deg C bakeout during operation,
II) Internal pressure 1.2 bar (a) at room temperature during transportation,
III) Gravity load of vessel assembly with equipments connected on the ports,
IV) Thermal load during bakeout (150 deg C) and temperature variations during the day

5.2. Dimensions and tolerances of Vacuum Vessel (10 m) Section:

Refer **Section 5.9**, for detailed list of drawings relevant to procurement of vacuum vessel assembly. Individual vacuum vessel section has following dimension:

1. Inside diameter (ID): 1240 mm
2. Outside diameter (OD): 1246.4 mm (for 3.2 mm thk. sheet)
3. Wall thickness (thk.) of sheet material: 3.2 mm (most preferred thickness)
4. Length: 10 m each (without end flanges)

Preferred tolerances on vessel cross-section at the ends is included in the **table #4** below. **Vendor shall include in his bid**, the corresponding tolerances they can ensure at the ends along 10 cm length in each 10 m vessel section.

Sr. No.	Parameters	Values (mm)	Vendor input
1.	Concentricity of vessel shell **along 10 cm** expanded ends	0.25	
2.	Perpendicularity of the shell ends with the shell axis	0.25	
3.	Flatness of vessel shell ends	0.25	
4.	Longitudinal straightness of tube	±3.20	

Table 4: Tolerance on 10 m Vessel Section

Vendor shall describe step wise procedure he will follow with reference to following guidelines in accomplishment of his stated tolerance and **include in the technical bid** –

1. Procedure for 10 cm end expansion (concentricity) of tube
2. Procedure for end machining; (flatness and perpendicularity [10 cm expanded portion])
3. Length of the Vessel section without end flanges
4. Proposed flange dimension (with neck / without neck as considered in proposal)
5. Tube to flange connection Joint detail – to maintain the flatness of end flanges (with O-ring grooves).
6. Tolerance on Flatness of vessel end flanges, proposed value
7. Overall length of each vessel section with end flanges

This tolerances shall be measured and recorded at the end of fabrication of each 10 m vessel section length, before welding it with the end flange. Perpendicularity shall be measured with respect to axis of 10 cm expanded ends.

The proposed tolerances by vendor, in his bid shall be included in the manufacturing drawings and inspection plan.

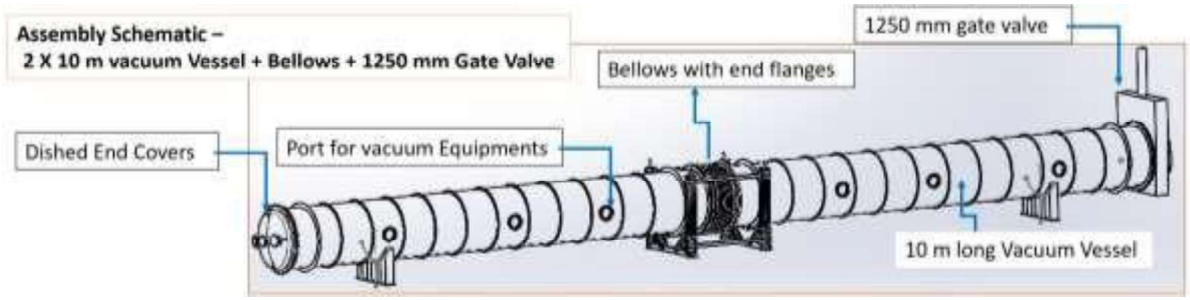


Figure 2: 3-D model of Vacuum Vessel assembly

Figure-2 shows the 3D CAD model of the assembled Vacuum Vessel. **Figure-3** shows the nomenclature of the various component of the vacuum vessel. Nomenclature details of the components are given in **Table #5**. The surface roughness of all internal and external surfaces of the finish vessel section shall be as received in HRAP condition *mill finish without any further surface treatment*.

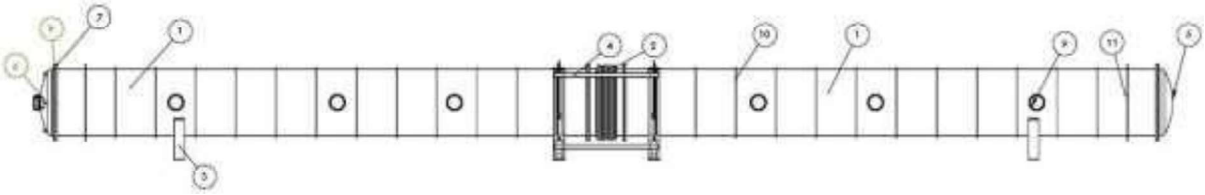


Figure 3: Vacuum Vessel Assembly 2-D sketch

List of part which make vacuum vessel section and vacuum vessel assembly -Part list

Sr. No.:	Component (In 20 m Length of vessel)	Quantity (Nos.)
1.	Vacuum Vessel 10 m Length	2
2.	Bellows with flat flanges	1
3.	Saddle Support	2
4.	Guided Support Assembly	1
5.	Tori spherical Dished End-A	1
6.	Tori spherical Dished End-B with 200 CF (3 nos.) ports	1
7.	Flange with double O-Ring Groove	4
8.	Flat Flange	4
9.	250 CF Port	12
10.	Vacuum Stiffener (covering 20 m Length of vessel)	22
11.	Support Stiffener (covering 20 m Length of vessel)	4

Table 5: Part List of Vacuum Vessel Assembly

5.3. Design Verification

5.3.1. Evaluation of input data

Evaluate “Vacuum vessel” input reference drawings, in context with technical specifications and functional requirements (comprising of dimensions with tolerances, surface finish, weld joints, lifting lugs locations etc.) listed in **Table #3 & #4**, in assessment of manufacturing feasibility of vessel and its assembly parts. Vendor shall be responsible to accomplish functional requirements

of Vacuum Vessel sections in manufacturing and demonstrate them during testing as defined in subsequent **Section 5.13**

5.3.2. Design of Support structure for vacuum vessel assembly

- Perform design calculations **to develop support structure** as per ASME Section –VIII Div.-1 for vacuum vessel with stiffeners, bellows and equipment assembly considering applicable load cases.
- Refer drawings for vacuum vessel assembly configuration to assess and verify detailed dimensions to develop the support structure, refer drawing list in **table #7** in **section 5.9.**
- Develop layout of vacuum equipments (**refer section 5.7 and Appendix-1**) connected to vacuum vessel assembly and design support structure, taking into account respective elevations and alignment requirements of integrated system.
- Vendor shall prepare a report containing design calculation and analysis performed (if any) to ensure failsafe support structure and submit to the Buyer for approval.

Table #6 lists operation load combinations of vacuum vessel; additionally include details of equipments attached to the vessel as relevant in support structure design calculation

Sr. No.	Load Cases	Value
1.	Dead Weight of assembly	(Include all attachment) gravity load
2.	Dead Weight + External pressure	External Pressure: 1 Bar(a) Internal pressure : Vacuum
3.	Dead Weight + External pressure + Thermal	External Pressure: 1 Bar(a) Internal pressure : Vacuum Vacuum Baking at 423 ±10
4.	Boundary Condition	Horizontal movement at Saddle support
5.	Transport conditions	Dead Weight Load Internal pressure : 1.2 bar (a)

Table 6: Load Combinations for Support Structure Design

Note: In addition to vessel support structure, appropriate structure is to be included to support vacuum equipments connected to vessel. Refer schematic layout of **figure #4** in **section 5.7**.

5.4. Welding

All welding shall be performed in clean, contamination-controlled area in consultation with the Buyer. Provision for fume extractor is essential to control the contamination in weld areas throughout the fabrication cycle.

Where necessary to establish the welding parameters, distortion control, a small scaled down mock up is recommended. To qualify welding, at certain location (welding port nozzles pad, stiffeners) welding mock-ups are strongly recommended.

5.4.1. Welding Quality

The VENDOR shall submit a welding quality management plan for approval before any welding on the components is performed.

The VENDOR shall qualify the welding procedure specification (WPS) and welders before beginning of production welding work.

The VENDOR shall submit all welding quality documentation. That shall include welding qualifications, and results of all welding inspections and examinations (i.e. Mechanical/ visual/ In-Process Inspections/ Radiography Tests/ / Leak Tests, etc. whichever is applicable).

VENDOR shall maintain records in accordance with paragraph UW- 48 Section VIII Div. I of the ASME BPVC for all welders and welding operators

5.4.2. Welding requirements

All welding shall be compatible with UHV application requirements. The butt joints shall use full penetration welds, w*elding from vacuum exposed side is preferred.* Entire welding shall be performed by welders who have been qualified for procedures and positions as required by ASME Section IX, Article II, of the Boiler and Pressure Vessel Code.

Vendor shall include in his bid details of – welding process, type of welding (autogenous or with filler), detail shall include where welding will be automatic or manual etc. In automatic welding necessary qualification of the process and operator shall be ensured.

A. Welding consumable shall be verified from CMTR prior to their use. Ferrite content in filler material should be in FN – 5-8 range.
B. VENDOR can choose from GTAW (GAS Tungsten ARC) or PAW (Plasma Arc) welding, using high purity (99.999%) shielding gas. VENDOR shall propose the option which he want to use in the bid with necessary supporting information
C. Purging is essential during welding where applicable.
D. Welds that show evidence of a lack of purge shall be deemed unacceptable.
E. No liquid penetrant testing shall be used on any weld.
F. Welding on the vacuum vessel shall be done complying procedure specified and qualified under the rules of the ASME BPVC Section IX.
G. All welding shall be done in such a manner that the weld surface is smooth and free of irregularities. No mechanical process shall be used to achieve smooth appearance.
H. Welding to the interior component surface is NOT allowed. Welding of fixtures to the exterior pads is acceptable, other welding to the component need prior approval by the Buyer.
I. Details of post weld heat treatment if any need to be included
J. Details of post welding the cleaning of joints

5.4.3. Applicable Specifications: –

ASME Sec IX	: Welding and Brazing Qualification
ASME Sec V	: Non-destructive Examination (NDE)
ASME Sec II Part A, SA 370	: Test methods and definitions for mechanical testing of steel products
ASME Sec II Part C	: Specifications for Welding Rods, Electrodes and Filler metals
EJMA Standards	: for the design of bellows

Latest edition of the code / specification with applicable addendum, shall be referred and followed for the scope of work

5.5. Fasteners

All bolted joints shall use metric fastener set made up of material as specified in **section 4.2**, **Refer Table 2**. In case use (requirement) of non-standard fasteners, necessary approval must be taken from

Buyer. The compatibility of the fastener set need be ensured according to their usage in vacuum application. VENDOR shall supply **15% quantity as spare** fasteners (as specified in deliverable list).

5.6. Pipe, Bellows and pipe fittings

Piping, expansion bellows and other standard metal fittings of pipes/tubes used shall be of austenitic stainless-steel SS 304L in respective finish as detailed in **section 4.2**. Procurement of bellows standard pipe/tubes, fittings included in the 2-D drawings of the vessel assembly is in the manufacturer's scope. All necessary CF flanges or KF flanges (wherever necessary) need to fabricated / procured as per their standard design and dimensions (metric) conforming to ISO 3669.

5.6.1. Specification for Bellows

Nominal size:

- Inside diameter: 1240 mm
- Maximum outside diameter: 1422 mm
- Length: 635 ±3 mm
- Thickness: 2.6 ± 0.1 mm. (**preferred thickness**)

Type:

- Single ply, Unreinforced

Design Pressure:

- External: 1 Bar (atmospheric pressure)
- Internal: Ultra high vacuum (operation)
- Internal: 1.2 bar (a) during transportation from factory to delivery site

Temperature:

- Maximum Design temperature: 200 deg C

Maximum Movement:

- Operating:
  - Axial: 6.6 mm in Contraction Total Cycle-7500.
    : 41.0 mm in Extension Total Cycle-7500.
  - Lateral: 1.0 mm (Total 5 Cycle)
  - Rotational: 0.20 Additional Degrees (5 Cycle)
- Transient:
  - Axial: 88 mm in Contraction (20 cycle)
  - Rotational: Maximum 0.20 degree (20 Cycle).

Dimensional Limitations:

- Nominal Overall Length: 635 ±3.0 mm
- Tangents (Straight portion of ends) : 127 ± 3.0 mm
- The outside circumference of the ends of the Bellows shall be within ± 3 mm
- Ends of the Bellows shall be perpendicular to the cylindrical axis within 2 mm
- The ends of the Bellow shall be flat within 2 mm in unrestrained state of Bellows

Spring Rate:

- Maximum allowed axial spring rate: 1400 KN/m
- The designed axial spring rate of Bellows shall be less than maximum allowed axial spring rate.

5.7. Standard Vacuum Equipment and Instrument

During operation, vacuum vessel assembly is pumped down and maintained in ultra high vacuum and monitored during its operation. For this purpose set of essential vacuum equipments are identified. The technical specification guidelines are provided in attachment. (Refer **Appendix-01**)

A typical equipments layout in integrated vacuum vessel assembly is presented in **Fig.-04**, to guide VENDOR in preparing necessary interface (connection details) details, and help in selection of equipments with the connection flanges of suitable size. This sketch will help VENDOR in preparing assembly drawings of equipments support structure in integrated layout. Bidders are recommended to include supporting technical details of equipment interface details of proposed equipments integrated layout with support structure

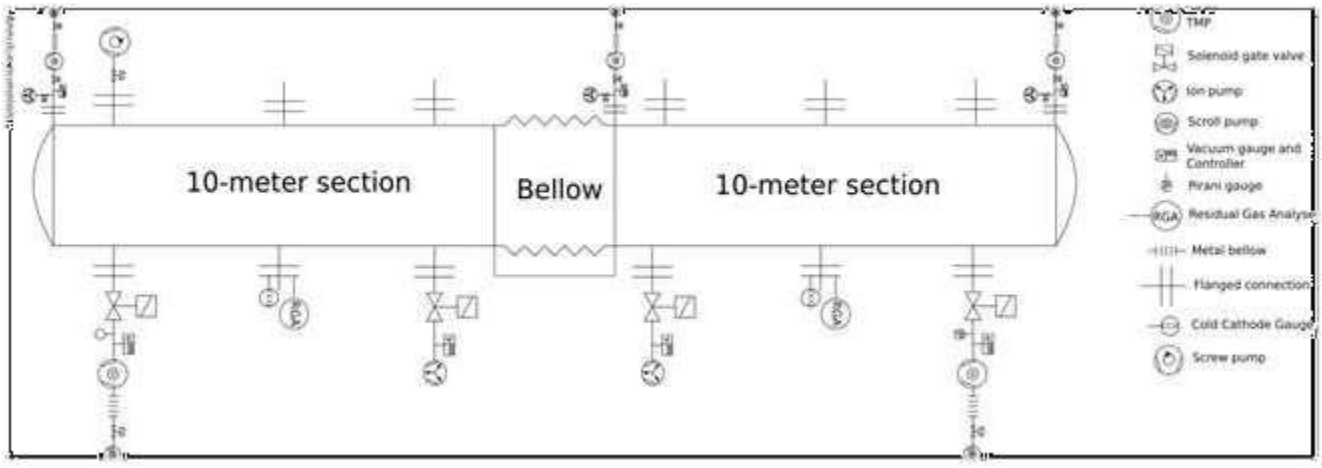


Figure 4: Schematic of Vacuum Equipment connected to Vacuum Vessel Assembly

5.7.1. Scope:

This section provide guideline details for selection and procurement of equipments for integration with Vacuum Vessel assembly including control and monitoring of operation. Guideline specifications of Vacuum equipment provided (**Appendix #01**) cover major requirements with minimum acceptance criteria and other supplementary information. These details will serve as guidelines in selecting equipments for procurement from original equipment manufacturer (OEM).

5.7.2. General Information:

VENDOR should procure equipments and accessories included in the scope of supply from original equipment manufacturer or their authorised agents. All equipments shall be used in UHV application and need to comply with specified minimum requirements provided in respective sections A, B, etc. of **Appendix -01**.

- VENDOR shall procure equipments from OEM / or their authorised agents. Re-furbished equipment/ items/ components are not acceptable. Vendor shall submit an undertaking on this in his bid (Refer **Appendix -01**)
- Pumping speed range for vacuum pumps is applicable for nitrogen unless specified separately
- All equipments shall be free of oil & hydrocarbon emissions throughout their operating life. Necessary certificate obtained from OEM should be included in the bid
- Combination of TMPs with its backing pump shall be of same make (Both pumps shall be from same original equipment manufacturer)

- Equipment shall be compatible with electrical power supply of 230/240 V 50 Hz single-phase or 415 V 50 Hz, three-phase (to be specified by bidder)
- Incorporated specifications are guided with objective to include air cooled (avoiding water cooling option) equipments wherever practical, VENDOR should contemplate this aspect in making equipment selection
- Individual equipment shall have provision with local display where essential and include controller to interface with computer for local / remote control, monitor and operation of the equipment integrated with vacuum vessel
- Computer interface provision in individual vacuum equipment can be Ethernet (most preferred) / RS 485 / RS 232 in descending order of preference as mentioned
- Each equipment shall come with cables (power, signal) in required length to discharge corresponding function without any joints. Include cable lengths considering equipment location in assembly and its distance from the control rack
- Involvement of Third party Inspection (TPI) at all respective stages for inspection and testing of vacuum equipment covering activities within India. (Refer **Appendix-02**)

5.7.3. Documentation:

Document which describes dimensions, technical specifications, calibration status, control features, shop testing results, operation & maintenance, etc. shall be supplied with each individual equipment and its accessories.

Literature supplied shall be in ENGLISH language.

VENDOR shall use below guidelines to provide information on equipment in his bid. Wherever soft copies are not available, hard copies of the document shall be included in the supply list

- Product Catalogue / Brochure, Operation & Maintenance manual
- Equipment part & assembly drawings, PID, circuit diagram with part list, make of the parts including spare list
- Calibration status of the instruments / equipment, wherever applicable
- Details shelf life of spare parts, storage condition requirements
- Quality plan used by original equipment manufacturer in equipment production, testing, packing and despatch
- Results of the testing covering, material of construction to final shop testing
- Safety, operation and control interlock details with applicable circuit diagrams
- Document covering guarantee / warranty details

5.7.4. Integration and demonstration of functional specifications:

All equipments included in the scope of supply shall be integrated with the vacuum vessel assembly. VENDOR shall propose layout of equipment considering schematic provided in **section 5.7 in figure #4**, and design suitable structure to support equipment at their base. For design of the support structure, **Vacuum Vessel center line elevation shall be 1778 mm (including raised platform of height 708 mm)**.

- Functional specifications of individual equipment shall be demonstrated in isolation, before it is integrated with vacuum vessel, complying with provided guideline specifications

- Vacuum vessel assembly include designated ports with schedule flange sizes to connect vacuum equipment, however vendor need to add interface with these flanges where necessary, in alignment with corresponding vacuum equipment flange. Where essential provision of adapter for interfacing equipments / instruments is part of scope of supply. **Size of UHV gate valve selection should consider matching with interfacing flanges of equipments and instruments instead of vacuum vessel port flange**. (e.g. If TMP has 200 CF flange, gate valve should be of 200 CF instead of 250 CF size port flange). **Note that interfacing adaptor should be of suitable length to facilitate access and tightening of the fasteners**.
- Vendor shall align isolation valve with adapter (as per need) for interfacing equipment on corresponding port opening of Vacuum vessel including roughing vacuum pump.
- VENDOR shall estimate stage wise pump down durations, to bring down internal pressure (vacuum) in vacuum vessel assembly considering equipments included in the bid prior to demonstration of ultimate vacuum. The pump down consists of three stages - from atmosphere to low vacuum using roughing pump, from low vacuum to high vacuum using turbomolecular pump and from high vacuum to ultra-high vacuum using ion pump. Estimation shall consider two scenarios – scenario one - Vessel not baked; scenario two - Vessel baked to 150 deg C.
- Minimum acceptance test requirements are provided under each equipment section in the **Appendix - #01**.

5.7.5. Delivery:

Equipments included in the scope of supply shall be tested in isolation and later in integrated vacuum vessel assembly at VENDOR site as a part of FAT / PDI.

Individual equipment with its accessories shall be detached from integrated assembly after successful factory acceptance testing for packing and delivery.

Each individual equipment included in the deliverables list shall be packed and delivered to the site. (Refer **Section 8 & 10**)

Each equipment comprising the scope of supply, shall be considered as accepted by IPR after successful demonstration of their operation complying specifications in site acceptance testing.

5.7.5.1. Delivery Schedule:

Manufacturing / fabrication drawings along with design verification report shall be submitted for approval of Buyer within two months from the date of LOI / purchase order / Contract placement with selected VENDOR.

The delivery period for completion of scope of supply included in the scope of work up to factory acceptance test shall be 9 (nine) months from the date of approval of manufacturing / fabrication drawings

Period for site installation work and testing shall be 1 (one) month from the receipt and incoming inspection of the deliverables delivered to IPR site.

5.8. 20 m Vacuum Vessel Assembly and Alignment – optimisation:

Each individual module used is called segment, 10 m long vessel is called vessel section; two sections together (with intermediate bellows with flat end flanges) form 20 m long vessel assembly connected. Vendor in his bid shall propose module size by selecting suitable size sheet.

VENDOR should consider following guideline to prepare fabrication plan for 10 m vessel section and subsequently 20 m long vessel assembly.

Length and width of sheet, used to fabricate individual segments making 10 m length of the vessel section, should be optimised to minimise the circumferential joints, by selecting the width of the sheet suitably. (e. g. sheet with certain width, will be used to make tube of 1.24 m ID which will involve certain longitudinal joints and number of circumferential joints in fabricating 10 m long vessel module). Lesser the longitudinal and circumferential joints, better shall be the design from vacuum operation point of view. It is essential to keep adjacent longitudinal weld joints between vessel segments, staggered at 90 deg.

Ends of vessel sections shall be expanded along 10 cm length and machined to ensure specified flatness, perpendicularity and concentricity at the ends of each vessel section (refer **Table 04**).

VENDOR shall include the detail of vessel to flange joint considering manufacturing aspect and dimensions with geometrical tolerances requirements.

Vessel end flange joints shall incorporate double O-ring for vacuum sealing (If vendor propose other option for joint configuration for vacuum sealing, it need to be approved by buyer). Provision for vacuum pumping of annulus space between double O-ring joints must be incorporated. A rectangular groove between two adjacent O-ring grooves on flange, is termed as annulus volume and continuously evacuated to pressure < 1 x 1e-5 mbar during operation. A combination of small TMP and Ion pump is used to maintain vacuum in annulus space.

Flatness of the sealing surfaces of the flanges play vital role in achieving UHV in the vessel assembly. VENDOR need to pay attention to it while detailing the vessel to flange weld joint and machining.

Distortion control is vital while performing welding during vessel section fabrication to ensure required dimension control as well as UHV compatible sealing at flanged connections.

5.9. Reference Guideline Drawings

2-D drawings shall be provided by IPR for reference input on vacuum vessel assembly. **Table #7** include list of drawings detailing vessel assembly and its components. IPR shall provide soft copy of drawing in pdf format, Native SOLIDWORKS, step file format (if required).

Support structure included in supplied 2-D drawings, is indicative and not fully developed. VENDOR will design it and include details in 3-D model, the fabrication drawings and assembly drawings.

The site integrated assembly of vacuum vessel with vacuum equipments is not included in the supplied drawings. VENDOR to prepare the 3-D model, and 2-D assembly drawings of integrated layout.

Adapter used in attachment and installation of vacuum equipments, are also not included in the supplied, drawings VENDOR shall suitably choose them to match equipment connection flange size and include in the fabrication drawings.

Lifting lugs for handling of vessel and few assembly parts are not included in the drawings, suitable size lugs to be included in the fabrication drawings, where necessary.

Sr. No	Item Description	Drawing Reference
1.	Vacuum Vessel Assembly	LIGO_20_A3_LI_VISTA_01_SH01
2.	Vacuum Vessel	LIGO_20_A3_LI_VISTA_02_SH01

3.	Bellows with End Flanges	LIGO_20_A3_LI_VISTA_03_SH01
4.	Saddle Support Assembly	LIGO_20_A3_LI_VISTA_04_SH01
5.	Guided Support Assembly	LIGO_20_A3_LI_VISTA_05_SH01-03
6.	Torispherical Dished End-A	LIGO_20_A3_LI_VISTA_06_SH01
7.	Torispherical Dished End-B	LIGO_20_A3_LI_VISTA_07_SH01
8.	Vacuum Stiffener	LIGO_20_A4_LI_VISTA_08_SH01
9.	Support Stiffener	LIGO_20_A4_LI_VISTA_09_SH01
10.	Grooved Flange	LIGO_20_A3_LI_VISTA_10_SH01
11.	250 CF Port	LIGO_20_A3_LI_VISTA_11_SH01
12.	Flat Flange	LIGO_20_A3_LI_VISTA_12_SH01
13.	Lifting Lug	LIGO_20_A4_LI_VISTA_13_SH01
14.	200 CF Port	LIGO_20_A4_LI_VISTA_14_SH01
15.	Adapter Assembly	LIGO_20_A4_LI_VISTA_15_SH01

Table 7 Vacuum Vessel 2-D drawing input list

5.10. Tools and fixtures:

Vendor shall formulate a detail plan for sequential fabrication of 10 m long vacuum vessel module, weld port nozzles (with stiffener pads) and end flanges to realise 20 m long vacuum vessel assembly. To maintain specified close tolerances (refer **section 5.2**), vendor need to make extensive use of tools & fixtures. Fixture will be necessary during locating, fixing, marking, welding, machining (where necessary) and lifting.

The 10 m long vacuum vessel section is fabricated using segments formed by rolling individual sheet. Specialized Tools and Fixtures are to be designed and fabricated to aid in retaining shape, precise positioning individual sections and to control axial alignment of vessel section during fabrication.

Suitable fixtures shall be necessary during welding to control the distortions – segment to segment joint, stiffener welding, vessel section to flange joint, port nozzles to vessel section etc. Spider-shaped fixture may be used during welding vessel sections, vessel section (10 m) end flanges and port nozzles on vessel section.

Tools and fixtures for handling and lifting the fabricated sections (10 m long) of the vacuum vessel shall be necessary to control distortions and deflections.

5.11. Control Instrumentation display unit:

The Vacuum Vessel assembly is integrated with listed vacuum equipments and instruments necessary in operation control & monitoring. The integrated assembly is controlled using a centralised control system. Vendor shall design and supply a central instrumentation control display unit. This control unit will have an instrumentation rack in which the controllers of the vacuum equipments listed in Appendix-01 shall be mounted. The vacuum equipments will be operated and its controlled parameters displayed and recorded in a data server which can be an industrial desktop computer. An extension to this facility will be made available so that individual equipments can be locally controlled using an industrial laptop. The remote operation of vacuum equipments shall be managed using a PLC based controller having a suitable GUI operating on the desktop PC as well as on the laptop. Suitable interfaces also to be made available on desktop PC and the laptop for communication with the vacuum equipments.

VENDOR shall procure equipments and instrumentation with connected accessories from OEM or their agents, ensuring compatibility and reliability in the integrated system. Equipments and instrumentation list with guideline specifications & quantity has been given in Appendix-01.

For list of deliverables refer **section 11**.

The schematic of central control display unit is included herein below

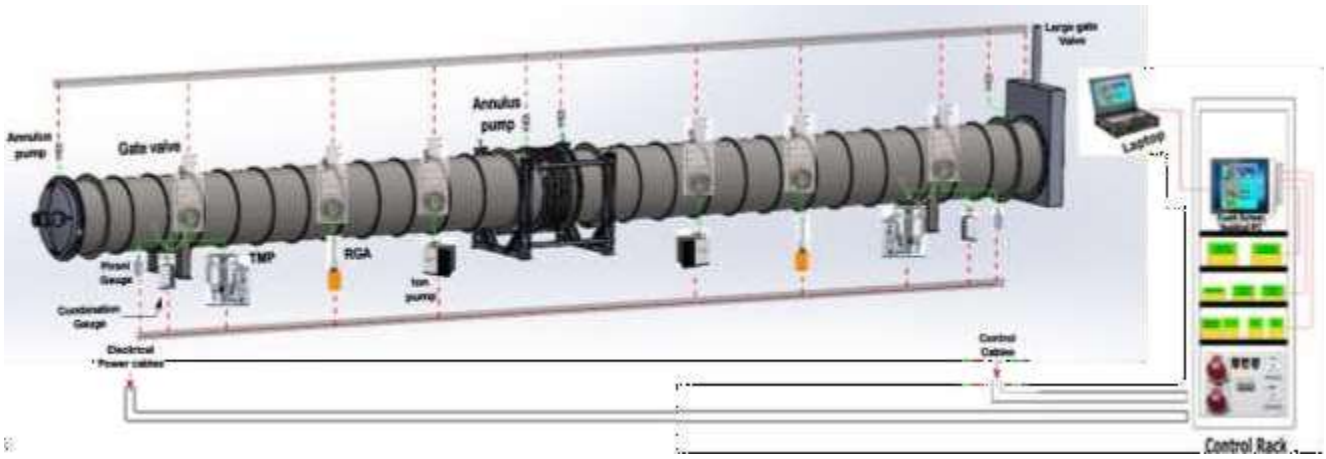


Figure 5: schematic central instrumentation display unit

5.12. Cleaning and cleanliness:

UHV compatible cleanliness is of prime importance throughout the manufacturing to assembly stages. This section provide guidelines for cleaning & preserving the cleanliness.

No grinding with abrasive wheels, cloth or stones is allowed on the internal vacuum surface unless specified / agreed. Fabricated vessel assembly is intended for use in an Ultra-High vacuum application. Hydrocarbon contamination shall be prevented at each stage. Material & parts shall be covered when stored to minimize possible exposure to contaminants. All parts of Vessel assembly shall be cleaned prior to assembly and testing.

No iron, carbon steel or other contaminants (such as grease, oil, etc.) shall come in contact with the component surfaces during material handling in fabrication, assembly & testing.

A. The VENDOR shall follow the good practice of cleaning. The vacuum vessel assembly operate in Ultra high vacuum (≤ 1e-9 mbar), at some point of time without active pumping. Throughout handling the internal surfaces of the vessel parts should not be touched with bare hands after final cleaning during assembly.
B. Vessel shall be steam cleaned with detergent (**Mirachem 500 / Inpro-clean 1300 or equivalent**) and dried (air dried) prior to covering as per approved procedures. The vessel shall be free of all surface contaminants, forming lubricants, free from residue from forming rolls, tools etc. and standing water. The VENDOR shall submit all cleaning procedures and methods to Buyer for approval, prior to implementation.

- Ultrasonic cleaning of smaller components shall be done prior to their assembly
- After cleaning, the components shall be blown dry
- Cleaning agents used in cleaning shall be compatible with construction material and free of hydrocarbons. After cleaning, all parts are covered to protect from further contamination

The VENDOR shall do quantitative analysis post cleaning for surface cleanliness assessment. The test procedure & other details shall be mutually agreed upon.

5.13. Inspection, Testing and Quality Requirements

The VENDOR shall have in effect Quality Assurance Plan in shop-floor (own as well as subcontractors), specifying inspection, testing and documentation procedures that will ensure that the equipment furnished will comply in all respects with these specifications. The responsibility for inspection rests with VENDOR QA department. The QA Plan shall incorporate Contamination Control Plan as well covering all contract aspects. **VENDOR shall include their Quality Plan draft in the bid**.

The VENDOR shall inspect all raw materials and store it indoors in a clean dry storage space.

Each vacuum vessel assembly part shall be visually inspected after cleaning.

Vacuum Components will be inspected under both visible and ultraviolet light ("Black Light") prior to leak tests after steam cleaning. Any gross contamination if observed, shall be removed.

Detailed quality plan shall be developed before Manufacturing Readiness Review (MRR).

5.13.1. Scope definition

Responsibility for all inspections rests with the VENDOR; however, the Buyer reserves the right to inspect the components at any time during or after fabrication to assure that the workmanship and material both are in compliance with this specification.

The Buyer shall have the right to witness all manufacturing processes.

The Buyer shall be informed at least 5 working days prior to critical inspections scheduled date.

A. Vendor shall prepare manufacturing and inspection plan (MIP) to ensure execution of scope of work progresses through each stage complying ultra-high-vacuum compatible vacuum vessel assembly with acceptance criterion.
B. Instruments and test equipment used in determining conformance with acceptance criterion shall be controlled, calibrated and adjusted at specified intervals to suit with surrounding environment to maintain accuracy within limits.
C. For the NDE inspection ISNT or ASNT level II qualified inspectors in respective technique shall be engaged.
D. Valid calibration document shall accompany each of the equipment and made available.
E. Consumables used in inspection & testing shall be identified with halogen & sulfur contents as limited by the specification for stainless steel components. VENDOR shall get it approved from Buyer prior whenever they are used.
F. If VENDOR anticipate certain changes in approved specifications, he shall raise deviation request (DR) in approved template to get Buyer approval before implementation.
G. If DR is not raised by VENDOR /approved by Buyer, deviation from specifications recorded in inspection & test results, shall be considered as noncompliance and dealt accordingly.

5.13.2. Documentation

Following is the list of the documents used for reference, logging the inspection and testing in recording the results.

I. Manufacturing / fabrication drawings for components, subassemblies and assemblies

II. MIP identifying the inspection stages, agencies to inspect and supporting documents
III. Welding qualification procedure documents, weld data sheets applicable to welds
IV. Details of instruments, equipments used in the inspection and testing
V. Templates to record inspection & test results (jointly prepared by VENDOR and Buyer)
VI. Procedure (with template) for deviation request (jointly prepared by VENDOR and Buyer)
VII. Where necessary supporting evidence to be included in the test reports
VIII. Procedure and template for reporting Non-Conformance

Any other essential document will be included in the list, where needed.

5.13.3. Dimension Metrology

The VENDOR shall perform stage wise dimensional check for each component, subassembly & assembly to record the inspection outcomes. All assemblies shall be checked for measurement as per drawing dimensions following MIP. The VENDOR shall prepare stage wise (MIP identified) dimension inspection reports (DIR) and submit to Buyer for approval and preserve them subsequently. Mutually agreed templates shall be prepared and used for DIR. The reports shall be verified by Buyer (or representative) and may witness the measurement of the critical dimension of the components and sub-assemblies at predefined HOLD points.

- The instrument used in dimensions measurement shall have required accuracy
- VENDOR shall notify to Buyer, the details of instrument before it is used
- Each dimension measurement shall have minimum four records in agreed orientations

5.13.4. Inspection of welds

I. **Weld Data Sheet (WDS):** All the welds in subassembly / assembly identified by serial numbers on a weld reference sketch. Further welding parameters shall be filled for each of these welds. The format of WDS shall be agreed between VENDOR and Buyer
II. **Weld Surface Finish:** The welds shall have a regular surface finish complying with drawings specific to bead profile, surface convexity and concavity. Convexity in fillet joint shall not exceed 0.1 S + 0.8 mm, where S is the size of the fillet weld in inches while in groove weld reinforcement to be 3.2 mm max, and shall have a gradual transition to the plane of the base metal surface
III. **Visual Examination:** Visual Examination shall be carried out as per ASME Sec V. Visual inspection include - weld preparation geometry, post tack welding and intermediate weld passes. Arc strikes, weld size, transition, overlap, undercut, inadequate penetration, weld spatter, surface cracks / porosity & underfill.
IV. **Radiographic Examination:** This examination shall be performed 100% on full penetration seal welds where they are applicable and accessible for test. The radiographic examination shall be carried out as per ASME Sec. V and acceptance criteria as per ASME Sec VIII Div. 1.
V. **Fillet joint testing:** He leak testing of all fillet joints shall be used in place of ultrasonic examination to assess their reliability to hold vacuum. Fillet joint shall be initially qualified by preparing a test coupon conforming to weld geometry, by subjecting it to mechanical testing. Each fillet joint need to comply with He leak rate.

5.13.5. Helium Leak Testing and vacuum demonstration

- Only-oil free / dry pumps (Roughing or Turbomolecular pump) to be used in vacuum pumpdown. VENDOR shall arrange necessary equipments required (refer Appendix-01) during shop testing and Factory Acceptance Testing (refer **Section 5.13.6**)
- Following standards shall be followed in Helium leak testing

- ASTM E498 - Standard Test Methods for Leaks Using the Mass Spectrometer leak Detector shall be followed
- ASME Sec. V Article 10 – Non-Destructive Examination - Leak Testing

- Weld joints and all demountable vacuum seal joints shall be 100% tested by He Leak testing
- The MSLD used in leak testing shall have MDLR less than or equal (≤) to 1 x 1e-10 mbar.lit/sec
- Vendor shall arrange necessary end covers, connectors, bellows, during leak testing

5.13.5.1. Helium Leak Testing

A. The VENDOR shall submit proposal for leak test procedures, with equipment layout to perform helium leak testing for the Buyer's approval before implementation. After performing tests the VENDOR shall submit the documented results to Buyer for review and records. The Buyer reserves the right to witness the tests on-site. The vendor shall notify the Buyer 5 working days before each lot is taken up for leak testing.
B. Procedure of He leak testing should include Annulus space volume between two O-rings.
C. During fabrication or assembly of the vessel, the components or the sub-assemblies may need to go through the leak testing using a helium mass spectrometer leak detector (MSLD).

The acceptable helium leak rates for the sub-assemblies and the assembly is given herein -

Helium Leak testing acceptance criteria (at room temperature)

I) Global He leak rate for vacuum vessel assembly - shall be better than (<) **5 x 1e-7** mbar-l/s.
II) Individual He leak rate for vacuum vessel assembly - shall be better than (<) **1 x 1e-9** mbar-l/s.

5.13.5.2. Vacuum demonstration

Independent testing of individual vacuum equipment (turbo molecular pump, backing pump, Ion pump, Gate valves, vacuum gauges etc.) is included in the scope of supply. VENDOR shall perform these test to ensure compliance with specifications (refer **Appendix-01**) prior to integration with vacuum vessel assembly.

- Vacuum demonstration is performed on vacuum vessel integrated with equipments, instruments and accessories. The outcome of the test shall comply acceptance criteria specified for main vessel volume, and for integrated flange annulus volume.
- Vacuum vessel assembly with bellows and support structure shall be evacuated at room temperature to demonstrate specified ultimate vacuum
- VENDOR need to make arrangement for baking tapes, thermal shielding (insulation) over the tapes to facilitate baking of vessel assembly up to 150 (±10) deg C.
- Initially O-rings shall be thoroughly cleaned in ultrasonic bath to remove all surface contamination
- O-rings used in the vessel assembly shall be baked in vacuum oven to 150 deg C, and soaked for 24 hours at this temperature
- Vacuum baking of O-rings shall be performed just prior to their use in assembly. After vacuum baking exposure of the O-rings to atmosphere shall be very limited.
- Post cleaning, O-rings shall not be handled by bare hands.

Vacuum demonstration at factory acceptance criteria

I) Pressure in Vacuum vessel assembly main volume - shall be better than (<) 1e-7 mbar.
II) Pressure in integrated flange annulus volume - shall be better than (<) 1e-5 mbar.

5.13.5.3. Test reports

The leak test reports must include, but not limited to, the following:

Identification of the VENDOR, the contract no. and equipment under test

Identification of the part, weld or the area subjected to examination

Time / duration of Examination

Test Equipment details including calibration status (where applicable)

Reference to approved procedures

Interpretation of test results

Name of the inspector with qualification / certification details

Identification of the sub vendor conducting the examination (if applicable)

Date of examination and inspector's signature.

5.13.6. Factory Acceptance Tests (FAT) / Pre-Despatch Inspection (PDI)

Vendor shall compile all reports / records of stage wise inspection and testing performed during the execution of scope of work, and present to the Buyer as a part of the factory acceptance test (FAT) and seek approval prior to dispatch. The Approved MIP shall be updated at the end of each identified stage in the last column reserved for the same and completed state wise details shall be included in the submission of document as a part of FAT.
Factory acceptance testing (pre despatch inspection) in the scope of work covered in these specifications include following -

5.13.6.1. Visual Inspection

The compilation of stage wise visual inspection reports shall be verified, assessed with reference to approved documents as a part of FAT.

5.13.6.2. Dimensions Inspection

The compilation of stage wise dimension inspection reports shall be verified, assessed with reference to approved documents as a part of FAT. Where necessary IPR representative may witness / participate (in person or remotely) in dimension inspections.

5.13.6.3. Cleanliness Assessment

Cleaning inspection reports shall be verified, assessed with reference to approved documents as a part of FAT. Where necessary IPR representative may witness / participate (in person or remotely) during cleaning operations, cleanliness inspections.

5.13.6.4. Helium Least Testing

He Leak testing reports shall be verified, assessed with reference to approved documents as a part of FAT. IPR representative will witness / participate (in person or remotely) Vacuum leak testing.

5.13.6.5. Demonstration of ultimate pressure (Vacuum)

Ultimate pressure (vacuum) demonstration reports shall be verified, assessed with reference to approved documents as a part of FAT. IPR representative will witness / participate (in person or remotely) the demonstration.

5.13.6.6. Testing of all vacuum equipments

The compilation of equipment test results and other specified documents (Supplied by OEM) and test results performed at Vendor's premises before integration with vacuum vessel assembly shall be assessed. Set of relevant documents included with the (e.g. calibration certificate etc.) equipment shall be verified, before equipments are accepted at factory. Where necessary IPR representative may witness / participate (in person or remotely) in verification / inspections / testing.

5.13.6.7. Delivery configuration, Packing and Forwarding details

VENDOR and Buyer mutually decide and agree upon the delivery configuration of all deliverables, packing details and transportation mode, which includes details of tools & fixtures, lifting configurations, deliverable layout, packing material and container/transporter for transport. Vendor shall prepare draft document describing in detail these objectives and present it during MRR. VENDOR shall expand the draft document agreed in MRR and subsequently get it approved. Approved report shall be part of FAT

Any deviations in parameters recorded in inspection and test reports listed above, from the acceptance criterion defined in drawings, specified in approved documents or mutually agreed before commencement of the fabrication, shall be considered as non-conformance. VENDOR need to generate non-conformance report, as per agreed procedure and seek its acceptance from Buyer, to complete the FAT / PDI.

Satisfactory accomplishment of acceptance of above mentions inspections results and reports will be considered as acceptance of FAT / PDI.

Following inspection & testing need to be accomplished complying acceptance parameters in fulfilment of the FAT / PDI

Requirements	**Vacuum Vessel assembly**	**Acceptance fulfilment Parameter**
Dimensions with Tolerances	As specified in Approved fabrication drawings	Comply with the dimensions in drawing
Surface Finish	As specified in Approved fabrication drawings	Comply with specifications in drawing
Cleanliness of Vacuum exposed surface	As specified in Approved cleaning procedures document	Comply with the Mutually agreed test results.
Individual Leak rate Gross Leak rate **(Before baking and after backing)**	*Main Vessel Volume / Annulus space volume* *Individual He Leak Rate* Gross leak rate	• ≤ 1 x 10^{-9} mbar.l/s. • ≤ 5 x 10^{-7} mbar. l/s.
Vacuum Demonstration **(with baking upto 150 deg C)**	at IPR site -	• ≤ 1.0 x 10^{-7} mbar
Vacuum in Annulus Space between O- rings	Annulus space vacuum	• ≤ 1 x 10^{-5} mbar

(TMP + Ion Pump)		
Packing, forwarding and Transportation Documents	Agreed draft document in MRR shall be finalised and followed	• The document shall be approved by Buyer

5.13.7. Site Delivery and Final Acceptance Tests (SAT)

After onsite receipt of the deliverables, VENDOR shall unload and shift to designate Laboratory. Following the site receipt and unloading; inspection, installation and testing of integrated system is included in scope of work of VENDOR. Following sequence describe scope of work at site -

[1] Unloading and transfer to the installation location inside designated laboratory in IPR
[2] Visual Inspection of all the deliverable packing, individual boxes to check status of the sensors attached. If the indicators are safe, then shock / or acceleration is within set values, if indicator signals are otherwise then its impact on deliverable need careful assessment to verify if vacuum vessel part or equipments inside boxes are adversely impacted.
[3] After assessment of sensor, if there is no damage observed, then vessel Installation starts, if there is damage then necessary action to eliminate effect of damage is taken before vessel assembly starts.
[4] After site installation of vessel assembly and integration with equipment and control instrument display unit, alignment checks are performed as a part of site testing

The assembly and integration will follow the guidelines prepared by VENDOR for integration at Factory, as per drawings complying dimensions of approved assembly drawings / as built drawings. During site installation following compliance shall be ensured.

Requirements	**Vacuum Vessel assembly**	**Acceptance fulfilment Parameter**
Dimensions and Tolerance	As specified in approved fabrication / as built drawings	Comply with the dimensions in drawings
Surface Finish	As specified in approved fabrication drawings	Comply with the specifications in drawings
Cleanliness of Vacuum exposed surface	As specified in approved cleaning procedures document	Comply with the Mutually agreed test results.

5.13.7.1. Site Acceptance

After installation, integration and alignment checks are completed, the integrated assembly shall be tested to demonstrate following compliance.

Requirements	**Vacuum Vessel assembly**	**Acceptance fulfilment Parameter**
Individual Leak rate	*Main Vessel Volume*	• ≤ 1 x 10^{-9} mbar.l/s.
Vacuum Demonstration (if necessary, baking up to 150 deg C is done)	at vendor site -	• ≤ 1.0 x 10^{-7} mbar

Vacuum in O- rings annulus Space (TMP + Ion Pump if needed)	Annulus space vacuum	• ≤ 1 x 10^{-5} mbar

After fulfilment of site testing compliance, vacuum vessel along integrated with vacuum equipments, instruments and control instrument display system shall be accepted.

After completion of these tests, Vendor will seek site final acceptance certificate from the Buyer.

Buyer shall provide certain services to the VENDOR for onsite activities as detailed in **section 2.1.2.** Any other requirements, either to be arranged by vendor or bring it to the notice of Buyer seeking provision. Buyer may or may not accept such request.

6. Repairs

VENDOR and Buyer shall mutually discuss and agree upon the repair procedures for any defect observed during manufacturing or fabrication. The defect may be surface, welding or any other inflicted physical damage. If the defect or damage is observed to be beyond repairs, then the defective or damages parts, subassembly shall be replaced by VENDOR. The necessary mutually agreed upon non-conformance procedure shall be followed in such cases to arrive upon the decision.

7. Identification

Material identification and its traceability are important aspects to be established and followed through the project cycle of this procurement

1. VENDOR shall prepare material traceability procedure and get it approved for implementation
2. Identification of the material shall be maintained and documented through entire manufacturing processes (i.e. re-stamping material heat numbers after each cut).
3. If material identity is lost, they shall be re-qualified by making all tests that were required for the material or as indicated in this specification.
4. Marking the finished parts of vessel assembly with marking fluids, die stamps, and/or electro-etching is not permitted. A vibratory tool with a minimum tip radius of 0.1 mm is acceptable for marking only on the outside of the vessel or bellows.
5. Vessel assembly, Bellows shall be marked with the Buyer's part number included in the drawings.

8. Storage, Packaging, and Shipping

Storage of raw material, semi finished and finish parts, assembly and final assembly shall be planned by VENDOR and related documents submitted to Buyer for his review.

Vacuum components shall be stored indoors in a clean dry area prior to and during packing. After packing any contamination shall be avoided. All deliverable shall be delivered at IPR site as defined

VENDOR shall include in his bid the details of the storage space including floor area, handling provisions, proposed storage layout and plan for contamination control.

All components shall be prepared for shipment as per Buyer approved Procedure developed by the VENDOR. The requirements of this section shall be incorporated in the VENDOR procedure.

Suitable metal (preferably Aluminium) covers shall be used on all open component flanged connections. These covers shall be provided by the VENDOR for protecting the connections from mechanical damage and preventing the entry of dirt into the equipment. The use of tape or plastic sheet alone as a shipping cover is not acceptable). Packing shall include a dehumidifier module.

All small components shall be wrapped in cleanroom compatible material after cleaning operations have been completed to prevent contamination. (i.e. shipping cover). All Components shall be packed for shipment in a Cleanroom environment.

Finished flange surfaces must be covered and protected during shipment to site

Before shipment of the consignment, the VENDOR shall make sure that all the items in the scope of the supply are fully included in the packing boxes.

A. The shipment of equipment shall be effected after Shipping Release / Despatch Clearance is obtained from IPR.
B. It is recommended that VENDOR should take up the road survey along planned shipment route for transport up to the unloading / installation location. Moving supplies up to installation location is responsibility of VENDOR.
C. To obtain necessary clearance from statuary bodies for safe transportation of deliverables, if required lies within the scope of the vendor.
D. Required tools, shackles, slings for handling and lifting the delivery items at Factory and at the delivery site, is in the scope of VENDOR. Suitable spreader bars shall be used in lifting the vessel sections, or any other items.
E. Lifting plans shall be prepared and finalised in consultation with Buyer to handle the critical parts and assembly of the vacuum vessel
F. Packing cases must be robust enough to take care of the impact during handling and transportation. Packing shall be suitable for the storage of items in a tropical climate.
G. Suitable stiffener and cushion should be provided to arrest any movement and vibration during transportation.
H. Packing container size and shape shall be such that, it provide necessary access to load and unload the vessel assembly inside it at factory and delivery site respectively
I. Shock and tilt indicators must be fitted to reveal evidence of mishandling during transportation.
J. Transhipment in transit shall be avoided, by arranging direct delivery to IPR site.
K. All packages shall be clearly, legibly and durably marked with uniform block letters (preferably with waterproof all weather paint or stickers):
    i. Net and gross weights
    ii. Sign / waterproof sticker showing 'side up'
    iii. Sign / water-proof sticker showing 'fragile' marks in case of delicate equipment.
    iv. Sign /water-proof sticker showing slinging and sling position
    v. Any handling and unpacking instructions, where it is considered necessary,
    vi. Identification mark relating them to the appropriate shipping documents.
    vii. In case of equipment, it shall be clearly marked and labelled on the outside of its packing with its description and catalogue / part number.

9. Painting

Surfaces of carbon Steel used in support structure shall be painted using a procedure and color approved by the Buyer. If Galvanised steel section are used in fabrication of support structure, then, the paining of surfaces is not necessary.

10. List of Deliverables

Scope:

This section contain list of deliverable, included in the scope of work under this procurement tender. The deliverables included in scope of supply shall be transmitted to Buyer at the end of scope of work,

in the form of soft copy and one hard copy in case of items in digital form (**Table-8**); in the form of physical item in case of manufactured / standard bought out items (**Table-9**).

Vendor shall give an undertaking in his bid proposal, that he shall supply deliverables included herein at the end of completion of scope of work complying technical specifications.

A. Deliverable list - in Digital form

Table (#8) list items which shall be transmitted to Buyer in soft copy along with one hard copy (where applicable) (list is exhaustive but not limited to only mentioned here)

Sr. No.	Item (Applicable to Integrated Vacuum Vessel Assembly)	Form of submission Unit / Quantity
1.	Drawing evaluation report with identified proposed changes (if any) with their approval status	Report (Set)
2.	Design Verification Report with approval status (including support structure design calculations)	Report
3.	Manufacturing drawings with BoM – to be approved before commencing manufacturing / fabrication	With approval status
4.	Material Specification – raw material procurement	
5.	Material Testing – Certificates (applicable to raw material, welding consumable and standard bought out items) This is a part of incoming material inspection	Original certified Material test reports, Material test certificates, for testing performed in laboratory and shop floor
6.	Activity for which the custom built tool / fixture designed and manufactured include - - Machining - Fabrication / Welding - Handling / Lifting - Cleaning - Inspection & Testing - Transportation - Temporary support structure to store parts of VACUUM VESSEL in stable configuration	Drawings of fixture specifically designed and manufactured to use for activity covered in the scope of procurement of VACUUM VESSEL - A. Tool Specification including standard bought out items used in tool assembly if any B. Manufacturing Drawings C. Dimension check report D. Tool use procedure
7.	Procedure / Qualification established – - Material identity and traceability procedure - Manufacturing procedure - Dimensional stability control procedure - Weld Procedure qualification (WPQ) - Welding parameter used - Cleaning procedure - Cleaning consumable details (data sheet) - NDE procedure details - Assembly procedure for VACUUM VESSEL - Equipment integration sequence - Packing procedure - Transportation configuration plan - Other support document developed during the work	One soft copy and one hard copy of approved procedures. Report containing qualifications performed during the scope of work execution Wherever applicable, with approval status
8.	Test and Inspection –	Manufacturing and Inspection plan for approval.

Sr. No.	Item (Applicable to Integrated Vacuum Vessel Assembly)	Form of submission Unit / Quantity
	Manufacturing inspection plan with list of identified stages covering scope of work - Dimension inspection report (DIR) – for each identified stage in MIP (individual part, sub-assembly and assembly VACUUM VESSEL) - Visual inspection report – for each identified stage in MIP (individual parts and VACUUM VESSEL assembly) - NDE test report	Templates for inspection reports Report containing each of the following A. Visual inspection reports B. Dimension check for parts C. Dimension check for assembly D. NDE test reports for welding
9.	Helium Leak Testing – - Leak testing plan with equipment layout, template for recording leak test outcome - List and specifications of equipment and instruments used - Vacuum leak test report in specified format (details of magnitude of leak detected and its location)	Report containing records of leak testing A. Applicable documents related to equipment and instruments B. Substantiated leak test results with identified location, magnitude with acceptance status C. In case of non-accepted leak, details of repairs and subsequent leak testing records
10.	Ultimate Vacuum Demonstration – - Ultimate vacuum demonstration plan with equipment layout, template for recording outcome of the demonstration - List and specifications of equipment and instruments used - Pump down curve covering duration to achieve ≤ 1 x 1e-7 mbar pressure in Vacuum Vessel assembly	Report consisting of 1. List of used equipments 2. Technical specifications of equipment used 3. Pump down procedure adopted 4. Pump down curve covering vacuum pumping duration until realization of ≤ 1 x 1e-7 mbar 5. Temperature profile across vacuum vessel if Baking is foreseen / performed
11.	End of manufacturing report – - Digital photograph of critical operations and stages - Video covering incoming material testing stage till the demonstration of ultimate vacuum in VACUUM VESSEL / - Approved deviation requests - Nonconformity report covering duration of entire scope of work As Built Drawings incorporating accepted dimensions inspection records	Report consisting of 1. Nonconformity report 2. Deviation/Change request with their resolution status 3. Specified set of digital photographs in soft copies 4. Specified video in soft copy on storage media 5. As Built Drawing set Complete set of drawings A. Soft copy B. Two sets - hard copy in specified size of paper

Table 8 List of deliverables - Digital format

B. Deliverable list - in Physical form

Deliverable list included in **table (#9)** of items in the physical form which include Vacuum Vessel assembly components shall be delivered in stable configuration. All these item shall be transported to deliver at IPR Gandhinagar, after dispatch clearance is issued by the Buyer in mutually agreed (between Buyer and VENDOR) delivery configuration.

List of deliverables in physical form –

Sr. No.	Item description	Quantity (Nos.)
	Manufactured / standard bought out items	
1.	10 m long Vacuum Vessel (with stiffener; end flanges with O-ring groove and pump ports) with cover flange to close 10 m vessel section end.	2 set (as per approved drawings) **Note:** inclusion of end covers for closure of 10 m vessel sections.
2.	Saddle support	2 set (as approved drawings)
3.	Bellows with end flanges and necessary tie rods (minimum 4 numbers) for rigidity	1 set (with tie rods)
4.	Guided Support	1 set
5.	Roller Support	As per approved drawings
6.	Structure for raised platform (708 mm height)	1 set
7.	Dished end + Dished end with ports	1 set + 1 set
8.	Fasteners (set of) Nuts, Bolt, 2 Washers **(As Per BoM) + 15% quantity as spare**	**BoM specified numbers** + Spares (I**n approved drawings Quantity)**
9.	ConFlat (CF) blank flange of different size **(As Per BoM in approved Manufacturing drawing)**	BOM + one additional blank flange per port as spare (packed separately)
10.	Vacuum Seals – "O" Ring and ConFlat (CF) copper gaskets **(As Per BoM in approved Manufacturing drawing)**	BOM Set + additional 1 set of double "O" ring pair and two CF gaskets per joint as spare
11.	Set of Heating elements, with insulating cover and sensors, variac to control the temperature and electrical connector	Designed to bake vessel assembly to 150 deg C temperature
	Vacuum equipment	
1.	850 l/s (± 10%) Turbo Molecular Pump (integrated with foreline roughing pump)	2 sets (Appendix-01-B)
2.	850 l/s (± 10%) Ion Pump	2 sets (Appendix-01-C)
3.	50 l/s (± 20%) Turbo Molecular Pump (integrated with foreline roughing pump)	2 Nos. (Appendix-01-B)
4.	75 l/s (± 20%) Ion Pump	2 Nos. (Appendix-01-C)
5.	20-30 l/s Roughing Pump (including connection bellows, clamps, adapter etc.) with compatible UHV gate valve	1 set (Appendix-01-A)
6.	UHV 1250 mm Size gate valves 50" with **ISO 1250 Flange and Support**	1 No (Appendix-02)
7.	UHV gate valves 200 / 250 CF (For TMP and Ion Pump)	4 Nos. (Appendix-01-E)
8.	UHV gate valves 63 / 100 CF (For TMP and Ion Pump)	4 Nos. (Appendix-01-E)
9.	UHV gate valves 40 / 63 CF (For RGA, Vacuum Gauge)	6 Nos. (Appendix-01-E)
10.	Gate valve for Roughing pump	1 (GV for pump in Sr. No 05)
11.	Vacuum gauge (combination gauge) with controller	3 (Appendix-01-F)
12.	Vacuum gauge (cold cathode gauge) with controller	2 (Appendix-01-G)
13.	0-100 AMU RGA with controller	2 (Appendix-01-D)

Table 9: List of Deliverables - Physical Form

14.	Adapter with suitable size flanges to interface the vacuum equipment with the vessel assembly ports	As per interface requirement in approved drawings
15.	Corresponding controller instrument display unit, including control rack, cables & cable trays with holder, industrial desktop and laptop as agreed in MRR.	Covering integrated system of vessel, equipments & instruments included in the scope of supply
16.	Spreader bars, shackles, slings, chains etc.	Conforming to the lifting plan proposed and approved in MRR
17.	Boxes containing Vacuum Vessel section and other equipments shall be mounted with sensors to detect tilt, shock and acceleration	VENDOR and Buyer shall mutually agree to finalise set values, and positions including list of boxes

C. Deliverable list - Other details

Both the ends of 10 m long section will be closed with end covers during transportation.

Both the ends of Bellows shall be closed with the end covers and tie rods (4 nos.) shall be used to protect it during transportation.

Preferred delivery configuration – 10 m long Vacuum Vessel section filled with the dry nitrogen (5N purity) gas up to 1.2 bar (a) pressure and connected with pressure gauge to monitor internal pressure.

The Vessel delivery configuration shall be mutually agreed upon (**refer section 8**).

Tools which are used as attachments between parts of Vacuum Vessel and required during handling & lifting **(e.g. shackles, lifting ropes or chains etc.)** shall be part of the deliverables to enable handling deliverables at delivery site (IPR Gandhinagar).

Vendor shall identify custom built special purpose tool and fixture essential in accomplishment of scope of work and **include in the bid proposal**. The list shall be finalised during MRR.

11. Non-Escort Privileges and Inspection Right

Non-escort privileges for IPR representatives to all areas of the facilities where the work is being performed shall be arranged. This will include access to all areas where material is being stored, processed or tested.

12. Guarantee

All manufactured components of vacuum vessel assembly shall be guaranteed for satisfactory operation consistent with the factory test results of vacuum demonstration and helium leak at least for a period of 12 months (from the date of acceptance of integrated system at the delivery site) against any manufacturing defects or inappropriate quality control. The integral leak rate should not deteriorate beyond the limits of acceptance criterion during the guarantee period.

All vacuum equipments integrated with the vessel shall be guaranteed for at least one year from the date of site acceptance.

13. DEFINITIONS:

The following definitions are applicable to this document:

AC: After Completing (of activity)
ASME: American Society of Mechanical Engineers
ASNT: American Society for Non-destructive Testing

ASTM: formerly known as American Society for Testing and Materials
BS: Before Start (of Manufacturing)
BOM: Bill of Material
CAD: Computer Aided Design
CF: ConFlat (CF) Flange
CMTR: Certified Material Test Report
CS: Carbon Steel
DM: Demineralization
DR: Deviation Requests
EF: End of the Factory acceptance
FAT: Factory Acceptance Testing
FE: Finite Element
GTAW: Gas Tungsten Arc Welding
H: Hold Point
IPR: Institute for Plasma Research
ISNT: Indian Society for Non-Destructive Testing
ISO: International Standards Organization
KOM: Kick of Meeting
LIGO: Laser Interferometer Gravitational Wave Observatory
LI-VISTA: LI-Vacuum Integrated System Test Assembly
LOI: letter of Intent
MTC: Material Test Certificate
MIP: Manufacturing and Inspection plan
MSLD: Mass Spectrometer Leak Detector
MDLR: Minimum Detectable Leak Rate
N: Notification point
NDE: Non-destructive Examination
NDT: Non-Destructive Testing
NVR: Non-volatile residue
MIP: Manufacturing and Inspection Plan
OD: Outer Diameter
OFHC: Oxygen Free High Conductivity (Copper)
PAW: Plasma Arc Welding
PDI: Pre Dispatch Clearance
PO: Purchase order
PQR: Procedure Qualification Record
PMI: Positive Metal Identification
PPM: Part Per Million
PWHT: Post Weld Heat Treatment
QAP: Quality Assurance Plan
QP: Quality Plan
R: Review point
RGA: Residual Gas Analyzer
SAT: Site Acceptance Testing
SoW: Scope of work
SS: Stainless Steel
SWP: Shop Weld Plan
UHV: Ultra High Vacuum
WDS: Weld Data Sheet
WO: Work Order
WPQ: Welder Performance Qualification
WPS: Welding Procedure Specification

Appendix: 01

This Appendix list Vacuum Equipment and provide general guideline specifications. For general information on vacuum equipment including scope, documentation, testing etc. requirements refer **section 5.7** of technical specifications.

A. Specification for Roughing Pump:

Oil free roughing pump is used for initial pumpdown of the vacuum vessel from atmosphere to 10^{-2} mbar range pressure in vacuum vessel before turbo molecular pump (TMP) is switched on for further pumpdown.

Table (#10) provide essential major specifications, which will serve as guideline in choosing right pump with a gate valve (pneumatic), used in initial roughing pumpdown of vacuum vessel.

Vendor shall propose roughing pump following these guidelines and include details in technical bid, ensuring compliance with the stated parameters. Selection of connection flange of pump and gate valve to interface with vacuum vessel with suitable adapter is at vendor's discretion with due consideration to keep pumpdown duration minimum.

To provide pumping speed and ultimate pressure included herein, vendor may propose a set of compatible pumps/individual pump selected for the purpose of providing specified pumping speed, at his discretion.

Where under the specifications heading "specify" is mentioned, vendor shall fill in his bid, the parameters obtained from original equipment manufacturer.

No.	Description	Units	Specification
1.	Quantity	Set	1
2.	Type - Oil free dry		Specify
3.	Nominal Pumping speed	l/s	20-30
4.	Ultimate pressure	mbar	≤ 5 x 10^{-2} mbar
5.	Inlet Connection flange DN / NW		40 Specify if different
6.	Exhaust Connection / Fore line connection flange DN NW		Specify flange size -
7.	Gas Ballast NW / DN		Suitable size connection flange Specify flange size -
8.	Provision of the port at the inlet (for connection of gauge / MSLD)		Specify type and size -
9.	Electrical power requirement	kW	Specify
10.	Cooling System		Preference for air cooled Pump
11.	Ambient Operating temperature	^{0} C	20 - 40 Specify Operating temp. range
12.	Foot print dimension	mm x mm	Specify
13.	Portable skid / Support (Preferable Aluminium structure)		Include available details
14.	Make		Specify make of pump
15.	Model		Specify model number of pump
16.	Essential accessories		**UHV gate valve – 1 no. (Include)**

	Include one UHV gate valve of compatible size with flange in Sr. #5		Include recommendation for other essential accessories for safety & performance enhancement

Table 10: Specification for Roughing Pump

Acceptance criteria:

- Test certificates of pump from the original equipment manufacturer including stating its dry oil free.
- Demonstration of ultimate pressure at the pump inlet (≤ 5 x 10^{-2} mbar).
- Demonstration of overall operation parameters as included in functional specification of the pump during factory acceptance of the integrated vacuum vessel
- Final acceptance of the pumps shall be after testing and satisfactory operation of the pump in integrated Vacuum Vessel at IPR site.

B. Specification for Turbo Molecular Pump with backing pump (TMP-Set):

Oil free and hydrocarbon free TMP-Set is essential to continue pumping of the Vacuum Vessel after initial pump down by roughing pump. Set consisting of TMP and **backing pump** shall be used together.

Table (**#11**) provide essential major specifications, which will serve as guideline in choosing right pump used in brining VV internal pressure in UHV region. Turbo pump shall be engaged in operation to take the Vacuum Vessel volume to less than 10^{-6} mbar.

Vendor shall include specifications of proposed pumps in technical bid ensuring compliance with the parameters stated herein. Vendor shall choose suitable adapter (if needed) for connecting the pumps, with the vessel port opening flange and accordingly include the details in drawings.

Ensure combination of TMP and **its backing pump** is from the same original manufacturer. This is necessary for compatibility and cover essential warranty of equipment's.

Where under specifications heading "specify" is mentioned, vendor shall fill in the parameters obtained from original equipment manufacturer in his bid submission.

No.	Description	Units	Specification	
1.	Quantity	Set	2	2
2.	Type - Oil free dry, without any hydrocarbon traces		Specify	
3.	Nominal Pumping speed	l/s	850 (±10 %)	50 (±20 %)
4.	Ultimate pressure	mbar	≤ 1 x 10^{-9}	
5.	High vacuum connection flange CF-F, ConFlat		200 Specify if different	63 Specify if different
6.	Exhaust Connection / Foreline connection flange DN NW		Specify flange size for each variant	
7.	Electrical power requirement	kW	Specify	
8.	Cooling System		Air cooling	
9.	Ambient Operating temperature	^{0} C	20-40 Specify Operating temp. range	
10.	Bake out temperature (at inlet flange and neck)	^{0} C	150 deg C (+10)	

11.	Foot print dimension	mm x mm	Specify
12.	Operating position		Should operate in any orientation
13.	Portable skid / Support (Preferable Aluminium structure)		Include if available
14.	Make		Specify: Turbo Pump - Baking Pump -
15.	Model		Specify: Turbo Pump - Backing Pump -
17.	Essential accessories Splinter Shield Heating pad Vent valve (automatic venting)		Provide details of accessories Include recommendation for essential accessories for safety & performance enhancement

Table 11: Specification for TMP

Acceptance criteria:

- Test certificates of pump from the original equipment manufacturer **stating it is oil free dry pump**
- Demonstration of ultimate pressure at the pump inlet ≤ 10^{-9} mbar in standalone mode
- Demonstration of operation position, overall parameters, operation control, venting (auto) during factory acceptance of the integrated vacuum vessel at factory
- Final acceptance of the pump shall be after testing and satisfactory operation in integrated vacuum vessel the pump at IPR site.

C. Specification for Ion Pump (IP):

Ion pump is necessary to continue pumping vacuum vessel volume beyond 10^{-6} mbar internal pressure to achieve less than (<) 10^{-9} mbar.

Table (**#12**) provide major specifications which will serve as guideline in choosing right pump used to bring down pressure inside vacuum vessel to less than (<) 10^{-9} mbar.

Vendor shall include specifications of proposed Ion pumps in technical bid ensuring compliance with the parameters stated herein. Vendor shall include suitable adapter (if needed) for its connection with vessel port flanges and include the details accordingly in the drawings.

Prefer to supply both variants of Ion Pumps from the same original equipment manufacturer make, to have manageable essential warranty of these equipment.

Where under specifications heading “specify” is mentioned, vendor shall fill in the parameters obtained from original equipment manufacturer in his bid submission.

No.	Description	Units	Specification	
1.	Quantity	Set	2	2
2.	Nominal Pumping speed	l/s	850 (±10%)	75 (±20%)
3.	Ultimate pressure	mbar	≤ 1 x 10^{-10} mbar	
4.	UHV Connection flange (Vacuum System Side) CF-F, ConFlat		200	63
			Specify if different	

5.	Additional port DN NW		Specify details if additional port is available on pump
6.	Recommended starting pressure	mbar	Specify recommended starting pressure
7.	Element Material		Titanium Specify if different
8.	Electrical power requirement	kW	Specify
9.	Ambient Operating temperature	^{0} C	20-40 Specify Operating temp range
10.	Bake out temperature (Entire pump assembly)	^{0} C	150 deg C (+10)
11.	Foot print dimension	mm x mm	Specify
12.	Operating position		Any orientation
13.	Portable skid / Support (Preferable Aluminium structure)		Include details if available
14.	Make		Specify Large Size pump - Small Size pump -
15.	Model		Specify Large Size pump - Small Size pump -
18.	Essential accessories Heater		Provide details of accessories Include recommendation for essential accessories for safety & performance enhancement

Table 12: Specification for Ion Pump

Acceptance criteria:

- Test certificates of supply pumps from the original equipment manufacturer
- Calibration curves (if applicable) from the original equipment manufacturer
- Demonstration of ultimate pressure at the pump inlet ≤ 10^{-10} mbar in standalone mode
- Demonstration of overall operation position, parameters, operation control during factory acceptance testing of the integrated vacuum vessel
- Final acceptance of the pump shall be after testing and satisfactory operation in integrated Vacuum Vessel at IPR site.

D. Specification for Residual Gas Analyzer (RGA):

Table (#13) provide major specifications which will serve as guideline in choosing right RGA unit used to measure partial pressure inside vacuum vessel when under vacuum.

Vendor shall include specifications of RGA in technical bid details and ensure compliance with the parameters stated herein. The connection flange size shall be aligned in the drawings with the port openings and its flanges accordingly by the vendor.

Where under specifications heading “specify” is mentioned, vendor shall fill in the parameters obtained from original equipment manufacturer in his bid submission.

No.	Description	Units	Specification

1.	Quantity	Set	2
2.	Detectable Mass range	amu	1-100
3.	Resolution	amu	Specify
4.	Number of filaments		Dual filament, with built-in degas option (field replaceable)
5.	Detector type		Faraday cup and electron multiplier
6.	Detectable partial pressure range	mbar	Faraday cup < 10^{-10} mbar Electron multiplier < 10^{-13} mbar
7.	UHV Connection flange CF-F, ConFlat		35 CF / 40 DN Specify flange size if different
8.	Recommended starting pressure	mbar	Specify starting pressure
9.	Element Material (Tungsten and Thorium is not acceptable)		Specify element material
10.	Electrical power requirement	kW	Specify
11.	Ambient Operating temperature	^{0}C	20-40 Specify operating temp. range
12.	Gauge head Bake out temperature (with controller cable connected and electronics attached)	^{0}C	150 deg C (+10) Specify, baking with controller cable is allowed
13.	Operating position		Any orientation
14.	Make		Specify
15.	Model		Specify
16.	Essential accessories		Include recommendation for essential accessories for safety & performance enhancement

Table 13: Specification for RGA

Acceptance criteria:

- Evaluation of calibration curve /certificates from original equipment manufacturer.
- Test measurement of residual gas mass (for H2, He, N2, moisture, Ar etc.) at vendor site.
- Demonstration of overall operation parameters, operation control, during factory acceptance testing of the integrated Vacuum Vessel.
- Final acceptance of RGA shall be after testing and satisfactory operation in integrated Vacuum Vessel at IPR site.

E. Specification for set of UHV Gate Valves (GV):

UHV Gate valve is necessary to isolate vacuum equipment from Vacuum Vessel in its assembly to facilitate its maintenance anytime during operation of vacuum vessel without disturbing internal vacuum.

Table (**#14**) provide major specifications which will serve as guideline in choosing gate valve used to isolate vacuum equipment from vacuum vessel assembly.

Vendor shall include specifications of proposed gate valves in technical bid ensuring compliance with guideline parameters stated herein. Vendor may include adapter (in needed) to connect gate valve with vessel port opening flange using and include these details in the drawings.

Prefer to supply all variants of gate valves from the same original equipment manufacturer make, to have manageable essential warranty of these equipments.

Where under specifications heading "specify" is mentioned, vendor shall fill in the parameters obtained from original equipment manufacturer in his bid submission.

Sr. No.	**Description**	**Units**	**Specification**		
1.	Quantity	Set	4	4	6
2.	Connection flange CFF CF-F. ConFlat		200 / 250*	63 / 100*	40 / 63*
			Aligned with vacuum equipment flange sizes (Roughing pump, TMP, Ion Pump, RGA and vacuum gauge etc.) Roughing pump (refer table no. 3, section A above), shall use transition piece for gate valve connection (this is not included in the numbers stated above. Include corresponding size gate valve for roughing pump (additionally as needed)		
3.	Operation		Electro-pneumatically / electrically operated		
4.	Helium leak tightness Housing Valve seat	mbar-l/s	 $\leq 5 \times 10^{-10}$ $\leq 1 \times 10^{-9}$	 $\leq 5 \times 10^{-10}$ $\leq 1 \times 10^{-9}$	
5.	Operation pressure range	mbar	Atmosphere to 1×10^{-10} mbar		
6.	Material Housing Bonnet seal Valve gate Valve Seal		 SS 304 / 304L Metal SS 304 / 304L Viton		
7.	Compressed air requirement		Specify following for each variant Air pressure - Air Flow rate -		
8.	Differential pressure across gate In closed condition		Specify for each variant differential pressure		
9.	Ambient Operating temperature	^{0} C	20-40 Specify operating temperature		
10.	Bake out temperature (Entire pump assembly)	^{0} C	150 deg C (+20)		
11.	Number of cycles before opening for first service	cycles	Specify Number of cycles		

12.	Overall dimensions	mm	Specify overall dimensions
13.	Operating orientation		Valve must operate in any orientation (specify)
14.	On / Off position indicator visual and separate switches for open/close for remote status monitoring		Yes Include details
15.	Make		Specify Large Size - Small Size -
16.	Model		Specify Large Size - Small Size -
17.	Essential accessories Include set of two O-rings (for each size of valve as spare in the price bid		Include recommendation for essential accessories for safety & performance enhancement

Table 14: Specification for UHV Gate Valve

Note:

Gate valve are used for interfacing vacuum equipments listed in this annexure (so gate valve flange size need to be aligned with the connection flange of individual equipment included in the bid) (TMP, Ion Pump, RGA, vacuum gauge etc.) flange size of gate valve mentioned in the specifications are indicative and need to be aligned with respect to flange size of vacuum equipments included in technical bids.

Acceptance criteria:

- Verification of Test certificates for each valve from original equipment manufacturer.
- He Leak detection of the body and gate seals in compliance with specification parameters
- Demonstration of overall operation position, parameters, operation control, during factory acceptance testing of the integrated Vacuum Vessel.
- Final acceptance of gate valve shall be after testing and satisfactory operation in integrated Vacuum Vessel at IPR site.

F. Specification for Combination Gauge (CG):

Table (**#15**) provide major specifications which will serve as guideline in choosing combination gauge which is used to monitor pressure in vacuum vessel assembly.

Vendor shall include specifications of proposed combination gauge in technical bid, ensuring compliance with the guideline parameters. Gauge connection flange size shall be aligned in the drawings with the vessel port with addition of adapter if needed for gauge connection by the vendor.

Where under specifications heading “specify” is mentioned, vendor shall fill in the parameters obtained from original equipment manufacturer in his bid submission.

No.	Description	Units	Specification
1.	Quantity	Set	3
2.	Pressure measuring range	mbar	Atmosphere to $< 1 \times 10^{-9}$

			Specify the range -
3.	Degas option		Yes - needed
4.	Filament material type (Tungsten / Thorium material in filament is not acceptable)		Yttria coated Iridium Specify if different
5.	UHV Connection flange CF-F, ConFlat / DN		35 CF / 40 DN Specify flange size
6.	Set Points		Trip Point relays for safety interlocking
7.	Ambient Operating temperature	^{0} C	20-40 Specify operating temp. range.
8.	Bake out temperature	^{0} C	150 deg C (+10)
9.	Operating position		Any orientation
10.	Make		Specify
11.	Model		Specify
12.	Essential accessories		Include recommendation for essential accessories for safety & performance enhancement

Table 15: Specification for Combination Gauge

Note:
Gauge shall come with calibration certification with it.

Acceptance criteria:

- Compliance check of functional specifications by evaluation of calibration curve /certificates received from original equipment manufacturer
- Detection of pressure in integrated Vacuum Vessel Assembly at vendor site
- Final acceptance at IPR site

G. Specification for Cold Cathode Gauge (CCG):

Table (**#16**) provide major specifications which will serve as guideline in choosing cold cathode gauge which is used to monitor pressure in vacuum vessel assembly.

Vendor shall include specifications of selected gauge in technical bid details and ensure compliance with the parameters stated herein. After the selection of the gauge, its connection flange size shall be aligned in the drawings with the vessel port opening where the gauge shall be mounted accordingly by the vendor.

Where under specifications heading “specify” is mentioned, vendor shall fill in the parameters obtained from original equipment manufacturer in his bid submission.

No.	Description	Units	Specification
1.	Quantity	Set	2
2.	Pressure measuring range	mbar	from 1 X 10^{-3} to < 1 X 10^{-9}
3.	Degas option		Yes
4.	UHV Connection flange		35 CF / 40 DN

	CF-F, ConFlat		Specify flange size -
5.	Set Points		Trip Point relays for safety interlocking
6.	Ambient Operating temperature	^{0} C	20-40 Specify operating temp. range -
7.	Bake out temperature	^{0} C	150 deg C (+10)
8.	Operating position		Any orientation
9.	Make		Specify
10.	Model		Specify
11.	Essential accessories		Include recommendation for essential accessories for safety & performance enhancement

Table 16: Specification for Combination Gauge

Note:

Gauge shall come with calibration certification with it.

Acceptance criteria:

- Compliance check of functional specifications by evaluation of calibration curve /certificates received from original equipment manufacturer
- Detection of pressure in integrated Vacuum Vessel Assembly at vendor site
- Final acceptance at IPR site

Appendix: 02

A. Specifications for large size UHV gate valve (1250 mm)

Large size UHV Gate valve is necessary to isolate vacuum vessel assembly from adjacent interfacing system of LI-VISTA facility, to facilitate isolation of two systems when needed during facility operation.

Table (#17) provide major specifications which will serve as guideline in choosing gate valve used to isolate vacuum equipment from vacuum vessel assembly.

Vendor shall include specifications of selected gate valve in technical bid details and ensure compliance with the parameters stated herein.

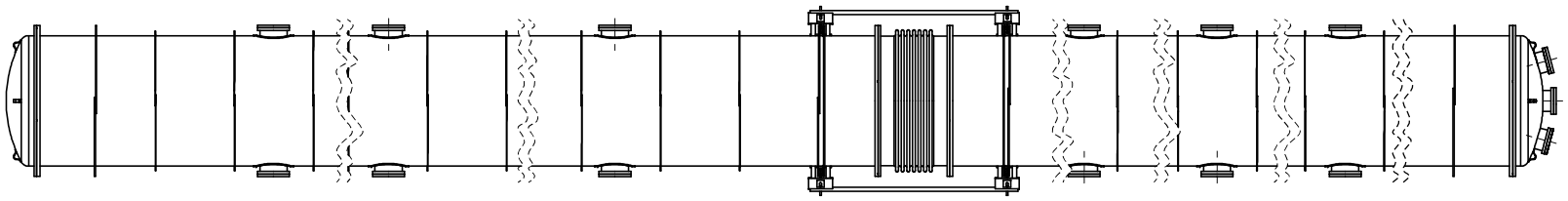
VENDOR shall fill in the details corresponding to the listed specification in the last column the parameters obtained from original equipment manufacturer in his bid submission indicating compliance status.

Sr. No.	Specifications	Input by vendor, Provide details
	Mechanical Requirement	
1.	Body - 304 / 304L stainless steel Gate – 304 / 304L stainless steel Gate Valve OEM to specify if they use stress relief heat treatment	
2.	Valve Installation – a. Installed vertically with the actuators on top b. Provision for supporting the valve from below.	
3.	End Connection – Flange ends Valve end connection shall be flanged a. Flange on both side ((Double O-Ring in matching flange – in others scope) b. Flange **customization** to suit matching flange, PCD, Thickness and size of hole. c. The sulfur content of the material shall be informed by OEM Gate valve flange has interface with the flange on vessel, and need to be aligned to fit with double O-ring joint suitably for UHV operation (Tentative size of the flange on vacuum vessel is – **OD – 1444 MM**; **M16 X 24 nos. PCD 1387 mm**)	
4.	Gate shall have viton seals Bonnet with metal seal (proffered) / Viton seal	
5.	Valve body remain in position within assembly, while gate is removed for maintenance purpose	
6.	The clear aperture through the valve - 1250 mm	
7.	The Valve flange face (mating with the O-ring seal) surface finish < 0.8 µm	
8.	Valve shall be rated for Minimum 10,000 cycles until first service is required	
9.	Valve operating Pressure range 5e-10 mbar to 1.2 bar (Specify maximum pressure difference gate can sustain in closed position)	
10	Helium Leak rate a. Gate seals ≤ 1e-9 mbar. l /s of helium b. Valve body ≤ 1e-9 mbar. l/s	

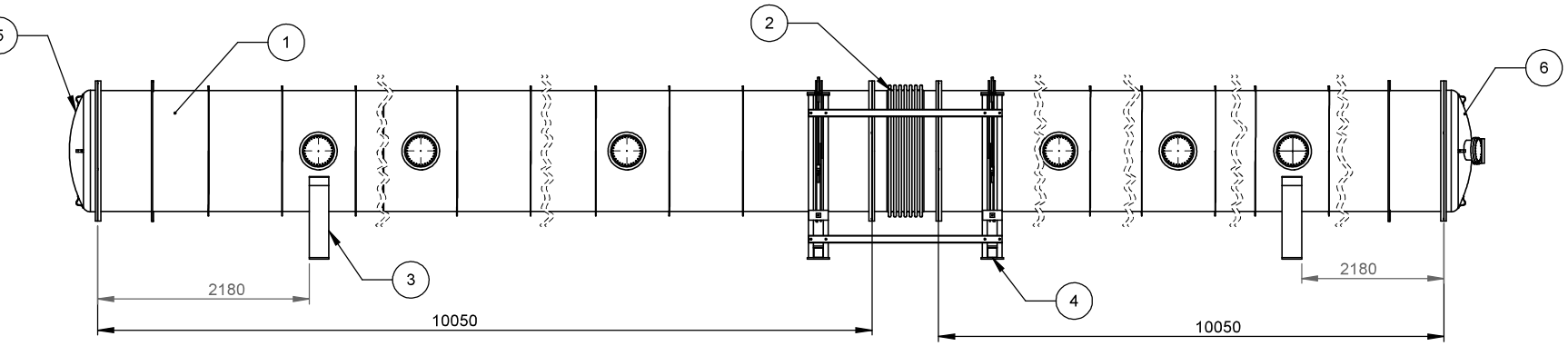
Sr. No.	Specifications	Input by vendor, Provide details
	c. Bonnet Seal ≤ 5 x 1e-10 mbar. l/s	
11	Actuator motion a. Option 1 –Electric Actuator b. Option 2 – Electro Pneumatic actuator In either case valve assembly will have mechanical visual position indicator	
12	Valve body bakeable to 150 deg C ± 20 (maximum) (Provide baking temperature value for closed and open position of gate)	
13	a. Valve shall incorporate locking feature in closed position Gate valve shall have a positive, padlockable device to prevent opening or closing. The valve shall be designed so that no damage occurs to the valve or to its actuator if valve actuation is attempted while the valve is locked open or closed. Provision of interlock to close the gate (from open position) In case of electrical power failure –OEM to specify if this feature exist.	
14	Gate valve shall be capable of stroking from fully open to sealed **in up to 5 minutes**, and from sealed to fully open in **up to 5 minutes**. **Gate motion speed should be optimised considering vibration and Shock during motion**	
15	No lubrication permitted in Vacuum volume of assembly in installation a. If necessary, with prior approval, only non-contaminating and non-migratory lubrication may be used on the internal mechanisms	
16	Valve shall be processed, cleaned following standard UHV protocols – OEM to provide cleaning procedure details, optical check of cleanliness	
17	Valve cleaned, assembled, tested, and packaged in an **ISO Certified** cleanroom and ready for UHV service upon arrival at site with no post processing required	
	Electrical Requirements	
a.	Instrumentation Requirements - a. Provision of limit switches to indicate the fully opened and fully closed positions.	
b.	Controls Requirements a. Provision of controller for local open, close and stop operations. Additionally, each valve shall provide terminal strips in a junction box to interface with control system in future for remote open, close and stop operations.	
	Power Requirements	
1.	Specifications of power requirement to be provided by VENDOR	
2.	**Functional Requirement:**	
3.	Particulate generation: a. Specify Lubrication used in the internal mechanism The design should consider minimum particulate generation	

Sr. No.	Specifications	Input by vendor, Provide details
	Gate valve test requirements (fulfilling functional requirement)	
1.	Each valve shall be inspected for dimensional conformance to approved assembly drawings	
2.	Each valve shall be inspected for cleanliness by standard procedure	
3.	Prior to final gate seal leak testing of valve it shall perform 20 cycles. The valve shall be shown to be capable of stroking in either direction in 5 minutes or less	
4.	Each valve shall be leak tested prior to shipment. OEM to inform if valve is baked at 150 deg C prior to leak testing? An RGA with calibrated leak shall be used in performing the leak testing. Partial pressures for Hydrocarbons species < 5 x 10^{-10} mbar	
	List of documents (to be Included in deliverables) – (Language – English)	
1.	Drawings – Part and assembly drawing of gate valve assembly with 3-D CAD Data file	
2.	Manufacturing inspection plan followed in the manufacture and assembly of valve	
3.	Manufacturer's standard QA reports (including final functional test reports of complete valve)	
4.	Applicable test certificates, operation performance certificates including CMTR for raw material used in the construction (gate, body and flanges).	
5.	Leak test procedures and testing report (including data)	
6.	Mechanical and dimensional inspection (including as built CAD data)	
7.	Maintenance guide - Installation, Operating & Maintenance Instructions	
8.	List of spare parts with part numbers	

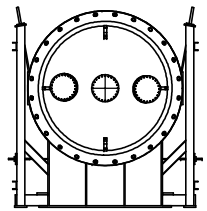
Table 17: Specification Sheet for large size UHV gate valve (1250 mm)



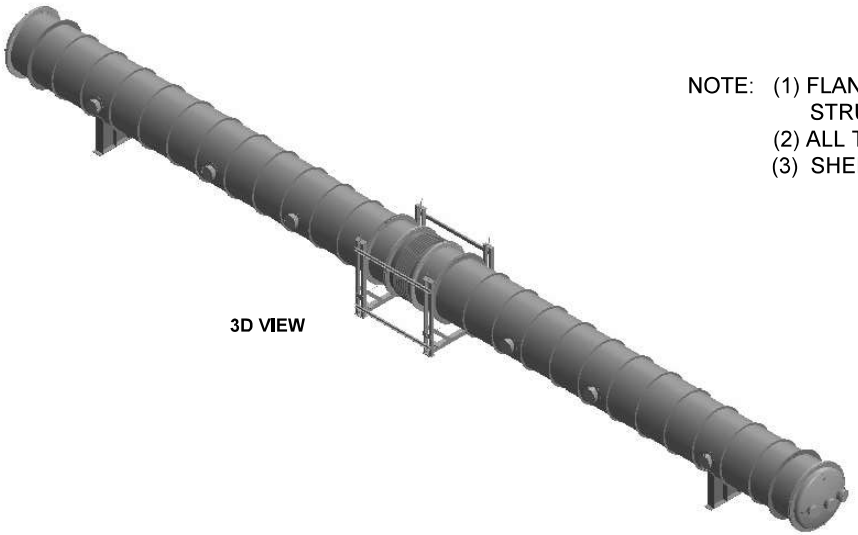
TOP VIEW



FRONT VIEW



SIDE VIEW



3D VIEW

NOTE: (1) FLANGED END DISHED HEAD SHALL BE SUPPORTED AND HANDLED BY SEPARATE SUPPORT STRUCTURE WITH GUIDED MOVEMENT.
(2) ALL THE GROOVED FLANGE SHALL BE CONNECTED WITH PIPE LINE FOR ANNULAS PUMPING.
(3) SHEET THICKNESS IS DRIVING DIMENSION, ALL OTHER DIMENSIONS SHALL BE TAKE REFERNCE FROM THIS.

SR. NO.	NAME OF PART	REF. DRG. NO.	MATERIAL	QTY.	WEIGHT	REMARK
6	TORISPHERICAL_DISH_END_0B	LIGO-20-A3-LI_VISTA-07-SH01	---	1		
5	TORISPHERICAL_DISH_END_0A	LIGO-20-A3-LI_VISTA-06-SH01	---	1		
4	GUIDED SUPPORT	LIGO-20-A3-LI_VISTA-05-SH01	---	1		
3	SADDLE SUPPORT ASSY	LIGO-20-A3-LI_VISTA-04-SH01	---	2		
2	BELLOW WITH FLANGES	LIGO-20-A3-LI_VISTA-03-SH01	---	1		
1	VACUUM VESSEL	LIGO-20-A3-LI_VISTA-02-SH01	---	2		

ANGULAR DIMENSIONS		LENGTH OR DIA	
UP TO 10	±1°30'	UP TO 6	±0.3
10-50	±1°	6-30	±0.5
50-120	±0°30'	30-120	±0.8
120-400	±0°15'	120-400	±1.2
OVER 400	±0°10'	400-1000	±2
SURFACE FINISH	▽ 8-25	▽▽▽ 0.025-1.6	
	▽▽ 1.6-8	▽▽▽▽ < 0.025	

ALL DIMENSIONS ARE IN MM

ASS'Y GROUP:

	MATERIAL	QTY.	
DRAWN BY	PINAKIN		21-05-21
CHECKED BY	ATUL		19-05-21
APPROVED BY	RAKESH		19-05-21

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Institute for Plasma Research,
Bhat, Near Indira Bridge Gandhinagar 382 428, Gujarat (india)

TITLE: VACUUM VESSEL ASSEMBLY

SCALE: 1:1 / NTS

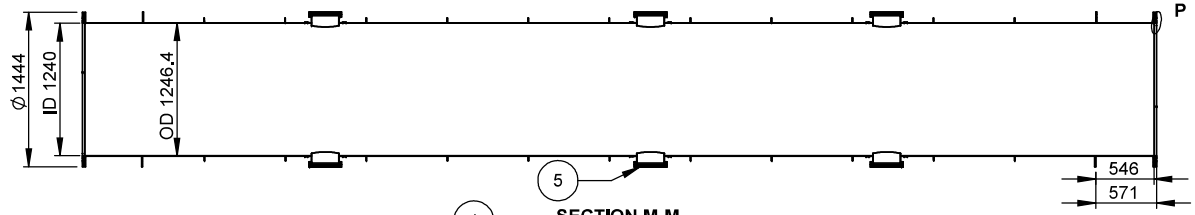
DRG.NO: LIGO-20-A3-LI_VISTA-01-SH01

REV.: 0

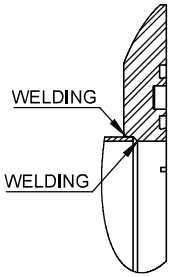
SHEET: 1/1

E:\Ligo_Drawings_Pinakin\Proto Type_Beam_tube\

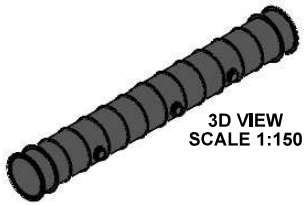
11-06-2021



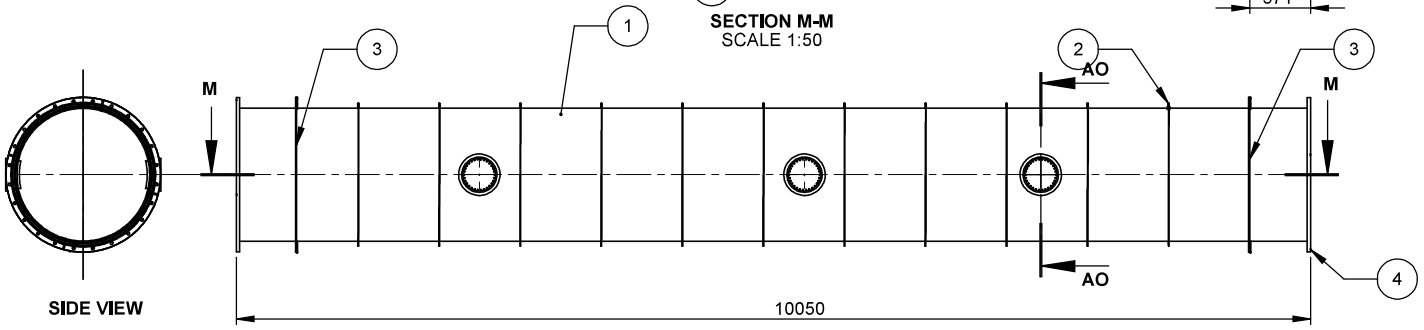
SECTION M-M
SCALE 1:50



DETAIL P
SCALE: 1:4

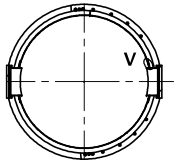


3D VIEW
SCALE 1:150

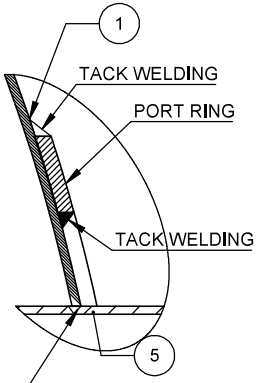


SIDE VIEW

FRONT VIEW

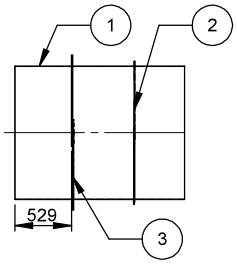


SECTION AO-AO
SCALE 1:50

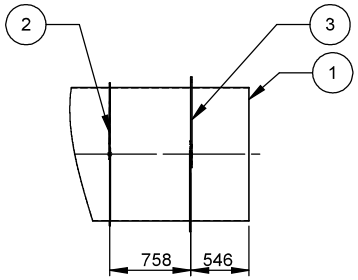


DETAIL V
SCALE: 1:2

WELDING (INSIDE)
FOR PART NO.1& 5



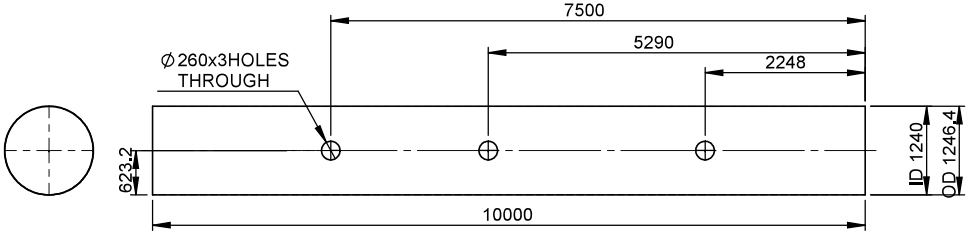
DETAIL FOR PART NO.1, 2,3
LEFT END SIDE OF VACCUM VESSEL

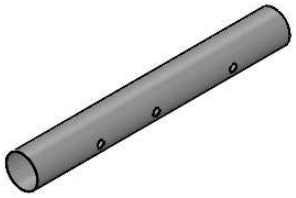


DETAIL FOR PART NO.1, 2,3
RIGHT END SIDE OF VACCUM VESSEL

NOTE:

1. EACH VACUUM STIFFENER SPACED AT 758mm FROM THE GUIDED SUPPORT STIFFENER
2. VACUUME STIFFENER AND SUPPORT STIFFENER CONTINUOUS FILLET WELD FROM ONE SIDE AND INTERMITTENT FILLET WELD FROM ANOTHER SIDE.
3. PORT RING SHALL BE TACK WELDED WITH PART NO.1 FROM OD AND ID.





01 **VACUUM VESSEL**

SR. NO.	NAME OF PART	REF. DRG. NO	MATERIAL	QTY.	WEIGHT	REMARK
6	'O' RING	---//---	VITON			
5	250_CF_PORT	LIGO-20-A3-LI_VISTA-11-SH01	SS 304L	6		
4	GROOVED FLANGE	LIGO-20-A3-LI_VISTA-10-SH01	SS 304L	2		
3	SUPPORT STIFFENER	LIGO-20-A4-LI_VISTA-09-SH01	SS 304L	2		
2	VACUUM STIFFENER	LIGO-20-A4-LI_VISTA-08-SH01	SS 304L	11		
1	VACCUM VESSEL	---//---	SS 304L	1		

ANGULAR DIMENSIONS		LENGTH OR DIA	
UP TO 10	±1°30'	UP TO 6	±0.3
10-50	±1°	6-30	±0.5
50-120	±0°30'	30-120	±0.8
120-400	±0°15'	120-400	±1.2
OVER 400	±0°10'	400-1000	±2
SURFACE FINISH	▽ 8-25	▽▽▽ 0.025-1.6	
	▽▽ 1.6-8	▽▽▽▽ < 0.025	

ALL DIMENSIONS ARE IN MM

ASS'Y GROUP:

MATERIAL	QTY.	
DRAWN BY	PINAKIN	21-05-21
CHECKED BY	ATUL	19-05-21
APPROVED BY	RAKESH	19-05-21

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Bhat, Near Indira Bridge Gandhinagar 382 428, Gujarat (india)

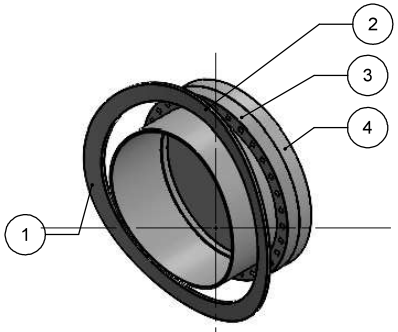
TITLE: VACUUM VESSEL

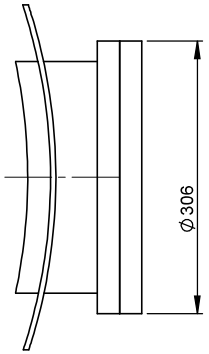
SCALE: 1:1 / NTS

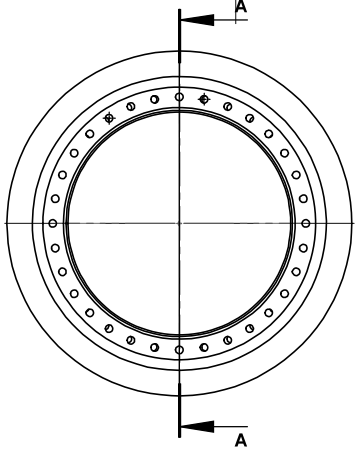
DRG.NO: LIGO-20-A3-LI_VISTA-02-SH01

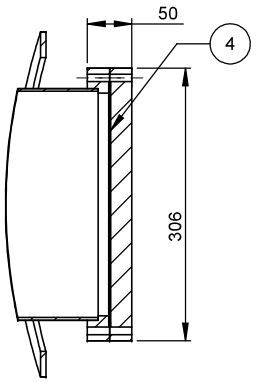
REV. 0

SHEET 1/1



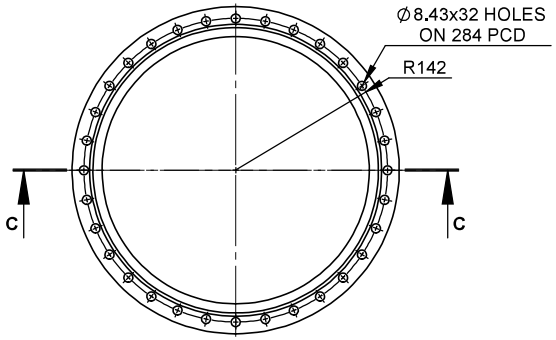


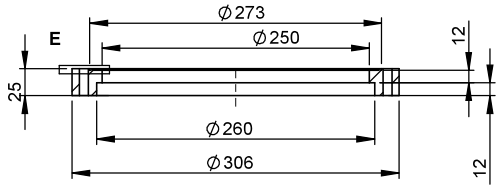




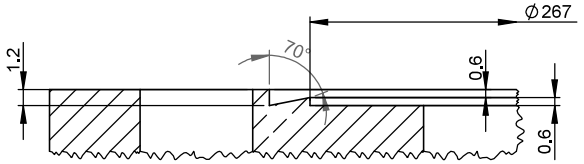
250 CF PORT

SECTION A-A
SCALE 1:6



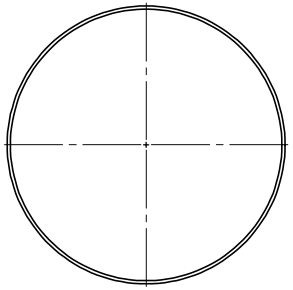


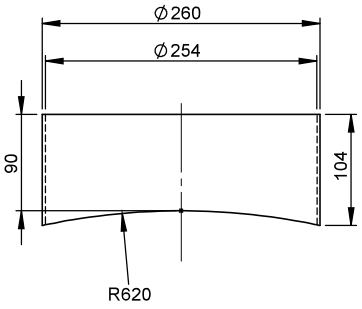
SECTION C-C



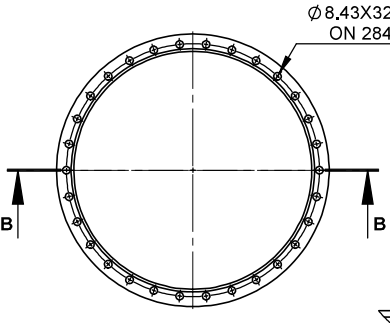
DETAIL E
SCALE: 2.5:1

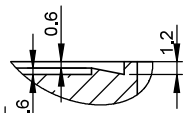
03 250 CF FLANGE

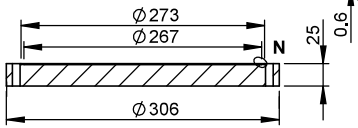




02 PORT NOZZLE



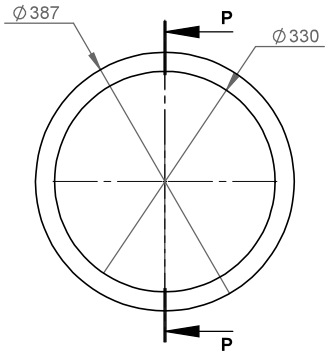


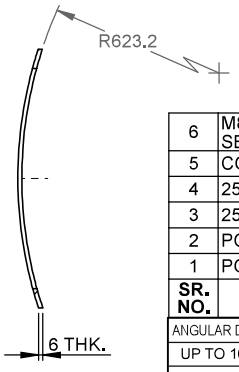


DETAIL N
SCALE: 2:1

SECTION B-B
SCALE 1:6

04 250 CF BLANK FLANGE





SECTION P-P
SCALE 1:8

01 PORT RING

SR. NO.	NAME OF PART	REF. DRG. NO.	MATREIAL	QTY.	WEIGHT	REMARKS
6	M8 NUT-BOLT-WASHER SET	---//---	SS 316L	32		
5	COPPER GASKET	---//---	COPPER	1		
4	250 CF BLANK FLANGE	---//---	SS 304L	1		
3	250 CF FLANGE	---//---	SS 304L	1		
2	PORT NOZZLE	---//---	SS 304L	1		
1	PORT RING	---//---	SS 304L	1		

ANGULAR DIMENSIONS		LENGTH OR DIA	
UP TO 10	±1°30'	UP TO 6	±0.3
10-50	±1°	6-30	±0.5
50-120	±0°30'	30-120	±0.8
120-400	±0°15'	120-400	±1.2
OVER 400	±0°10'	400-1000	±2
SURFACE FINISH	▽ 8-25	▽▽▽ 0.025-1.6	
	▽▽ 1.6-8	▽▽▽▽ < 0.025	

ALL DIMENSIONS ARE IN MM

ASS'Y GROUP:

MATERIAL	QTY.	
DRAWN BY	PINAKIN	21-05-21
CHECKED BY	ATUL	19-05-21
APPROVED BY	RAKESH	19-05-21

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Institute for Plasma Research,
Bhat, Near Indira Bridge Gandhinagar 382 428, Gujarat (india)

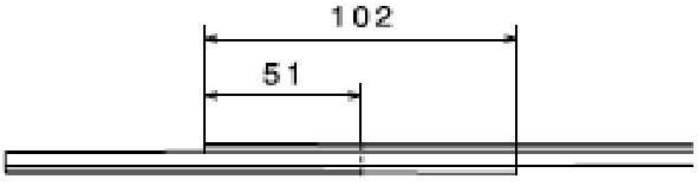
TITLE: 250 CF PORT

SCALE: 1:1 / NTS

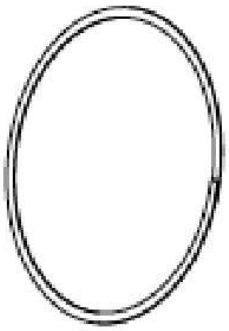
DRG.NO: LIGO-20-A3-LI_VISTA-11-SH01

REV.: 0

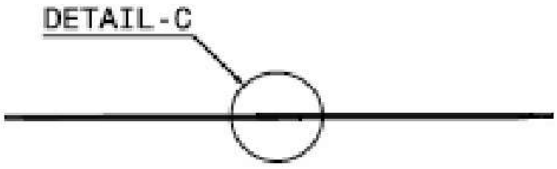
SHEET: 1/1



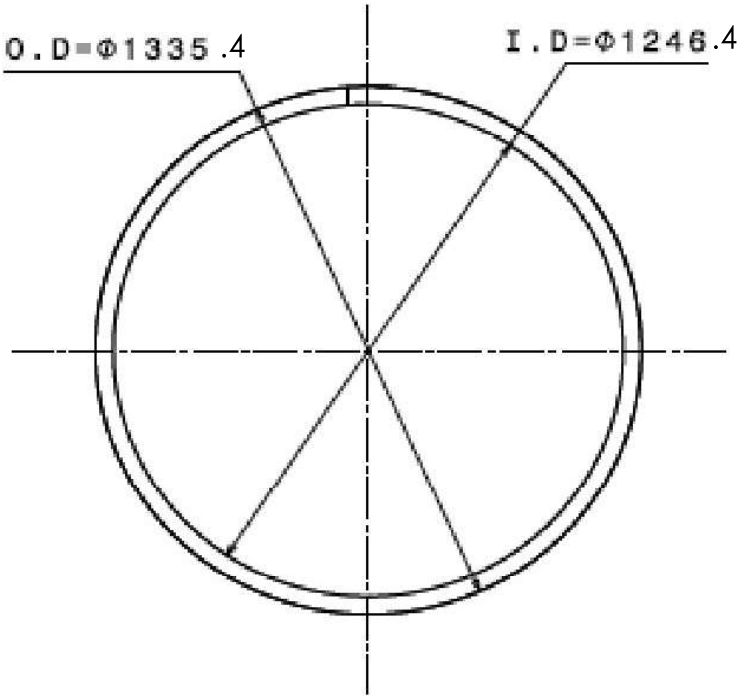
DETAIL-C
SCALE-1:2



ISOMETRIC VIEW
SCALE-1:25



TOP VIEW



FRONT VIEW

SIDE VIEW

ANGULAR DIMENSIONS		LENGTH OR DIA	
UP TO 10	±1°30'	UP TO 6	±0.3
10-50	±1°	6-30	±0.5
50-120	±0°30'	30-120	±0.8
120-400	±0°15'	120-400	±1.2
OVER 400	±0°10'	400-1000	±2
SURFACE	▽ 8-25	▽▽▽ 0.025-1.6	

ALL DIMENSIONS ARE IN MM		
ASS'Y GROUP:		
MATERIAL	QTY.	
SS 304L		
DRAWN BY	PINAKIN	19-05-21
CHECKED BY	ATUL	19-05-21

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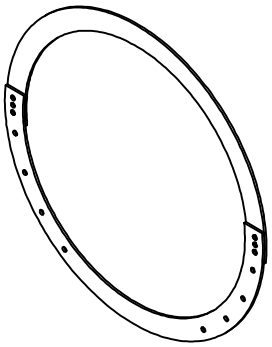
Bhat, Near Indira Bridge Gandhinagar 382 428, Gujarat (india)

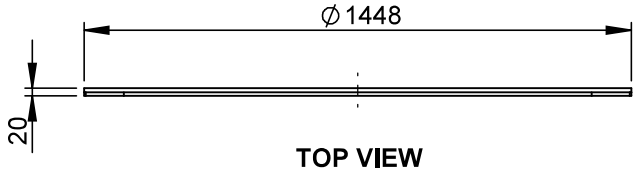
TITLE
VACUUM STIFFENER

SCALE 1:1 / NTS

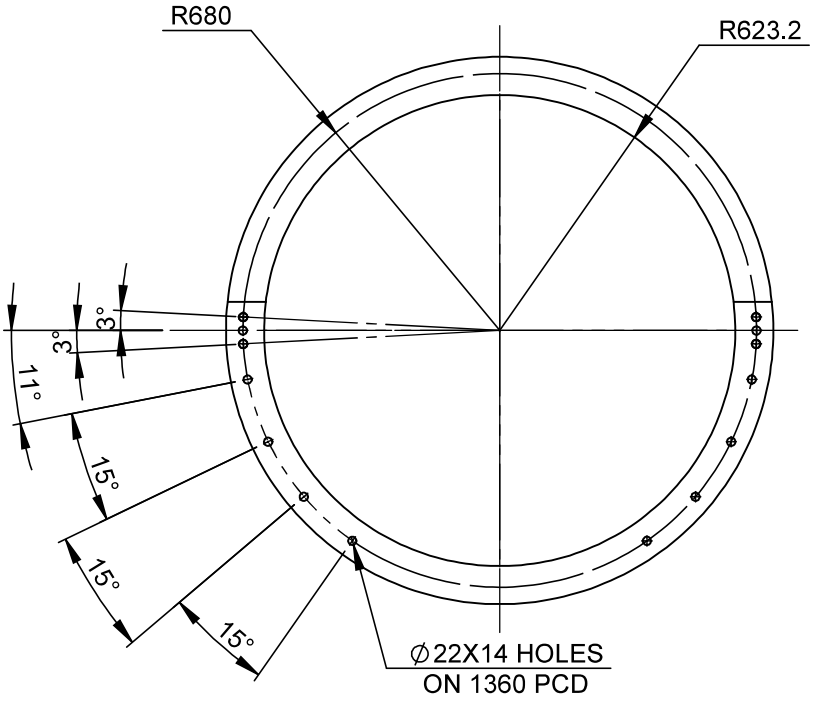
E:\Ligo_Drawings_Pinakin\Proto Type_Beam_tube\



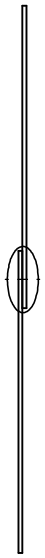
3D VIEW

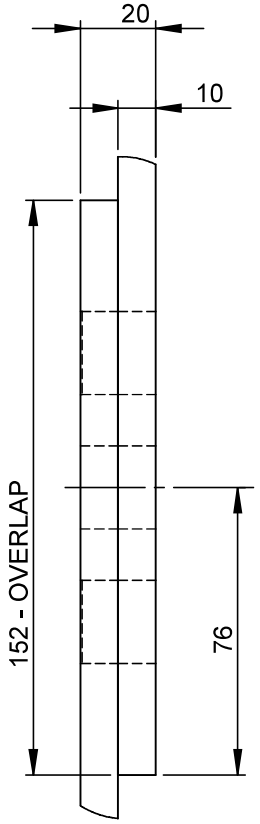


TOP VIEW



FRONT VIEW





DETAIL T
SCALE: 1:2

E:\LIGO_DRAWINGS_PINAKIN\PROTO TYPE_BEAM_TUBE\

ANGULAR DIMENSIONS		LENGTH OR DIA	
UP TO 10	±1°30'	UP TO 6	±0.3
10-50	±1	6-30	±0.5
50-120	±0°30'	30-120	±0.8
120-400	±0°15'	120-400	±1.2
OVER 400	±0°10'	400-1000	±2
SURFACE	∇ 8-25	∇∇∇ 0.025-1.6	

ALL DIMENSIONS ARE IN MM

ASS'Y GROUP:

MATERIAL	QTY.	WEIGHT
SS 304L		
DRAWN BY	PINAKIN	19-05-21
CHECKED BY	ATUL	19-05-21

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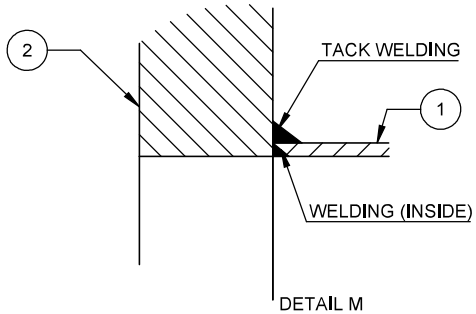
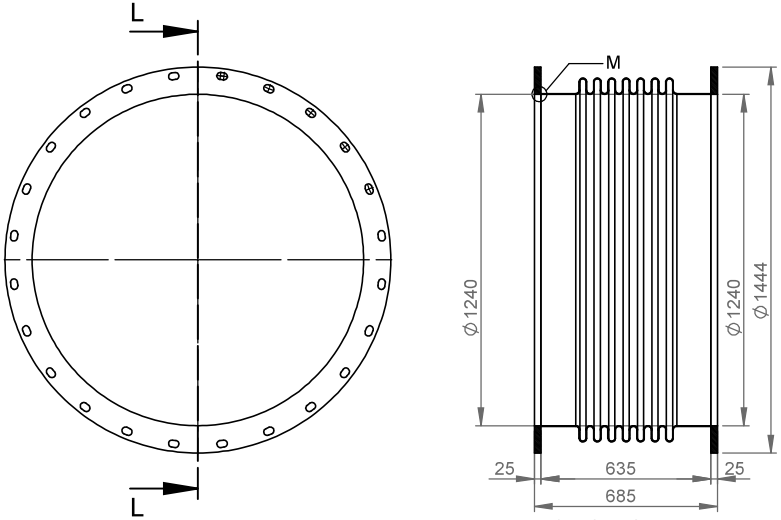
TITLE
SUPPORT STIFFENER

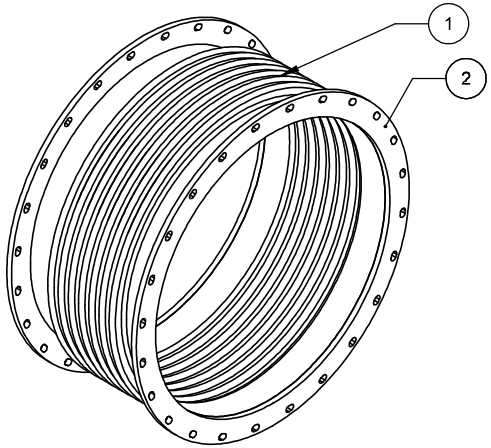
SCALE 1:1 / NTS

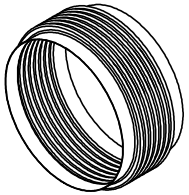


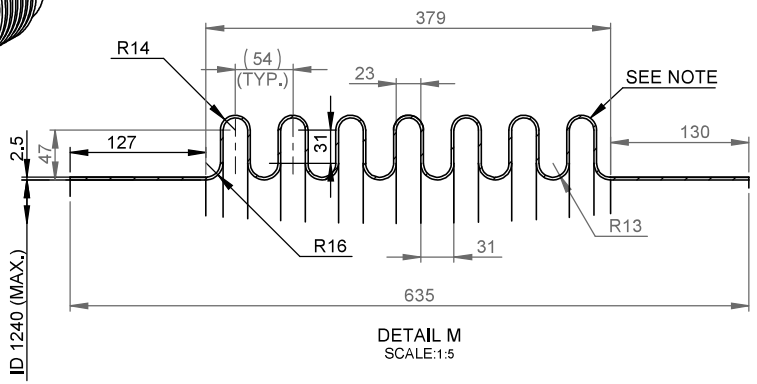
DETAIL M
SCALE: 1:1



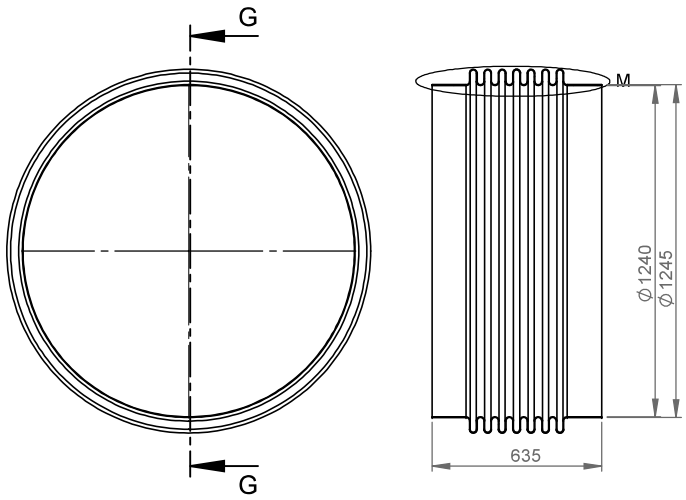
SECTION L-L







DETAIL M
SCALE:1:5



SECTION G-G

NOTE: BELLOW'S MAX. OD SHOULD BE 1422 MM.

SR. NO.	NAME OF PART	REF. DRG. NO.	MATERIAL	QTY.	WEIGHT (KG)	REMARKS
2	FLAT FLANGE	LIGO-20-A3-LI_VISTA-12-SH01	SS304L	2		
1	BELLOW	---	SS304L	1		

ANGULAR DIMENSIONS		LENGTH OR DIA	
UP TO 10	±1°30'	UP TO 6	±0.3
10-50	±1°	6-30	±0.5
50-120	±0°30'	30-120	±0.8
120-400	±0°15'	120-400	±1.2
OVER 400	±0°10'	400-1000	±2
SURFACE FINISH	▽ 8-25	▽▽▽ 0.025-1.6	
	▽▽ 1.6-8	▽▽▽▽ < 0.025	

ALL DIMENSIONS ARE IN MM

ASS'Y GROUP:

MATERIAL	QTY.	
DRAWN BY	PINAKIN	19-05-21
CHECKED BY	ATUL	11-05-21
APPROVED BY	RAKESH	11-05-21

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TITLE: BELLOW WITH FLANGES

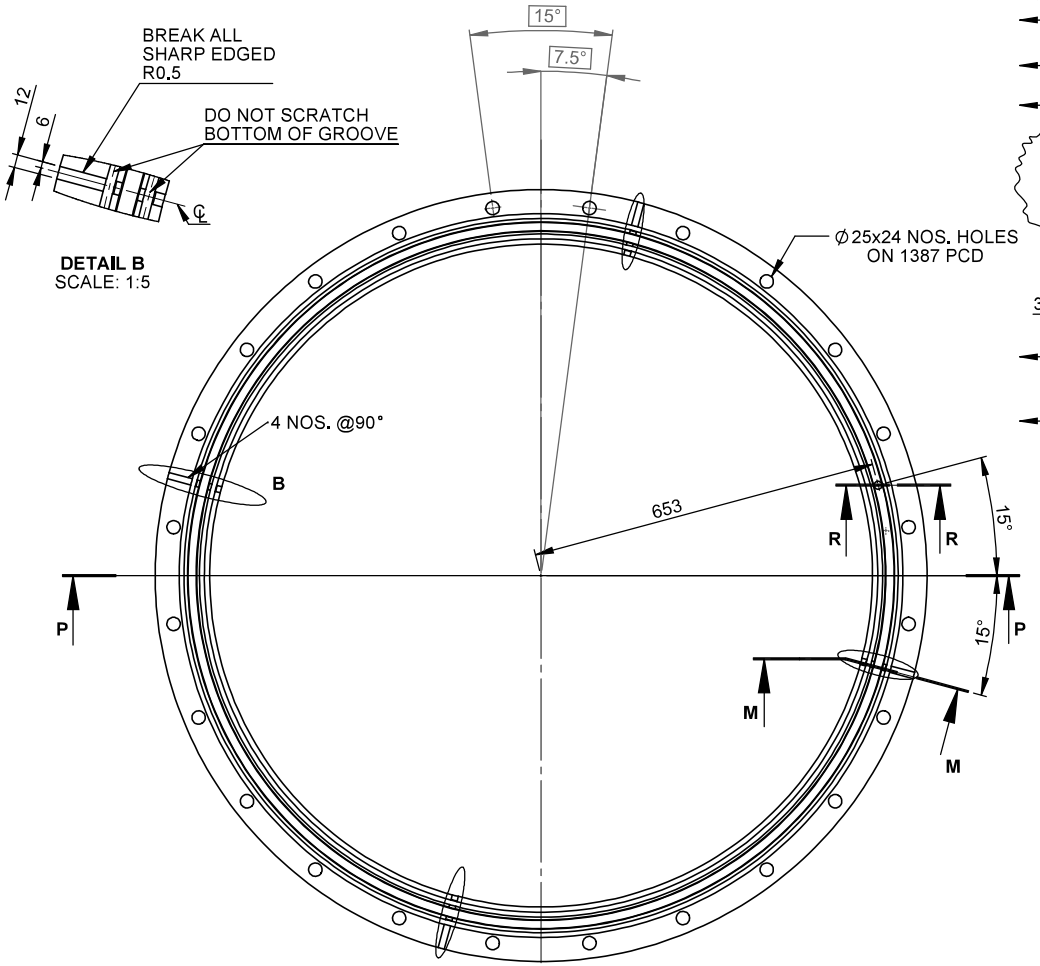
SCALE: 1:1 / NTS

DRG.NO: LIGO-20-A3-LI_VISTA-03-SH01

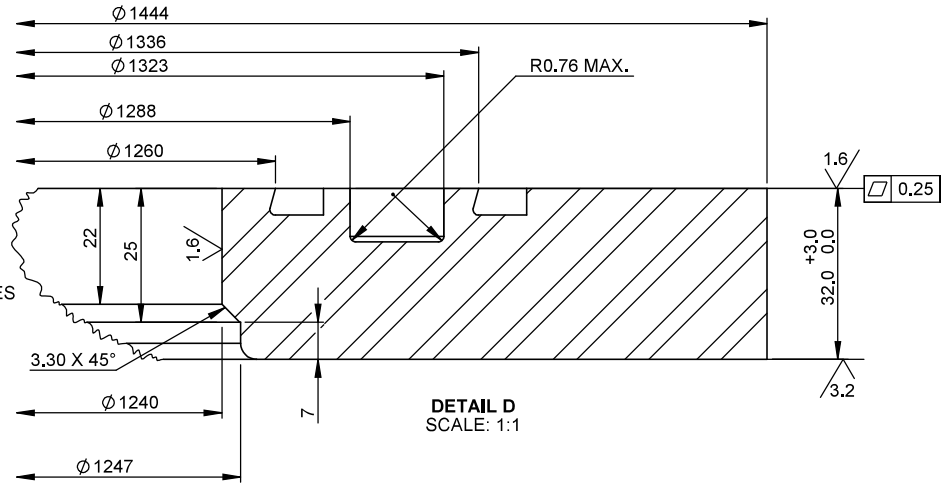
REV.: 0

SHEET: 1/1

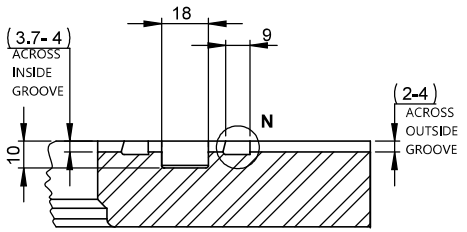
11-06-2021



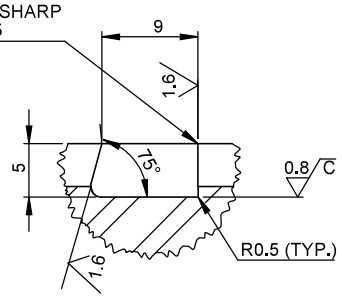
DETAIL B
SCALE: 1:5



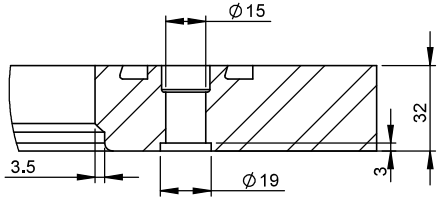
DETAIL D
SCALE: 1:1



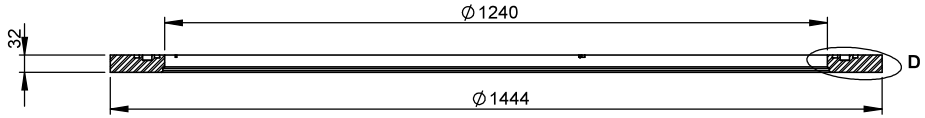
SECTION M-M
SCALE 1:2



DETAIL N
SCALE: 2:1



SECTION R-R
SCALE 1:2



SECTION P-P
SCALE 1:10

NOTE: FLANGE NEED TO BE ALIGN WITH RESPECT TO FLANGE AT GATE VALVE AND DISHED END

SR.NO.	NAME OF PART	REF. DRG. NO.	MATERIAL	QTY.	WEIGHT (KG)	REMARKS
1	GROOVED FLANGE	---//---	SS 304L	1		

ANGULAR DIMENSIONS		LENGTH OR DIA	
UP TO 10	±1°30'	UP TO 6	±0.3
10-50	±1°	6-30	±0.5
50-120	±0°30'	30-120	±0.8
120-400	±0°15'	120-400	±1.2
OVER 400	±0°10'	400-1000	±2
SURFACE FINISH	▽ 8-25	▽▽▽ 0.025-1.6	
	▽▽ 1.6-8	▽▽▽▽ < 0.025	

ALL DIMENSIONS ARE IN MM

ASS'Y GROUP:

	MATERIAL	QTY.	
DRAWN BY	PINAKIN		21-05-21
CHECKED BY	ATUL		19-05-21
APPROVED BY	RAKESH		19-05-21

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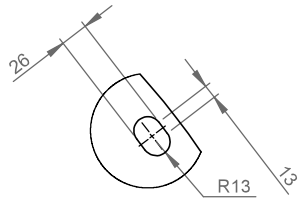
TITLE: **GROOVED FLANGE**

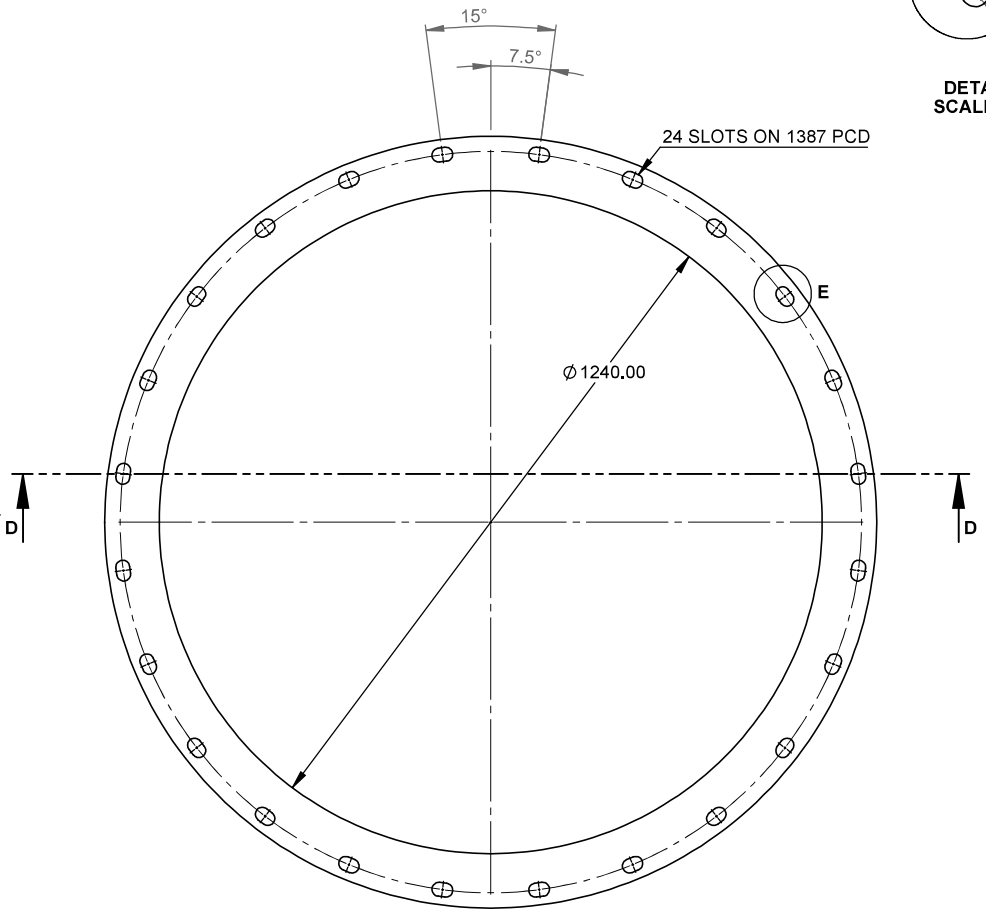
SCALE: 1:1 / NTS

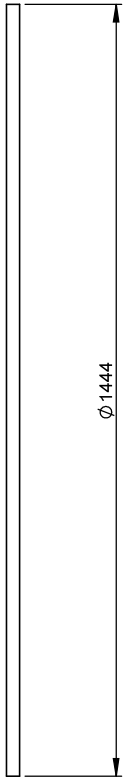
DRG.NO: LIGO-20-A3-LI_VISTA-10-SH01 | REV. 0 | SHEET 1/1

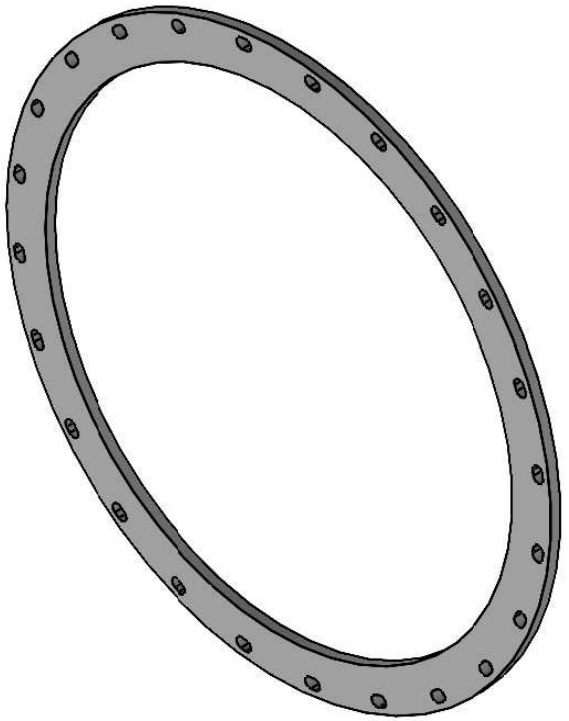
GROOVED FLANGE



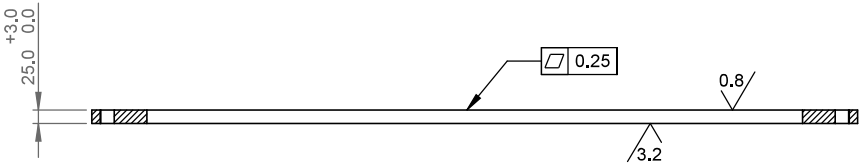
DETAIL E
SCALE 1 : 5







3D VIEW



SECTION D-D
SCALE 1 : 10

NOTE: FLANGE NEED TO BE ALIGN WITH RESPECT TO
GATE VALVE FLANGE AND DISHED END FLANGE

ANGULAR DIMENSIONS		LENGTH OR DIA	
UP TO 10	±1°30'	UP TO 6	±0.3
10-50	±1°	6-30	±0.5
50-120	±0°30'	30-120	±0.8
120-400	±0°15'	120-400	±1.2
OVER 400	±0°10'	400-1000	±2
SURFACE FINISH	▽ 8-25	▽▽▽ 0.025-1.6	
	▽▽ 1.6-8	▽▽▽▽ < 0.025	

ALL DIMENSIONS ARE IN MM
ASS'Y GROUP:

MATERIAL	QTY.	
SS 304L		
DRAWN BY	PINAKIN	19-05-21
CHECKED BY	ATUL	19-05-21
APPROVED BY	RAKESH	19-05-21

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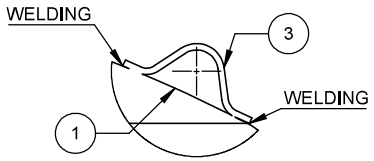
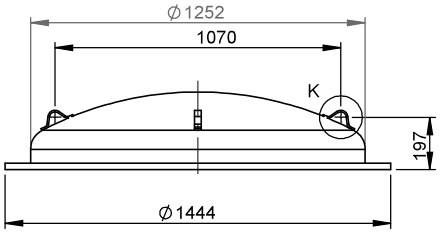
TITLE: FLAT FLANGE
SCALE: 1:1 / NTS
DRG.NO: LIGO-20-A3-LI_VISTA-12-SH01
REV.: 0
SHEET: 1/1

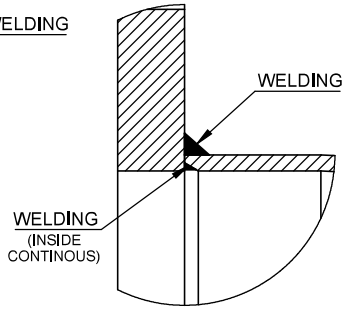
E:\Ligo_Drawings_Pinakin\Proto Type_Beam_tube\

11-06-2021

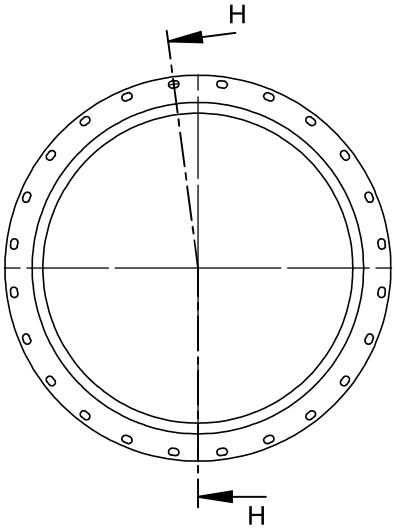


DETAIL K
SCALE: 1:5

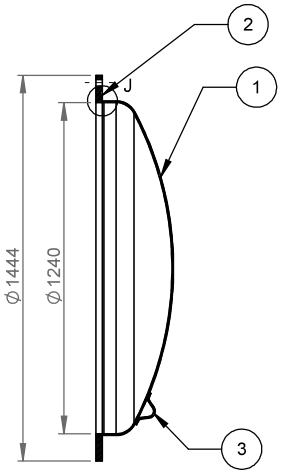




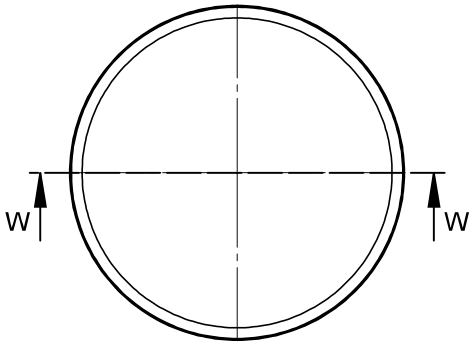
DETAIL J
SCALE: 1:2

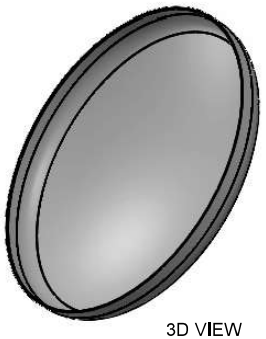


FRONT VIEW

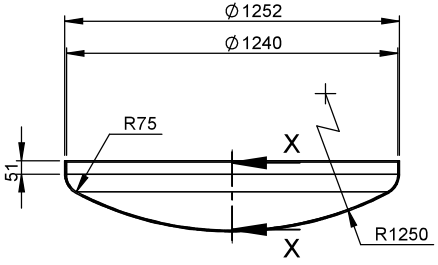


SECTION H-H

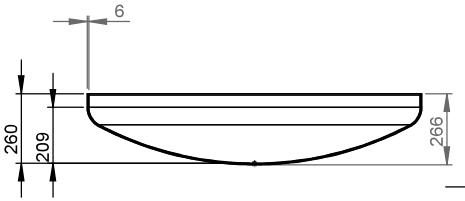




3D VIEW



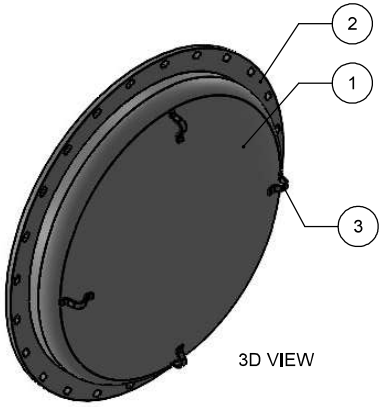
SECTION W-W



SECTION X-X

TORISPHERICAL DISH_A

TORISPHERICAL DISH END_0A



3D VIEW

SR. NO.	NAME OF PART	REF. DRG. NO.	MATERIAL	QTY.	WEIGHT (KG)	REMARKS
3	LIFTING LUG	LIGO-20-A3-LI_VISTA-13-SH01	---	4		
2	FLAT FLANGE	LIGO-20-A3-LI_VISTA-12-SH01	---	1		
1	TORISPERICAL DISH	---//---	SS 304L	1		

ANGULAR DIMENSIONS		LENGTH OR DIA	
UP TO 10	±1°30'	UP TO 6	±0.3
10-50	±1°	6-30	±0.5
50-120	±0°30'	30-120	±0.8
120-400	±0°15'	120-400	±1.2
OVER 400	±0°10'	400-1000	±2
SURFACE FINISH	▽ 8-25	▽▽▽ 0.025-1.6	
	▽▽ 1.6-8	▽▽▽▽ < 0.025	

ALL DIMENSIONS ARE IN MM
ASS'Y GROUP:

	MATERIAL	QTY.	
DRAWN BY	PINAKIN		24-05-21
CHECKED BY	ATUL		24-05-21
APPROVED BY	RAKESH		24-05-21

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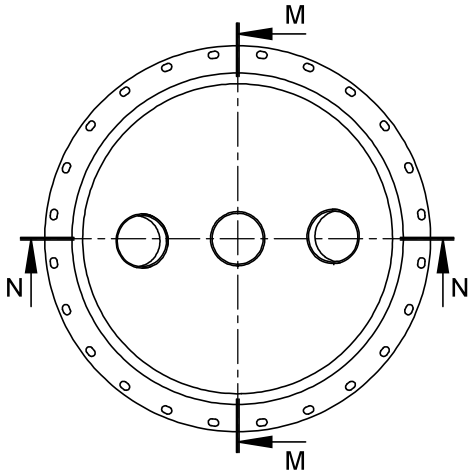
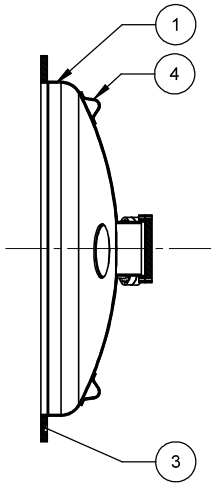
TITLE: TORISPHERICAL DISH END_0A
SCALE: 1:1 / NTS
DRG.NO: LIGO-20-A3-LI_VISTA-06-SH01
REV.: 0
SHEET: 1/1

E:\Ligo_Drawings_Pinakin\Proto Type_Beam_tube\

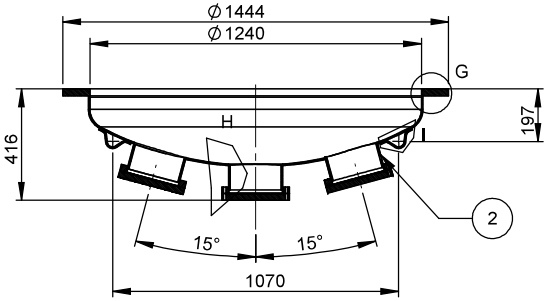
11-06-2021



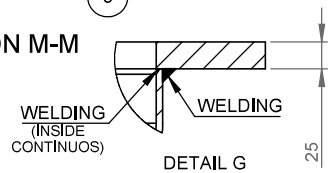
TOP VIEW



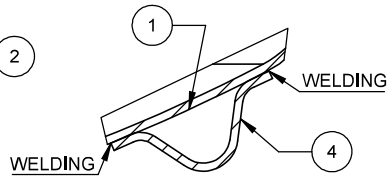
SECTION M-M



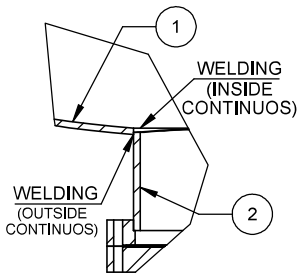
SECTION N-N



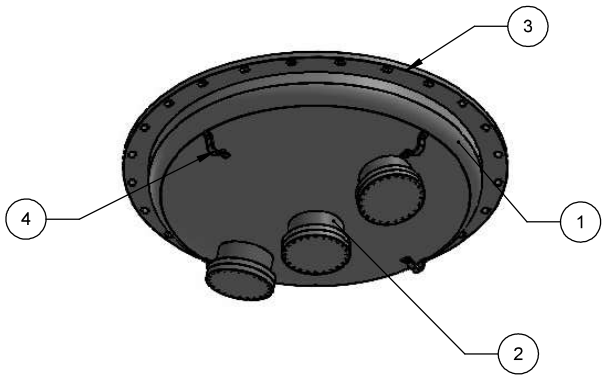
DETAIL G
SCALE: 1:5



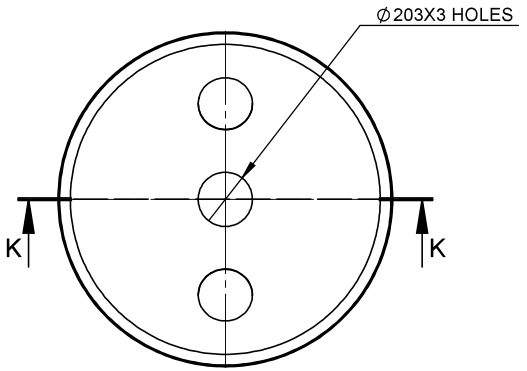
DETAIL I
SCALE: 1:4



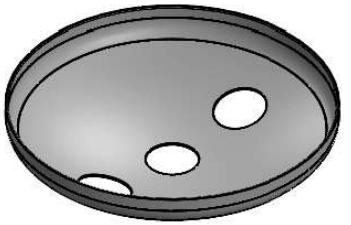
DETAIL H
SCALE: 1:5



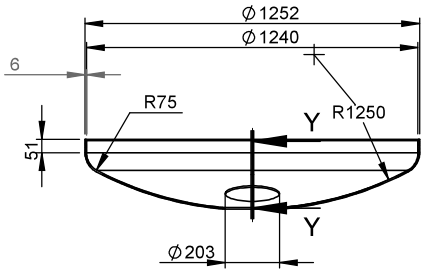
TORISPHERICAL_DISH END_0B



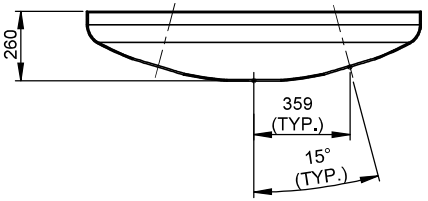
TOP VIEW



3D VIEW



SECTION K-K



SECTION Y-Y

(01) TORISPHERICAL_DISH END

SR. NO.	NAME OF PART	REF. DRG. NO.	MATERIAL	QTY.	WEIGHT (KG)	REMARKS
4	LIFTING LUG	LIGO-20-A3-LI_VISTA-13-SH01	---	4		
3	FLAT FLANGE	LIGO-20-A3-LI_VISTA-12-SH01	---	1		
2	200 CF PORT	LIGO-20-A3-LI_VISTA-14-SH01	---	3		
1	TORISPHERICAL_DISH END	---//---	SS 304L	1		

ANGULAR DIMENSIONS		LENGTH OR DIA	
UP TO 10	±1°30'	UP TO 6	±0.3
10-50	±1°	6-30	±0.5
50-120	±0°30'	30-120	±0.8
120-400	±0°15'	120-400	±1.2
OVER 400	±0°10'	400-1000	±2
SURFACE FINISH	▽ 8-25	▽▽▽ 0.025-1.6	
	▽▽ 1.6-8	▽▽▽▽ < 0.025	

ALL DIMENSIONS ARE IN MM

ASS'Y GROUP:

	MATERIAL	QTY.	
DRAWN BY	PINAKIN		24-05-21
CHECKED BY	ATUL		24-05-21
APPROVED BY	RAKESH		24-05-21

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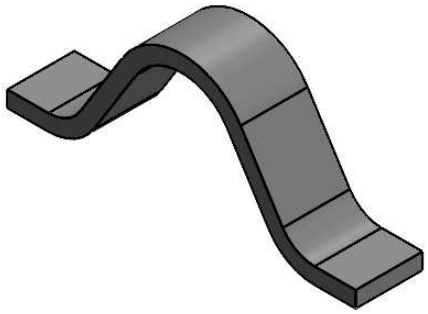
TITLE: TORISPHERICAL DISH END_0B

SCALE: 1:1 / NTS

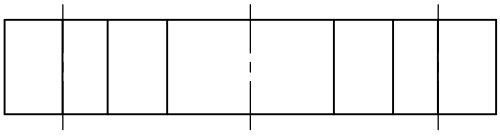
DRG.NO: LIGO-20-A3-LI_VISTA-07-SH01

REV.: 0

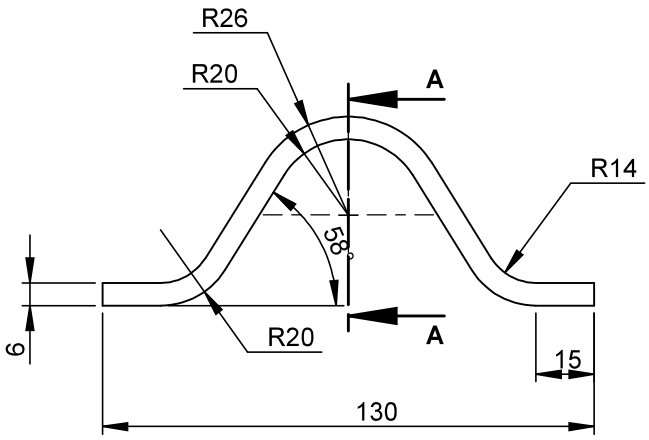
SHEET: 1/1



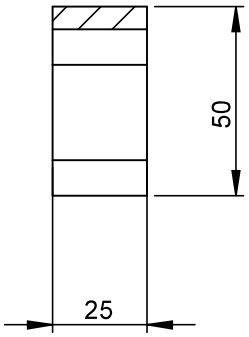
3D VIEW



TOP VIEW



FRONT VIEW



SECTION A-A

ANGULAR DIMENSIONS		LENGTH OR DIA	
UP TO 10	±1°30'	UP TO 6	±0.3
10-50	±1°	6-30	±0.5
50-120	±0°30'	30-120	±0.8
120-400	±0°15'	120-400	±1.2
OVER 400	±0°10'	400-1000	±2
SURFACE	∇ 8-25	∇∇∇ 0.025-1.6	

ALL DIMENSIONS ARE IN MM

ASS'Y GROUP:

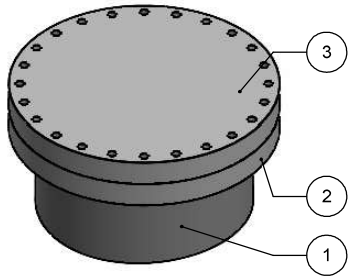
MATERIAL	QTY.	WEIGHT
SS 304L		
DRAWN BY	PINAKIN	19-05-21
CHECKED BY	ATUL	19-05-21

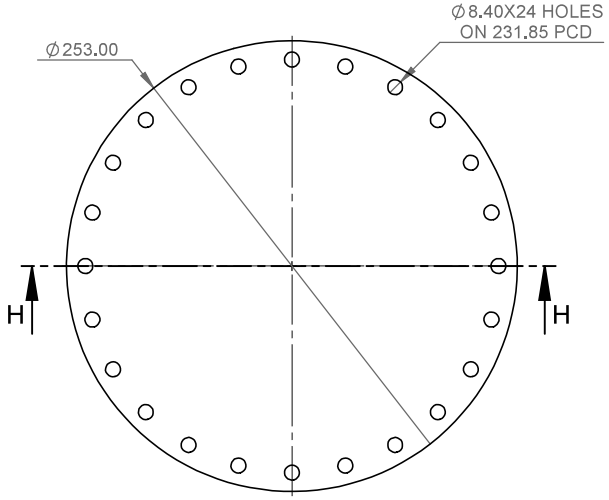
LIGO - India
Institute for Plasma Research,
Bhat, Near Indira Bridge Gandhinagar 382 428, Gujarat (india)

TITLE
LIFTING LUG

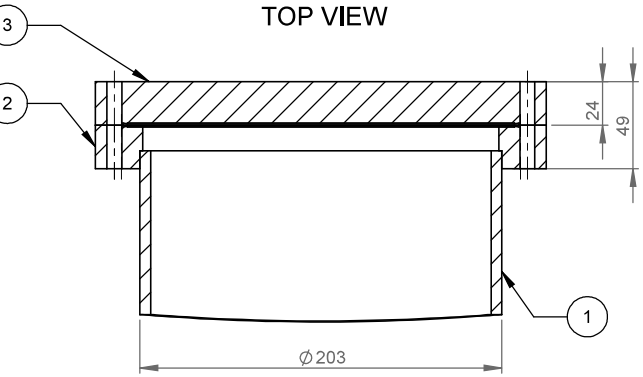
SCALE 1:1 / NTS

E:\LIGO_DRAWINGS_PINAKIN\PROTO TYPE_BEAM_TUBE\

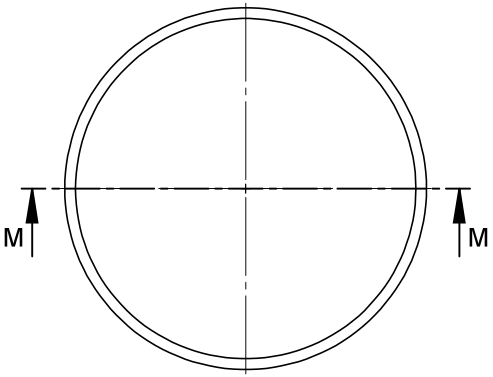




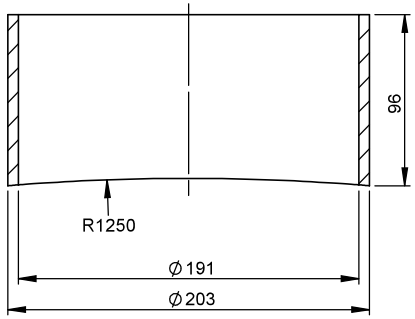
TOP VIEW



SECTION H-H
SCALE (1:3)

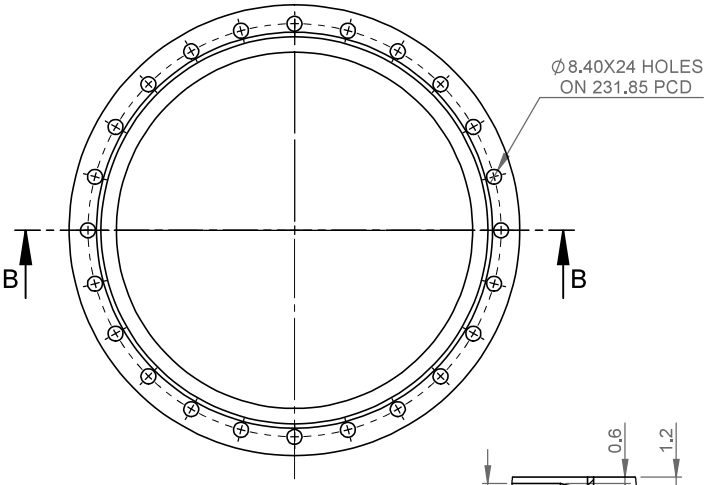


TOP VIEW

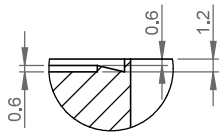


SECTION M-M
SCALE (1:3)

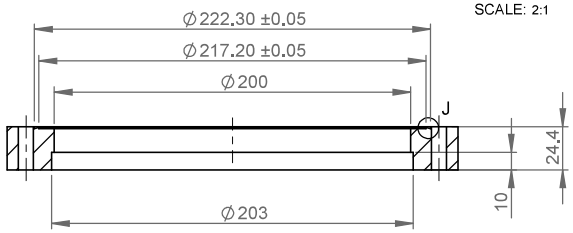
01 **PORT NOZZLE**



TOP VIEW



DETAIL J
SCALE: 2:1



SECTION B-B
SCALE (1:3)

02 **200 CF FLANGE**

SR. NO.	NAME OF PART	REF. DRG. NO.	MATERIAL	QTY.	REMARK
03	200 CF_BLANK_FLANGE	---//---	SS 304L	3	
02	200 CF_FLANGE	---//---	SS 304L	3	
01	PORT NOZZEL	---//---	SS 304L	3	

ANGULAR DIMENSIONS		LENGTH OR DIA	
UP TO 10	±1°30'	UP TO 6	±0.3
10-50	±1°	6-30	±0.5
50-120	±0°30'	30-120	±0.8
120-400	±0°15'	120-400	±1.2
OVER 400	±0°10'	400-1000	±2
SURFACE FINISH	▽ 8-25	▽▽▽ 0.025-1.6	
	▽▽ 1.6-8	▽▽▽▽ < 0.025	

ALL DIMENSIONS ARE IN MM

ASS'Y GROUP:

MATERIAL	QTY.	
DRAWN BY	PINAKIN	19-05-21
CHECKED BY	ATUL	19-05-21
APPROVED BY	RAKESH	19-05-21

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Bhat, Near Indira Bridge Gandhinagar 382 428, Gujarat (india)

TITLE: 200 CF PORT

SCALE: 1:1 / NTS

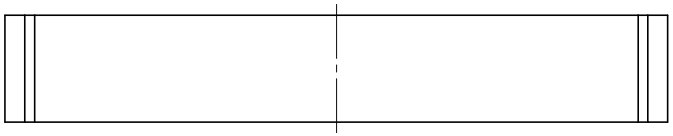
DRG.NO: LIGO-20-A3-LI_VISTA-14-SH01

REV.: 0

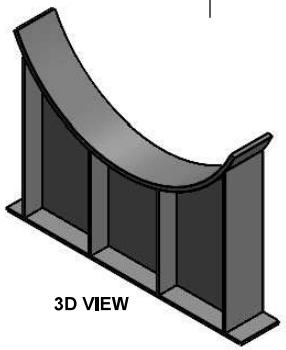
SHEET: 1/1

E:\Ligo_Drawings_Pinakin\Proto Type_Beam_tube\

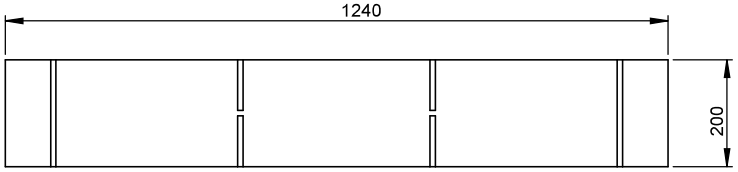
11-06-2021



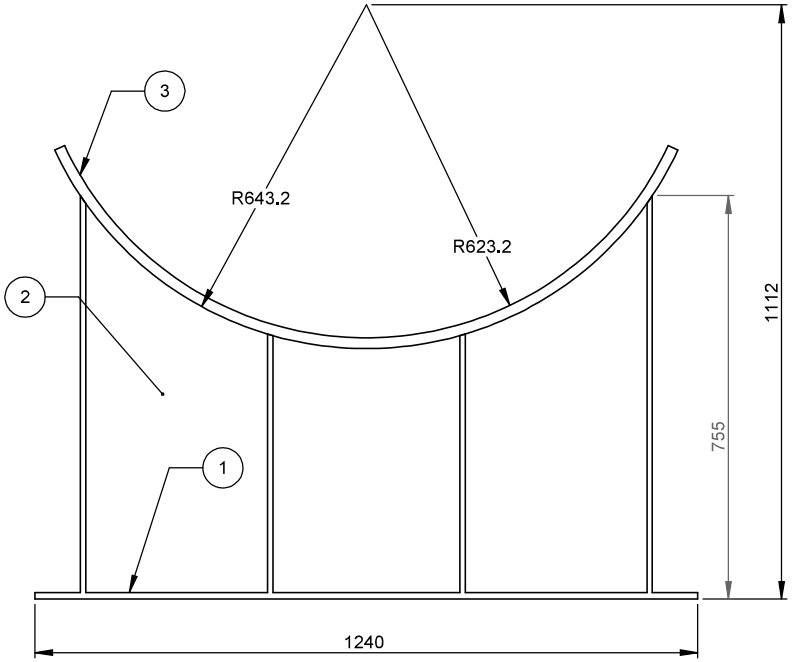
TOP VIEW



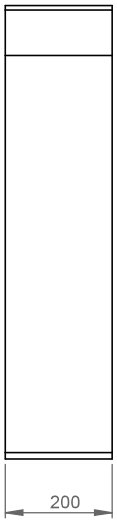
3D VIEW



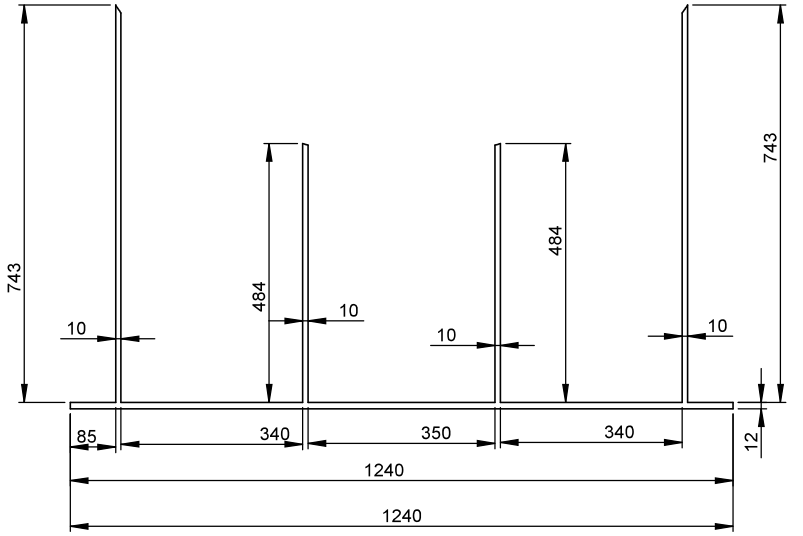
TOP VIEW



FRONT PLATE



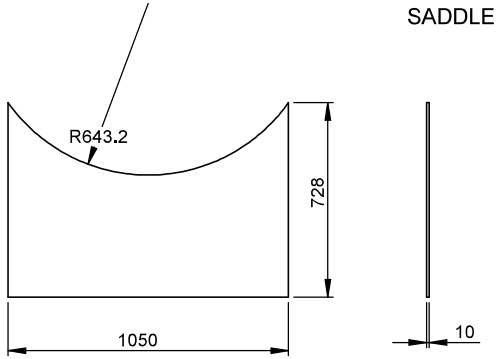
SIDE VIEW



FRONT VIEW

01 BASE PLATE

SADDLE SUPPORT ASSY



FRONT VIEW

02 MID PLATE

NOTE: THIN SHEET ABOVE WEAR PLATE SHALL BE USED TO AVOID CARBON STEEL DIRECT CONTACT WITH SS AT VACUUM VESSEL.

SR. NO.	NAME OF PART	REF. DRG. NO.	MATERIAL	QTY.	WEIGHT (KG)	REMARKS
3	WEAR_PLATE	----//---	CARBON STEEL	1		
2	MID PLATE	----//---	CARBON STEEL	1		
1	BASE_PLATE	----//---	CARBON STEEL	1		

ANGULAR DIMENSIONS		LENGTH OR DIA	
UP TO 10	±1°30'	UP TO 6	±0.3
10-50	±1°	6-30	±0.5
50-120	±0°30'	30-120	±0.8
120-400	±0°15'	120-400	±1.2
OVER 400	±0°10'	400-1000	±2
SURFACE FINISH	▽ 8-25	▽▽▽ 0.025-1.6	
	▽▽ 1.6-8	▽▽▽▽ < 0.025	

ALL DIMENSIONS ARE IN MM

ASS'Y GROUP:

	MATERIAL	QTY.	
DRAWN BY	PINAKIN		19-05-21
CHECKED BY	ATUL		19-05-21
APPROVED BY	RAKESH		19-05-21

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Institute for Plasma Research,
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TITLE: SADDLE SUPPORTASSY

SCALE: 1:1 / NTS

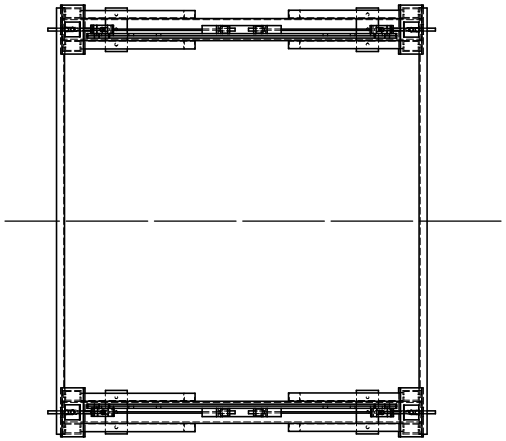
DRG.NO: LIGO-20-A3-LI_VISTA-04-SH01

REV.: 0

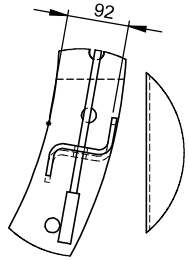
SHEET: 1/1

E:\Ligo_Drawings_Pinakin\Proto Type_Beam_tube\

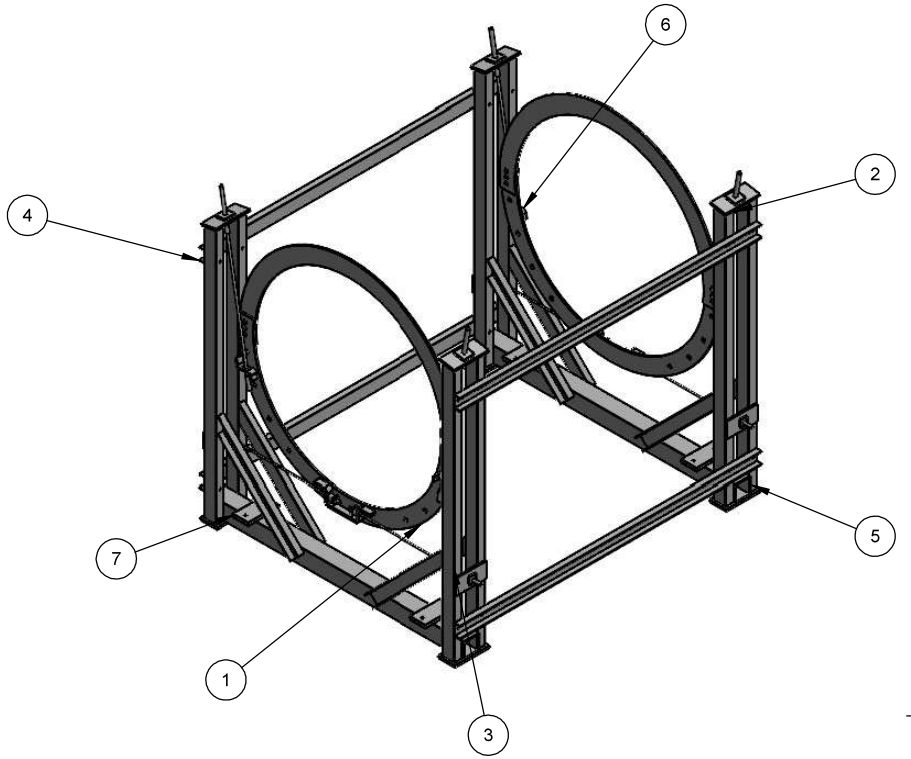
11-06-2021

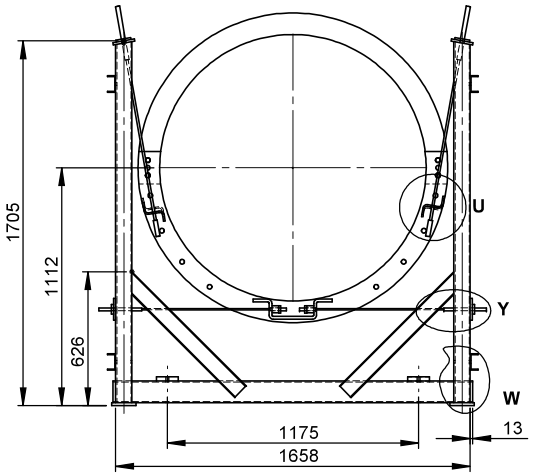


TOP VIEW

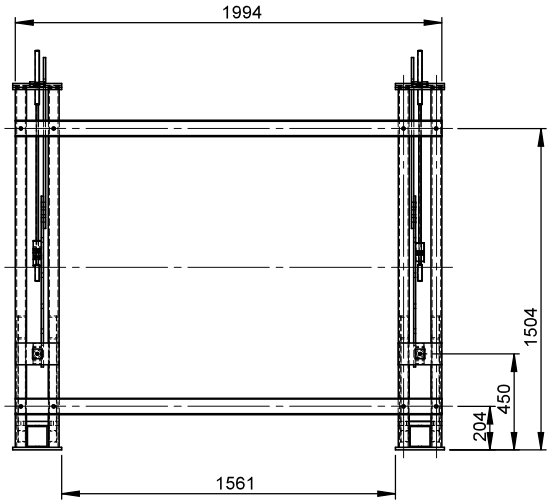


DETAIL U
SCALE: 1:8

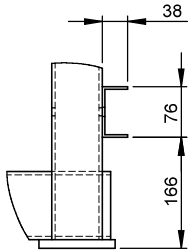




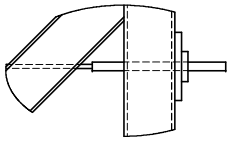
FRONT VIEW



SIDE VIEW



DETAIL W
SCALE: 1:8



DETAIL Y
SCALE: 1:8

SR. NO.	NAME OF PART	REF. DRG. NO.	MATERIAL	QTY.	WEIGHT (KG)	REMARKS
7	G_S_PLATE-2	LIGO-20-A3-LI_VISTA-05-SH03	CARBON STEEL	4		
6	G_S_PLATE-6	LIGO-20-A3-LI_VISTA-05-SH03	CARBON STEEL	4		
5	G_S_TUBE-2	LIGO-20-A3-LI_VISTA-05-SH03	CARBON STEEL	2		
4	G_S_C PLATE-1	LIGO-20-A3-LI_VISTA-05-SH03	CARBON STEEL	4		
3	G_S_H_S_CABLE_ASSY	LIGO-20-A3-LI_VISTA-05-SH03	CARBON STEEL	2		
2	G_S_01_ASSY	LIGO-20-A3-LI_VISTA-05-SH02	CARBON STEEL	4		
1	G_S_STIFFENER	LIGO-20-A4-LI_VISTA-09-SH01	--//--	2		

ANGULAR DIMENSIONS		LENGTH OR DIA	
UP TO 10	±1°30'	UP TO 6	±0.3
10-50	±1°	6-30	±0.5
50-120	±0°30'	30-120	±0.8
120-400	±0°15'	120-400	±1.2
OVER 400	±0°10'	400-1000	±2
SURFACE FINISH	▽ 8-25	▽▽▽ 0.025-1.6	
	▽▽ 1.6-8	▽▽▽▽ < 0.025	

ALL DIMENSIONS ARE IN MM

ASS'Y GROUP:

MATERIAL	QTY.	
DRAWN BY	PINAKIN	19-05-21
CHECKED BY	ATUL	19-05-21
APPROVED BY	RAKESH	19-05-21

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Institute for Plasma Research,
Bhat, Near Indira Bridge Gandhinagar 382 428, Gujarat (india)

TITLE: GUIDED SUPPORT ASSEMBLY

SCALE: 1:1 / NTS

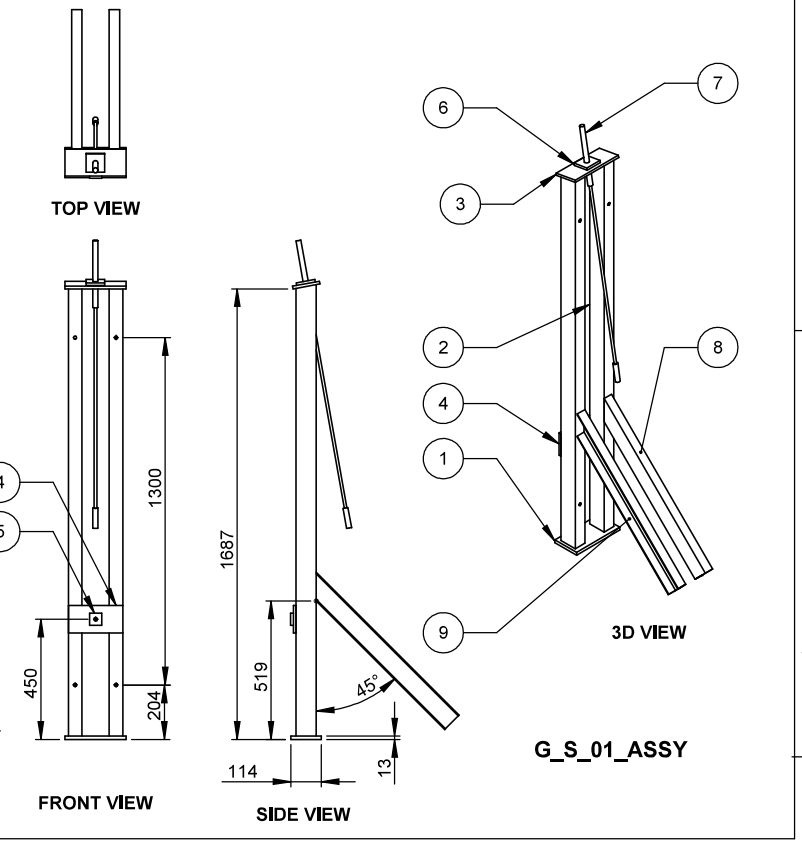
DRG.NO: LIGO-20-A3-LI_VISTA-05-SH01

REV. 0

SHEET 1/3

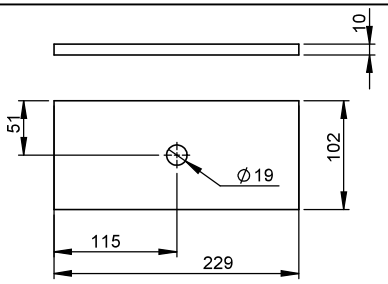
E:\Ligo_Drawings_Pinakin\GUIDED SUPPORT ASSY\

11-06-2021

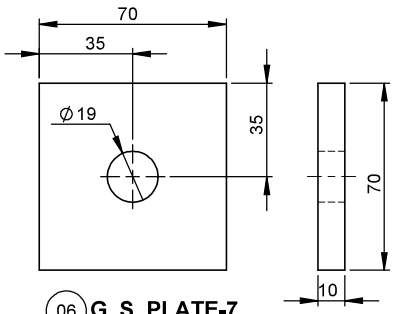


G_S_01_ASSY

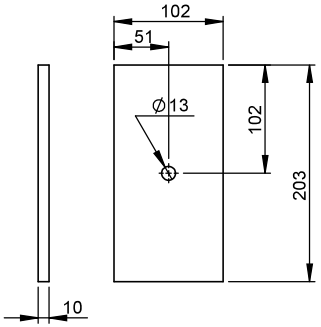
01 G_S_PLATE-1



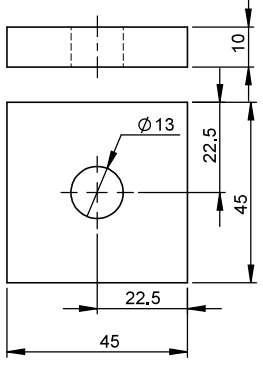
03 G_S_PLATE-5



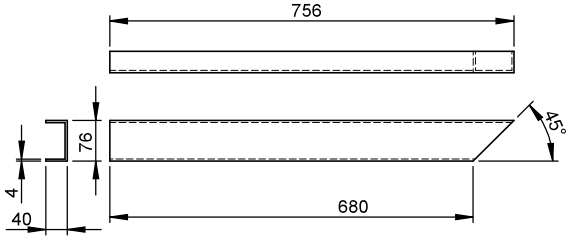
06 G_S_PLATE-7



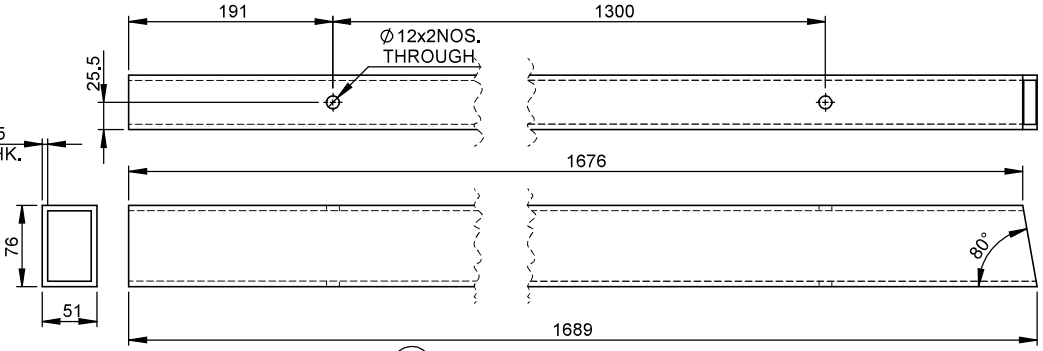
04 G_S_PLATE-3



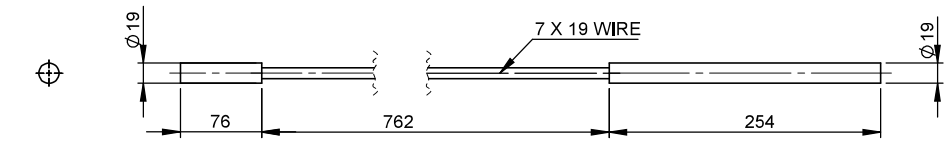
05 G_S_PLATE-4



08 09 G_S_C PLATE-2A



02 G_S_TUBE-1



07 G_S_V_S_CABLE

NOTE: 1. PART NO. 8 IS SAME AS PER PART NO.-9 ONLY CUT OPERATION (45°) IS MIRROR AS PART NO. -9

2. PART NO.02, 08, 09 SHOULD BE STANDARD SECTION.

SR. NO.	NAME OF PART	REF. DRG. NO.	MATERIAL	QTY.	WEIGHT (KG)	REMARKS
9	G_S_C PLATE-2A	---//---	CARBON STEEL	1		
8	G_S_C PLATE-2	---//---	CARBON STEEL	1		
7	G_S_V_S_CABLE	---//---	CARBON STEEL	1		
6	G_S_PLATE-7	---//---	CARBON STEEL	1		
5	G_S_PLATE-4	---//---	CARBON STEEL	1		
4	G_S_PLATE-3	---//---	CARBON STEEL	1		
3	G_S_PLATE-5	---//---	CARBON STEEL	1		
2	G_S_TUBE-1	---//---	CARBON STEEL	2		
1	G_S_PLATE-1	---//---	CARBON STEEL	1		

ANGULAR DIMENSIONS		LENGTH OR DIA	
UP TO 10	±1°30'	UP TO 6	±0.3
10-50	±1°	6-30	±0.5
50-120	±0°30'	30-120	±0.8
120-400	±0°15'	120-400	±1.2
OVER 400	±0°10'	400-1000	±2
SURFACE FINISH	▽ 8-25	▽▽▽ 0.025-1.6	
	▽▽ 1.6-8	▽▽▽▽ < 0.025	

ALL DIMENSIONS ARE IN MM

ASS'Y GROUP:

	MATERIAL	QTY.	
DRAWN BY	PINAKIN		19-05-21
CHECKED BY	ATUL		19-05-21
APPROVED BY	RAKESH		19-05-21

LIGO - India
Institute for Plasma Research,
Bhat, Near Indira Bridge Gandhinagar 382 428, Gujarat (india)

TITLE: GUIDED SUPPORT ASSEMBLY PARTS

SCALE: 1:1 / NTS

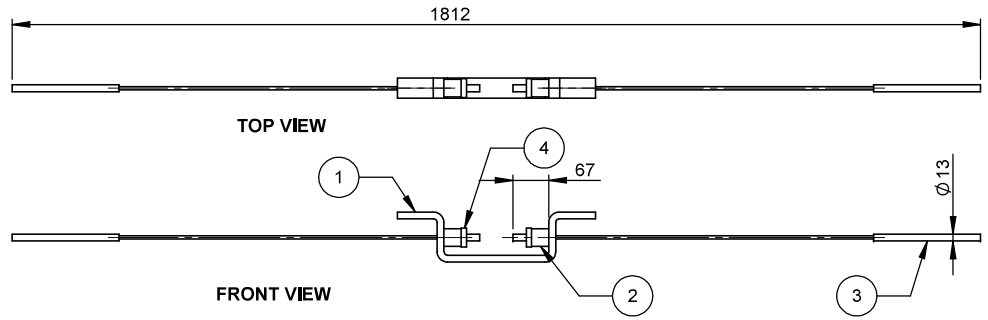
DRG.NO: LIGO-20-A3-LI_VISTA-05-SH02

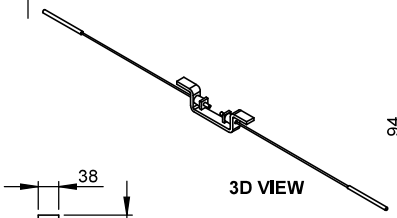
REV. 0

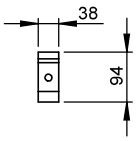
SHEET 2/3

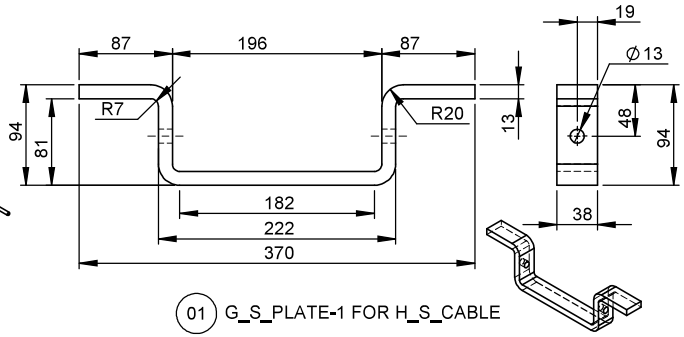
E:\Ligo_Drawings_Pinakin\GUIDED SUPPORT ASSY\

11-06-2021



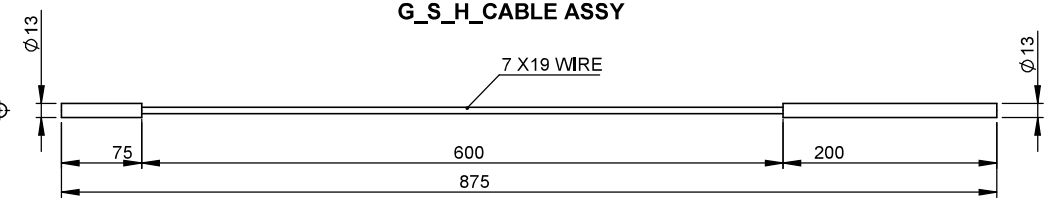




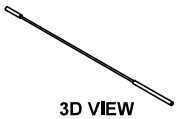


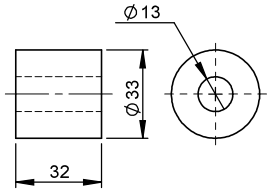
01 G_S_PLATE-1 FOR H_S_CABLE

G_S_H_CABLE ASSY

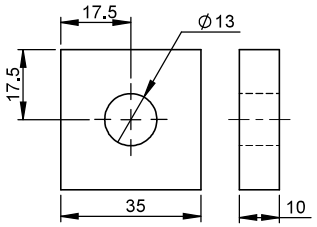


03 G_S_H_S_CABLE

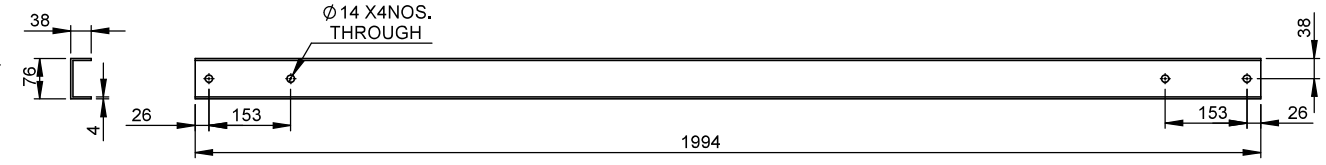




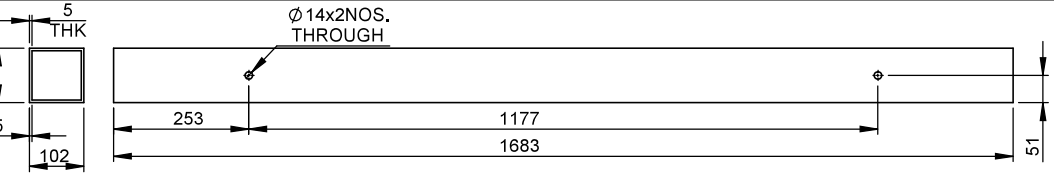
02 G_S_PIPE FOR H_S_CABLE



04 G_S_PLATE-2 FOR H_S_CABLE

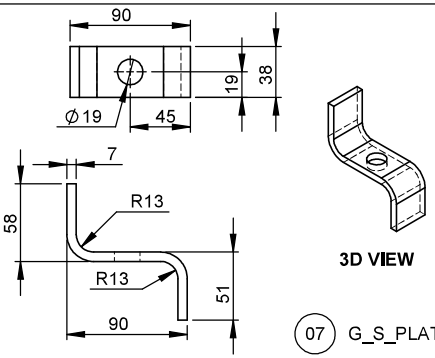


05 G_S_C PLATE-1

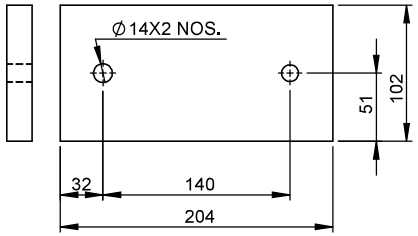


06 G_S_TUBE-2

NOTE: PART NO.05, 06 SHOULD BE STANDARD SECTION.



07 G_S_PLATE-6



08 G_S_PLATE-2

SR. NO.	NAME OF PART	REF. DRG. NO.	MATERIAL	QTY.	WEIGHT (KG)	REMARKS
8	G_S_PLATE-2	---//---	CARBON STEEL	--		
7	G_S_PLATE-6	---//---	CARBON STEEL	--		
6	G_S_TUBE-2	---//---	CARBON STEEL	--		
5	G_S_C PLATE-1	---//---	CARBON STEEL	--		
4	G_S_PLATE-2 FOR H_S_CABLE	---//---	CARBON STEEL	2		
3	G_S_H_S_CABLE	---//---	CARBON STEEL	2		
2	G_S_PIPE FOR H_S_CABLE	---//---	CARBON STEEL	2		
1	G_S_PLATE-1 FOR H_S_CABLE	---//---	CARBON STEEL	1		

ANGULAR DIMENSIONS		LENGTH OR DIA	
UP TO 10	±1°30'	UP TO 6	±0.3
10-50	±1°	6-30	±0.5
50-120	±0°30'	30-120	±0.8
120-400	±0°15'	120-400	±1.2
OVER 400	±0°10'	400-1000	±2
SURFACE FINISH	▽ 8-25	▽▽▽ 0.025-1.6	
	▽▽ 1.6-8	▽▽▽▽ < 0.025	

ALL DIMENSIONS ARE IN MM

ASS'Y GROUP:

MATERIAL	QTY.	
DRAWN BY	PINAKIN	19-05-21
CHECKED BY	ATUL	19-05-21
APPROVED BY	RAKESH	19-05-21

LIGO - India
Institute for Plasma Research,
Bhat, Near Indira Bridge Gandhinagar 382 428, Gujarat (india)

TITLE: GUIDED SUPPORT ASSEMBLY PARTS

SCALE: 1:1 / NTS

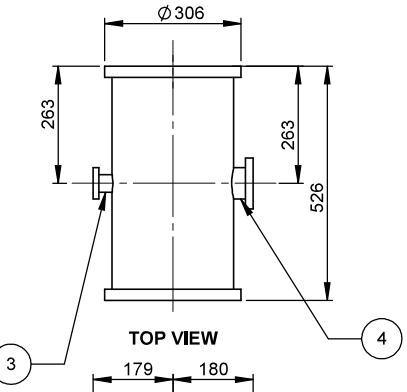
DRG.NO: LIGO-20-A3-LI_VISTA-05-SH03

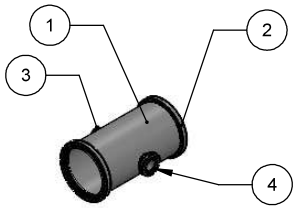
REV.: 0

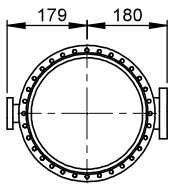
SHEET: 3/3

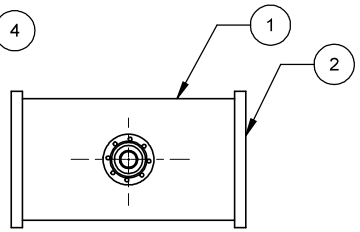
E:\Ligo_Drawings_Pinakin\GUIDED SUPPORT ASSY\

11-06-2021

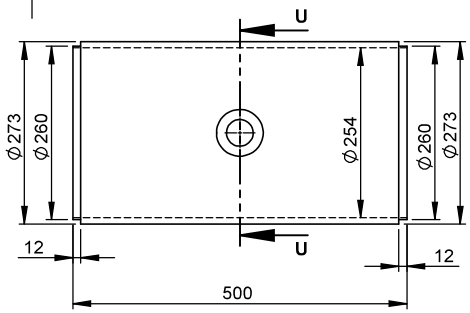


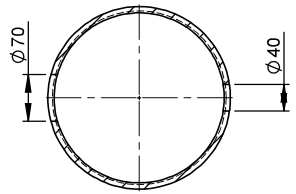




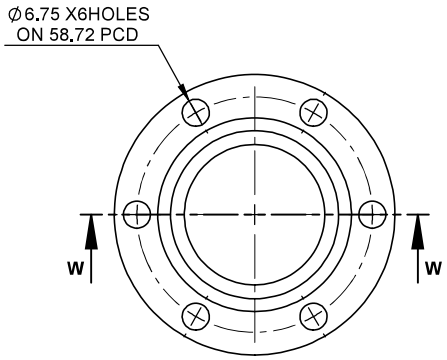


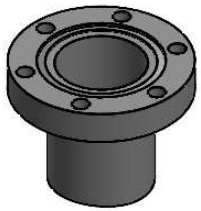
ADAPTOR ASSY

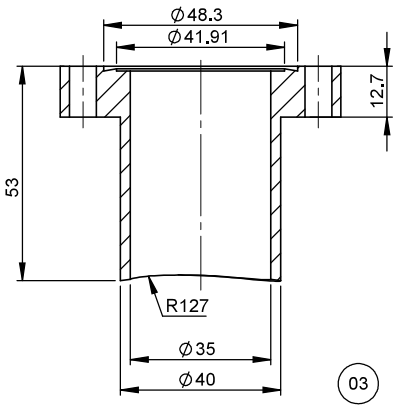


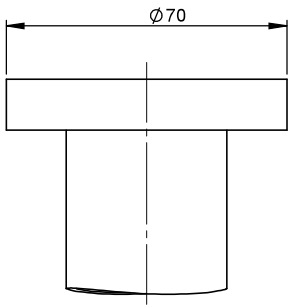


1 PIPE FOR 250 CF

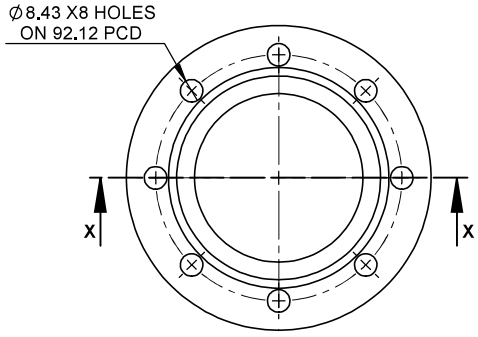


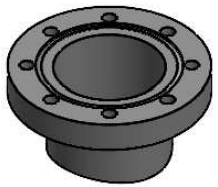


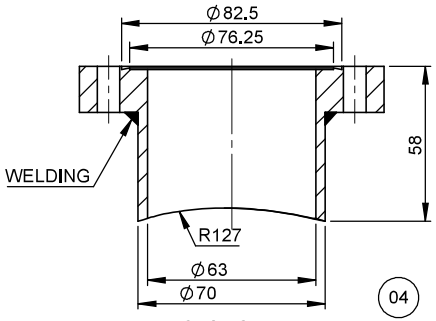


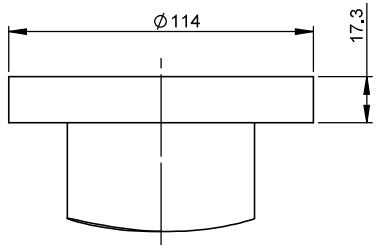


03 35 CF PORT









04 63 CF PORT

SR. NO.	NAME OF PART	REF. DRG. NO.	MATREIAL	QTY.	REMARKS
4	63 CF Port	---//---	SS304L	1	
3	35 CF Port	---//---	SS304L	1	
2	250 CF FLANGE	LIGO-20-A3-LI_VISTA-11-SH_01	SS304L	2	
1	PIPE FOR 250 CF	---//---	SS304L	1	

ANGULAR DIMENSIONS		LENGTH OR DIA	
UP TO 10	±1°30'	UP TO 6	±0.3
10-50	±1°	6-30	±0.5
50-120	±0°30'	30-120	±0.8
120-400	±0°15'	120-400	±1.2
OVER 400	±0°10'	400-1000	±2
SURFACE FINISH	▽ 8-25	▽▽▽ 0.025-1.6	
	▽▽ 1.6-8	▽▽▽▽ < 0.025	

ALL DIMENSIONS ARE IN MM

ASS'Y GROUP:

	MATERIAL	QTY.	WEIGHT
DRAWN BY	PINAKIN	19-05-21	
CHECKED BY	ATUL	19-05-21	
APPROVED BY	RAKESH	19-05-21	

LIGO - India
Institute for Plasma Research,
Bhat, Near Indira Bridge Gandhinagar 382 428, Gujarat (india)

TITLE: ADAPTER ASSY

SCALE: 1:1 / NTS

DRG.NO LIGO-20-A3-LI_VISTA-15-SH_01

REV. 0

SHEET 1/1

11-06-2021

TECHNICAL COMPLIANCE SHEET

Technical Compliance Sheet for Procurement of "Integrated Vacuum Vessel & Vacuum Equipment"

(To be filled by VENDOR and include in the tender bid)

Sr. No.	Section	Parameter / Text	Compliance	Vendor Response on the specification compliance Mention Specifics of bid input for reference
1	2.0	Scope		
		Co-ordination of sub-contractors	The VENDOR shall be responsible for coordination of all their subcontractors and for overall guarantees relating to mechanical or material compatibility. It is the specific responsibility of the VENDOR to invoke all reference specifications as applicable, in purchase order on each subcontractor.	
		Responsibility of the VENDOR to follow specified requirements in accomplishment of scope of work	All alternate approaches must be approved by the Buyer before use, which are proposed by VENDOR	
		Scope of supply	The scope of supply include installation at IPR site and testing to demonstrate compliance with functional requirements of integrated vacuum vessel assembly. Integrated vacuum vessel with equipments and control instrumentation display unit, dimension inspection, alignment checks, Helium leak test and demonstration of vacuum shall be performed complying site acceptance specifications.	
		Custom Duty exemption	IPR will not provide custom duty exemption certificate	
	2.1	Scope of Work	VENDOR shall prepare Fabrication / Engineering drawings based on the input reference drawings of major components and all associated minor components (essential) of vacuum vessel assembly.	
			SOLIDWORKS CAD tool shall be used for preparation of 3-D models and 2-D drawings.	
			VENDOR shall present a step-by-step procedural sequence of component	

Sr. No.	Section	Parameter / Text	Compliance	Vendor Response on the specification compliance Mention Specifics of bid input for reference
			assembly using 3D CAD-model for review by Buyer.	
		Stainless steel sheet material used in the fabrication of vacuum vessel shall be air-baked.	The recommended air baking parameters – soaking at 440 ± 8 deg. C, for 36 hours in electric operated baking oven.	
		VENDOR shall design all tools, fixtures & jigs (covering scope) necessary in integration of components	Tools for use in manufacturing, welding and assembly of major/minor components. VENDOR needs to design guide-rails/ self-guiding mechanism for roller /saddle supports	
		Site delivery, installation and testing	VENDOR shall unload and shift the delivered items at IPR site, assemble and integrate vessel with equipments on site in specified lab and demonstrate stated integrated performance	
		Support structure made up of carbon steel, shall be painted with spray paint (conformation of colour at later stage).	If VENDOR propose to use galvanised steel sections for support structure, he may include it in his proposal. This option will be an alternate to the painted carbon steel	
		Step by step assembly & integration of vacuum vessel shall be documented with photographs & drawings.	Detailed assembly and integration procedure will help in assembly and disintegration of vessel for future reference.	
		Vacuum vessel assembly and integration with vacuum equipments in cleanroom of at least **ISO-8 class.** Include details of proposed cleanroom	Vacuum Vessel Assembly and integration with the vacuum equipments and accessories shall be performed in Cleanroom (Class ISO 8 or better). Provide details of cleanroom technical parameters, floor area etc. to demonstrate assembly feasibility	
		Contents of this section should reflect in the bid	Read contents of this section and considered in the bid preparation	
	2.1.1	Scope of work at Delivery Site	Read contents of this Section	
	2.1.2	Provision of services to the contractor for site work	Read contents of this Section VENDOR should included details for Any additional requirement for site work for consideration of the Buyer.	
	2.1.3	Guidelines to prepare supplementary documents	Supplementary documents need to be prepared to accomplish SoW , Read contents of the Section	

Sr. No.	Section	Parameter / Text	Compliance	Vendor Response on the specification compliance Mention Specifics of bid input for reference
2	3.0	Reference Schedule	• VENDOR shall include a proposal for preliminary schedule in his bid • The VENDOR shall develop a detailed schedule with in two weeks after contact award and submit to Buyer	
3	4.0	Material	The VENDOR shall procure all materials (specified) for components of the vessel, tools, jigs, fixtures, etc. for the fabrication, assembly, testing of the vacuum vessel described in this specification.	
	4.1	Applicable standards (Noted the applicable standards, codes and their Priority.	Any discrepancies between document contents, and code & standards shall be brought to the attention of the Buyer for resolution.	
	4.2	Material grade selection guidelines	The material specification requirements for Vacuum Vessel assembly constituent part shall be followed as listed in table #2	
	4.3	Material Test Certificates	• Noted the details to be provided for procured material • Noted requirement of specimen coupons for testing by Buyer	
	4.4.1	Material cutting and machining	Read and noted Supplied guidelines	
	4.4.2	Rolling of shells	Read and noted Supplied guidelines	
4	5	Technical and Functional Requirements of Vacuum Vessel	Read and note technical details of Vacuum Vessel Noted on Vessel axis elevation and tolerance on this dimension	
	5.1	Functional Requirement of Vacuum Vessel and Support Structure	Noted the details provided - Vacuum Vessel assembly functional requirements at room temperature (table #3)	
	5.2	Dimensions and tolerances of Vacuum Vessel (10 m) Section	ID: 1240.0 mm OD: 1246.4 mm (with wall thk.: 3.2 mm) Length: 10 m Read and noted tolerances in table #4. Bid include proposed tolerances	
	5.3	Design Verification		

Sr. No.	Section	Parameter / Text	Compliance	Vendor Response on the specification compliance Mention Specifics of bid input for reference
	5.3.1	Evaluation of input data	Evaluate "Vacuum vessel" input drawings, in context with technical specifications and functional requirements (comprising of dimensions with tolerances, surface finish, weld joints, lifting lugs locations) listed in Table #3 & #4, in assessment of manufacturing feasibility of vessel parts assembly. Vendor shall be responsible to accomplish functional requirements of Vacuum Vessel sections in manufacturing and demonstrate them during testing as defined in subsequent Section #5.13	
	5.3.2	Design of Support Structure for vacuum vessel assembly	Perform design calculations as per ASME Sec. VIII Div.-1 for vacuum vessel with stiffeners, bellows and large gate valve assembly considering applicable load cases **to develop support structure** In addition to this, suitable support structure shall be designed for all vacuum equipments connected with vacuum vessel assembly (Fig 4 layout) Noted the content of this section	
	5.4	Welding	5.4.1 Welding quality 5.4.2 Welding Requirements 5.4.3 Applicable Specifications Noted the content of these sections	
	5.5	Fasteners (VENDOR shall supply 15% quantity as spare fasteners)	All bolted joints shall use metric fasteners, made up of austenitic stainless steel (SS-316) Refer Section 4.2, **Table 2**.	
	5.6	Pipes, Bellows and pipe fittings	Material grade as per section 4.2 Bellows Specs as per section 5.6.1 Read the contents of this section	
	5.7	Standard Vacuum Equipments and Instruments - VENDOR should procure equipments and accessories included in the scope of supply from original equipment manufacturer or their authorised agents	As per technical specification guidelines provided in Appendix – 01 Noted – (equipment layout – Fig #4) 5.7.1 Scope 5.7.2 General Information 5.7.3 Documentations 5.7.4 Integration & Demonstration of Functional specification	

Sr. No.	Section	Parameter / Text	Compliance	Vendor Response on the specification compliance Mention Specifics of bid input for reference
			5.7.5 Delivery Each equipment shall be considered as accepted by Buyer after successful accomplishment of site acceptance tests **Noted the contents of these sections**	
	5.8	20 m Vacuum Vessel Assembly alignment – Optimisation	Noted the guidelines provided - Vendor include brief description on their approach for Vessel assembly using individual segments Noted list of drawings included.	
	5.9	Reference Guideline drawings	Ref. guideline 2-D drawings list of Vacuum Vessel is noted (Table #7)	
	5.10	Tools and Fixtures	Noted the guidelines provided on need and use of tools and fixtures. Vendor shall formulate plan for fabrication including tools & fixtures and submit for approval of Buyer	
	5.11	Control Instrumentation Display Unit Vendor shall ensure requirements of interfaces between vessel and equipments in layout of control Instrumentation display unit	VENDOR shall procure equipments and instrumentation with accessories from OEM ensuring compatibility and reliability of operation in the integrated system under this procurement. The schematic of central control display unit is included in **figure 5.** For list of deliverables refer **section 10**.	
	5.12	Cleaning and Cleanliness	Noted guidelines on cleaning and cleanliness provided in this section. The VENDOR shall submit all cleaning procedures for approval to Buyer The VENDOR shall do quantitative analysis post cleaning for surface cleanliness assessment. The test procedure & other details shall be mutually agreed upon.	
	5.13	Inspection, testing and quality requirements	The VENDOR shall have in effect, Quality Assurance Plan specifying inspection, testing and documentation procedures that will ensure that the equipment furnished will meet in all respects the requirements of this specification. **VENDOR shall include their Quality Plan in bid submission**	

Sr. No.	Section	Parameter / Text	Compliance	Vendor Response on the specification compliance Mention Specifics of bid input for reference
			5.13.1 Scope definition 5.13.2 Documentation 5.13.3 Dimension Metrology 5.13.4 Inspection of welds 5.13.5 Helium Leak Testing and vacuum demonstration 5.13.6 Factory Acceptance Tests (FAT) 5.13.7 Site Delivery and Final Acceptance Tests (SAT) **Noted the contents in these sections**	
5	6.0	Repairs	VENDOR and Buyer shall mutually discuss and agree upon the repair procedures for any defect observed during manufacturing or fabrication	
6	7.0	Identification	• Material identification and its traceability are important aspects to be established and followed through the project cycle of this procurement Noted the contents of this section	
7	8.0	Storage, Packaging, and Shipping	• VENDOR shall include in his bid the details of the storage floor area, handling provisions and plan for contamination control. • All components shall be prepared for shipment per Buyer approved Procedure developed by the VENDOR. • The requirements of this section shall be incorporated in the Seller's procedure. Noted the contents of this section	
8	9.0	Painting	• Carbon Steel surfaces used in support structure shall be painted using buyer approved procedure and color • If Galvanised steel section are used in fabrication of support structure, then, the paining of surfaces is not necessary	
9	10.0	List of Deliverables	The deliverables shall be transmitted to purchaser, in • A – Digital form: soft copy & one hard copy (where applicable) (Table-8);	

Sr. No.	Section	Parameter / Text	Compliance	Vendor Response on the specification compliance Mention Specifics of bid input for reference
			• B – Physical form: Manufactured / standard bought out items include in Table-9 • C- Other details. • Vendor shall give an undertaking in his bid proposal, that he shall supply deliverables included herein at the end of completion of scope of work complying technical specifications Noted the contents of this section	
10	11.0	Non-Escort Privileges and Inspection Right	Non-escort privileges for IPR representatives to all areas of the facilities where the work is being performed shall be arranged. This will include access to all areas where material is being stored, processed or tested Noted the contents of this section	
11	12.0	Guarantee	• All manufactured components of vacuum vessel assembly shall be guaranteed for satisfactory operation consistent with the factory test results of vacuum demonstration and helium leak at least for a period of 12 months. • All vacuum equipments integrated with the vessel shall be guaranteed for at least one year from the date of site acceptance. • Noted the contents of this section	
12	Appendix – 01	Vacuum Equipments -	Contents of this appendix are noted and accordingly equipment specifications included in the bid - A. Roughing Pump B. TMPs with backing pumps	

Sr. No.	Section	Parameter / Text	Compliance	Vendor Response on the specification compliance Mention Specifics of bid input for reference
			C. Ion Pumps D. Residual Gas Analyser E. UHV gate valves F. Combination gauges G. Cold cathode Gauges	
13	Appendix – 02	Large size gate Valve	Large size UHV Gate valve is necessary to isolate vacuum vessel assembly A. 1250 mm UHV Gate valve VENDOR shall fill in corresponding details of listed specifications in table	

I/We have noted specified technical points of and provided corresponding specifications in the compliance listed in the table above. We have provided our response against each of the point included in the compliance matrix. We undertake to fulfil our compliance response mentioned above.

Place:

Date:

Signature of Bidder (With official seal)

SECTION ‘D’
FORMAT FOR SUBMISSION OF PART-II (PRICE)

Validate Print Help

Item Rate BoQ

Tender Inviting Authority: Head-Purchase Section, IPR

Name of Work: Fabrication of Vacuum Vessel, Integration with vacuum equipment, Large Size 1250 mm (50 inch) UHV Gate Valve and Vacuum Instrumentation, Factory Acceptance Tests, Supply and Installation at Institute for Plasma Research, Gandhinagar as per the detailed specifications mentioned in the tender documents

Tender No: IPR/TN/PUR/TPT/ET/21-22/008 Dated 09th Aug 2021

Name of the Bidder/ Bidding Firm / Company :	

PRICE SCHEDULE

(This BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevent 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	**INTEGRATED VACUUM VESSEL ASSEMBLY**					
1.01	Fabrication of Vacuum Vessel, Integration with vacuum equipment, Large Size 1250 mm (50 inch) UHV Gate Valve and Vacuum Instrumentation, Factory Acceptance Tests and Supply ((including unloading and shifting at site with required material handling equipments) at Institute for Plasma Research, Gandhinagar as per the detailed specifications mentioned in the tender documents [Comprising of 10 m Vacuum Vessel Section x 2 Nos. to be integrated with Bellows, Support Structure, Vacuum equipments with support structure listed in Appendix: 01 and Appendix: 02 (1250 mm UHV Gate Valve) of Section 'C' of tender specification (Deliverable list Included in Sr.10 of Section 'C').	1.000	System		**0.00**	INR Zero Only
1.02	Installation and testing charges for item no-1.01	1.000	Job		**0.00**	INR Zero Only
Total in Figures					**0.00**	INR Zero Only

Quoted Rate in Words	**INR Zero Only**