प्लाज़्मा अनुसंधान संस्थान
Institute for Plasma Research
Bhat, Gandhinagar 382 428, Gujarat, (India)
भाट, गांधीनगर ३८२ ४२८, गुजरात, (भारत)

निविदा आमंत्रण सूचना (एनआईटी)
Notice Inviting Tender (NIT)

निविदा सूचना TENDER NOTICE NO: IPR/TN/PUR/TPT/ET/21-22/041
दिनांकित DATED 04-02-2022

निदेशक, प्लाज़्मा अनुसंधान संस्थान (आईपीआर) के लिए और उनकी ओर से प्रमुख- क्रय एवं भंडार अनुभाग, प्लाज़्मा अनुसंधान संस्थान, क्रेता की निविदा विनिर्देशों के अनुसार अनुबंध के निष्पादन हेतु **दो भाग** में ऑनलाइन निविदाएं आमंत्रित करते हैं। निविदा आमंत्रण, निविदा शर्तें, अनुबंध की सामान्य शर्तें, अनुबंध की विशेष शर्तें और अनुबंध की अतिरिक्त शर्तें, यदि कोई हो, जो निविदा के अनुसार अनुबंध को नियंत्रित करेगी, संलग्न हैं।

बोली जमा करने के इच्छुक बोलीदाताओं से अनुरोध है कि वे इस दस्तावेज़ की सामग्री को देखें और सुनिश्चित करें कि निविदा आमंत्रण सूचना में निर्दिष्ट नियत तारीख और समय पर या उससे पहले और तकनीकी विनिर्देशों एवं नियमों और शर्तों के अनुसार बोली ऑनलाइन जमा करें और इसके साथ संलग्न प्रपत्र संख्या **e_IPR-PUR-103A** एवं **e_IPR-PUR-103B** डिजिटल रूप से हस्ताक्षरित या स्याही से हस्ताक्षरित वचनपत्र को अपलोड करें।

ऑफलाइन बोलियां हार्ड कॉपी सहित किसी भी रूप में स्वीकार नहीं की जाएगी।

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** 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 Nos. **e_IPR-PUR-103A** and **e_IPR-PUR-103B.**

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

प्रमुख-खरीद अनुभाग / Head-Purchase Section
निदेशक, आईपीआर के लिए और उनकी ओर से / For and on behalf of Director, IPR
(खरीदार / The Purchaser)

संलग्नक: ऊपर के रूप में। / Encl: as above.

निविदा सूचना TENDER NOTICE NO: IPR/TN/PUR/TPT/ET/21-22/041
दिनांकित DATED 04-02-2022

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.

कार्य/वस्तु विवरण / Work/Item Description	Design, Drawings, Manufacturing, Fabrication, Testing & Inspection, Factory Acceptance Tests, Supply and Site Acceptance Tests of Second Calorimeter alongwith Mandatory Spares at IPR as per the detailed specifications mentioned in the tender documents
निविदा शुल्क / Tender Fee	Not Applicable
बयाना राशि जमा (ईएमडी) / Earnest Money Deposit (EMD)	Rs. 9,60,000.00 **Earnest Money Deposit (EMD)** must be in the form of **Demand Draft drawn** in favour of "**Institute for Plasma Research**" payable at **Gandhinagar** and **a copy** thereof **must be uploaded along with quotation.** Demand Draft shall be sent to "**Head-Purchase Section, Institute for Plasma Research, Bhat, Near Indira Bridge, Gandhinagar-382428** in a **sealed envelope super scribing** boldly **Tender Number and Due date, so as to reach before the due date and time. Offers opened without receipt of EMD before due date and time will be rejected. EMD will be forfeited if the bidder withdraws or amends, impairs or derogates from tender in any respect within the period of validity of the tender.** **Exemption from Payment of EMD : As per Tender Document**
प्रकाशन तिथि / Publishing Date	**04-02-2022 at 18:00 Hrs.**
दस्तावेज़ डाउनलोड / बिक्री प्रारंभ तिथि / Document Download / Sale Start Date	**04-02-2022 at 18:00 Hrs.**
स्पष्टीकरण प्रारंभ तिथि / Seek Clarification Start Date	**04-02-2022 at 18:00 Hrs.**
स्पष्टीकरण समाप्ति तिथि / Seek Clarification End Date	**24-02-2022 by 17:00 Hrs.**
आईपीआर द्वारा स्पष्टीकरण का जवाब / Response to Clarification by IPR	**21-03-2022** by **17.00 Hrs**
बोली जमा करने की तिथि / Bid Submission Start Date	**22-03-2022** at **10.00 Hrs**
बोली जमा करने की अंतिम तिथि / Bid Submission Closing Date	**12-04-2022** at **13.00 Hrs**
भाग-I (तकनीकी बोली) के ऑनलाइन खुलने का समय और तिथि / Time and Date of online Opening of PART-I (Technical Bid)	**13-04-2022** at **14.00 Hrs**
भाग-II के ऑनलाइन खुलने का समय और तिथि (मूल्य बोली) / Time and Date of online Opening of PART-II (Price Bid)	**Will be declared later on**

पूर्व-बोली पूछताछ की प्राप्ति के बाद 04-03-2022 @ 10:30 **बजे पर वीडियो कॉन्फ्रेंस के माध्यम से विक्रेताओं के साथ प्री-बिड मीटिंग आयोजित की जाएगी। इच्छुक विक्रेताओं को 02-03-2022 पर या उससे पहले निम्नलिखित लिंक के माध्यम से पूर्व-बोली बैठक में भाग लेने के लिए सवयं को पंजीकृत करना आवश्यक है:**

https://forms.gle/Pis5gmn1ja796WSU6

पासवर्ड के साथ वीडियो कॉन्फ्रेंस के माध्यम से निर्धारित पूर्व-बोली बैठक में शामिल होने के लिए वेब लिंक को उन विक्रेताओं के साथ साझा किया जाएगा, जिन्होंने 03-03-2022 **तक केवल उपरोक्त लिंक के माध्यम से (पूर्व-बोली बैठक भागीदारी के लिए) पंजीकृत किया है। यदि, उन्हें वीडियो कॉन्फ्रेंस में शामिल होने के लिए लिंक प्राप्त नहीं होता है, वे निविदा आमंत्रण अधिकारी से** nodalofficer.et@ipr.res.in **पर संपर्क कर सकते हैं।**

कृपया ध्यान दें कि यदि इस निविदा में किसी भी प्रकार का स्पष्टीकरण आवश्यक हो, चाहे वह तकनीकी है या अन्यथा, तो बोलियां जमा करने से पहले स्पष्टीकरण प्राप्त करना होगा।

पात्रता मानदंड और निविदा दस्तावेज के साथ विस्तृत निविदा सूचना वेबसाइट https://eprocure.gov.in/eprocure/app **पर नि:शुल्क देखने और डाउनलोड करने के लिए उपलब्ध है। ई-निविदा प्रक्रिया में भाग लेने के लिए, उपरोक्त ई-निविदा पोर्टल पर पंजीकृत होना अनिवार्य है और डिजिटल हस्ताक्षर प्रमाणपत्र (कक्षा-**III) **होना आवश्यक है। नए पंजीकरण/निविदा के लिए, बोलीदाता नीचे दिए गए "ऑनलाइन बोली जमा करने हेतु निर्देश" पढ़ सकते हैं।**

इस एनआईटी की एक प्रति संस्थान की वेबसाइट **www.ipr.res.in** पर भी उपलब्ध है**|**

Pre-bid meeting with the vendors will be held through Video Conference on **04-03-2022** @ 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 **02-03-2022**:

https://forms.gle/Pis5gmn1ja796WSU6

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 03-03-2022. 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.

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** .

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'' areaavailable 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, withoutchanging 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 encryptiontechniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of bid opening. The confidentiality of the bids is maintained using the secured Socket Layer 128 bit encryption technology. Data storage encryption of sensitive fields is done. Any bid document that is uploaded to the server is subjected to symmetric encryption using a system generated symmetric key. Further this key is subjected to asymmetric encryption using buyers/bid opener's public keys. Overall, the uploaded tender documents become readable only after the tender opening by the authorized bid openers.

7) The uploaded tender documents become readable only after the tender opening by the authorized bid openers.

8) Upon the successful and timely submission of bids (i.e. after Clicking "Freeze Bid Submission" in the portal), the portal will give a successful bid submission message & a bid summary will be displayed with the bid no. and the date & time of submission of the bid with all other relevant details.

9) The bid summary has to be printed and kept as an acknowledgement of the submission of the bid. This acknowledgement may be used as an entry pass for any bid opening meetings.

ASSISTANCE TO BIDDERS

1) Any queries relating to the tender document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contact person indicated in the tender.

2) Any queries relating to the process of online bid submission or queries relating to CPP Portal in general may be directed to the 24x7 CPP Portal Helpdesk.

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

TWO-PART TENDER

INVITATION TO TENDER

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** 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 Nos. **e_IPR-PUR-103A** and **e_IPR-PUR-103B.**

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)

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DEFINITIONS AND INTERPRETATION

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

1.1 "BID" shall mean the quotation in response to the NIT submitted with EMD, if applicable and within the period mentioned in the NIT.

1.2 "BIDDER" means an individual, a firm, a limited liability partnership, a company whether incorporated or not, an association of person or joint venture who has submitted a bid to execute the contract and shall be deemed to include his successors, heirs, executors, administrators and permitted assignees, as the case may be.

1.3 "CONSIGNEE" shall mean the authorised representative or officer of the purchaser at the site to whom the stores are required to be delivered in the manner indicated in the contract.

1.4 "CONTRACTOR" means a successful bidder with whom a contract agreement has been entered to by the purchaser and shall be deemed to include his successors, heirs, executors, administrators and permitted assignees, as the case maybe.

1.5 "CONTRACT" or "PURCHASE ORDER" means and comprises of a letter or e- mailor ink signed or digitally signed document issued/sent by the purchaser conveying acceptance of bidder's/contractor's bid submitted in response to the NIT within the validity of the bid and any subsequent amendments/alterations thereto made on thebasis of mutual agreement.

1.6 "DELIVERY DATE" means date of completion of contract excluding warranty period and its obligations as stipulated in the contract.

1.7 "DIRECTOR, INSTITUTE FOR PLASMA RESEARCH" means the Director, Institute for Plasma Research, for the time being in the charge of the Purchase and Stores Department, IPR and includes Head- Purchase & Stores Department, Head- Purchase Section, Purchase Officer-II, Purchase Officer-I, Dy. Officer (Purchase) or Assistant Purchase Officer of the said Institute for Plasma Research or any other officer authorized in writing to execute the contract on behalf of the purchaser.

1.8 "EARNEST MONEY DEPOSIT (EMD)" means the deposit made in the form and manner specified in the NIT by the participating bidder towards bid security.

1.9 "HINDRANCE" means an event resulting in stoppage or delay of work because of the purchaser as recorded by the contractor and authenticated by the purchaser.

1.10 "INSPECTOR" or "QUALITY SURVEYOR" means any engineer/officer nominated and deputed by the purchaser or their appointed consultants or quality surveillance agency or any other person authorized by the purchaser from time to time to act as his representative for the purpose of inspection of stores under the contract.

1.11 "Notice Inviting Tender (NIT)" means invitation to tender, tendering condition, general conditions of contract, special conditions of contract, additional conditions of contract, if any and any other document mentioned thereto.

1.12 "PARTIES" mean the parties to the contract, i.e., the contractor and the purchaser named in the contract.

1.13 "PERFORMANCE SECURITY BANK GUARANTEE (PSDBG)" means the depositmade in the form and manner specified in this document by the contractor towards satisfactory performance of the contract till completion of the warranty period.

1.14 "PURCHASER" means Director, Institute for Plasma Research forthe time being the Head- Purchase and Stores Department or any other authorized officer and includes his successor or assignees.

1.15 "STORES" or "PLANT" means the materials, goods, machinery, plants, equipment or parts thereof specified in the contract which the contractor has agreed under the

contract.

1.16 “SUB-CONTRACTOR” means any contractor engaged by the contractor with the prior approval of the purchaser in relation to the contract.

TWO PART TENDER SECTION –A

Invitation to Tender and Tendering Conditions

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1. INVITATION TO TENDER

1.1 Head-Purchase and Stores Department, Institute for Plasma Research, for and on behalf of Director, Institute for Plasma Research (IPR), invites bids for execution of contract in accordance with the purchaser's technical specifications. The conditions of contract which will govern the contract pursuant to this tender are available in the NIT. Bidders who are in a position to be submitted online in Two Parts in English language as under:

1.2 PART-I (TECHNO-COMMERCIAL): This part of the bid shall include/contain all technical details, technical specifications, drawings submit their bid for the same as per the conditions stipulated in the NIT are requested to submit their bid in a manner and method specified in the NIT.

2 EMD

2.1 EMD where called for will have to be submitted by the participating bidder in the form and manner specified in the NIT so as to reach the purchaser at the address mentioned in the NIT on or before the due date and time mentioned in the NIT.

2.2 Non receipt of EMD as per Clause no. 2.1 above, will result in rejection of bid without any reference to the bidder, except in cases given under Clause no. 2.3 below.

2.3 The following categories of bidders are exempted from submission of EMD:

2.3.1 Bidders having valid registration with Directorate of Purchase and Stores, Department of Atomic Energy;

2.3.2 Micro and Small Enterprises having valid registration with MSME or NSIC or Udyog Aadhaar/ Udyam Aadhar in respect of procurement of goods and services, produced and provided by MSE and startups recognized by Department of Industrial Policy & Promotion (DIPP) are eligible for exemption according to government policies.

2.3.3 Foreign Bidder directly submitting bid (not through their Indian Agent or Indian Counterpart or Indian subsidy) in the currency other than INR.

2.4 Forfeiture of EMD

2.4.1 EMD shall be forfeited if the bidder withdraws or amends impairs or derogates from the tender in any respect within the validity of his bid.

2.4.2 If the successful bidder fails to furnish the required Security Deposit/ Performance Security Bank Guarantee (PSDBG), the EMD furnished shall be forfeited.

2.5 REFUND OF EMD

2.5.1 EMD of unsuccessful bidders will be returned within thirty days after finalization of the tender or after expiry of validity of their bid, whichever is later.

2.5.2 EMD of successful bidders will be returned within thirty days of submission of security deposit as called for in the contract.

3. MANNER AND METHOD FOR SUBMISSION OF BIDS

3.1 All bids in response to this invitation to tender shall, literature, reference to earlier supplies of similar stores along with quantity, time required for submission and approval of drawings, manufacturing and delivery period, inspection/testing procedure, itemized list of spares and quantity recommended by the bidder for purchase, term of price, mode and payment terms, mode of despatch, excluding any price details thereof. The bidder shall note that this part of the bid is purely techno-commercial.

3.2 The bidder shall not mention the price of the stores or the financial bid in the uploaded document as Part-I of the bid. If Bidder includes prices of the stores or the financial bid in Part-I (Techno-Commercial) of the bid, such bids will be rejected without any notice to the bidder.

3.3 Part-II (Price) of the bid shall be submitted strictly online in accordance with the format provided by the Purchaser.

3.4 The bidder shall quote cost of essential accessories and spares specified in the price bid format, wherever asked for, to make their bid complete in all respect as per purchaser's technical specifications in Part-II of bid.

3.5 If bidder indicates any changes of any nature of the Techno-Commercial bid or upload any technical document indicating changes of any manner/nature of Techno-Commercial bid in Part-II of the bid; such bids will be rejected without any notice to the bidder.

3.6 The bidder will co-relate the prices of stores in Part-II of the bid with the description of the stores indicated in Part-I (Techno-Commercial) of the bid in order to enable the purchaser to identify the prices with the corresponding stores in Part-I (Techno-Commercial) of the bid.

3.7 Both Part-I (Techno-Commercial) and Part-II (Price) of the bid should be submitted together online on or before the time and date specified for its submission in the NIT.

4 PRICE

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

5 PAYMENT TERMS

5.1 Standard payment terms for supplies made against this tender will be as indicated in Form no. IPR-P-100.

6 CONDITIONAL DISCOUNT

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

7 VALIDITY OF BIDS

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

8 ONE BID PER BIDDER

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

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

9 QUALIFYING REQUIREMENTS

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

10 PRE-BID MEETING

10.1 A pre-bid meeting for providing clarifications to the bidder will be held on-line unless otherwise specified, on the date and time mentioned in the NIT. Bidders participating in this tender and who have enrolled in our e-tender portal (https://eprocure.gov.in/eprocure/app) can login and upload their queries. Bidders are requested to upload their queries both Technical and Commercial well in advance at the eTender portal within the due date and time prescribed for the submission of queries. Queries/clarification/information sought in any other manner shall be ignored. Any modification to the tender, which may become necessary as a result of the pre-bid meeting, will be uploaded on the e-tender portal against the particular Tender ID. Bidders are requested to update themselves by visiting e-tender portal

(https://eprocure.gov.in/eprocure/app frequently. It may be noted that no queries will be entertained after the date and time for submission of queries. Therefore, bidders in their own interest should participate in the pre-bid meeting to understand the tendered requirements.

11 OPENING OF BID

11.1 Unless otherwise preponed or postponed, bids will be opened online in two stages on the date and time indicated in the NIT.

11.2 Part-I (Techno-Commercial) of the bid will be opened at the first stage on the due date and time indicated for opening in this NIT.

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

11.4 After completion of the evaluation of the Part-I (Techno-Commercial) of the bid, the due date and time for opening of Part-II (Price) of the bid shall be intimated to the bidders whose bids are found technically acceptable to the purchaser. The due date and time will also be displayed on the e-tender portal.

11.5 Part-II (Price) of the bid, whose Part-I of the bid is found to be techno-commercially acceptable to the Purchaser can be viewed.

12 DECLARATION OF HOLIDAY

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

13 EVALUATION OF BIDS

13.1 TECHNICAL CLARIFICATION

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

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

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

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

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

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

13.3.1.3 CIF price + taxes & duties as applicable =DDP

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

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

13.4 **CAPACITY AND FINANCIAL CAPABILITY**

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

13.5 **PAST PERFORMANCE**

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

13.6 **POST SUPPLY INSPECTION**

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

14 QUANTITY

14.1 Quantities mentioned in the NIT are approximate. One or more of the items of the stores tendered or a portion of any one or more of the items of such stores may be accepted by the purchaser. A bidder shall be bound to supply to the purchaser such an item or items or such portion or portions of one or more of the items as may be accepted by the purchaser.

15 INSTALLATION/ERECTION AND COMMISSIONING

15.1 Wherever, the purchaser's NIT includes installation and commissioning or supervision of installation and commissioning or erection and commissioning of the stores by the bidder, the bidder must clearly and separately quote the prices for the supply of the Stores and the charges for installation and commissioning or its supervision or erection and commissioning, as the case may be.

15.2 The bidder should not include charges towards installation and commissioning or its supervision or erection and commissioning in the price of the stores offered. In case of failure to quote separately, purchaser will deduct taxes as applicable on full contract value.

15.3 In respect of contracts involving installation and commissioning or its supervision or erection and commissioning by the contractor where identifiable charges for the same have been quoted, the contractor shall bear the tax liability as per the rates prevailing at the time of undertaking the job in accordance with the relevant Act/Laws in force in India.

15.4 When the scope of the contract includes installation and commissioning, it shall be the sole responsibility of the contractor to undertake the installation and commissioning as and when called for, by the purchaser.

16 TEST CERTIFICATE

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

17 OPERATION/INSTRUCTION MANUAL:

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

18 LEAFLET/CATALOGUE:

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

19 ACCEPTANCE OF BID

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

19.2 The purchaser also reserves the right to reject the bid, which is not in conformity with the conditions contained in this document or the instructions to bidders attached in NIT, if any including non-acceptance of submission of securities as called for in the NIT.

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

20 STATUTORY LEVIES SUCH AS GOODS AND SERVICE TAX

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

20.2 GOODS AND SERVICE TAX

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

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

21 CUSTOMS DUTY

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

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

22 FLUCTUATION IN THE STATUTORY LEVIES

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

23 AUTHENTICATION

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

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

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

and damages.

24 DELIVERY OF STORES FOR CONTRACT IN INDIAN CURRENCY

24.1 Bidder should note that the bid is liable for rejection by the purchaser unless the bidder offers to complete the contract within the delivery date specified by the purchaser. The prices quoted by the bidder should include all charges involved for direct and safe delivery of the stores to the place of delivery indicated by the purchaser. Purchaser will neither undertake responsibility for transit insurance nor pay for it separately. The bidder shall quote as per the delivery terms stated in the NIT.

24.2 The stores shall neither be despatched under 'purchaser's risk' nor consigned to 'self', but only to the consignee indicated in the contract. Non-adherence to this condition shall make the contractor liable to bear all consequential penalties/expenses such as demurrage, wharfage, etc. which the purchaser may incur.

24.3 The consignee will, as soon as possible, but not later than thirty days from the date of arrival of stores at destination notify the contractor of any loss or damage to the stores that may have occurred during transit to enable the contractor to repair/rectify the defects/damages or replace the stores as is appropriate, free of all charges. In case it is desired by the contractor for returning of the stores to them, all expenses towards transportation, etc. will be borne by the contractor and the contractor will also furnish bank guarantee as per format in Annexure for the payment already made by the purchaser to the contractor on this account, if any.

25. DOCUMENTS TO BE UPLOADED BY INDIAN BIDDER

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

26. PURCHASE/PRICE PREFERENCE

26.1 Purchase/price preference to industries will be given as per the policy of the Government of India in force at the time of opening of bids provided their bid is in compliance with the conditions of the policy.

26.2. PURCHASE PREFERENCE FOR MICRO & SMALL ENTERPRISES (MSE's):

26.2.1. Benefits, as prescribed by the MSME Policy of the Government of India shall be provided to MSE vendors registered as manufacturers for the goods procured or for the service providers for services to this Department. The procuring Entity reserves its option to give price preference to Micro and Small Industries in comparison to the large-scale industries as per policies of the Government from time to time.

26.3. MAKE IN INDIA:

26.3.1. As defined under the Public Procurement (Preference to Make in India), order 2017, Revised order dated: 16/09/2020 or as being revised from time to time, in procurement of goods or services in respect of which the Nodal Ministry/Department has communicated, that there is sufficient local capacity and local competition, only "Class-I local supplier', as defined under the said order, shall be eligible to bid irrespective of purchase value.

26.3.2. Only "Class-I local supplier" and "Class-II local supplier', as defined under the above said order, shall be eligible to bid in procurements under taken by this Directorate, except where the mode of procurement is by issue of Global Tender Enquiry. The bidding supplier shall indicate the percentage of local content for the item being offered in their bid.

26.3.3. Where the procurement is by issue of Global Tender enquiry, Non local suppliers, shall also be eligible to bid along with "Class-I local suppliers and Class-II local suppliers". Suppliers/bidders offering imported products will fall under the category of Non-local suppliers.

26.3.4. Subject to the provisions of the above said order, and to any specific instructions issued by the Nodal Ministry or in pursuance of the said order, purchase preference shall be given to "Class-I local Suppliers" in procurements under taken by this Directorate, in the manner specified there in the order.

26.3.5. The bidders along with their bid/tender shall be required to provide a self-declaration certificate of the local content (where the procurement value is Rs.10 Crore or less) for the item offered and their status as Class-I/Class-II/Non-Local supplier and their eligibility to participate in the tender as per Annexure-XI failing which bid will be rejected. In cases of procurement for a value in excess of Rs.10 crores, the "Class-I local supplier'/'Class-II local supplier' shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of Contractors other than companies) giving the percentage of local content.

26.3.6. Self-declaration certificate should quantify the percentage of local content of the offered product only. It should also indicate the location. However, claiming the services such as transportation, insurance, installation & commissioning, training and after sale service support like AMC/CMC etc., shall not be considered as local content as per OM N.P-45021/102/2019-BE-II-Part(1)(E-50310) dated:4/03/2021 issued by Ministry of Commerce and Industry, DPIIT.

26.3.7. False declarations/violation of this order terms shall be deemed to be breach of code of integrity resulting in debarment of the firm for a period up to 2 years. Under such circumstances, the supplier shall not be considered for any preferences as proposed in the order.

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

26.3.9. Bidders/contractors 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):

26.3.9.1. Class-I local supplier is with local content equal to or more than as prescribed by the Nodal Ministry/ NIT, if prescribed, for the item being procured or 50% whichever is higher.

26.3.9.2. Class-II Local supplier is with local content more than as prescribed by the Nodal Ministry/NIT, if prescribed, for the item being procured or 20% whichever is higher, but less than that applicable for class-I local supplier.

26.3.9.3. Non-local supplier is with local content less than that applicable to class-II local supplier, as stated above.

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

26.4. GLOBAL TENDER:

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

26.5. ELIGIBILITY OF BIDDERS FROM SPECIFIED COUNTRIES:

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

26.5.2. 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.

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

27. FREE ISSUE MATERIAL (FIM): (This clause shall apply only to contract for supply of fabricated stores with purchaser's FIM)

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

27.2 RISKS TO BE COVERED: Any loss or damage to the FIM due to fire, theft, riot, burglary, strike, civil commotion, terrorist act, natural calamities, etc. and any loss or damage arising out of any other causes such as other objects falling on FIM while in his possession including transit period.

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

27.3 Notwithstanding the insurance cover taken out by the Indian contractor as above, the contractor shall indemnify the purchaser and keep the purchaser indemnified to the extent of the value of FIM to be issued till such time the entire contract is executed and proper account for the FIM is rendered and the left over/surplus and scrap items are returned to the purchaser. The contractor shall not utilize the FIM for any job other than the one contracted out in this case and also not indulge in any act, commission or omission or negligence which may cause/result in any loss/damage to the purchaser and in which case, the contractor shall be liable to pay full compensation to the purchaser to the extent of damage/loss as assessed by the purchaser. The decision of the purchaser will be final and accepted by the contractor. The contractor shall be responsible for the safety of the FIM after these are received by him and all through the period during which the materials remain in his possession/control/custody. The FIM on receipt at the contractor's works shall be inspected by him for ensuring safe and correct receipt of FIM. The contractor shall report the discrepancies, if any, to the purchaser immediately but not later than five working days from the date of receipt of FIM. The contractor shall take all necessary precautions against any loss, deterioration, damage or destruction of the FIM from whatever cause arising whilst the said FIM remain in his possession/custody or control. The FIM shall be inspected periodically at regular intervals by the contractor for ensuring safe preservation and storage and maintain inspection report. The contractor shall also not mix up the FIM in question with any other goods and shall render true and proper account of the FIM actually used and return balance/remaining/unused FIM on hand and scrap within the delivery date. If it is not possible to return balance remaining unused FIM on hand and scrap within

the delivery date, the contractor hereby authorizes the purchaser to deduct the difference between the cost of FIM supplied and the cost of FIM actually used from the amount payable to the contractor. The contractor shall also indemnify the purchaser to compensate the difference in cost between the actual replacement cost of FIM lost/damaged and the claim settled in favour of the purchaser by the insurance company. The decision of the purchaser, as to whether the contractor has caused any loss, destruction, damage or deterioration of FIM while in his possession, custody or control from whatever cause arising and also on the quantum of damage suffered by the purchaser, shall be final and binding upon the contractor.

27.4 Wherever the contract envisage supply of FIM by the purchaser to the foreign contractor for fabrication of the stores, such FIM shall be safeguarded by a Bank Guarantee to be provided by the contractor at his own cost for the full value of FIM and the Bank Guarantee shall cover, the risks mentioned in Clause 27.2 and 27.3 above and shall be valid for six months beyond the delivery date.

27.5 FIM will be issued to the contractor only after receipt of the insurance policy/Bank Guarantee from the contractor. The contractor shall arrange collection of the FIM from the purchaser's premises and safe transportation of the same to his premises at his risk and cost.

28. BIDS FROM INDIAN AGENTS ON BEHALF OF FOREIGN CONTRACTOR

28.1 Indian agents are allowed to quote on behalf of only one foreign contractor against this tender.

28.2 In case the bid is submitted by an Indian bidder or Indian agent on behalf of their foreign contractor, following documents is required to be uploaded with the bid, failing which, bid is liable to be rejected without further notice to the bidder.

28.2.1 Copy of the agency agreement between the principal and the Indian agent showing the percentage or the quantum of agency commission payable and included in the price quoted and a valid letter of authority from the principal authorizing the Indian agent to submit the bid on their behalf should be uploaded with the bid. The agency agreement shall be valid on the date of opening of bid and shall remain valid throughout the currency of contract.

28.2.2 The type and nature of after sales services to be rendered by the Indian agent.

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

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

30. PROHIBITION AGAINST USE OF THE NAME OF INSTITUTE FOR PLASMA RESEARCH WITHOUT PERMISSION FOR PUBLICITY PURPOSES

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

31. CONFIDENTIALITY

31.1 The drawings, specifications, prototypes, samples or any other correspondence/ details/information provided by the purchaser relating to the tender or the contract shall be kept confidential by the bidder or contractor as the case may be, and should not be disclosed or passed on to any other person/firm without prior written consent of the purchaser. This clause shall also apply to anyone claiming through bidder or contractor, i.e., the sub-contractors, consultants, advisers of the contractor and its employees, etc.

32. CANVASSING

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

33. EXPORT LICENCE/EXPORT PERMISSION

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

33.2 Establishment of letter of credit or similar payment instruments shall be done only after receipt of export license/export permission, if applicable the contract/ purchase order.

33.3 The contractor shall indemnify the purchaser against any consequences in respect of any end-use declaration they/their overseas principals may furnish to the government/government agencies of the country of origin of the Stores, while seeking export permission/license. It is, therefore, necessary that the contractor offering stores from foreign countries shall have thorough knowledge of export contract regulations prevalent in those countries.

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

34. END USE CERTIFICATE

34.1 Whenever an End Use Certificate is desired by the bidder, the same shall be clearly mentioned in the bid and the purchaser shall provide an End Use Certificate as per the format given below. The purchaser will not provide any other document/declaration in this regard.

END USE STATEMENT

"We hereby certify that the item/s i.e..... being procured from M/s…… against our Purchase Order No. IPR/…….…… dated …… will be used for……

We also certify that the item/s will not be used in designing, developing, fabricating or testing of any chemical, biological, nuclear, or weapons of mass destruction or activities related to it.

It is further certified that we will not re-export the Item/s prior to obtaining permission from the concerned authorities as may be required".

35. COMPLIANCE WITH THE SECURITY REQUIREMENTS OF THE PURCHASER

35.1 The contractor shall strictly comply with the security rules and regulations of the purchaser in force and shall complete the required formalities including verification from police and any other authority and obtain necessary prior permission for entry into the purchaser's premises, wherever authorized by the purchaser.

36. COUNTRY OF ORIGIN

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

37. TERMS AND CONDITIONS OF THE CONTRACT

37.1 It must be clearly understood that any contract concluded pursuant to this NIT shall be governed by the General, Special and Additional Conditions of the Contract as contained in the NIT. Bidder must, therefore, take special care to go through the NIT. It should also be realized that the General Conditions of Contract, Special Conditions of Contract and Additional Conditions of Contract, if any, contained in NIT is binding and

the bidder is willing to execute the contract as per the purchaser's terms and conditions of contract.

38. SAMPLES

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

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

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

39. DETAILS OF BANKERS

39.1 The bidder shall submit along with Part-I (Techno-Commercial Part) of the bid account details, IFSC code, the name and address of his bankers for refund of EMD and payment as applicable.

40. SUBMISSION OF DRAWINGS

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

41. SUB-CONTRACTING

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

42. SHOP/FACTORY EVALUATION, QUALITY SURVEILLANCE/ INSPECTION AND SUBMISSION OF PROGRESS REPORT

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

and free access to his factory/work/records to the inspector for the purpose of inspection or for ascertaining the progress of contract.

43. PACKING

43.1 Contractor shall note that packing for shipment shall be in accordance with the instructions outlined in this NIT. Each package shall be limited to the size and weights that are permissible under the existing air, sea or road cargo limits, as the case may be. Even when no packing specification is included in the NIT, it will be contractor's responsibility to provide appropriate packing depending upon the nature of the supply and the transportation and handling hazards. The stores shall be so packed and protected as not to suffer deterioration, damage or breakage during shipment and storage in a tropical climate.

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

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

44. DEVIATIONS TO PURCHASER'S TECHNICAL SPECIFICATIONS

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

45. SETTLEMENT OF COMMERCIAL TERMS AND CONDITIONS OF CONTRACT

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

46. PARTICIPATION OF INDIAN/OVERSEAS BIDDER IN THE TENDER

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

47. TERMS OF DELIVERY

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

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

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

47.2.1.1 List of Gateway Airports

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

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

47.2.2 For sea shipment: FOB (Port of despatch)

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

48. AGENCY COMMISSION

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

SECTION 'B'

FORMAT FOR SUBMISSION OF TENDER

Form No: e_IPR-PUR-103A

DECLARATION

Part-I (Techno-commercial) of Tender No:_____Dated_____

Bidder's Bid No:_____ Dated_____

From,
M/S_____
_____
_____

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

Dear Sir,

I / We have gone through the tendering conditions pertaining to the Two Part Tender and General Conditions of Contracts and Special Conditions of Contracts, if any

a. I/we hereby agree to execute the contract in accordance with the tender specifications incorporated in Section "D" of the tender document also agree to abide by General Conditions of Contract, Special Conditions of Contract contained in Section "C" of the Tender Document and Additional Conditions of Contract, if any.
b. Purchaser will be at liberty to accept any one or more of the items of Stores offered by us and I/We shall be bound to supply the stores as may be specified in the contract.
c. I/We hereby agree to keep our above mentioned bid valid for the period mentioned in the NIT.
d. Deviations to technical specifications contained in Section "D" of the tender documents are detailed in Annexure "A" of the tender form while deviations proposed to General Conditions of Contract and Additional Conditions of Contract, if any, are detailed in Annexure "B" to this tender.
e. Prices applicable are indicated in the price bid format of the tender.
f. I/We are also uploading herewith all the leaflet/ catalogue, etc. pertaining to the stores offered.
g. If I/We withdraw or modify the bid during the period of validity of if I/We are awarded the contract and I/We fail to submit a PSDBG before the deadline mentioned in the contract, I/We shall be suspended for a period of one year from being eligible to submit bids for contracts with Institute for Plasma Research.

Yours faithfully
Bidder
(Digitally signed or ink signed)

Form No: e_IPR-PUR-103B

DECLARATION

Part-II (Price) of Tender No:_____ Dated:_____
Bidder's Bid No:_____ Dated_____

From,
M/S_____
_____
_____

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

Dear Sir,

In response to purchaser's invitation to tender and as per the tender and contract conditions, the prices applicable for the contract as contained in Part-I (Techno-commercial) of our tender are indicated in the price bid format of the tender.

I/We hereby agree to keep our above mentioned bid valid for the period mentioned in the NIT.

If I/We withdraw or modify the bid during the period of validity or if I/we are awarded the contract and I/We fail to submit a PSDBG before the deadline mentioned in the contract, I/we shall be suspended for a period of one year from being eligible to submit bids for contracts with Institute for Plasma Research.

Yours faithfully
Bidder
(Digitally signed or ink signed)

SECTION 'C'

General Conditions of Contract and
Special Conditions of Contract

Form No. IPR-P-100

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

General Conditions of Contract
and Special Conditions of
Contract

Index

Clause No. Clause Title Page No.

SPECIAL CONDITIONS OF CONTRACT (Part-B)

PREAMBLE

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

PART-A

GENERAL CONDITIONS OF CONTRACT

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

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

2. DRAWINGS AND SPECIFICATIONS

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

In case any discrepancy is noted in the drawings and/or specifications and any interpretation of the same be required, the matter shall be referred to the purchaser for clarification which shall be binding upon the contractor. Otherwise, the contractor shall assume responsibility for the interpretation of the drawings and specifications including his sub-contractor(s).

In case any difference or dispute arises with regard to the true intent and meaning of drawings or specification or in case any portion of the same be obscure or capable of more than one interpretation, the same shall be decided by the purchaser whose decision shall be final.

All lettering on the drawings is to be considered as part of the specification and contract. In all cases figured dimensions are to be followed rather than those indicated by scale. Large scale drawings will take precedence over smaller scale drawings.
The contractor's drawings shall, when approved by the purchaser, be deemed to be included in the list of drawings which form part of the contract. The contractor shall not proceed with fabrication until all drawings associated therewith have been duly approved by the purchaser in writing or as specified in the NIT.

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

3. GENERAL WARRANTY

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

The contractor's bid to execute the contract in accordance with the technical specifications shall be deemed to be an admission on his part that he has fully acquainted himself with the details thereof and no claim shall lie against the purchaser on the ground that the contractor did not examine or acquaint himself fully with the technical specifications of the contract.

4. ALTERATIONS

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

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

5. PACKING

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

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

6. INSPECTION

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

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

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

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

The contractor shall provide the drawings, tooling, gauges, instruments etc. and extend all the help required for carrying out the inspection work.

The contractor shall produce an inspection plan to the purchaser's satisfaction notifying check points on the plan. The final inspection shall be conducted as per the approved quality assurance plan.

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

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

7. SECURITIES

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

7.1. Applicable for contracts in INDIAN RUPEE

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

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

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

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

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

Where the contractor fails to complete the contract within the delivery

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

7.3. PERFORMANCE SECURITIES

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

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

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

7.4. BANK GUARANTEE FOR FREE ISSUE MATERIAL

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

8. DELIVERY DATE – TIME IS THE ESSENCE OF CONTRACT

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

PHASED DELIVERY/MILESTONE

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

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

9. ADVANCE INTIMATION OF DELIVERY

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

10. EXTENSION OF DELIVERY DATE

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

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

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

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

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

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

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

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

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

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

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

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

12. INSPECTOR'S AUTHORITY

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

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

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

13. RECTIFICATION AND REPLACEMENT OF DEFECTIVE STORES

If the inspector finds that the contractor has executed any unsound or imperfect work, the inspector shall notify such defects to the contractor in writing with thirty days from the date of delivery and the contractor on receiving the details of such defects or deficiency, shall at his own expenses, within seven days or otherwise within such time as may be mutually agreed upon between the parties as reasonably necessary, proceed to alter, reconstruct or remanufacture the stores to the requisite standard and technical specifications according to the contract.

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

14. CONSEQUENCE OF REJECTION

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

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

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

15. RECOVERY OF SUMS DUE

Whenever any claim for payment arises out of or under this contract against the contractor, the purchaser shall be entitled to recover the sum by appropriating, in part or whole, the security deposited by the contractor or any payment which at any time may become due to the contractor under this or any other contract with the purchaser. If this sum is not sufficient to cover the full amount recoverable, the contractor shall pay to the Purchaser on demand the remaining balance due. Similarly, if the purchaser has or makes any claim, whether liquidated or not, against the contractor under any other contract with the purchaser the amount payable to the contractor under the contract including the security deposit shall be withheld till such claims of the purchaser are finally adjudicated upon and paid by the contractor

16. LIEN IN RESPECT OF CLAIMS IN OTHER CONTRACTS

It is agreed that any sum of money due and payable to the contractor under any contract may be withheld or retained by way of lien by the purchaser or any other person or persons contracting through the purchaser against any claim of the purchaser or such other person or persons in respect of payment of a sum of money arising out of or under any other contract made by the contractor with the purchaser or with other such person or persons.

It is further agreed term of the contract that the sum of money so withheld or retained under this Clause by the purchaser will be kept withheld or

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

17. WARRANTY

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

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

In case the contractor opts for return of stores for rectification/repair at their works, contractor shall furnish bank guarantee for the cost of stores as per Annexure-V or VI (as applicable) valid till acceptance of rectified/repaired Stores. Further the warranty period will get extended for the period the Stores were not available to the purchaser for his use. If the contractor, after such notification, makes default or delay in rectifying all such defects, deficiencies or failure to the satisfaction of the purchaser, the purchaser may take recourse to the remedies provided for in Section C Part-A Clause no. 11 and14.

18. PERMIT AND LICENSES

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

19. PATENT INDEMNIFICATION

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

In the event of any claim being made or action being taken against the purchaser in respect of the matter referred to in Clause No. 19.1 above, the contractor shall promptly be notified thereof and he shall at his own expense, conduct all negotiations for the settlement of the same and any litigation that may arise there from.

In the event of any designs, drawing, plans or diagrams or any manufacturing methods or process furnished by the contractor etc. constituting infringement of patent or any other protected rights etc. and use thereof is restrained, the contractor shall procure for purchaser, at no cost to the latter, the rights to continue using the same or to the extent it is possible to replace the same so as to avoid such infringement and subject to approval by the purchaser or modify them so that they become non-infringing, but such modifications shall otherwise be to the entire satisfaction of the purchaser.

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

20. MODE AND DOCUMENTATION OF PAYMENT

20.1. Payment for contracts in currency other than INDIAN RUPEES

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

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

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

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

20.2. PAYMENT FOR CONTRACTS IN INDIAN RUPEE

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

i) GST compliant invoice in favour of paying authority duly pre-receipted.

ii) Receiving voucher from Stores (RV).

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

21. STATUTORY DEDUCTIONS

The purchaser has the right to make statutory deductions from the payments made to the contractor as applicable on the date of making

such payment as per the provisions of relevant Act or Rules made there under. Appropriate certificate to that effect will be provided by the purchaser's paying authority.

22. AGENCY COMMISSION

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

INSURANCE FOR CONTRACTS IN CURRENCY OTHER THAN INDIAN RUPEE

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

23.MARKING

The marking shall generally be as under:

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

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

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

24. CODE OF INTEGRITY

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

(i) Prohibition of
   (a) making offer, solicitation or acceptance of bribe, reward or gift or any material benefit, either directly or indirectly, in exchange for an unfair advantage in the procurement process or to otherwise influence the procurement process.
   (b) any omission, or misrepresentation that may mislead or attempt

to mislead so that financial or other benefit may be obtained or an obligation avoided.

(c) any collusion, bid rigging or anticompetitive behavior that may impair the transparency, fairness and the progress of the procurement process.

(d) improper use of information provided by the procuring entity to the bidder with an intent to gain unfair advantage in the procurement process or for personal gain.

(e) any financial or business transactions between the bidder and any official of the procuring entity related to tender or execution process of contract; which can affect the decision of the procuring entity directly or indirectly any coercion or any threat to impair or harm, directly or indirectly, any party or its property to influence the procurement process.

(f) obstruction of any investigation or auditing of a procurement process.

(g) making false declaration or providing false information for participation in a tender process or to secure a contract;

(ii) Disclosure of conflict of interest.

(iii) Disclosure by the bidder of any previous transgressions made in respect of the provisions of sub-clause (i) with any entity in any country during the last three years or of being debarred by any other procuring entity.

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

25. LAW GOVERNING THE CONTRACT

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

26. JURISDICTION

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

27. SETTLEMENT OF DISPUTES

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

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

28. Arbitration

In the event of any dispute or difference arising out 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.

29. TRANSFER OF OWNERSHIP

29.1 Ownership of the stores supplied by the foreign contractor shall be transferred to the purchaser in accordance with the payment terms or INCOTERMS accepted.

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

29.3 Transfer of title shall not in any way absolve the contractor from his responsibilities and liabilities under the contract. Notwithstanding the

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

INTELLECTUAL PROPERTY RIGHTS

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

30. EXERCISING THE RIGHTS AND POWERS OF THE PURCHASER

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

31. TERMINATION OF CONTRACT

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

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

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

PART-B

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

SPECIAL CONDITIONS OF CONTRACT

1. RESPONSIBILITY FOR COMPLETENESS

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

2. FINAL TEST

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

3. REJECTION OF DEFECTIVE PLANT

If the completed plant or any portion thereof before it is finally accepted is found to be defective or fails to fulfill the requirements of the contract during the currency of the contract including warranty period, the purchaser shall give the contractor notice setting forth with the details of such defects or failure and the contractor shall forthwith rectify the defective plant or alter the same to make it comply with the requirement of the contract at the earliest and in any case not later than thirty days from the date of such intimation of the incident. In case the contractor fail to do so within the abovementioned time the purchaser may reject and replace at the cost of the contractor, the whole or any portion of the plant as the case may be, which is defective or fails to fulfill the requirement of the contract. Such replacement shall be carried out by the purchaser within a reasonable time and at reasonable price and to the same specifications as far as possible and under competitive conditions. The contractor shall be liable to pay to the purchaser the extra cost, if any, of such replacement procured and/or erected as provided for in the contract, such extra cost being the difference between the price paid by the purchaser under the contract for such replacement and the original price admitted in the contract placed with the contractor or the cost as determined by the purchaser out of the price admitted in the original contract, where separate price for such defective/rejected stores is not available in the contract. Contractor shall refund to purchaser any sum paid by the purchaser to the contractor in respect of such defective plant when rejected and no replacement is procured by the purchaser.

4. WARRANTY

The contractor shall provide warranty of stores supplied for a minimum period of twelve calendar months after the stores comprising plant/machinery/equipment/ instruments has been put into operation

(or a suitable mutually agreed longer period to be reckoned from the date of last major shipment depending upon the nature of the stores comprising plant/machinery/equipment/instrument) the contractor shall be responsible for any defects that may develop under conditions provided for in the contract and under proper use, arising from the faulty materials, design or workmanship in the plant or from faulty erection of the plant by the contractor, but otherwise and shall rectify such defects at his own cost when called upon to do so by the purchaser who shall state in writing such defects.

If it becomes necessary for the contractor to replace or renew any defective portions of the plant for purpose of rectification under this Clause, the provisions of this Clause shall apply to the portions of the plant so replaced or renewed until expiration of six months from the date of such replacement or renewal or until the end of the above mentioned period of twelve months whichever is later. If any defect is not rectified within a reasonable time, the purchaser may cancel the contract or part thereof whose decision will be final and binding on the contractor and the contractor will refund the money so paid to the contractor forthwith without any demur.

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

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

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

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

5. ERECTION AND COMMISSIONING

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

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

6. TRAINING

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

7. PAYMENT TERMS

7.1. FOR CONTRACTS IN INDIAN RUPEE ONLY

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

7.1.1.1. GST compliant invoice in favour of paying authority duly pre-receipted.

7.1.1.2. Original shipping release containing the stamp and signature of the purchaser's inspection authority.

7.1.1.3. Preliminary Inspection Report alongwith Material receipt confirmation documents from Stores.

And balance payment will be released against following documents:

i) Installation, commissioning and training certificate if applicable

ii) Receiving voucher receipt from Stores.

7.2. FOR CONTRACTS IN CURRENCIES OTHER THAN INDIAN RUPEE

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

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

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

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

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

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

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

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

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

i. Acceptance Report
ii. Receiving voucher from Stores

8. FORCE MAJEURE

DEFINITION OF FORCE MAJEURE

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

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

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

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

riot

state/region/country wide transporters strike

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

nuclear event causing nuclear radiation, radioactive

contamination NOTICE OF FORCE MAJEURE

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

DUTY TO MINIMISE THE EFFECT

The party or parties affected by the event of force majeure shall use reasonable efforts to mitigate the effect thereof upon its or their

performance of the contract and to fulfill its or their obligations under the contract

CONSEQUENCES OF FORCE MAJEURE

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

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

FORCE MAJEURE AFFECTING SUB-CONTRACTOR

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

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

9. LIMITATIONS

Anything in this Contract to the contrary not withstanding

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

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

10. HINDRANCES

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

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

ANNEXURE

BANK GUARANTEE/ HINDRANCE
REGISTER FORMAT

ANNEXURE-I: PERFORMANCE SECURITY BOND

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

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

1. WHEREAS on or about the (Date of the Purchase Order) M/s._____a Company incorporated under the Companies Act 1956 and having its registered office at _____
(hereinafter referred to as 'The Contractor') entered into an agreement bearing No. _____(hereinafter referred to as 'The Contract'), with Institute for Plasma Research acting through Director/ Head- Purchase and Stores Department/ Head-Purchase Section, Institute for Plasma Research, Bhat, Near Indira Bridge, Gandhinagar-382428. (hereinafter referred to as (Purchaser) for supply of _____(hereinafter referred to as 'The Equipment').

2. AND WHEREAS under the terms & conditions of the contract, the Contractor shall furnish Performance Security Bond for an amount of Rs. _ (Rupees _____only) representing 3% of the total value of the contract in the form of a bank guarantee, in a manner herein contained duly executed by a scheduled/nationalised bank towards satisfactory performance of the contract and performance of the equipment and against any loss or damage caused to or suffered or would be caused to or suffered by the Purchaser by reason of any breach by the said Contractor(s) of any terms and conditions contained in the said agreement. The Performance Security Bond shall be valid till satisfactory completion of Defect Liability Period covering the Warranty/Guarantee period of the equipment as per the terms & conditions of the said agreement.

3. NOW WE, the____(Bank) in consideration of the promises do hereby agree and undertake to pay to the Institute for Plasma Research, (the purchaser) on behalf of the Contractor, the said sum of Rs._____(Rupees _Only), the amount due and payable under the guarantee without any demur, merely on a demand from the Institute for Plasma Research stating that the amount claimed is due by way of loss or damage caused to, or suffered by, the Purchaser by reason of any breach by the said Contractor of any of the terms and conditions contained in the said agreement or by reason of the contractors failure to perform the said agreement or by reason of unsatisfactory performance of the equipment during the Warranty period. Any such demand, made on the bank, shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs._____ (Rupees _____only).

4. WE undertake to pay to the Purchaser the said sum of ₹_____ (Rupees_____Only), demanded notwithstanding any dispute or disputes raised by the Contractor(s), in any suit on proceedings pending before any Court or Tribunal relating thereto, our liability under this presents being absolute irrevocable and unequivocal. The payment so made by us under this bond shall be a valid discharge of our liability for payment thereunder and the Contractor shall have to no claim against us for making such payment.

5. WE HEREBY further agree that the decision of the Institute for Plasma Research as to the

amount of damages suffered by the Purchaser by reasons(s) of any breach by the said Contractor or whether the said equipment is giving satisfactory performance or not during the Warranty Period as per the terms and conditions of the said agreement, shall be final and binding on us.

6. AND WE, the_____(Bank) do hereby further agree that our liability hereinunder shall not be discharged by virtue of any agreement between the Purchaser and the Contractor whether with or without our knowledge and/or consent and shall remain in full force and effect during the period that would be taken for the performance of the said agreement or by reason of the Purchaser showing any indulgence or forbearance to the Contractor whether as to payment, time for performance, or any other matter whatsoever relating to the contract, which but for this provision, would amount to discharge of the surety under the law.

7. THIS guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor.

8. OUR Guarantee shall remain in force until_____and unless a claim under the guarantee is lodged with us within three months from the said date, all rights of the Purchaser under the guarantee shall be forfeited and we shall be relieved and discharged from all our liabilities hereunder.

9. Notwithstanding anything contrary contained in any law for the time being in force or banking practice, this guarantee shall not be assignable or transferable by the beneficiary. Notice or invocation by any person such as assignee, transferee or agent of beneficiary shall not be entertained by the bank. Any invocation of the guarantee can be made only by the beneficiary directly.

Dated the_____day of_____202_
For_____
(Indicate the Name of bank)

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

(By Indian/Foreign Contractor)

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

Whereas on or about the_____day of_____20 , M/s._____a company having incorporated their office at_____(hereinafter referred to as 'the Contractor') entered into an Contract No._____dt._____(hereinafter referred to as 'the Contract') with the Head-Purchase and Stores Department, Institute for Plasma Research, on behalf of the Director, Institute for Plasma Research (Hereinafter referred to as 'the Purchaser') for manufacture and supply of_____Nos. of (hereinafter referred to as the instrument') at a cost of_____(in words).

Whereas as per the terms and conditions of the Contract, the Contractor had delivered to the consignee all the_____Nos. of instruments, out of which_____No./s. of the instrument costing_____(in figure and words) was found defective and not working satisfactorily after its receipt by the consignee and therefore the instrument received from the Contractor was rejected by the Purchaser.

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

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

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

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

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

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

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

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

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

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

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

Dated the_____day of_____202_
For_____
(Indicate the Name of bank)

ANNEXURE VI: BANK GUARANTEE FORMAT FOR RE-EXPORT OF REJECTED EQUIPMENT FOR REPAIRS / REPLACEMENT.
(By local agents of foreign Contractor)

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

Whereas on or about the_____day of_____20 , M/s._____, a company having incorporated their office at_____(hereinafter referred to as 'the Contractor') entered into a Contract bearing No._____dt._____(hereinafter referred to as 'the Contract') with the Head-Purchase and Stores Department, Institute for Plasma Research, on behalf of the Director, Institute for Plasma Research, Gandhinagar, Gujarat, (Hereinafter referred to as 'the Purchaser') for manufacture and supply of Nos._____of (hereinafter referred to as the instrument') at a cost of_____(in figures and words). The Contract recognizes M/s._____(name and address) as the Indian agent of the Principals M/s._____in India.

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

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

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

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

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

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

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

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

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

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

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

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

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

Dated the_____day of_____202_
For_____
(Indicate the Name of bank)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Dated the_____day of_____202_
For_____
(Indicate the Name of bank)

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

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

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

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

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

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

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

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

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

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

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

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

Dated the_____day of_____202_
For_____
(Indicate the Name of bank)

ANNEXURE-X: FORMAT FOR HINDRANCE REGISTER

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

(To be printed in letter head)

Annexure-XI

Self-Certification under preference to Make in India order Certificate

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

_____

_____

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

Thanking You,

_____
Signature with date:
Name:
Designation:
Official Seal

(To be printed in letter head)

ANNEXURE-XII

Annexure to Bid Form: Eligibility Declarations

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

Tender No. IPR/

Tender Tile:
Bidder's Name: _____
(Address and contact details) Date:_____
Bidder's Reference No._____

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

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

Penalties for false or misleading declarations:

We hereby confirm that the particulars given above are factually correct and nothing is concealed and also undertake to advise any future changes to the above details. We 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)

SECTION 'D' :

TECHNICAL SPECIFICATIONS OF STORES

AND

DRAWINGS

Please see attachment to the tender

SECTION 'E' :

PRICE SCHEDULE

Please see attachment to the tender

Annexure-IV

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

ADDITIONAL CONDITIONS OF CONTRACT against

IPR Tender No: IPR/TN/PUR/TPT/ET/21-22/041 Dated: 04/02/2022

Following clauses are deleted in Form No. m_IPR-P-103

(Section–A)

a) 47.2

Following clause is modified in Form No. e_IPR-PUR-103

7 VALIDITY OF BIDS

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

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

PART-A

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

PART-B

a) 7.2

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

PART–A

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

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

PART–B

7.1 The Clause Sr. No. 7.1 under heading Payment Terms of Section-B "General Conditions of Contract" of Form No. e_IPR-PUR-103 (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 basic price of Item Sr. No. 1.0.1 of Price Schedule will be paid as an advance against approval of Fabrication Drawings of Calorimeter and on submission of Bank Guarantee for an equivalent amount from State Bank of India or any Indian Nationalized / Scheduled Banks as appearing in the second schedule of Reserve Bank of India (other than Co-Operating and Grameen Banks) on a non-judicial stamp paper of appropriate value valid till delivery of the system and on receipt of Proforma Invoice in triplicate.

b) 10% of basic price of Item Sr. No. 1.0.1 of Price Schedule will be paid as an advance against receipt of raw material at vendor site and after acceptance by IPR on the basis of tests reports submitted by vendor and on submission of invoice alongwith Bank Guarantee for an equivalent amount from State Bank of India or any Indian Nationalized / Scheduled Banks as appearing in the second schedule of Reserve Bank of India (other than Co-Operating and Grameen Banks) on a non-judicial stamp paper of appropriate value valid till delivery of the system and on receipt of Proforma Invoice in triplicate.

c) 60% of basic price of Item Sr. No. 1.01 of Price Schedule + 100% of all other charges will be paid after receipt of second calorimeter at IPR, Gandhinagar Site, its physical verification by representative of IPR and on receipt of Invoice in triplicate.

d) Balance 20% of basic price of Item Sr. No. 1.01 of Price Schedule and 100% of Item Sr. No. 1.02 of Price Schedule will be paid within 30 days after satisfactory completion of site acceptance tests (SAT).

7.4 ***The Clause Sr. No. 4 under heading Warranty of Section-B "General Conditions of Contract" of Tender Form No. e_IPR-PUR-103 (Terms and Conditions) is replaced with the Clause No. 10 of PART-A : Scope of Supply, Scope of Work and Technical Specifications of Second Calorimeter under Section-D of tender documents.***

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

Annexure – IX

Following Annexures are added in Form No. IPR-P-100

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

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

IMPORTANT NOTE:

1) **QUOTATIONS ARE INVITED IN INDIAN CURRENCY ONLY.**
2) **QUOTATIONS RECEIVED OTHER THAN "INR" QUOTE SHALL SUMMARILY BE REJECTED.**
3) **OFFERED PRICE SHOULD BE EXCLUSIVE OF APPLICABLE GST.**
4) **PARTIAL OFFER IS NOT ACCEPTABLE. OFFER RECEIVED FOR THE PARTIAL ITEM SHALL BE SUMMARILLY BE REJECTED**
5) **RATE MENTIONED AS "0" IN PRICE SCHEDULE SHALL BE CONSIDERED AS "WITHOUT ANY CHARGE/ FREE OF COST".**

Annexure – XIII

COMMERCIAL TERMS & CONDITIONS

IPR Enquiry/ Tender No. & Date	**IPR/TN/PUR/TPT/ET/21-22/041 dated 04/02/2022**
Item Description	Design, Drawings, Manufacturing, Fabrication, Testing & Inspection, Factory Acceptance Tests, Supply and Site Acceptance Tests of Second Calorimeter alongwith Mandatory Spares at IPR as per the detailed specifications mentioned in the tender document.

Sl. No.	PARTICULARS	REMARKS
I	**Name of the Bidder**	
II	**Bidder Bid 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)	
1	Price Term for Supplies offered in Indian Currency	FOR IPR Gandhinagar
3	**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 issuance of GST Concessional Certificate you shall charge GST on Supply Portion @5% only** **Goods and Service Tax for Service items: As applicable**	

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

Yours faithfully
Bidder
(Digitally signed or ink signed)

SECTION 'D' :

TECHNICAL SPECIFICATIONS OF STORES

AND

DRAWINGS

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

QUALIFYING REQUIREMENTS

ITEM DESCRIPTION	**Design, Drawings, Manufacturing, Fabrication, Testing & Inspection, Factory Acceptance Tests, Supply and Site Acceptance Tests of Second Calorimeter, its Mandatory Spares at IPR as per the detailed specifications mentioned in the tender document.**

Sr. No.	Criteria	Documents required to submit / upload
1	Quality Management System:- Bidder shall have valid ISO 9001:2015 certification	Valid ISO 9001 : 2015 certification
2	Technical Competence and work experience:- Bidder shall have in-house machining facility suitable to job and shall have past experience in manufacturing components involving precision machining	Executed Purchase Order(s) / work orders (unpriced copies), work completion certificates along with the technical details showing bidder's relevant experience and facility details, shall be supplied as a documentary evidence.
3	Technical Competence and work experience:- Bidder / their sub-contractor shall have past experience of EB welding of copper alloys, in last 10 years.	***In case of Manufacturer :-*** Executed Purchase Order(s) / work orders (unpriced copies), work completion certificates along with the technical details showing bidder's relevant experience, shall be supplied as a documentary evidence. ***In case of Sub-Contracting :-*** Bidder shall submit the documentary evidence as stated above (on behalf of sub-contractor) along with Bidder's agreement of association with the identified EBW sub-contractor.
4	Financial Capabilities:- Average annual turnover during FY 16-17, FY 17-18 and FY 18-19 shall be ≥ ₹ 6 Crores	Bidder shall submit the Audited Balance Sheets OR Chartered Accountant Certificate of the financial years 2016-2017, 2017-2018 and 2018-2019

	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

Our 2 Part Tender Notice No. IPR/TN/PUR/TPT/ET/21-22/041 dated 04-02-2022 for Design, Drawings, Manufacturing, Fabrication, Testing & Inspection, Factory Acceptance Tests, Supply and Site Acceptance Tests of Second Calorimeter, its Mandatory Spares at IPR

Technical Specification

Manufacturing, Testing and Supply of

Second Calorimeter

Part-A : Scope of Supply, Scope of Work and Technical Specifications

(Including Appendixes)

Dispatch Site

Institute for Plasma Research

Near Indira Bridge, Bhat Village, District Gandhinagar, Gujarat

Acronyms

IO	ITER Organization	
INTF	Indian Test Facility	
ASME	American Society of Mechanical Engineering	
ASNT	American Society of Non Destructive Testing	
ISO	International Standard Organization	
HTE	Heat Transfer Element	
NDT	Non Destructive Testing	
EBW	Electron Beam Welding	
MIP	Manufacturing and Inspection Plan	
TIG	Tungsten Inert Gas	
LPT	Liquid Penetrant Testing	
MPT	Magnetic Particle Testing	

Definition

To avoid misunderstanding, the meaning of the words utilized in the document is given below.

INTF	The Indian Test Facility in the Institute for Plasma Research, Gandhinagar, Gujarat dedicated to the "Full characterization of the Diagnostic Neutral Beam" for ITER. The prime objective of the facility is to install a full-scale test bed for the qualification of all diagnostic neutral beam parameters and the behaviour of the beam line components prior to installation and operation in ITER.
Bidder	The industry which applies for the Tender
Acceptance Test	These are the tests aimed to verify that the procured item satisfies all the requirements of the specifications.
Second Calorimeter	Components intended to procure under this tender notice.
Site	The location where the system or equipment object of these tender specifications will be installed. The Site considered in this document is the Indian Test Facility (IN TF) located at Institute for Plasma Research (IPR), Gandhinagar, Gujarat (India).
Supplier	The industry which will win the Tender.

Content:

Our 2 Part Tender Notice No. IPR/TN/PUR/TPT/ET/21-22/041 dated 04-02-2022 for Design, Drawings, Manufacturing, Fabrication, Testing & Inspection, Factory Acceptance Tests, Supply and Site Acceptance Tests of Second Calorimeter, its Mandatory Spares at IPR

1. Introduction

The Indian Test Facility (INTF) is a R&D facility under development at Institute for Plasma Research, Gandhinagar, Gujarat. This facility is dedicated to the "Full characterization of the Diagnostic Neutral Beam" for ITER. The prime objective of the facility is to install a full-scale test bed for the qualification of all diagnostic neutral beam parameters and the behaviour of the beam line components prior to installation and operation in ITER.

The INTF comprises of a large Vacuum vessel (VV) which houses Beam line components, Beam source, Cry sorption pumps, HV Bushing, and Beam diagnostics. It has interfaces with Data acquisition and control system and different power supplies with transmission line. The size of vacuum vessel is 10m long attached with 13m long duct together to accommodate 20.67m beam transport experimental setup. At the end of duct, a small vessel is provided which houses Second Calorimeter.

One of the objectives of INTF (as shown in fig. 1) is to characterize the beam transport for a span of 20.67m which is equivalent to the beam path travelled by the beam from its origin to ITER plasma. To characterize the beam from its initial production stage till its delivery, diagnostics play an important role for its safe and optimized operation. To estimate the power of the beam at the delivery point i.e., 20.67m, a Second calorimeter is designed.

Function of Second Calorimeter

The Second Calorimeter is designed to have two main functions.

- To dump all the beam power generated from beam source.
- To measure the temperatures on the dumping panels for beam diagnostics.

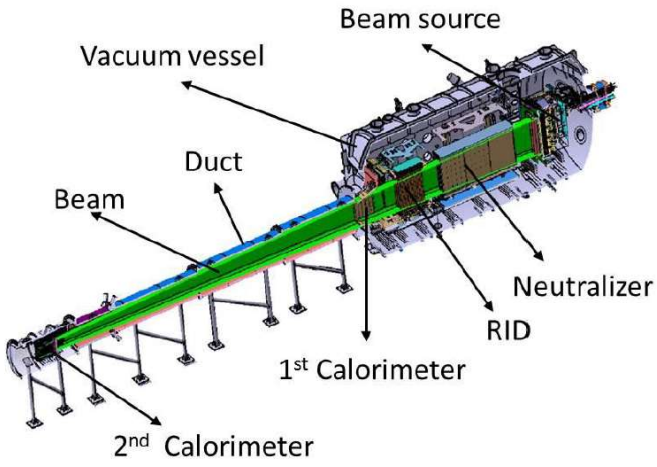


Fig 1: INTF test bed

This particular tender concern manufacturing, testing and Supply of the Second Calorimeter for Indian Test Facility

This document describes scope of supply / work and the technical requirements for the manufacturing, inspection & testing and supply of second calorimeter to IPR.

Second Calorimeter

Second Calorimeter (as shown in fig. 2) is a thermal sink component to be installed at the end of the INTF duct where focused neutral beams having power up to 2.8 MW and power densities of 66 MW/m^2 directed to dump on it.

It consists of two dumping panels formed by Heat Transfer Elements (HTE) which are actively cooled by demineralized water. These panels configured in V shaped to limit incident power densities of beam within 10 MW/m^2. From the vertex end both the panels have 21 HTEs and arranged in symmetric fashion about beam axis. However, two more HTEs are placed in the right panel which forms the tail to vertex in order to stop the beam escaping from the vertex end. In addition to avoid the heating of edged of HTEs, shadowing is done by providing offset of 1mm w.r.t adjacent. In each panel, HTEs are vertically mounted to optimize the number of HTEs. Each H.T.E. is 700 mm in length, 65 mm in width and 17 mm thick.

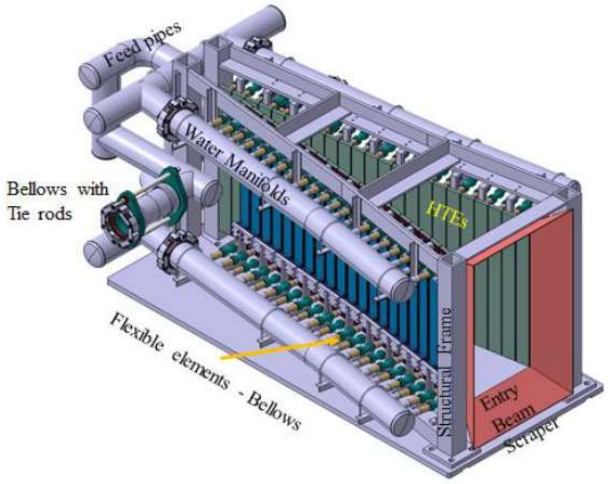


Fig 2: Second Calorimeter Assembly

HTE, made up of CuCrZr alloy as shown in Fig. 3(a) is the major element of Second Calorimeter assembly. HTEs are actively cooled and capable to remove the heat flux of ~10MW/m2. Cooling channels inside the HTEs are formed by machining of the fins in the HTE base plate which is then closed with a cover plate. Joining of HTE base plate to cover plate is realized by electron beam welding in lap configuration as shown in Fig. 3(b). The cover plate also has cooling water inlet and outlet SS connections welded on it using electron beam welding technique. It may be noted that the dissimilar CuCrZr to SS welding is realized by using a Ni interface. The inlet and outlet of each HTE is connected to a common inlet and outlet water manifold through metallic bellows. The transition joints between the SS adapter on the HTE bellows and the bellows and the water manifolds should be TIG welded. Also, each panel is provided with water manifolds and feed pipes for water supply and supported on structural frame separately. Each feed pipes are provided with flexible connections to compensate misalignment with vessel interface arise due to manufacturing errors.

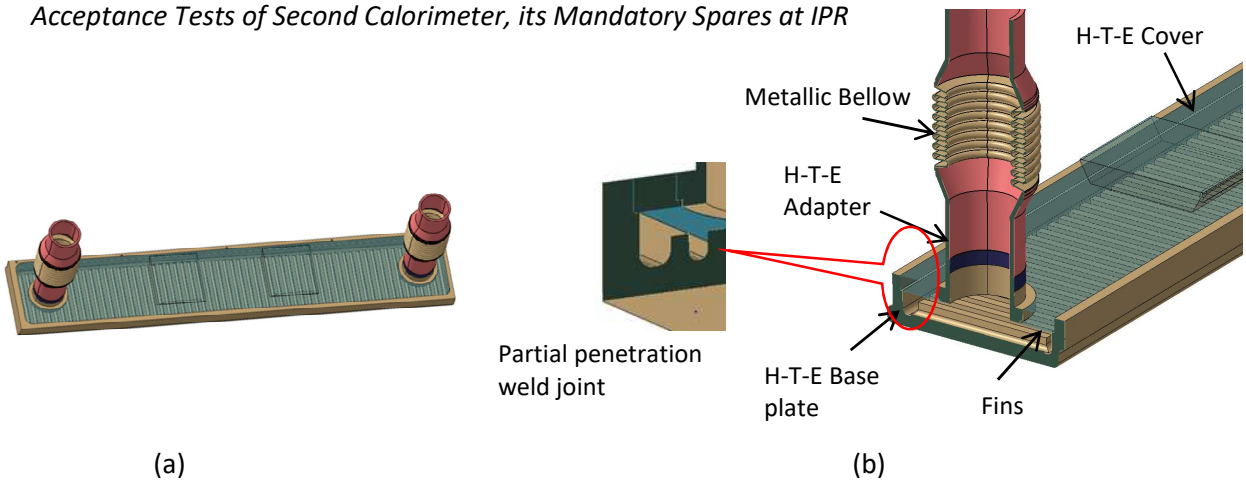


Fig 3 : (a) H-T-E assembly (b) Cross section of H-T-E assembly showing the sub-component details and weld configuration of H-T-E base plate to cover plate

Thermal sensors are installed in each of the Heat Transfer Element (H-T-E) , Out let of each H-T-E and the In /out cooling pipes for intended diagnostics.

2. Scope of supply

Basic Scope of Supply are as per below table.

2.1 Deliverables: Components

Sl. No.	Description	Quantity (Nos.)
1	Second Calorimeter as described in section 1	01

2.2 Deliverables: Mandatory Spares

Sl. No.	Spares Description	Qty (Nos.)	Remarks
1	Heat Transfer Elements (Type 1) for Second Calorimeter according to drawing no. HTE-T1-00-00 (HTE assy type 1), 01-01-01-02-01(Front Plate) , 01-01-01-02-02 (Cover plate), 01-01-01-02-03 (Adapter)	2	In finished condition
2	Heat Transfer Elements (Type 2) for Second Calorimeter according to drawing no. HTE-T2-00-00 (HTE assy type 2), HTE-T2-00-01 (Front plate), HTE-T2-00-02 (Cover plate), HTE-T2-00-03 (Adapter)	2	In finished condition
3	Spares (O rings, fasteners, blind flanges, bellows, Thermocouples, etc.)	20% of actual requirements	Bidder may propose any additional spare (other than those listed in Sl. No.2)

			based on his experience. The same shall be included in his technical proposal.

Important Note: Availability of spares shall be guaranteed for minimum 5 years from the delivery of equipment.

The broad scope of work is as given below:

1. Preparation of Manufacturing drawings of individual components, sub-assemblies & main assembly and submit the same to IPR for approval.
2. Preparation of following Manufacturing Documents (Please refer section 8 of this specification for the details of documents to be generated during the execution of this project) and submit the same to IPR for approval.
   - Quality Plan (QP)
   - Manufacturing and Inspection Plan (MIP)
   - Manufacturing Procedures
   - Welding related documents like weld data sheets, WPS, WPQR, WPQ
   - Inspection reports
   - Acceptance Test Plans
   - Certificates
3. Preparation of Deviation request & Non-conformance report (Whenever applicable) and submit the same to IPR for approval.
4. Procurement of all required raw material & brought out items in accordance to Appendix 1.
5. Design, procure & manufacture the Jigs & Fixtures required during all the phases of manufacturing of second calorimeter.
   Jigs & Fixtures required for Leak testing of Equipment at site, Transportation of equipment & Assembly of equipment at Site etc. are property of purchaser. The same shall be supplied along with supply of second calorimeter.
6. Manufacturing & Assembly of Second calorimeter as per drawings, technical specifications and Manufacturing & Inspection Plan (MIP) with the optimum and efficient method of manufacturing to meet the design & operational requirements.
7. Perform Heat Transfer Element type testing as prescribed in section 6.4.1 of this specification.
8. Testing & Inspection of the materials, parts, components & assembly at appropriate stages as per Technical Specifications.
9. Perform Factory acceptance test.
10. Preparation of as built drawings incorporating all the modification and amendment resulting from all the activities up to the assembly and testing on site.

If modification is developed in 3D environment (and then finalized on 2D drawing), 3D models shall be delivered in universal exchange format (.step) or equivalent, to be agreed between purchaser and bidder.

The above shall be made available in both reproducible hard copy and electronic copy.

11. Packaging, freight and insurance of all the components.
12. Transport & Safe delivery of components from manufacturing site to INTF Site, IPR Gandhinagar, India.
13. Perform the Site Acceptance Test.
14. Supply of Spares as mentioned in above table.
15. Bidder shall provide the sufficient & appropriate manpower at Site to perform the final acceptance of component at site.

    Bidder shall obey IPR safety rules during working at IPR Site.
16. Provide photographs of the special operation undertaking during manufacturing.

3 Delivery Schedule

All the deliverables mentioned in section 2.1 and 2.2 shall be delivered as follows;

Activity	Schedule
Date of Issue of Letter of Intent (LoI)	T0
Manufacturing drawing submission by bidder and its approval from IPR	T0 + 3 month
Delivery of Second Calorimeter (section 2.1) and Mandatory Spares (section 2.2) to IPR Site.	T0 + 24 month

The bidder shall present the detailed manufacturing schedule at the time of pre-bid and along with the bid. The deviation, if any from the above timeline shall be mentioned at the time of pre-bid.

4 Technical Specifications

Bidder shall follow the technical requirements specified in following specification to manufacture & supply of Second calorimeter.

Part-A: Scope of Supply/works and Technical Specifications

Appendixes

Appendix 1: Technical requirements for material

Appendix 2: Technical requirements for cleaning

Appendix 3: Technical requirements for pickling & passivation

Appendix 4: Technical requirements for welding & welding qualification

Appendix 5: Technical requirements for pressure testing

Appendix 6: Inspection & testing requirements

Appendix 7: Technical requirements for leak testing

Appendix 8: Technical requirements for thermal sensors

Appendix 9: Technical requirements for metallic bellows

Appendix 10: Technical bid format

5 Preparation of Manufacturing Drawing

The Bidder and possible sub-contractors shall use the build to print design & engineering drawings provided by IPR to develop all the manufacturing drawings. The details provided in the engineering drawings are comprehensive and provide necessary information to Bidder for the preparation of manufacturing drawings.

Bidder shall submit the manufacturing drawings to IPR for approval before start of manufacturing. Bidder shall prepare Manufacturing drawings for all sub components, sub-assemblies & final assembly indicating required details like Bill of material, weld joint design, welding process, dimensional tolerance, surface finish etc. Bidder shall assess and specify the tolerance on individual components such a way that it meets the assembly requirements of all interfacing components and also functional tolerance (as specified in the engineering drawings) are achieved.

Bidder shall use CATIA software / AUTOCAD software to prepare manufacturing drawings and 3D Model. If bidder want to use any other software than listed above, the same shall be proposed at the time of bidding.

6 Technical Requirements

This section includes the technical requirements of major manufacturing process involved in the manufacturing of second calorimeter with cross reference of relevant Appendixes describing detailed requirement for this process (as applicable). Bidder shall ensure the compliance of all the technical requirements (including those listed in the referred Appendixes) during the contract execution.

➢ Manufacturing process involved in Second Calorimeter Manufacturing

- Procurement of raw material (CuCrZr and Stainless Steel)
- Precision machining of SS and CuCrZr plates/pipes
- EBW of CuCrZr to CuCrZr and CuCrZr to SS316L through Ni transition
- TIG welding of cooling water manifolds to main water header
- Fabrication of Heat Transfer Element assembly, Support frame and Support structure
- Post weld Heat Treatment (i.e Aging treatment) of Heat Transfer Element after EBW (Refer section 6.2.4 for detail)
- Thermal Cycling of Heat Transfer Element assembly (including dissimilar joints i.e. CuCrZr-Ni-SS316L) before leak testing. (Refer Section 6.2.5 for detail)

- Cleaning after manufacturing

6.1 Material

Raw materials used in second calorimeter shall meet the requirement specified in Appendix 1.

Brought out items shall be procured according to Bill of Material of engineering drawings & applicable technical specification. All material shall be new and of specified quality.

Traceability of each material shall be maintained throughout all manufacturing process. Traceability documentation which cross-references component parts to material certificates shall be included in given documentation.

6.2 Manufacturing Process Requirements

General requirements

- Care shall be taken to avoid any contact of stainless steel and CuCrZr with carbon steel. Also, separate tools shall be used for fabrication of SS components.
- SS fabrication areas shall be kept separated from neighbouring fabrication areas to prevent contamination. However, should this infrastructure be not available to the bidder, he shall provide a plan for effective and safe implementation of this requirement, which shall be approved by IPR.
- The raw material, subassemblies and finished components shall be covered with polythene sheets to avoid contamination during storage
- Separate storage areas for S.S material away from C.S material shall be used and identification of all material and off cuts (like heat no, plate no., rolling direction etc.) Shall be maintained by transferring the same to other location before cutting.

6.2.1 Marking

- Marking shall not result in contamination of the material, significant strain hardening or sharp discontinuities.
- Marking shall be carried out in areas of minimum /no loading. No marking is permitted in areas of stress concentrations or in weld heat affected zones.
- Marking shall not affect interpretations of NDE results.
- Marking with ink stamps, indelible ink, paint and adhesive taps which are not vacuum compactible are not allowed.

6.2.2 Cuttings

- Cutting can be done either machining, grinding, shearing or plasma cuttings.
- In case of shearing the strain, hardened zone is subsequently to be removed by machining / grinding.
- During grinding local over heating of the material is to be avoided.

- Cutting and machining of CuCrZr plates and tubes shall be carried out with careful control of cutting and machining parameters in order to preserve the material aging status.
- After plasma arc cutting at least 1mm of metal is to be removed subsequently from the cut edges by grinding. The cut edges shall be checked visually for any cracks.
- Cutting fluids for use on components / parts shall be water soluble, non-halogenated and phosphorus and sulphur free and shall meet the requirements of DIN 51521. Bidder shall submit the list of cutting fluid to be used during the manufacturing before to IPR for approval before initiating the manufacturing activities.

6.2.3 Welding & Welding Qualification

Welding Qualification & Production welding of second calorimeter components / sub-assembly & final assembly shall be carried out in accordance to Appendix 4.

6.2.4 Post Weld Heat Treatment (Applicable for EB Welded CuCrZr component i.e Heat Transfer Element only)

- After completion of Electron Beam welding, Heat Transfer Element assembly (made of CuCrZr) shall be post weld heat treated (i.e. Aging treatment) at 475°C with a temperature variation of ±10°C for 3 Hours.
- To economies the process time few elements may be combined for one batch run.
- Post weld heat treatment shall be carried out in Vacuum furnace containing filament which are not exposed in vacuum.
- Vacuum furnace containing heating filament exposed in vacuum may be acceptable subject to condition that contamination shall exceed the limits given in following table. The measurement of concentration of contamination shall be carried out by Residual Gas Analyzer.

Table 1 : Allowed concentration of contamination

General Contaminants	Perfluoropolyphenylethers Sum of (peak at 69 and 77 amu)	Chlorinated species (Sum of peaks at 35 and 37 amu)
0.1	0.01	0.01

6.2.5 Thermal Cycling of Component

Component which includes weld joints of dissimilar material (i.e. Heat Transfer Element assembly) shall be subject to minimum three thermal cycle from the ambient to maximum possible operating temperature (i.e 350 C). Leak test (at room temperature) of such component (H-T-E assembly sub-components having dissimilar material joints) shall be done before & after thermal cycling.

6.2.6 Draining & Drying

Components delivered to site shall be dry internally and externally. Any internal volumes wetted during acceptance testing shall be drained completely and dried by purging with dry air until the purge gas has a water content of < 4000 ppm . The volumes will then be left at atmospheric pressure of dry air for a minimum period of 24 hours at ambient temperature. If after that time, the water content of the enclosed gas has risen to >4000 ppm, the drying process shall be repeated until this condition is met.

6.2.7 Surface cleaning

- Surface of the components shall be cleaned in accordance to Appendix 2.
- Second Calorimeter components shall be compatible with an operation in a high vacuum environment.
- Average surface roughness of components shall be less than 6.3Ra (µm).
- Deviations, if any shall be managed in accordance to non-conformity and deviation request procedures.

6.3 Instrumentation

Instrumentation for Second calorimeter shall be as per Appendix 8

6.4 Acceptance Requirements

6.4.1 Heat Transfer Element Type test

Heat transfer Elements are identified as a critical component of Second Calorimeter and Electron beam welding is the key technology to ensure the leak tightness as per the specification. To ensure the reliability of the EBW process, the very first H-T-E shall be qualified for the following tests before initiating the mass production EB welding.

Test Description	Requirements & Acceptance Criteria
Dimensional Inspection	Approved Manufacturing drawing of H-T-E assembly
Pressure Test	Appendix 5
He Leak test	Stage 1 Section 4.2 of Appendix 7

Successful completion of the above tests on first H-T-E establishes the reliability of EB welding process. Thereafter bidder will be allowed to EB weld the sub sequent H-T-Es of the production batch.

It is also important to note that to meet the delivery schedule, bidders are encouraged to complete the material production, machining and keep all the HTEs ready to EB weld

in parallel to the above Type test. This will enable the initiation of mass production EB weld as soon as the Type test is successful.

Should there be any clarification required on the above methodology of execution, the bidders are requested to raise them at the time of pre-bid.

6.4.2 Acceptance Test at Factory

The Bidder is responsible for checking that all items conform to the contractual requirements as set out in the contracts between the Bidder and IPR.

Various tests as described below shall be performed during manufacturing (i.e. In-process inspections) and after completion of Final assembly (i.e. Final acceptance of component before delivery to IPR site).

- **During Manufacturing of Component (In-Process inspection)**

Test Description	**Requirements & Acceptance Criteria**
Raw material Inspection	Appendix 1
Weld Qualification	Appendix 4
Production welding Inspection & tests	Section 7.3 of Appendix 6
Visual Inspection	Section 7.1 of Appendix 6
Dimensional Inspection	Approved Manufacturing Drawing Section 7.2 of Appendix 6
Heat Transfer Element type test	Section 6.4.1 of Part-A
Flow test of 01 No. Heat Transfer Element assembly	Section 7.4 of Appendix 6

- **After Final Assembly of Component (Final acceptance before delivery _i.e. FAT)**

Test Description	**Requirements & Acceptance Criteria**
Visual Inspection	Section 7.1 of Appendix 6
Dimensional Inspection	Approved Manufacturing Drawing Section 7.2 of Appendix 6

Pressure test	Appendix 5
He Leak test	Appendix 7

After successful completion of Factory acceptance test, shipping clearance (i.e Release note) will be issued by IPR.

Bidder shall provide appropriate packing provisions and also submit the transportation plan so as to ensure that the integrity & cleaning of second calorimeter are preserved until its arrival at the site.

Acceptance of the test results and certificates does not relieve the bidder from the responsibility for compliance with all the contractual requirements.

6.4.3 Site Acceptance Test (SAT)

After delivery of components to INTF Site, Bidder shall repeat the some of the acceptance test (as mentioned below) in the presence of IPR representative.

Final Site Acceptance tests include ;

Test Description	**Requirements & Acceptance Criteria**
Visual Inspection	1. Check for the physical state and condition of the packing for possible damage during transportation 2. Accelerometer check 3. Unpacking of package and check following on component; - Component's cleaning and conservation - Visually check the transportation damage (if any) on the component
Pressure test	Appendix 5
He Leak test	Appendix 7

If any of the Site Acceptance Tests prescribed in the present specification reveals a defect due to a fault or damage during transport or unloading, the Bidder shall perform an urgent and effective repair or shall guarantee the replacement of the faulty component free of charge, managing the repair or replacement by means of a proper non-conformity management procedure.

After positive results of all the Site Acceptance tests, delivery of the complete contractual documentation to IPR, the second calorimeter will be eventually accepted.

Important Note: *After delivery of components at INTF site, storage space will be provided by IPR.*

Also during Site Acceptance test at INTF site, following facility will be provided by IPR,

1. *Pressurized air (for pressure test)*
2. *Vacuum Pump*
3. *Power & Electricity*
4. *Helium Leak detector*

It is to be noted that it is Bidder's responsibility to perform the Site Acceptance Test. Bidder shall depute qualified and trained manpower for the same.

7 Packing and Transportation

7.1 General Instructions

It is under the responsibility of the Bidder to take any measure to ensure safety during packaging, transportation, delivery to Site, unloading, temporary storage and assembly on Site.

Obtaining necessary clearance / interactions with statuary bodies for safe and authorize transportation of component, if required lies within the scope of the Bidder. The IPR has no obligation in this regard.

The Bidder shall prepare a "Transport and delivery plan" for handling, storage, packing, shipping and delivery of components and sub-assemblies. The plan shall be submitted to IPR for review & approval.

The shipment of equipment / components shall not be affected until and unless written "Inspection Release Note" / "Shipping Release" / "Dispatch Clearance" is obtained. The same will be issued by the IPR or his authorized representative at Bidder's work after satisfactory completion of "Factory acceptance test". The Bidder then only shall dispatch the equipment / component to site.

Transhipment in transit shall be avoided and Bidder shall arrange specially hired conveyance for direct delivery at site.

7.2 Packing during Transport, Delivery and Storage

- During storage and transport all the components and assemblies suitably cleaned before transportation *(as per Appendix 2 of this specification)* shall be packed in new, clean, sealed polythene bags or sealed aluminium foils. They shall be individually located in purpose, built containers made of high-quality tough material to avoid damage during handling and transport and to provide medium term storage (up to 2-3 months) on Site.
- The packing shall be suitable and rigid enough to ensure safety of components / equipment during all stages of shipping by road to site, loading, stacking and storage

at plant site. Adequate number of silica gel packets along with a copy of shipping release shall be kept inside carte.

- Desiccant elements shall be included in the packages, filled with nitrogen at pressure of 1 Bar, to prevent condensation.
- The package shall be stencilled in bold character with indelible paint, protected with shellac to indicate following information in English:
  - Shipping mark,
  - Package numbers along with content description
  - Dimensions
  - Gross weight in kilos,
  - The purchase order number
  - Lifting Points
  - Any other necessary data to identify the equipment and relate it to the contract.
- Packing list shall plainly show package number, kinds of package, contents, dimensions and net, legal and gross weight of each package. If different items are in a package, the net weight for each item shall be specified.
- Recording accelerometers and thermometers shall be installed and sealed on each transport package, in order to monitor and record oscillations/shocks and temperatures during transport and delivery to the site.
- Handling instructions shall also be clearly marked on the outside of the packaging. Chemical or radiological hazards, etc., shall be identified on the packaging. All such marking shall be in English.
- Aluminium foil is recommended for sealing pipe openings, and protective caps shall be fitted to flanges before packaging and sealing. Where it is not practical to enclose the components, e.g. due to size, all opening must be sealed to prevent the ingress of contaminants during transit. Sealing surfaces shall be protected to prevent damage by scratching, impact, etc.
- The use of adhesive tape for the protection and packaging of vacuum components shall be restricted to prevent the risk of contamination from the tape.
- To prevent damage and possible contamination during transit, the packaging of components shall be done as soon as possible after the acceptance testing and final cleaning at the Bidder's premises.
- Vacuum components shall be handled as little as possible after final cleaning.
- Volumes which have been pumped for leak testing shall be backfilled with dry nitrogen or air (<100 ppm H_2O) at a positive pressure of 0.12 MPa and valves off.
- Where practical, vacuum components shall be entirely enclosed in heat sealed polyethylene for shipping. The polyethylene enclosure shall be purged and back filled with dry air (<100 ppm H_2O). Where this is not practical, alternative conditions shall be accepted by the IPR.

7.3 Protection during Transport, Delivery and Storage

- All kind of special handling fixtures shall be packed and sent as part of the shipment.
- Transport of components / assemblies is expected to be in a horizontal configuration.
- Protection elements are to be designed and manufactured to protect the assemblies and all other components during transport and storage against weather effects, mechanical damage and destruction of cleanliness and finish machining achieved by specific surface treatment.

  Particular care shall be given for packing and fixing of fragile components requiring proper special protections against damage during transportation.

  The cooling passages and all other openings shall be provided with temporary closures and seals. Prior to sealing, each circuit shall be pressurized to 1 bar absolute using nitrogen.

7.4 Delivery address

- The Second Calorimeter shall be delivered to following address:

ITER India Lab building, INTF Site
Institute for Plasma Research,
Bhat,
Gandhinagar-382428
Gujarat
India

- The mail correspondence of documents / reports shall be at following address:

ITER-India , Institute for Plasma Research
Block A Sangath Skyz, Bhat Motera road
Koteshwar
Ahmedabad – 382 424
Gujarat,
India.
e-mail of contact person shall be provided whenever asked by Bidder

8 Documentation

The second calorimeter and relevant procurement deliverables shall be supplied with all the manufacturing documentation (Listed in below table) required to satisfy reviews, validations, verifications, and other regulatory and licensing activities.
Successful bidder shall prepare & submit all the documents to IPR for approval.

Sl. No.	**Document to be supplied**	**Ref. Documents/Spec. (if any)**
1	Quality Plan *(Covers the whole scope of contract including the work of sub-contractors)*	*Format to be provided by II*
2	Manufacturing and Inspection Plan	*Format to be provided by II*

	(Covers the whole scope of contract including the work of sub-contractors)	
3	Manufacturing Drawings *(Individual component, sub assembly & final assembly)*	*Engineering drawings supplied along with Tender notice*
4	Manufacturing Schedule	--
5	Nonconformance Reports	*Format to be provided by II*
6	Deviation Request	*Format to be provided by II*
7	Weld Plan	Appendix 4
8	Welding Procedure Specification , Procedure Qualification Records & Welder Qualification Record	Appendix 4
9	Weld Data sheets *(Detailing all the details like joint detail, welding process, welding parameters, inspection & testing prior to, during and after welding etc.)*	Appendix 4
10	Manufacturing Procedures	
	1. Material Identification , Traceability & Marking	Appendix 1
	2. Cleaning Procedure	Appendix 2
	3. Inspection & Testing Procedure	Appendix 6
	4. PWHT (i.e aging) & Thermal cycling Procedures	*Section 6.2.4 & Section 6.2.5 of this specification*
	5. Pressure Testing Procedure	Appendix 5
	6. Helium Leak Testing Procedure	Appendix 7
	7. Flow Test Procedures	Appendix 6
	8. Procedures for Handling of Non-conforming items	Bidder's QMS
	9. Packing & Transportation Procedure	Section 10
11	Clean Work Plan	Appendix 2
13	Factory Acceptance Plan	*Section 6.4.1 of this specification*
14	Site Acceptance Plan	*Section 6.4.2 of this specification*
15	NDE Personnel Qualification	Appendix 6
16	Inspection reports & Certificates like, Material Test certificate, Lab test certificates, Visual Examination reports, Dimensional Inspection reports, Non Destructive Examination reports, Production Proof Sample Examination reports, Cleaning Inspection reports, Special Test, Pressure Test reports, Leak Test reports etc.	Appendix 6
17	As built drawings	--
20	Progress Report	--
20	Assembly & Maintenance Manual	--

	The Bidder shall provide an Assembly and Maintenance Manual including, but not limited to: • A consolidated component schedule listing all the components used in the system; • Comprehensive information about the system (drawings, component lists etc.); • Detailed handling instructions; • Detailed assembly/disassembly procedures; • Assembly check list; • Maintenance instructions, including calibration and adjustment procedures; • Recommended spares list with associated replacement schedule. In particular detailed information shall be given about: • Nominal and maximum bolts tightening torques, in particular to avoid damage to ceramic insulators.	
	Final Data Book The final data book shall be prepared by Bidder in co-ordination with IPR. The content and format shall be provided by IPR along with tender documents.	--

9 Notification, witness and Hold Point

IPR shall monitor the production activity of the Bidder and possible sub-contractors in accordance with an approved Manufacturing and Inspection Plan.

This monitoring shall include Notification Points (NP), Witness Points (W) and Hold Points (HP) at critical steps in the Bidder's manufacturing plans.

Hold Point (HP): An operation that must be signed off by an IPR representative before work proceeds beyond this point.

Notification Point (NP): Identifies an operation that must be notified to an IPR representative. This notification gives the IPR representative the opportunity to arrange an inspection visit if deemed necessary therefore adequate notice must be given to permit arrangements for this visit. In the absence of the appointed representative and with IPR documented agreement work can proceed.

Witness (W): identifies an operation that must be witnessed.

Surveillance (S1): identifies an operation that requires 100% inspection.

Surveillance (S2): identifies an operation that requires random inspection or spot checks.

Review (R): identifies a document or report that must be reviewed.

Operations /Activity	***Hold/Notification/ Witness interventions***
	IPR
Approval of Procurement follow-up documentation (like Quality Plan , Manufacturing and Inspection Plan (MIP), Manufacturing drawings ,Manufacturing and Inspection & Testing Procedures etc)	H
List of Bidder's sub- contractors	R
Kick off Meeting with Bidder	H
Raw Material inspection	N
Inspection of major brought out items like Metallic bellows, thermal sensors and hoses.	N
Jigs & Tooling design and manufacturing	R
Marking And Cutting of Material	R
Machining and Drilling of parts	R
Heat Transfer Element type test	HP
Dimensional inspection of Parts	N
Welding Qualification (Procedure & Welders)	HP
Non Destructive Testing of welds	W
Flow Test & Pressure drop	W
Assembly of component	N
Visual & Dimensional inspection of Assembly	W
Pressure testing of Assembly	W
He Leak testing of Assembly	W
Cleaning Inspection of Assembly	W
Pickling & Passivation of Component (if required)	N
Packing & Transportation	N
Preparation of End of Manufacturing report	H
Shipment clearance by IPR	H
Site Acceptance Tests	H

HP: Hold Point, N: Notification Point W: Witness

10 Warranty

- The bidder shall warranty the Second Calorimeter shall comply fully with the specifications laid down, for material, workmanship and performance.
- The bidder shall provide a warranty covering repair or replacement of the second calorimeter up to 1 years after the completion of final acceptance at IPR site. If any defects are discovered there in or any defects there in are found to have developed under proper use arising from faulty materials, design or workmanship, bidder shall remedy such defects at his own cost provided he is called up on to do so within the warranty period.
- Should Contractor fail to rectify, the Purchaser shall have the right to reject or repair or replace at the cost of the Contractor the whole or any portion of the defective second calorimeter.
- The decision of the Purchaser, notwithstanding any prior approval or acceptance or inspection thereof on behalf of the Purchaser, as to whether or not the second

calorimeter supplied by the bidder is defective or any defect has developed within the said warranty period of 1 years after the site acceptance of the second calorimeter or as to whether the nature of the defects requires renewal or replacement, shall be final, conclusive and binding on the bidder.

Technical Specification

Appendix 1: Technical requirements for materials

Dispatch Site

Institute for Plasma Research

Near Indira Bridge, Bhat Village, District Gandhinagar, Gujarat

1. Scope

This specification describes the requirements for manufacture, procurement, testing, inspection and supply of raw material for manufacture of Second Calorimeter.

2. General Requirements:

2.1 All the materials, welding consumables, proprietary items and bought out items including materials for trials, qualifications and production test coupons, testing etc., as required for manufacture of Second Calorimeter shall be procured and tested in accordance with this specification.

All the material used in manufacture shall be new and of specific quality.

2.2 Traceability and test certificate of material:

The contractor shall ensure that each material is properly identified, each block of material being assigned a unique traceable number. The number shall be traceable with the corresponding material test certificate.

Traceability of each material shall be maintained throughout all manufacturing processes.

It is the responsibility of contractor to ensure that all testing and characterization required by this specification are performed and well documented in test certificate and inspection report.

2.4 Usage of Stock material

Stock material from the contractor's own stock / material from stockiest can be used provided traceability of the component is established (Stamp on the material and relevant certificate). It is the contractor's responsibility to check that the certificates of analysis and all test results of the stock material meet the requirements of relevant specification. In such situation, where traceability is established and test certificates are available, MIP from the Raw material contractor may not be required to be submitted.

In case of unavailability of the tests conducted, the material can be upgraded by performing the necessary tests in accredited laboratory.

The Contractor is responsible for the quality of the stock material used. All material shall be free from surface cracks and fissures, forge and other tool marks, burns, delamination and other defects that would make it compatible with a high vacuum environment.

2.5 Usage of standard Items

Standard items shall be procured of required size, grade & specification as specified in the relevant drawings.

Contractor shall submit Test certificate conforming to EN 10204 Type 3.1 / Conformity certificate for all standard *metallic* items procured.

2.6 The dimensions mentioned in the drawings are finished dimensions and the Contractor shall procure the material in sufficient quantities and appropriate size taking into account the necessary allowances required for trails, manufacture, qualification, production test coupons and testing.

2.7 Contractor shall issue Purchase order to raw material contractor with following minimum information.

- Form of Product
- Grade & Specification.
- Quantity ordered.
- Nominal Dimensions
- Documentation requirement
- Inspection and Testing requirements
- Delivery schedule
- Access for purchaser during manufacturing for examination, inspection & testing if desired.
- Commercial Terms & Condition

2.8 Contractor shall arrange for reasonable access for ITER India at Raw material contractor's place for progress monitoring, inspection & testing during manufacturing if desired.

2.9 Where hot or cold rolled plate material is used, it is recommended that a surface parallel to the direction of rolling forms the vacuum boundary. This is due to the possibility of long leak paths caused by the stratification of inclusions.

Hot or cold rolled plate material shall not be used where the transverse cross section across the vacuum boundary is less than 25mm.

2.10 Surface Finish

2.10.1 Unless specified otherwise, maximum average surface roughness (defined in accordance with ISO 4278:2000) shall be 6.3 Ra (µm) for all metallic components.

2.10.2 Measurement Technique: Electric Stylus

2.10.3 Where the base material is not produced with an acceptable surface finish, such surface finishes may be achieved using techniques including:

- Machining
- Electro polishing
- Bead Blasting in a slurry in a water jet with alumina or glass beads.
- Surface Pickling followed by passivation

After the above surface finishing operations, it shall be ensured that remaining thickness is greater than the minimum specified thickness.

All processes on vacuum surfaces shall be followed by appropriate cleaning of the surface.

3. Technical requirements

All material shall meet the mandatory technical requirements for each grade & specification of each product form as specified in this section. Contractor shall refer the bill of material of drawings for required material grade for second calorimeter component.

3.1 SS 304 L Plates

SS 304 L Plates shall be procured in accordance to ASTM A 240 / SA 240 and ASTM A 480 / SA480.

3.2 SS 316 L Seamless Pipes

SS 316 L Seamless pipes shall be procured in accordance to ASTM A 312 / SA 312 and ASTM A 999 / SA 999.

3.3 SS 304L Forging

SS 304 L forging shall be procured in accordance to ASTM A 182 / SA 182 and ASTM A 788 / SA 788.

3.4 SS 316 L seamless tubes

SS 316 L seamless tubes shall be procured in accordance to ASTM A 213 / SA 213 and ASTM A 1016 / SA 1016.

3.5 Nickel Rod

Nickel rod (UNS No. N02201) shall be procured in accordance to ASTM B 160 and ASTM B 880.

3.6 CuCrZr Plates/ Bars

3.6.1 Process

The oxygen free copper shall be used as a base metal for CuCrZr alloy.

CuCrZr alloy shall be produced free of cuprous oxide, without the use of metallic or metalloid deoxidizers.

3.6.2 Chemical compositions

The composition of the material shall satisfy the requirement given in the following table. Test method shall be in accordance with ASTM E 478 and ASTM E 118.

Table 1: Chemical Composition

Alloy Designation	**Base Alloying Elements and Impurities (wt. %)***					
	Cu	**Cr**	**Zr**	**O**	**Other elements**	**Total of Other Elements**
CuCrZr	base	0.6 – 0.8	0.1 – 0.2	≤ 25 E-4	H, ≤ 1E-3 Co < 0.05	≤ 0.15 Cd – to be controlled, < 5 ppm

The chemical analysis shall be performed for each heat of material.

Note: The sum of impurities like (Al,Co,Fe,Ni,Pb,Si,Zn,As,P,Mn,B,Bi,Sn,Mg,Cd,Sb,S,O etc) shall be less than 0.15% . The impurities shall be analyzed and recorded on the test certificate.

3.6.3 Heat treatment

All plates shall be delivered in one of the following conditions.

Either

Condition A : Solution annealed heat treatment:

Solution annealed at 980°C ± 10°C for 20 minutes + water quench.
OR

Condition B : Solution annealed with cold work :

Solution anneal at 980ºC± 10ºC for 20 Minutes + water quench + cold work
(Usually cold work shall be in the range 20 to 30 %. However, the exact value of the cold work shall be recorded by the contractor)

Heat treatment cycle shall be recorded and included in the test report.

3.6.4 Mechanical properties

Tensile properties

Tensile Test shall be performed at ambient & Elevated Temperature (350º) in accordance with ASTM E8 and ASTM E 21 respectively on aged condition as given below.

Condition A + 475 C ±10°C for 3 hrs

OR

Condition B + 475 C ± 10 °C for 3 hrs

Tensile properties shall comply with the requirement given in Table 2.

The following values shall be recorded:

- Yield strength at 0.2% offset ,in MPa
- Tensile strength , in MPa
- Total Elongation after fracture ,%

Number of Test: one sample shall be tested per lot.

Table 2: Tensile Properties of CuCrZr

Temperature (ºC)	Ultimate Tensile Stress (Mpa) Min.	Yield Stress (Mpa) Min.	Elongation % (Min.)
20	384	264	13.5
350	263	202	14.3

Lot: *Lot shall consist of all material weighting less than 500 Kg from same Heat, Nominal Thickness & Heat treatment condition.*

3.6.5 Physical Characteristics

3.6.5.1 Electrical conductivity

Electrical conductivity test shall be performed in accordance with ASTM B 193. The electrical conductivity at 20°C shall be no less than 75% IACS.

Samples shall be in aged condition.

One sample shall tested per lot.

3.6.5.2 Grain size

Samples shall be tested in accordance with ASTM E 112.

Micrographs shall be used to examine the structure of the material as well as to establish the grain size.

The average grain size shall be less than 100µm. An occasional grain size as large as 200µm (<10% of grains) is acceptable after the completion of the manufacturing process.

3.6.6 Sampling

Test Description	**Frequency of Test**
Chemical	1 test per Each Heat
Tensile	1 test per lot
Grain Size	1 test per lot
Electrical conductivity	1 test per lot

Definition:

Lot: Lot shall consist of all material from same Heat , Nominal Thickness & Heat treatment condition.

3.6.7 Dimensions and Permissible Variations

The tolerances as specified in ASTM B 248 are applicable.

The main dimensions shall be recorded. The values shall be within the tolerances given on the drawing

3.6.8 Non Destructive Examination

- Visual Examination

All external surfaces of plates shall be examined by a visual examination in accordance with ASME Sec. V, Article 9. The surface shall be plane, uniform and free from wrinkles, buckles, blowholes, tears, cracks and inclusions.

- Ultrasonic Examination

All plates shall be 100% ultrasonically examined in accordance with ASME Sec.V article 5 or equivalent Standard. *The acceptance criteria shall be mutually agreed and shall be included in the ultrasonic testing procedure.*

3.7 CuCrZr Tubes/ Rods

3.7.1 Processes

The oxygen free copper shall be used as a base metal for CuCrZr alloy .

CuCrZr alloy shall be produced free of cuprous oxide, without the use of metallic or metalloid deoxidizers.

The tubes shall be produced by hot working or cold working process or both.

3.7.2 Chemical compositions

The composition of the material shall satisfy the requirement given in the following table. Test method shall be in accordance with ASTM E 478 and ASTM E 118.

Table 1: Chemical Composition

Alloy Designation	**Base Alloying Elements and Impurities (wt. %)**					
	Cu	**Cr**	**Zr**	**O**	**Other elements**	**Total of Other Elements**
CuCrZr	base	0.6 – 0.8	0.1 – 0.2	25 E-4	H, $\leq$ 1E-3 Co < 0.05	$\leq$ 0.15 Cd – to be controlled, < 5 ppm

The chemical analysis shall be performed for each heat of material.

Note: The sum of impurities like (Al,Co,Fe,Ni,Pb,Si,Zn,As,P,Mn,B,Bi,Sn,Mg,Cd,Sb,S ,O etc) shall be less than 0.15% . The impurities shall be analysed and recorded on the test certificate.

3.7.3 Heat treatment

All tubes shall be delivered in following conditions.

Solution annealed heat treatment:

Solution annealed at 980°C ± 10°C for 20 minutes + water quench.

Heat treatment cycle shall be recorded and included in the test report.

3.7.4 Mechanical properties

Tensile properties

Tensile Test shall be performed at ambient & Elevated Temperature (350ºC) in accordance with ASTM E8 and ASTM E 21 respectively on aged condition as given below.

Condition A 475° C ±10 °C for 3 hrs

OR

Condition B 475° C ±10 °C for 3 hrs

Tensile properties shall comply with the requirement given in Table 2.

The following values shall be recorded:

- Yield strength at 0.2% offset ,in MPa
- Tensile strength, in MPa
- Total Elongation after fracture ,%

Table 2: Tensile Properties

Temperature (ºC)	Ultimate Tensile Strength (MPa)	Yield Strength (MPa)	Elongation %
20	384	264	13.5
350	263	202	14.3

Number of Test: One sample shall be tested per lot.

3.7.5 Physical Characteristics

3.7.5.1 Electrical conductivity

Electrical conductivity test shall be performed in accordance with ASTM B 193. The electrical conductivity at 20°C shall be no less than 75% IACS.

Samples shall be in aged condition.

One sample shall test per lot.

3.7.5.2 Grain size

Samples shall be tested in accordance with ASTM E 112.

Micrographs shall be used to examine the structure of the material as well as to establish the grain size.

The average grain size shall be less than 100µm. An occasional grain size as large as 200µm (<10% of grains) is acceptable after the completion of the manufacturing process.

3.7.6 Sampling

Test Description	Frequency of Test
Chemical	1 test per Each Heat
Tensile	1 test per lot
Grain Size	1 test per lot
Electrical conductivity	1 test per lot

Definition:

Lot: Lot shall consist of all material from same Heat, Nominal Thickness and diameter & Heat treatment condition.

3.7.7 Dimensions and Permissible Variations

The tolerances as specified in ASTM B 251 are applicable. The main dimensions shall be recorded.

3.7.8 Non-Destructive Examination

- Visual Examination

All external surfaces of tubes shall be examined by a visual examination in accordance with ASME Sec. V, Article 9. The surface shall be smooth, uniform and free from wrinkles, buckles, blowholes, tears, cracks and inclusions.

- Eddy Current Examination

100% of eddy current examination of each product shall be provided in accordance with ASME Section V, Article 8 and ASTM E243 or equivalent EN std. Defects with a depth less than 10% of wall thickness are tolerated.

3.8 Filler material

Filler material shall be procured according to ASME Sec. II Part C SFA 5.9 or equivalent std. Ferrite contents of Stainless-steel filler shall be within 3 to 8%.

4. Material Test Report

Contractor shall provide the Inspection certificate type 3.1 in accordance with EN 10204 for all the procured material. Certificate shall include at least following information.

- Material designation and Marking
- Heat Number
- Identification of Product
- Melting process
- Heat treatment record (as applicable)
- Chemical Analysis
- Mechanical properties & Physical Characteristics
- NDE results (as applicable)

The contractor shall submit the above tests reports for evaluation and acceptance of IPR. The fabrication of second calorimeter shall be commence only after receipt of approval from IPR.

5. Packing and Transportation

The packing provided shall be suitable for repeated handling. Corrugated sheets shall be provided to prevent any possible rubbing. Scratches during handling and transportation. Materials shall be covered with polythene sheets and packed in wooden crates. All the opening in the crates shall be protected to prevent any entry of dirt and moisture during shipment and storage at site. Appropriate no. of silica gel packets shall be placed inside the packing to avoid moisture entrapment. Each crate shall be stencilled in bold letter with indelible paint to indicate shipping details, packing number, and dimension, gross& net weight and purchase order number.

Technical Specification

Appendix 2: Technical requirements for cleaning

Dispatch Site

Institute for Plasma Research

Near Indira Bridge, Bhat Village, District Gandhinagar, Gujarat

1. Scope

This appendix prescribes the Cleaning of Vacuum components also specify the requirements of clean condition to be maintained during various stages of contract execution of Second Calorimeter.

2. Clean condition: Definition

The term "Cleanliness conditions" means the environment and working conditions to be guaranteed and the precautions to be adopted in order to avoid contaminations from oils, greases, shavings, powders, paints etc. on the components under construction.

All the assembly operations shall be carried out inside a "Clean Area", as specified in the following section.

3. Documentation Requirement

- Contractor shall submit “Clean work plan” describing how cleanliness will be maintained throughout the manufacturing process, specific cleaning procedures and controls to maintain cleanliness including handling to ITER India.
- Contractor shall deliver a certificate of each items showing compliance with the appropriate specification.
- Any proposed deviation from the procedures and processes described in specification need to be accepted in writing by IPR. This is particularly important where the use of any chemical product (solvent, etchant, detergent etc.) other than those specified is proposed.

4. Cleaning of Vacuum Components

Second calorimeter components / sub-assemblies need cleaning to Ultra High vacuum standard.

4.1 General Requirements

The initial part of the works (e.g. storage of semi-finished products, marking of the pieces, machining operations etc.) can be carried out in a normal workshop area unless specified in the Technical Specifications or procedures approved for manufacturing.

After the initial works the materials are transferred to the Clean Area. Contractor shall ensure that, materials are cleaned before transferring them to clean area.

In case of impossibility to transfer the component inside the Clean Area the same cleanliness conditions shall be guaranteed in the area around the component.

The same cleanliness conditions shall be also guaranteed around the assembly areas.

4.2 Cleaning Procedure for Stainless Steel Components

4.2.1 Preclean

All debris, such as swarf, should be removed by physical means such as blowing out with a high pressure airline, observing normal safety precautions. Gross contamination, e.g. greases or cutting oils, etc., should be removed by washing, swabbing and rinsing with any non-halogenated general purpose solvent. Scrubbing, wire brushing, grinding, filing or other mechanically abrasive methods may not be used.

4.2.2 Wash

- The item should be washed down using a high pressure jet of hot town water (at approx. 80C), using a simple mild alkaline detergent. The detergent should then be switched off and the item rinsed thoroughly with hot water until all visible traces of detergent have been eliminated.

- If necessary, any scaling or deposited surface films should be removed by stripping with alumina or glass beads in a water jet in a slurry blaster.

- The item should be washed down with a high pressure hot demineralised water jet (at approx. 80^{o}C), with no detergent, ensuring that any residual beads are washed away. Particular attention should be paid to any trapped areas or crevices.

- The item should be dried using an air blower with clean dry air, hot if possible.

4.2.3 Chemical cleaning

- Where possible, the item should be immersed completely in an ultrasonically agitated bath of hot clean liquid solvent for at least 15 minutes, or until the item has reached the temperature of the bath, whichever is longer. The temperature should be the maximum specified by the supplier of the solvent.
- Halogenated solvents are not permitted.
- Where technically feasible, after the liquid immersion stage, the item should be immersed in the vapour of the solvent used for at least 15 minutes, or until the item has reached the temperature of the hot vapour, whichever is longer.
- It must be ensured that all liquid residues have been drained off, paying particular attention to any trapped areas, blind holes etc.
- The item is then be washed down with a high pressure hot (approx. 80 ^{o}C) water jet, using clean demineralised water. Detergent must not be used at this stage.
- The item is dried in an air oven at approx. 100^{o}C or with an air blower using clean, dry, hot air.
- If the item is too large to be cleaned by immersion the item may be cleaned by washing it down with a high-pressure jet of P3 Almeco P36 or T5161.
- The item is inspected for signs of contamination, faulty cleaning or damage.
- The item is baked to a specified temperature for a minimum period of 24 hours.

4.3 Cleaning of copper / copper alloys

- Items manufactured from copper or copper alloys may be cleaned using the procedures for stainless steel, except that in this case Almeco P3-36 is not acceptable.
- Copper surfaces may alternatively be cleaned using a light chromic acid or citric acid etch, followed by thorough washing in hot, clean demineralised water.

4.4 Cleaning Fluids

Following are the acceptable cleaning fluids.

- Isopropyl Alcohol
- Ethyl Alcohol
- Acetone
- Axarel 9100 ™
- Citrinox TM
- P3 Almeco TM , P36 or T5161
- RBS 25
- RBS A 350

Fluids other than the above may be used subjected to the approval from IPR.

5 Clean Area

The clean area is a controlled area that satisfies following conditions;

- Special clothing

Personnel shall wear clean clothes and clean shoes or overshoes.

- No smoking, eating or urinating shall be allowed.
- Floors, walls and ceilings

Floors shall be covered with a smooth coating (permanent or removable). If the enclosure is permanent all walls and ceilings shall not produce dust.

- Creation of dust

Inside the work area measures shall be taken to prevent dust penetrating into components already cleaned or in the process of being cleaned. Accordingly, work on the concrete shall be avoided on the construction site.

- Cleaning of floors

Floors shall be cleaned daily. This interval may be reduced or increased according to the type of work performed.

- Identification of work areas

The boundaries of work areas shall be marked off physically.

6 Inspection for Cleaning & Cleanliness

The cleanliness of component shall be checked by wipe tests on following stages of manufacturing.

- During Assembling
- During Factory Acceptance Test
- After receiving Component at Site

Technical Specification

Appendix 3: Technical requirements for Pickling & Passivation

Dispatch Site

Institute for Plasma Research

Near Indira Bridge, Bhat Village, District Gandhinagar, Gujarat

1 Scope

This specification describes the requirements of typical pickling / passivation process to be used for Stainless Steel and copper alloys material.

The Contractor is at liberty to utilize other techniques not described in this specification. In such a case, the contractor shall demonstrate that the proposed procedure will meet the contract requirement and such records shall be sent to IPR for approval before performing pickling and passivation process.

Since the Pickling & Passivation process might degrade the vacuum properties, it is advisable to use the necessary cleaning procedure as mentioned Appendix 2 for removing the heavy scale to avoid the use of such process during manufacturing of component. In case where this process is unavoidable, the contractor shall inform IPR before the start of the activity.

2 Documentation Requirement

Contractor has to submit Pickling and Passivation procedure to IPR for approval before application of the pickling and passivation process.

3 General

Pickling is used to remove heavy scale from steels or a heavy, loose oxide layer from Copper.

Dimensional stability cannot be guaranteed during the pickling process, so it should normally be carried out on the material before manufacturing.

Pickling and passivation must always be followed immediately by an appropriate cleaning process as mentioned in Appendix 2.

Pickling should always be followed by passivation. This is best carried out chemically, although native oxide layers can reform on exposure to atmosphere.

It should be noted that thermal outgassing from surfaces which have been pickled / passivated may be greater than that from a native metal surface and may require additional baking to achieve the outgassing requirements.

4 Pickling and Passivation Methods

5.1 Methods

- Gross contamination is removed by washing the material in a jet of hot (80C water).
- The material is allowed to dry.
- The material is thoroughly degreased.

- The pickling baths should be checked visually to ensure that there are no visible signs of contamination.
- The material is lowered into the pickling solution for the specified time or until the process is complete.

4.2 Solutions

Material	Solution	Concentration	Temperature (C)
Stainless Steel	Nitric Acid Hydrofluoric acid (52 %)	200 g/l 40 g/l	55-65
	Suplhuric acid Hydrofluoric acid (52%) Chromic acid	60 g/l 60 g/l 60 g/l	Room
	Hydrochloric acid Nitric acid	250 g/l 22 g/l	60-70
Copper and copper alloys	Sulphuric acid	20% aqueous solution	65-75
	Suplhuric acid Sodium dichromate	20% aqueous solution 75g/l	20-75
	Citric acid	1% aqueous solution	Ambient

5 Rinsing

Pickling & Passivation shall be followed by rinsing , first with process water and finally with demineralized water.

Requirements for demineralized water are as follows:

Chloride ion (Max ppm)	: 5
Fluoride Ion (Max ppm)	: 5
Conductivity (Max micro-mho / cm)	: 6
Solid in suspension(Max ppm)	: 0.10
SiO2 (Max ppm)	: 0.10
pH	: 6.00-8.00

6 Drying

After completing of Pickling and passivation, the parts/component shall be fully dried by any of the following methods.

- By evaporation – by means of circulating hot dry and oil free air between 60 to 80ºC.
- By placing the component either in a furnace or oven. The furnace/oven atmosphere will consist of inert gas.

7 Safety Precautions

The person working on pickling and passivation processes must protect their eyes with safety goggles, hands with rubber gloves and wear protective clothing or apron.

8 Test Report

Test report duly signed, giving the details of each surface treatment (Composition of bath, temperature or bath, time, tests done, technique adopted) carried out on component shall be prepared by the Contractor.

Technical Specification

Appendix 4: Technical requirements for welding & welding qualifications

Dispatch Site

Institute for Plasma Research

Near Indira Bridge, Bhat Village, District Gandhinagar, Gujarat

1. Scope

This specification defines the requirements of production welding and welding procedure & welder performance qualification for Second calorimeter.

2. General Requirements

- Welding shall be done on the job, strictly following the qualified welding procedures using approved welding consumables and qualified welders.
- Suitable sequencing of welds shall be carried out to avoid build-up of residual stresses and distortions.
- Safety measures for protecting workers involved in welding and cutting operations shall be in accordance with all local and national regulations.
- Contractor shall ensure that procedures are in place to ensure that welding parameters specified on the WPS are adhered to during production welding and shall perform regular audits to monitor their implementation.
- All welding equipment shall be suitably calibrated and shall be checked on a regular basis during production.

3. Weld Plan

Before fabrication can commence the Contractor shall prepare a Weld Plan and sent the same to IPR for Approval. Weld Plan shall include weld joint mapping identifying all the welds by proper numbering system, applicable WPS, Process used, type of joint with sketch, NDT requirements and welds requiring production proof samples.

Weld Plan, in conjunction with the following documents shall be submitted to IPR before start of welding activity.

- Welding Procedure Specification (WPS)
- Welding Procedure Qualification Record (WPQR)
- Welder Performance Qualification (WPQ)

4. Welding processes

Following welding process shall be used to manufacture the Second Calorimeter.

- **Electron Beam Welding :** Heat Transfer Element assembly weld joints.
  Joining of Dissimilar metal (i.e SS to Ni / *Inconel*, CuCrZr to Ni/ *Inconel*) and joining of CuCrZr to CuCrZr

- **TIG Welding:** Stainless Steel structures & pipe joints

5. Joint Configuration

The use of welds from both sides makes leak testing difficult and enhances the risk of trapped volumes forming virtual leaks or contaminant traps that are to be avoided. Thus,

vacuum sealing welds shall be either internal (i.e. facing the vacuum) or external. The use of stitch welds on the vacuum facing side is prohibited.

All welds which forms the boundary to air or water shall preferably be full penetration welds. Weld joints shall be designed such a way that they are accessible for repair whenever required. Butt welded joints are preferred to fillet or lap joints, since testability is improved.

Fillet, corner, lap and cross joints should be avoided for the welds which form the primary vacuum boundary. Welds shall normally be made in such a way that they can be leak tested at the time of completion.

6. Welding Procedure Specification (WPS)

The welding procedure specification is a document which details all the variables which must be defined to produce a weld of acceptable quality. The qualification of WPS shall be performed in accordance with this specification.

Each WPS shall include at least the details as mentioned in ISO 15609

7. Welding Procedure Qualification Record (WPQR)

The welding procedure qualification record is used to record all the relevant data from the welding of test piece in the qualification of the WPS.

The qualification of the WPS provides proof that the defined welding process, will achieve a weld of acceptable quality. The welding and testing of this must be witnessed by IPR or reputed Third Party Inspection Agency (TPIA). All welding data and results from the required non- destructive and destructive testing shall be documented using a Welding Procedure Qualification Record (WPQR).

8. Welding Procedure Qualification

Contractor shall perform welding procedure qualification in accordance to ISO 15614.

- Welding procedure qualification shall be performed for each weld process, joint configuration / thickness. , material combinations, welding consumable etc. w.r.t range of approval/ essential variable range as recommended by ISO 15614.
- Qualification test coupon shall be subjected to all destructive & non-destructive tests as required by ISO 15614. Acceptance criteria for such tests are in accordance to section 8.1.2 of this specification.
- Personnel performing the non-destructive examination shall be competent in accordance to EN 473, ISO 9712 or ASNT Level 2.
- Contractor can use the existing Welding Procedure Qualification Record (WPQR) , if available with them provided that following conditions are met ;

- The test must have been performed in the same environment as proposed for production, using the same welding technique, process, joint configuration and welding equipment.
- The allowable ranges are the same with regard to essential variables as specified by ISO 15614
- The test must have been witnessed by reputed Third party inspection agency (TPIA) or IPR representative.

8.1 Acceptance criteria

8.1.1 Destructive tests

8.1.1.1 Transverse Tensile tests

The tensile strength of the test specimen shall not be less than the corresponding specified minimum value for the parent metal unless otherwise specified prior to testing. For dissimilar parent metal joints the tensile strength shall not be less than the minimum value specified for the parent material having the lowest tensile strength.

(Please refer Appendix 1 of this tender doc. for required minimum tensile strength of each parent material)

8.1.1.2 Bend Test

The bend test specimen shall have no open defects exceeding 2mm measured in any direction on the convex surface after bending.

8.1.1.3 Ferrite content (for stainless steel)

Ferrite content in weld shall be 3 to 8%.

8.1.1.4 Hardness Testing

Hardness value of EBW welded joints shall be reported in Test report for reference.
Hardness values for SS material shall be reported in WPQR for reference.

8.1.1.5 Macro Examination

All fillet welds must have penetration at the root.
For lip welds, penetration shall be 0.7t where t is the thickness of the thinner material.

8.1.1.6 Tensile Test at Elevated temperature (CuCrZr to CuCrZr welding)

The tensile strength of the test specimen shall not be less than the corresponding specified minimum value for the parent metal (i.e. CuCrZr) at elevated temperature as specified in Material Specification.

(Please refer Appendix 1 of this tender doc. for required minimum tensile strength of CuCrZr parent material at elevated temperature)

8.1.1.7 Longitudinal Bend Test (for EBW only)

The bend test specimen shall have no open defects exceeding 2mm measured in any direction on the convex surface after bending.

8.1.2 Non Destructive tests

Defects which are detected by the various non-destructive examination method (RT, UT, PT, Visual etc.) shall be assessed in accordance to ISO 5817 Level B.

Important Note: *Acceptance criteria mentioned in this section is also applicable to assess the non-destructive examination of production welding.*

9. Welder Performance Qualification (WPQ)

Welder Qualification is intended to show the competence of the welder /operator in depositing sound welded material when following a qualified WPS. Welder Qualification shall be in accordance with EN287-1, ISO 9606 or ASME Sec. IX. For welding operators ISO 1418 / ASME Sec. IX shall be used.

The contractor shall establish and maintain a list of qualified welders and operators. This list shall include their individual identification and range of welds for which they are qualified.

10. Production Welds

10.1 Non-Destructive Examination of Production welds

100% volumetric examination (Radiography or Ultrasonic) shall be performed on production welds forming the water and vacuum boundaries.

All fillet welds (structural welds not forming the vacuum boundary) shall be visually tested.

Examination methods shall be as per ASME Sec. V / relevant EN ISO Standard. All production welds shall be evaluated in accordance to ISO 5817 Level B criteria.

The use of LPT shall be prohibited.

10.2 Production Proof Sample

Welds where volumetric examination is impractical (e.g. welds that are not full penetration butt welds or accessibility for carrying out the examination is limited) must be covered by production proof sampling (PPS). Each PPS will only represent a specific type of weld and must use the same material, thickness and set –up as the production weld.

A PPS must be welded by the same welder otherwise it would not be representative of the production welding. If more than one welder welds the production welds, each welder must perform PPS. PPS's are required for each shift of production welding to represent the welds performed on that shift.

PPS shall be sectioned and macro examined in four places (including one stop /start area). Photographs of the macros giving the date the PPS was welded, the welder's identity and identifying the production welds it is covering must be included in the final documentation package.

PPS welding may be witnessed by IPR's Representative. All Macros of PPS shall be reviewed by IPR's representative. As the PPS is a representative sample, rejection of the macros will result in rejection of all welds represented by those PPS.

10.3 Leak Testing of Production Welds

All vacuum sealing welds shall be 100% leak tested. Leak testing shall be done as per Appendix 7 of tender doc.

10.4 Weld Finish

Production welds used on all vacuum systems shall be left clean and bright but there is no vacuum requirement to machine the weld zone to match the surface finish of the parent material. All weld regions shall be free from scale, voids, blowholes, etc. and there shall be no visible evidence of inclusions.

10.5 Repair of Production Welds

The size and magnitude of all leaks found on welds forming a vacuum boundary shall be reported to the IPR. No weld repair shall be performed without qualification of the welding procedure. Welding procedures used for welding repair shall be qualified in accordance with this specification.

Any repair welding involving grinding or grinding followed by welding shall be re-examined by all the non-destructive tests as applicable to that joint, acceptance criteria for repair weld remain unchanged.

All repair vacuum boundary welds shall be subject to full vacuum leak testing in accordance with the approved procedure in line with Appendix 7 of Tender doc.

Technical Specification

Appendix 5: Technical requirements for Pressure testing

Dispatch Site

Institute for Plasma Research

Near Indira Bridge, Bhat Village, District Gandhinagar, Gujarat

1. Scope

This specification provides general requirements for Pressure Testing of cooling water piping system of Second Calorimeter.

2. Documentation Requirement

- Contractor shall submit the pressure testing procedure (which describes the applied test pressure, duration, test procedures, acceptance criteria and the records to be generated after completion of test) to IPR for approval.
- Contractor shall submit calibration certificate of Test gauge to IPR prior to testing.
- Contractor shall prepare the pressure test report after completion of testing.

3. Verification Prior to Pressure Testing

All Components upon completion of Fabrication and Assembly shall be checked / verified by Contractor and IPR representative to ensure following,

- All Fabrication has been completed, except for operations that could not be performed prior to the test.
- All applicable examinations, inspections and test including NDT Tests and Post Weld Heat Treatment (If applicable) are satisfactorily completed and accepted
- All Inspection against review, witness and hold point in Manufacturing Inspection Plan have been carried out and accepted.

4. Safety Precautions

Pressure Test shall be carried out in isolated place from work area / pit with appropriate safety precautions and equipment.

5. Preparation for Testing

Before applying Test pressure, the test equipment shall be inspected to see that it is tight and that all low-pressure filling lines and other appurtenances that should not be subjected to the test pressure have been disconnected or isolated by valves or other suitable means.

6. Pressure Testing General Requirements

6.1 Test Fluid

Pressure Test shall be done with dry Nitrogen Gas (N2) or *Argon*.

6.2 Test Pressure & Duration

Pressure

All components shall be subjected to a 15 bar test pressure.

Duration

Test pressure shall be held for duration not less than one hour.

6.3 Test Procedure

Shall be in accordance to ASME Sec. VIII Div. 2/ equivalent EN/ISO code.

6.4 Test Gauge

Location

Pressure gauge used in testing shall be connected directly to the test component. If the indicating gage is not readily visible to the operator controlling the pressure applied from a safe location, an additional indicating gage shall be provided where it will be visible to the operator and inspector throughout the duration of the test. It is recommended that a recording gage shall be used in addition to the indicating gage.

Range

Dial indicating pressure gages used for testing shall be graduated over a
Range of about two times the maximum intended test pressure, but in no case shall the range be less than one and on-half times nor more than four times the intended test pressure.

Digital reading pressure gages having a wider range may be used provided the readings give the same or a greater degree of accuracy than obtained with dial pressure gages.

Calibration

All gages shall be calibrated against a standard deadweight tester or a calibrated master. The contractor shall be able to exhibit the calibration certificate if requested.

6.5 Pressurization & Preliminary check

Pressure shall be gradually increased until a gage pressure which is the lesser of one half of the test pressure is attained, at which time a preliminary check shall be made to ensure integrity of sealing, opening etc. After satisfactory check pressure shall be gradually increased in steps until the test pressure is reached & hold it for prescribed duration.

7. Inspection and Testing

- Visual Examination shall be made to check leakage and permanent deformation for all joints and connections.
- Any leakages that are present, except for leakages that may occur at temporary test closures, shall be satisfactory repaired and retested.
- The inspector shall reserve the right to reject the Pressure test program if there are any visible signs of permanent distortion and deformations.

8. Acceptance Criteria

After pressure testing, the component shall not have

- Permanent deformation
- Leakage

9. Pressure Test record

Contractor shall record the following data in pressure test report.

- Identification of Parts being tested.
- Calibration status of measuring instruments
- Test condition
- Test pressure
- Test duration
- Test Fluid and temperature
- Test Result
- Date of Pressure Test
- Detail of witnessing authority.
- Reference of the Procedure followed.

Technical Specification

Appendix 6: Technical requirements for Inspection & testing

Dispatch Site

Institute for Plasma Research

Near Indira Bridge, Bhat Village, District Gandhinagar, Gujarat

1. Scope

This Appendix prescribes the requirements of various inspections and tests to be conducted during the course of execution of contract at contractor's premises (i.e Factory Acceptance Test) as well as at site (i.e Site Acceptance Test).

2. General Requirements

- The contractor shall inspect all the parts, sub-assemblies, final assemblies etc., for full compliances with specification and approved drawings.
- Dimensional check for the individual components and the completed equipment shall be carried out at a constant temperature as per the approved procedure and shall meet the requirements specified in the approved drawing.
- The contractor shall provide details of all the inspection and testing facilities. If deemed necessary IPR will have right to specify additional inspection / testing other than specified in this specification and cost of such test / inspection will be borne by the IPR. The records of all the tests and inspection shall be maintained by the contractor and the same will be a part of the final documentation.
- The Contractor shall prepare & submit Manufacturing Inspection Plan giving the stage of inspection indicating witness, review & hold points to IPR for approval.
- Records and certificates shall be supplied for all tests carried out, within one month of the tests being carried out. These test records and certificates shall be supplied for all tests.

➢ Test Procedure

Contractor shall submit the written manufacturing procedures *(as specified in Section 8 of Part-A)* to IPR during manufacturing. Manufacturing Procedure shall have at least following contents.

1. Scope & Purpose
2. Reference Documents to be used
3. Methodology
4. Acceptance Criteria
5. Records to be generated (If possible attach the template)

All tests are to be carried out in compliance with written procedures. The tests as described in this specification are to be included in the MIP at appropriate stage. The Contractor has to provide all necessary equipment and the personnel for carrying out the tests.

- Any item or component which fails to comply with the requirements of this specification at any stage of manufacture or test may be rejected. After adjustment, modification or repair if so directed by IPR, the contractor shall submit the item for further inspection and /or tests.

- Should the component or any portion thereof fail under test to give the required performance, further tests which are considered necessary by IPR shall be carried out by the contractor and the whole cost of the complete test shall be borne by the contractor.

- The contractor is responsible for the provision of all test equipment, measuring and recording instrumentation and personnel.

- Approval of any test by IPR does not relieve the contractor from their obligation to meet the requirements of the specification.

3. Access for inspector

The inspector shall be permitted free access, at all times while work on the Component is being performed, to all parts of the manufacturer's shop that concern the construction of the component.

4. Notification of Work Progress

The Contractor shall notify the inspector of the progress of all work associated with the manufacturing, inspection, examination and testing of the component. In addition, the manufacturer shall notify the inspector reasonably in advance when any required tests or inspections are to be performed.

5. Calibration of Measuring Instruments

Measures shall be established to ensure that tools, gauges, instruments and other inspection, measuring & testing equipment & devices used in determining conformance to acceptance criterion are of proper range, type, accuracy & precision. Testing & measuring devices used in activities affecting quality shall be controlled, calibrated and adjusted at specified intervals (at least once a year) on or before use to maintain accuracy within limits.

6. Qualification of NDE Personnel (for RT, UT & LPT)

The Contractor shall be responsible for assuring that non-destructive examination personnel have been qualified and certified as per EN 473, ISO 9712 or ASNT Level 2 prior to performing or evaluating examinations.

7. Inspection & Testing

7.1 Visual Inspection

All components shall be visually checked and they shall be free from Weld spatter, Surface cracks, Surface porosity and other defects.

7.2 Dimensional Inspection

The contractor shall respect the tolerance mentioned on the manufacturing drawings. He shall establish the procedure for dimensional and geometrical shape verification defining the measuring instruments, inspection method and accuracies of measurement, number of reading to be taken etc. The dimensional verifications shall be carried out on parts at each stage as mentioned in approved Manufacturing & Inspection Plan (MIP). Deviations (if any) shall be reported to IPR. The same will be evaluated for its effect on operation condition of component. After this review IPR can take decision regarding acceptance or rejection of component.

7.3 Examination of Production Welds

7.3.1 Visual Examination of welds

Visual Examination shall be carried out for each weld after each weld pass.
The weld shall be free from Weld spatter, Surface cracks, Surface porosity and other defects

7.3.2 Radiography Examination of Production Welds

Extent of Examination

100% welds forming the primary vacuum boundary shall be examined.

Method of Examination

All weld joints to be radiographed shall be examined and documented in accordance with ISO 17636/EN 1435 / ASME Sec.V

Acceptance Criteria

Acceptance Criteria for such examination shall be as per ISO 5817 Level B

7.3.3 Ultrasonic Examination of Production Welds

Extent of Examination

100% welds forming the primary vacuum boundary shall be examined.

Method of Examination

All weld joints shall be ultrasonically examined and documented in accordance with ISO 17640 / EN 1714 / ASME Sec.V

Acceptance Criteria

Acceptance Criteria for such examination shall be as per ISO 5817 Level B

7.4 Flow Test & Pressure Drop Test

- **Requirement**

- Second calorimeter cooling circuit has been designed such a way that water flow rate in single element is almost equal and the variation is within 1 % of each other. Typical nominal flow rate in single elements in all second calorimeter is listed as below.

- *H-T-E of Calorimeter: 60 litre per minute*

These calculations have been performed in PATHOM software. The calculations are based on practical assumptions of frictional losses in all circuit. The manufacturing processes may contribute to the frictional losses thus it is necessary that a flow test is carried out to ensure that this contribution is minimal. The test is also to ensure the absence of obstructions.

- Additionally, it is required that the pressure drops of the components be measured.
- These tests shall be carried out before Leak Testing of components.

- **Test Media**

The flow tests shall be carried out with DM Water.

- **Test Set up**

The above requirement met by conducting flow test on one H-T-E.

A test set up must be prepared in order to simulate the defined nominal flow rate (as mentioned above) in each element. Contractor shall send a schematic of Test set up to IPR for approval before performing tests.

- **Measurement**

Measurements shall be carried out for flow rate and pressure at the inlet and outlet of the cooling circuit under test.

Measured values shall be reported in Test report.

- **Draining & Drying**

After Flow & Pressure drop test, the components shall be drained & dried by-passing purging gas.

- **Test Report**

Contractor shall submit the test report including following for each test.

- Test object description

- Calibration status of measuring instruments.
- Base pressure & Flow
- Test fluid & Temperature
- Measured Value (i.e Test result)
- Details of witnessing authority

Reference of the procedure followed

7.5 Pressure Testing

Pressure Testing shall be carried out as per Appendix 5.

7.6 Leak Testing

Leak Testing shall be carried out as per Appendix 7.

7.7 Other acceptance tests

Other tests like cleanliness check (shall be as per Appendix 2) , Raw material receipt inspections (shall be as per Appendix 1) , weld qualification tests (shall be as per Appendix 4) , qualification test for bellows (shall be as per Appendix 9), Instrumentation tests (shall be as per Appendix 8) etc. shall be carried as indicated in approved Manufacturing & Inspection Plan.

Technical Specification

Appendix 7 : Technical requirements for Leak testing

Dispatch Site

Institute for Plasma Research

Near Indira Bridge, Bhat Village, District Gandhinagar, Gujarat

1. Scope

This specification defines the criteria for the leak testing in second calorimeter component.

2. Reference Documents

- ASME Sec. V Article 1 – General requirements
- ASME Sec. V Article 10 – Leak Testing
- EN 13185 – Non Destructive Testing –Leak Testing Tracer gas

3. Procedure for Leak Tightness and Testing

Contractor shall prepare the Leak testing procedure which shall satisfy following conditions:

a) A test plan showing the configuration arrangement and the type of equipment as well as the test procedures.

b) Chart recording of mass spectrometer signal to be made through test amplifier range identified. Standard Leak Signal, He introduction and termination must be identified on the recording. The recording shall cover the full duration of each test.

c) For each test, a document must be prepared showing the mechanical set-up, the number of the assembly, base pressure, calibration & measured leak-rate.

d) If the specification is not met, the leaks should be localized and marked. The event shall be reported. The test subject shall be re-tested after repair and the repairs shall be documented.

The procedure shall be submitted to IPR for review and approval

4. Requirements

4.1 General Requirements

- Helium leak tests shall be carried out on cooling circuits, in order to verify the correct manufacturing of the piping.
- All vacuum sealing welds shall be subjected to 100% leak test.
- All required examination like Non Destructive Examination & Pressure Testing shall be done prior to Final Vacuum Leak Testing.
- In no circumstance shall any vacuum component be installed if the leak testing shows leak above the specified maximum acceptable leak rate.
- All repaired vacuum boundary welds shall be subject to full vacuum leak testing in accordance with the procedures of this Appendix.
- No repair or re-work of the components (with the exception of simple tightening of flange joints or replacement of gaskets) shall be undertaken without prior agreement.
- Any repair or rework will require the leak test procedure to be repeated and may include a repeat leak test at the operating temperature.

- Prior to manufacture the contractor shall have an approved leak test plan detailing the timing and type of tests to be performed during manufacture.

4.2 *Leak Testing during various stage of manufacturing*

Leak Testing shall be done mainly in following two stages of manufacturing.

Stage 1: Leak testing of Heat Transfer Element (HTE) assembly (During manufacturing)

Stage 2: Leak testing of assembled second calorimeter (including HTE assembly)

Stage 1: Leak Testing of Heat Transfer Element (HTE) assembly

➢ Pre- Test Conditions

- Prior to acceptance leak tests on H-T-E assembly, joints of dissimilar materials shall be subject to a minimum of three thermal cycles from ambient to the maximum possible operating temperature (i.e 350 C) prior to leak testing. The time taken for any component to reach the specified bake temperature from ambient shall be less than 100 hours.
- All components and systems subjected to leak testing shall be according to *Appendix 2 of tender specification* prior to Leak testing.
- A Vacuum chamber shall be used and pre-tested in advance, in order to measure the He leak rate lower than 10^{-10} Pa m^3/s (air equivalent) , with pressure kept in the lower than *10^{-2} Pa or better.*

➢ Test conditions

Heat Transfer Element assembly shall be leak tested at ambient temperature. During testing, the direction of the pressure differential shall be kept in the same direction as during operation (i.e cooling loop shall be pressurized). In this case, pressure is considered as a test pressure (i.e 15 bar).

This test confirms the acceptance of H-T-E assemblies for their integration in to the final assembly of second calorimeter. Contractor shall identify these tests in the Manufacturing and Inspection Plan. Contractor may performed the intermediate leak test of other sub-assemblies (e.g. cooling header, In/out cooling piping etc.) to minimize the risk of failure in the final stage.

Stage 2: Leak testing of assembled Second Calorimeter

Qualified component (in stage 1) shall be assembled into the second calorimeter assembly. This section describes the methodology of leak testing final assembled component.

➢ Pre- Test Conditions

- All components and systems subjected to leak testing shall be cleaned prior to test according to *Appendix 2* prior to Leak testing.
- Before leak testing, final assembled component shall be subjected to pressure testing according to Appendix 5.

➢ **Test conditions**

Final assembly shall be leak tested at ambient temperature.

Cooling loop shall be evacuated and connected to helium leak detector. Helium will be sprayed over the weld joint and local leak test shall be performed.
After performing the local leak test, component assembly shall be tested for global leak test as follows,
Cooling loop of final assembled component shall be evacuated and connected to helium leak detector. Component shall be covered by polythene bag or suitable enclosure. Enclosures will be pressurized by helium.

5. Clean condition

At the beginning of the test, the component shall be temporarily extracted from the protection set up after the cleaning. The test shall anyway be carried out in clean conditions. At the end of the test, the component shall be protected again unless the subsequent test is performed right after.

6. Certification of Personnel

The Examination shall be performed by suitably trained/experienced person or personnel certified as per EN 473 or NDT Level 2 as per ASNT Practice.

7. Choice of Units

The measured leak shall be reported in SI units. i.e Pascal cubic meter per second ($Pa.m^3/s$).

8. Equipment Calibration

The Leak testing equipment shall be appropriately calibrated as required by code / standards.

9. Sensitivity of He detector

Minimum 10^{-10} $Pa\ m^3/s$

10. Leak Testing Methodologies

Use of vacuum leak detection methods is preferred for leak testing of second calorimeter components/ assembly. Typical test set up of the same is shown in the below figure.

Other methods & procedures may be used, but only with the prior approval of the IPR.

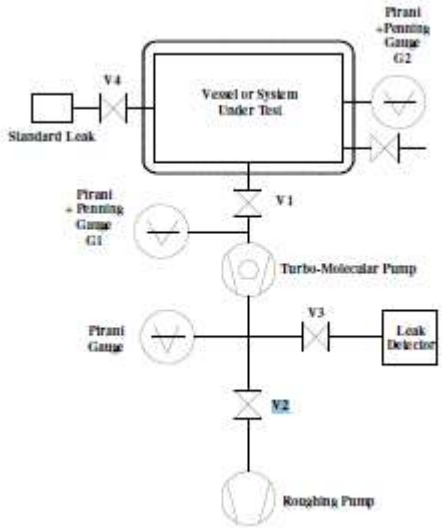


Fig. 1 : Test set up of He leak testing

11. Contractor 's responsibilities

- The Contractor is responsible for providing all jigs, seals and equipment to allow the leak tightness to be proven across all vacuum boundaries.
- The Contractor is responsible for the supply of tooling and methodologies for the subsequent removal of jigs, seals, and temporary closure plates etc. which have fitted to components to facilitate the leak testing of such components.

12. Acceptance Criteria

Acceptance of leak testing of component is subject to successfully completion of all stages and following conditions have been met.

- The leak detector has been correctly calibrated and its calibration value is within ±5% of the standard leak rate value as corrected for the ambient temperature.
- The test shall be carried out by qualified personnel as stated in section 6 of this specification.
- The leak rate value as measured by the leak detector has not increased in value above the measured background to a value greater than the specified leak rate during the entire duration of the global leak test.
- The location and magnitude of all identified leaks shall be recorded. All practicable efforts shall be made, after agreement with ITER India to reduce any leak quantified during the manufacturing phase to a level lower than the limit of detection of the leak detection methods used.
- The helium concentration around the test piece shall be at a minimum of 50% for the duration of the test. The helium concentration shall be measured and recorded

12.1 Acceptable Leak Rate

He Leak rate for all leak tests shall not exceed than $1x10^{-10}$Pa m^3/s (air equivalent).

13. Test Report

Full records of the tests carried out on any component shall be completed in order to maintain traceability of the leak test history of a particular item. The records shall consist of the following as minimum.

- Identification of the Manufacturer, the purchase order and equipment
- Identification of the part, weld or the area subjected to examination
- Time of Examination
- Reference approved procedures
- Surface condition and cleanliness
- Examination condition and in particular, calibration conditions
- Data records of the output of the leak detector for all the global tests specified including the standard leak calibration.
- A record of the helium concentration during the leak test where that is required.
- The make, model and date of manufacture of the helium mass spectrometer leak detector used in the tests.
- The results of all tests showing whether it was a pass or fail, and, if a failure, the measured leak rate and the location of the leak, together with the steps taken for any repair or elimination.
- The magnitude and location (if applicable) of all leaks identified during testing shall be recorded. This includes leaks of magnitude lower than the acceptance criteria for which no remedial action may have been taken.
- Interpretation results
- Name and qualification of the inspector
- Identification of the subcontractor conducting the examination (if applicable)
- Date of examination and inspector’s signature.

Technical Specification

Appendix 8: Technical requirements for Thermal sensors

Dispatch Site

Institute for Plasma Research

Near Indira Bridge, Bhat Village, District Gandhinagar, Gujarat

1. Scope

This Appendix describes the requirements for manufacture, procurement, testing, inspection, calibration and installation of thermal sensor during assembly of second calorimeter at contractor site.

2. Scope of supply

- Procurement of Thermal sensors including spare Thermal sensors (10% of total order quantity) in accordance with this specification. (Actual length of each Thermal sensor shall be worked out by contractor based on 3D Model & Engineering drawings provided by IPR.)
- Procurement of Thermal sensor mounting accessories & connector box
- Preparation of TC routine diagram (Contractor can take 3D model & Engineering drawing supplied by IPR as a base line).
- Mounting and routing of Thermal sensors up to termination end. Contractor shall provide suitable conduits also.

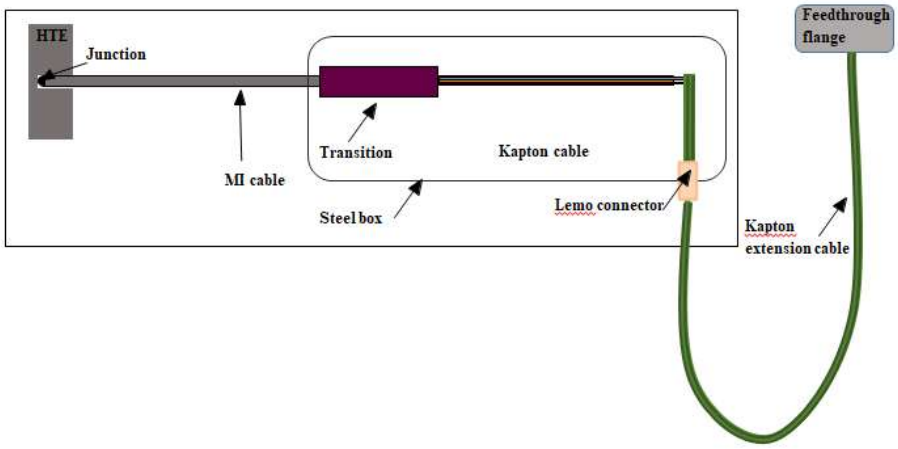
3. Thermal sensor Locations

Thermal sensor Location	**Number of Thermal sensors**	**Position of Thermal sensor**
Thermal sensor on H-T-E assembly		
Surface mounted Thermal sensors	186	On H-T-E
Thermal sensor on Piping		
Exit of HTE forming the left panel	21	On Pipe
Exit of HTE forming the right panel	23	
Inlet header	01	
Outlet header	01	

4. General Description

Thermal sensors mounted on Heat Transfer elements

Thermal sensors adopted are type N Thermal sensors and consists of three parts.



First part is mounted on the H-T-Es, that will be realized with Mineral Insulated Cable (MIC) with 1.0 mm diameter Inconel sheath and 0.1 mm diameter Thermal sensor wires, up to a termination for the transition to Kapton insulated cable (second part). This cable will include the two thermal sensor wires of 0.5 mm diameter that will be routed through the termination end. The ends should be crimped.
The length of thermal sensors cable is different for each sensor depending on cable layout. The transition from MIC to kapton shall be housed in a steel box.

Fixing of thermal sensor on HTEs : Thermal sensors shall be inserted into the drilled holes provided in each HTEs. Ceramic adhesive (with recommended curing) shall be used to fix the Thermal sensors into the holes.

Thermal sensor mounted on Piping

In this type, small metallic ring is welded or mechanically connected around the MIC cable at some mm from the end. This ring is needed as seat for the spring that gives the elastic force for sensing junction contact on the component. Sensors with clamping bands can be fixed on the outer surface of cooling tubes to measure the coolant temperature.

6. Mineral Insulated Cable (MIC) Specification

Standard specifications of IEC 61515 shall be applicable for procurement of MIC. Table shows the nominal specifications for the Cable. Any deviations from this table with the standard IEC 61515 shall be discussed and mutually agreed between Contractor and ITER-India.

Table 1: MIC cable Specifications

Insulant:	High Purity Magnesium Oxide 99.4 % min High Purity Alumina 99.4 % min
Sheath material	INCONEL 600
Conductors material	Type N standard alloys- Reference – IEC 60584-1 tolerance class 1 as per IEC 60584-2
Sheath outer diameter	1 mm (0.0394”)
Sheath thickness	0.1 mm (0.0040”)
Conductor diameter	0.1 mm (0.0040”)
Dimensional tolerances:	max +0 -10 % for outer diameter max ±10 % for other dimensions
Bending radius	Cable shall be capable of being bent through a radius of five times its mean diameter without visible damage.
Max operating temperature	800°C
Electrical characteristics	EMF values shall comply with IEC 60584-1 with initial calibration tolerances specified for base metal conductors in IEC 60584-2. Insulation resistance shall be measured between each wire and sheath wires, at test voltages of 75 V +/-25 V dc. The insulation resitance shall be 1Gohm.m
Radiography examination	The radiographs of measuring junction regio shall be made as specificed in IEC 60515 to confirm the absence of defects in the junction and closure weld confirm the genermal conformity of measuring junction dimensions with the requirements specified.
Grounded junction	Grounded junction shall be fabricated at one end complying with the requirements specified in IEC 61515
Tests and inspections	All mandatory tests and inspections specified in IEC 61515 are applicable.

Magnesium Oxide is the reference insulant; Alumina is considered an option can also be considered.

7. Kapton insulated Thermal sensor extension cable Specification

It is the third part of thermal sensor. Kapton extension cables shall be equipped with male plugs matching with sockets of LEMO connector at one end.

The Kapton insulated cable shall be procured with the specifications as given in following table.

Construction	Two insulated wires with outer insulation
Insulant	Kapton type HN
Conductors material	Type N standard alloys Tolerance class 1 as per IEC 60584-3
insulant outer diameter	1.5 mm
Conductor diameter	0.5 mm
Insulation voltage between conductors and each conductor to ground	500 VDC @ 20 °C
Max operating temperature	120 °C
Requirements, tests and inspection	All requirements, tests and inspections specified in IEC 60584-3 are applicable.

8. Calibration and identification

Calibration shall be performed on the thermal sensors. Recorded values shall comply with type N calibration as per IEC 60584-1 with maximum error of +/-1.0°C.

Each sensor shall be identified with a progressive number, marked on a small AISI 316 strip fixed on sensor leads, removable after sensor mounting. Calibration must be performed after electrical and leakage tests.

9. Cleaning and packaging

Sensors that have passed all the tests must be carefully degreased by ethanol. Ultrasonic cleaning is not allowed in any phase of the manufacturing.

After successful completion of the tests, during the period before assembly the sensors shall be individually packed and sealed in a closed bag. Prior to packaging the sheath shall be cleaned free from grease, oil, dirt, scale and other foreign matter. The thermal sensor shall be transported straight or in coils.

10. Acceptance Test on supplied Thermal sensors

- Verification of thermal sensor test certificate to ensure its compliance with specified technical requirements
- Visual inspection of thermal sensors

11. Assembly Procedure

Below only general guidelines are indicated for Thermal sensor mounting. A detailed Mounting Plan shall be developed by the Contractor during thermal sensor assembly.

A sufficient number of strips with several lengths must be prepared by the Contractor. Strips must have all edges rounded in order to not damage cables. Strips must be cleaned with the same procedure foreseen for other in-vacuum components.

Assembly shall follow the basic sequence below, to be repeated for all Thermal sensor corresponding to a single connector:

- Pre-assembly with not-permanent fixing to check cable lengths and local constraints.
- Permanent mounting of groups of Thermal sensor corresponding to single connectors.

Care must be taken to avoid any unnecessary stress on cables and any residual tension after final mounting. Minimum bending radius is 5 mm in any point.

Where cable electrical insulation is foreseen, care must be taken to avoid braid damage and risk of short circuits due to braid sliding.

12. Documentation

- Progressive number, marked on a small AISI 316 strip fixed on probes leads.
- Test certificate supplied by thermal sensor suppliers
- All the measurements specified in this specification

Technical Specification

Appendix 9: Technical requirements for Metallic Bellows

Dispatch Site

Institute for Plasma Research

Near Indira Bridge, Bhat Village, District Gandhinagar, Gujarat

10. Introduction

This specification describes the scope of supply & technical requirements related to supply of metallic bellows for second calorimeter assembly.

11. Scope of Supply

- Design of Bellows as per the design requirements given by IPR in this specification.
- Prepare the Design calculations & manufacturing drawings and send them to IPR for approval.
- Qualification of bellows design as per this specification.
- Manufacturing, testing & delivery of bellows
- Preparation of manufacturing documentation including manufacturing inspection plan, test reports etc. and submit the same to IPR for approval.

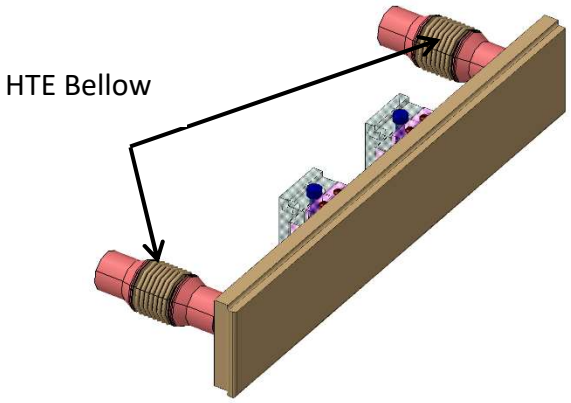
Important Note: Contractor can use the bellow from the catalogue, which shall be incompliance with the design requirement as stated in section 3.1.1 and 3.2.1. The corresponding design calculations shall be submitted to IPR for review and approval. In such situation (use of bellow from catalogue), the qualification test of the bellow as stated in section 7 is not required provided that, existing qualifications (for proposed catalogue product) is available with contractor.

12. Second Calorimeter Bellows

Following two types of metallic bellows will be used in second calorimeter assembly.

12.1 H-T-E Bellows

This bellow is a part of HTE assembly of calorimeter. As shown in below figure, at one end the bellow is connected with HTE through Ni transition piece, other end it is connected to Piping header. The main application of this bellow is to absorb relative thermal displacement of Heat Transfer Element with respect to piping system.



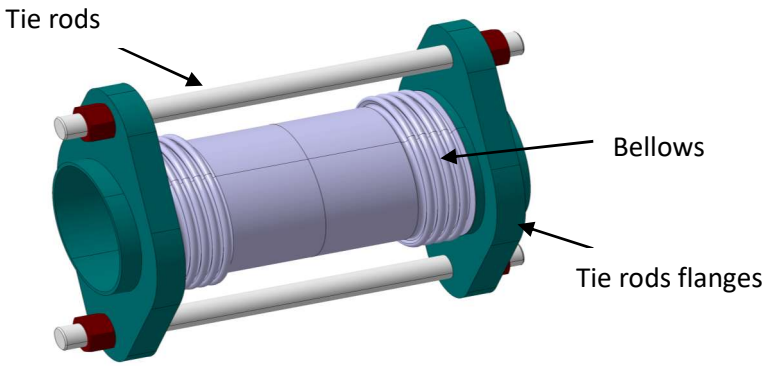
12.1.1Design Requirements of H-T-E Bellows

Sl. No.	Design Requirements	
1	Design code / standard	EJMA
2	Working Fluid	Demineralized Water
3	Connection Pipe Dimension (in mm)	OD: 26.67 mm , Thk : 1.65mm
4	Application	Absorb relative thermal displacement of THE with respect to piping
5	*Material of Construction**	
	Flexible Element	SS 316L* / SS 304L *
	End Pieces	
6	*Operating Condition*	
	Design Pressure (Int.) MPa	1
	Working Temperature °C (Min)	40
	Working Temperature °C (Max)	55
	Velocity m/sec	<1
7	*Movement*	
	Axial ,mm	+ 0.5 compression, 2 mm expansion
	Angular , deg	0
	Lateral ,mm	0.5
	Number of Cycle	>50000
8	End connection	Welded
9	Maximum space available for bellow in axial direction (without end pieces)	67 mm
10	Maximum OD of Bellow	40 mm

Alternate grade of Stainless steel will be allowed subject to prior approval from IPR.

12.2 Inlet /Outlet cooling header bellows

This bellow is installed at cooling header Inlet & Outlet headers. As shown in below figure, this is anchored circular bellow in axial direction using tie rods and it is used as a flexible element at the inlet & outlet cooling header piping for adjusting misalignment that may occurs during assembly of second calorimeter assembly. These bellows will be subjected to lateral displacement only.



12.2.1 Design requirements of Inlet & Outlet cooling header bellow

Sl. No.	Design Requirements	
1	Design code / standard	EJMA
2	Working Fluid	Demineralized Water
3	Connection Pipe Dimension (in mm)	OD : 114.30 mm , Thickness : 2.11 mm
4	Application	Alignment of cooling header with vessel interface during installation of second calorimeter in INTF vessel.
5	*Material of Construction**	
	Flexible Element	SS 316L* / SS 304L*
	End Pieces	
6	*Operating Condition*	
	Design Pressure (Int.) MPa	1
	Working Temperature °C (Min)	40
	Working Temperature °C (Max)	55
	Flow rate (Kg / s)	23
7	*Movement*	
	Axial, mm	0
	Angular, deg	0
	Lateral, mm	30
	Number of Cycle	>50
8	End connection	Welded
9	Maximum space available for bellow assembly in axial direction (with end pieces)	285 mm
10	Maximum space available for bellow assembly in Lateral direction (including tie rods)	265 mm

Alternate grade of Stainless steel will be allowed subject to prior approval from IPR.

13. Material

Material used for manufacturing of bellows shall comply with the requirements stated in Appendix 1.

14. Manufacture

Bellows shall be manufactured by hydrostatic, rolling or elastomeric forming process.

15. Welding

Welding of bellows shall meet the requirements as specified in Appendix 4.

16. Qualification of Bellows (Type Testing)

- Prior to manufacture of bellows assemblies, the manufacturer shall qualify a bellow design. The bellows manufacturer shall submit a qualification plan detailing the test to be performed on bellows assemblies to IPR for acceptance.
- After the completion of all manufacturing processes, a bellow representative of a batch for a particular design of a bellow shall undergo the following qualification tests.

- Fatigue Test
- Helium leak test

Important Note: *Contractor can use their existing bellow qualification (if already available) in case the qualified design is complying with the design requirement specified in section 3.1.1 & 3.2.1 of this specification.*

16.1 Fatigue life test

Bellow manufacturer shall demonstrate that the bellow taken for the type testing remains mechanically unaltered over the expected life. This can be achieved by carrying out following tests.

The test shall be carried out by displacing axially and laterally to the maximum design values, and subjected to an internal 2 MPa pressure. Application of displacement shall be repeated for design no. of cycle of bellow. Leak test shall be performed after this fatigue life test.

Alternatively,

The test can be performed by displacing only axially by an amount design axial displacement + axial equivalent of design lateral displacement and subjected to an internal 2 MPa pressure. This application of displacement shall be repeated for the design no. of cycle of the bellow. Leak test shall be performed after this test.

16.2 Leak testing

- Leak testing shall be done at ambient temperature by evacuating the bellow assembly and spray a helium on external surfaces.
- Leak testing shall be carried out as per Appendix 7.
- Leak rate for bellows assemblies shall be less than 1 x 10^{-10} $Pa.m^3.s^{-1}$ (air equivalent) at maximum operating temperature.

17. Testing & Inspection of Bellows

Manufacturer shall submit the test plan and test procedures detailing the tests to be performed on bellows assemblies to IPR for acceptance prior to manufacturing.

17.1 Leak testing

The bellows shall be subject to helium leak testing in accordance to Appendix 7.

17.2 Dimensional inspection

Manufacture, shall perform the dimensional inspection of finished bellows w.r.t approved drawings. Dimensional inspection shall be done by calibrated measuring equipment.

17.3 Pressure Test

Each bellows shall be pressure tested at pressure according to ASME B 31.3 / Appendix X of EJMA/ equivalent std. with application of dry N2 Gas.

18. Cleaning of Bellows Assemblies

Care to be taken during cleaning of bellows assemblies due to its convolution construction. If any cleaning residues are trapped between the convolutions, either inside or outside, these can result in corrosion which can rapidly cause leaks to develop. Similarly, if any particulates are deposited in the convolutions, mechanical puncturing can take place.

Alkaline degreasing solutions such as Almeco are prone to particulate precipitation and therefore must not be used for cleaning of bellows assemblies.

Manufacturer shall follow following procedures for cleaning of bellows assemblies. Alternate cleaning procedure may be allowed with prior approval from IPR.
The bellows shall be fixed in an extended position if at all possible.

- Any traces of visible, loose contamination shall be removed with a gentle jet of clean, dry air or nitrogen.
- The bellows shall be immersed in an ultrasonically agitated bath of isopropyl alcohol (IPA) or ethyl alcohol (ethanol).
- The bellows shall be vapour washed immediately in vapour of the same solvent.
- Then the bellows should be thoroughly dried inside and outside using a gentle jet of clean, particulate free air or nitrogen.
- The bellows shall be placed in a dry air oven at 100ºC for at least 1 hour.
- The bellows shall be sealed under dry nitrogen in a polyethylene bag.

19. Bellows Protection

Bellows shall be supplied with mechanical protection (such as the use of metal braiding or removable cover plates) to prevent accidental damage and ingress of matter to the bellows convolutions.

20. Marking

Bellows assemblies should be marked by scribing with a clean sharp point.
Chemical etching is prohibited. Dyes, marker pens, paints etc. shall not be used on surfaces.

21. Packing & Delivery

Where practical, Bellow assemblies shall be entirely enclosed in heat sealed polyethylene bags backfilled with a suitable dry gas. Nitrogen is preferred but other gases may be acceptable.

The use of adhesive tape for the protection and packaging of components shall be limited to prevent the risk of contamination from the tape. In particular tape used on austenitic stainless steel shall meet leachable chloride and fluoride limits of 15 ppm and 10 ppm respectively. Where used tape must be fully removable, without residue, using isopropyl alcohol or acetone as the solvent.

All bellows assemblies shall be transported in rigid packing cases or containers which are lined with waterproof material. Components should be packed with adequate protection from thermal and mechanical stresses which may adversely affect the operation of the bellows. All packing case joints shall be sealed and cases marked with bellows specific identification. Handling instruction shall also be clearly marked on the outside of the packaging. Any chemical or radiological hazards etc. must be identified on the packaging. All packaging marking shall be in English.

22. Certification

The manufacture shall provide the Material certificate of type 3.1 in accordance with EN 10204 for all bellows assemblies.

Technical Specification

Appendix 10: Technical Bid format

Dispatch Site

Institute for Plasma Research

Near Indira Bridge, Bhat Village, District Gandhinagar, Gujarat

Our 2 Part Tender Notice No. IPR/TN/PUR/TPT/ET/21-22/041 dated 04-02-2022 for Design, Drawings, Manufacturing, Fabrication, Testing & Inspection, Factory Acceptance Tests, Supply and Site Acceptance Tests of Second Calorimeter, its Mandatory Spares at IPR

1. Scope

This Appendix describes the Technical Bid format to be followed by Bidders while submitting the bids.

2. General

Bidder will enclose technical bid in this format in Part-A of bid. Bidder shall submit two set of documents in support of the information provided in this Appendix.

Bidder shall give the name of the subcontractor/s, if any of the following requirements which will be met by his subcontractor/s. Bidder will attach the confirmation letter in this regard from the subcontractor/s.

Technical bid should also contain bidder's specific confirmation regarding compliance of all commercial terms and conditions of the Tender as per General Conditions of Contract and Special Conditions of Contract. The Bidders, in addition, should mention applicability of Statutory levies (if any) and all other related information.

Bidder should ensure that the response is specific so that compliance with respect to the requirements is established on the basis of the response with no or minimal queries from IPR.

3. Other resources with Bidder

Bidder should provide the details of following information in the technical bid.

Sr. No.	Requirements	Details to be submitted by bidder	Bidder's Response
1	***Project Management*** Presence of well-organized project management team with defined roles and responsibilities at each stage of hierarchy and established schedule follow-up system.	Details of Organization chart of project management team and project management tools to be used for execution of this tender.	
2	***Electron beam welding*** with bidder or its sub-contractor)	Details of size of vacuum chamber, beam power, accelerating voltage etc. Bidder shall also provide the details of materials & joint configuration welded.	
2	***Machining Resources*** with bidder or its sub-contractor CNC horizontal and vertical milling machine	Details of machines along with their major specifications & quantity	
3	***Heat Treatment Resources*** with bidder or its sub-contractor Furnaces suitable for PWHT of EB welded Heat Transfer Element Assembly	Details of Heat Treatment furnace including size, temperature range and temperature recording systems etc.	

5	***Testing Facility*** with bidder or its sub-contractor (a) Ultrasonic testing (b) Radiography testing (c) Leak Testing	Bidder shall give details of equipment's and facilities available with them.	
6	***Personnel Resources with bidder or its sub-contractor.*** - NDE Operator	Bidder shall submit the NDE operator qualification certificate	
7	***Codes and Standards experience*** Bidder's experience in using ASME/ ASTM/ ISO/ EN Codes & Standards for manufacturing, material and inspection and testing of Component.	Details of earlier executed projects with the mention of Code / standards used.	

4. Technical compliance Matrix (attachment 1)

Bidder shall submit the compliance of the specified technical requirements in the prescribed format (available in attachment of this Appendix) along with the technical bid.

Place:

Date:

Signature

Name:

Name of the bidder:

Official Seal:

Technical Bid format

Technical Compliance Matrix for Tender No. IPR/TN/PUR/TPT/ET/21-22/041 Dated 04-02-2022

<table>
<tr><th>Section No.</th><th>Specifications / Requirements</th><th>Bidder's compliance</th><th>Remarks / Deviations</th></tr>
<tr><td colspan="4">Part-A : Scope of Supply, Scope of Work and Technical Specifications</td></tr>
<tr><td>2</td><td>Scope of Supply – Bidder's compliance</td><td></td><td></td></tr>
<tr><td>2.1</td><td>Deliverables: Second Calorimeter – 01 Nos.</td><td></td><td></td></tr>
<tr><td>2.2</td><td>Deliverables: Mandatory spares (H-T-E type 01 : 02 Nos , H-T-E type 02 : 02 Nos., Spares : 20 % of actual requirements)</td><td></td><td></td></tr>
<tr><td></td><td>Bidder's confirmation on broad scope of work defined in section 2.</td><td></td><td></td></tr>
<tr><td>3</td><td>Delivery Schedule</td><td></td><td></td></tr>
<tr><td></td><td><table><tr><th>Activity</th><th>Schedule</th></tr><tr><td>Date of Issue of Letter of Intent (LoI)</td><td>T0</td></tr><tr><td>Manufacturing drawing submission by bidder and its approval from IPR</td><td>T0 + 3 month</td></tr><tr><td>Delivery of Second Calorimeter (section 2.1) and Mandatory Spares (section 2.2) to IPR Site.</td><td>T0 + 24 month</td></tr></table></td><td></td><td></td></tr>
<tr><td>5</td><td>Preparation of Manufacturing Drawing</td><td></td><td></td></tr>
<tr><td></td><td>The Bidder and possible sub-contractors shall use the build to print design & engineering drawings provided by IPR to develop all the manufacturing drawings. The details provided in the engineering drawings are comprehensive and provide necessary information to Bidder for the preparation of manufacturing drawings.</td><td></td><td></td></tr>
<tr><td></td><td>Bidder shall submit the manufacturing drawings to IPR for approval before start of manufacturing. Bidder shall prepare Manufacturing drawings for all sub components, sub-assemblies & final assembly indicating required details like Bill of material, weld joint design, welding process, dimensional tolerance, surface finish etc. Bidder shall assess and specify the tolerance on individual components such a way that it meets</td><td></td><td></td></tr>
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	the assembly requirements of all interfacing components and also functional tolerance (as specified in the engineering drawings) are achieved		
	Bidder shall use CATIA software / AUTOCAD software to prepare manufacturing drawings and 3D Model. If bidder want to use any other software than listed above, the same shall be proposed at the time of bidding		
6	**Technical Requirements**		
6.1	**Material**		
	Raw materials used in second calorimeter shall meet the requirement specified in Appendix 1. Brought out items shall be procured according to Bill of Material of engineering drawings & applicable technical specification. All material shall be new and of specified quality. Traceability of each material shall be maintained throughout all manufacturing process. Traceability documentation which cross-references component parts to material certificates shall be included in given documentation.		
6.2	**Manufacturing process: General requirements**		
	Care shall be taken to avoid any contact of stainless steel and CuCrZr with carbon steel. Also, separate tools shall be used for fabrication of SS components.		
	SS fabrication areas shall be kept separated from neighbouring fabrication areas to prevent contamination. However, should this infrastructure be not available to the bidder, he shall provide a plan for effective and safe implementation of this requirement, which shall be approved by IPR		
	The raw material, subassemblies and finished components shall be covered with polythene sheets to avoid contamination during storage		
	Separate storage areas for S.S material away from C.S material shall be used and identification of all material and off cuts (like heat no, plate no., rolling direction etc.) Shall be maintained by transferring the same to other location before cutting.		
6.2.1	**Marking**		
	• Marking shall not result in contamination of the material, significant strain hardening or sharp discontinuities.		

	• Marking shall be carried out in areas of minimum /no loading. No marking is permitted in areas of stress concentrations or in weld heat affected zones. • Marking shall not affect interpretations of NDE results. • Marking with ink stamps, indelible ink, paint and adhesive taps which are not vacuum compactible are not allowed.		
6.2.2	**Cutting**		
	• Cutting can be done either machining, grinding, shearing or plasma cuttings. • In case of shearing the strain, hardened zone is subsequently to be removed by machining / grinding. • During grinding local over heating of the material is to be avoided. • Cutting and machining of CuCrZr plates and tubes shall be carried out with careful control of cutting and machining parameters in order to preserve the material aging status. • After plasma arc cutting at least 1mm of metal is to be removed subsequently from the cut edges by grinding. The cut edges shall be checked visually for any cracks. • Cutting fluids for use on components / parts shall be water soluble, non-halogenated and phosphorus and sulphur free and shall meet the requirements of DIN 51521. Bidder shall submit the list of cutting fluid to be used during the manufacturing before to IPR for approval before initiating the manufacturing activities.		
6.2.3	**Welding & Welding Qualification**		
	Welding Qualification & Production welding of second calorimeter components / sub-assembly & final assembly shall be carried out in accordance to Appendix 4.		
6.2.4	**Post Weld Heat Treatment (EB welded H-T-Es)**		
	○ After completion of Electron Beam welding, Heat Transfer Element assembly (made of CuCrZr) shall be post weld heat treated (i.e. Aging treatment) at 475°C with a temperature variation of ±10°C for 3 Hours. ○ To economies the process time few elements may be combined for one batch run. ○ Post weld heat treatment shall be carried out in Vacuum furnace containing filament which are not exposed in vacuum. - Vacuum furnace containing heating filament exposed in vacuum may be acceptable subject to condition that contamination shall exceed the limits given in following table. The measurement of concentration of contamination shall be carried out by Residual Gas Analyzer		
6.2.5	**Thermal Cycling of components**		

	Component which includes weld joints of dissimilar material (i.e. Heat Transfer Element assembly) shall be subject to minimum three thermal cycle from the ambient to maximum possible operating temperature (i.e 350 C). Leak test (at room temperature) of such component (H-T-E assembly sub-components having dissimilar material joints) shall be done before & after thermal cycling.		
6.2.6	**Draining & Drying**		
	Components delivered to site shall be dry internally and externally. Any internal volumes wetted during acceptance testing shall be drained completely and dried by purging with dry air until the purge gas has a water content of < 4000 ppm . The volumes will then be left at atmospheric pressure of dry air for a minimum period of 24 hours at ambient temperature. If after that time, the water content of the enclosed gas has risen to >4000 ppm, the drying process shall be repeated until this condition is met.		
6.2.7	**Surface Cleaning**		
	• Surface of the components shall be cleaned in accordance to Appendix 2. • Second Calorimeter components shall be compatible with an operation in a high vacuum environment. • Average surface roughness of components shall be less than 6.3Ra (µm). • Deviations, if any shall be managed in accordance to non-conformity and deviation request procedures.		
6.3	**Instrumentation**		
	Instrumentation for Second calorimeter shall be as per Appendix 8		
6.4	**Acceptance Requirements**		
6.4.1	**Heat Transfer Element type test**		
	Bidder shall perform the H-T-E type tests as mentioned in section 6.4.1 (tests to be carried out, methodology & acceptance criteria specified in the table provided).		
	Successful completion of the above tests on first H-T-E establishes the reliability of EB welding process. Thereafter bidder will be allowed to EB weld the sub sequent H-T-Es of the production batch		
	To meet the delivery schedule, bidders are encouraged to complete the material production, machining and keep all the HTEs ready to EB weld in parallel to the above Type test. This will enable the initiation of mass production EB weld as soon as the Type test is successful.		
6.4.2	**Acceptance test at Factory**		
	The Bidder is responsible for checking that all items conform to the contractual requirements as set out in the contracts between the Bidder and IPR.		

	Bidder shall perform the In-process inspections (during manufacturing) as mentioned in section 6.4.2 (tests to be carried out, methodology & acceptance criteria specified in the table provided).		
	Bidder shall perform the final acceptance of component (FAT) (after assembly of second calorimeter) as mentioned in section 6.4.2 (tests to be carried out, methodology & acceptance criteria specified in the table provided).		
	After successful completion of Factory acceptance test, shipping clearance (i.e Release note) will be issued by IPR. Bidder shall provide appropriate packing provisions and also submit the transportation plan so as to ensure that the integrity & cleaning of second calorimeter are preserved until its arrival at the site.		
	Acceptance of the test results and certificates does not relieve the bidder from the responsibility for compliance with all the contractual requirements.		
6.4.3	**Site Acceptance test (SAT)**		
	After delivery of components to INTF Site, Bidder shall repeat the some of the acceptance test (as mentioned below) in the presence of IPR representative.		
	Bidder shall perform the site acceptance test (SAT) (at IPR site) as mentioned in section 6.4.3 (tests to be carried out, methodology & acceptance criteria specified in the table provided).		
	If any of the Site Acceptance Tests prescribed in the present specification reveals a defect due to a fault or damage during transport or unloading, the Bidder shall perform an urgent and effective repair or shall guarantee the replacement of the faulty component free of charge, managing the repair or replacement by means of a proper non-conformity management procedure. After positive results of all the Site Acceptance tests, delivery of the complete contractual documentation to IPR, the second calorimeter will be eventually accepted.		
	Important Note: *After delivery of components at INTF site, storage space will be provided by IPR.* *Also during Site Acceptance test at INTF site, following facility will be provided by IPR,* *5. Pressurized air (for pressure test)* *6. Vacuum Pump* *7. Power & Electricity* *8. Helium Leak detector*		

	It is to be noted that it is Bidder's responsibility to perform the Site Acceptance Test. Bidder shall depute qualified and trained manpower for the same.		
7	**Packing & Transportation: General requirements**		
	It is under the responsibility of the Bidder to take any measure to ensure safety during packaging, transportation, delivery to Site, unloading, temporary storage and assembly on Site.		
	Obtaining necessary clearance / interactions with statuary bodies for safe and authorize transportation of component, if required lies within the scope of the Bidder. The IPR has no obligation in this regard.		
	The Bidder shall prepare a "Transport and delivery plan" for handling, storage, packing, shipping and delivery of components and sub-assemblies. The plan shall be submitted to IPR for review & approval.		
	The shipment of equipment / components shall not be affected until and unless written "Inspection Release Note" / "Shipping Release" / "Dispatch Clearance" is obtained. The same will be issued by the IPR or his authorized representative at Bidder's work after satisfactory completion of "Factory acceptance test". The Bidder then only shall dispatch the equipment / component to site.		
	Transshipment in transit shall be avoided and Bidder shall arrange specially hired conveyance for direct delivery at site.		
7.2	**Packing during Transportation, Delivery and storage**		
	During storage and transport all the components and assemblies suitably cleaned before transportation *(as per Appendix 2 of this specification)* shall be packed in new, clean, sealed polythene bags or sealed aluminium foils. They shall be individually located in purpose, built containers made of high-quality tough material to avoid damage during handling and transport and to provide medium term storage (up to 2-3 months) on Site.		
	The packing shall be suitable and rigid enough to ensure safety of components / equipment during all stages of shipping by road to site, loading, stacking and storage at plant site. Adequate number of silica gel packets along with a copy of shipping release shall be kept inside carte.		
	Desiccant elements shall be included in the packages, filled with nitrogen at pressure of 1 Bar, to prevent condensation.		
	The package shall be stencilled in bold character with indelible paint, protected with shellac to indicate following information in English:		

	• Shipping mark, • Package numbers along with content description • Dimensions • Gross weight in kilos, • The purchase order number • Lifting Points • Any other necessary data to identify the equipment and relate it to the contract.		
	Packing list shall plainly show package number, kinds of package, contents, dimensions and net, legal and gross weight of each package. If different items are in a package, the net weight for each item shall be specified.		
	Recording accelerometers and thermometers shall be installed and sealed on each transport package, in order to monitor and record oscillations/shocks and temperatures during transport and delivery to the site.		
	Handling instructions shall also be clearly marked on the outside of the packaging. Chemical or radiological hazards, etc., shall be identified on the packaging. All such marking shall be in English.		
	Aluminium foil is recommended for sealing pipe openings, and protective caps shall be fitted to flanges before packaging and sealing. Where it is not practical to enclose the components, e.g. due to size, all opening must be sealed to prevent the ingress of contaminants during transit. Sealing surfaces shall be protected to prevent damage by scratching, impact, etc.		
	The use of adhesive tape for the protection and packaging of vacuum components shall be restricted to prevent the risk of contamination from the tape.		
	To prevent damage and possible contamination during transit, the packaging of components shall be done as soon as possible after the acceptance testing and final cleaning at the Bidder's premises		
	Vacuum components shall be handled as little as possible after final cleaning.		
	Volumes which have been pumped for leak testing shall be backfilled with dry nitrogen or air (<100 ppm H2O) at a positive pressure of 0.12 MPa and valves off.		
	Where practical, vacuum components shall be entirely enclosed in heat sealed polyethylene for shipping. The polyethylene enclosure shall be purged and back filled with dry air (<100 ppm H2O). Where this is not practical, alternative conditions shall be accepted by the IPR.		
7.3	**Protection during transport, delivery and storage**		
	- All kind of special handling fixtures shall be packed and sent as part of the shipment.		

	- Transport of components / assemblies is expected to be in a horizontal configuration. - Protection elements are to be designed and manufactured to protect the assemblies and all other components during transport and storage against weather effects, mechanical damage and destruction of cleanliness and finish machining achieved by specific surface treatment. - Particular care shall be given for packing and fixing of fragile components requiring proper special protections against damage during transportation. - The cooling passages and all other openings shall be provided with temporary closures and seals. Prior to sealing, each circuit shall be pressurized to 1 bar absolute using nitrogen.		
7.4	**Delivery Address**		
	• The Second Calorimeter shall be delivered to following address: ITER India Lab building, INTF Site Institute for Plasma Research, Bhat, Gandhinagar-382428 Gujarat India		
	• The mail correspondence of documents / reports shall be at following address: ITER-India , Institute for Plasma Research Block A Sangath Skyz, Bhat Motera road Koteshwar Ahmedabad – 382 424 Gujarat, India.		
8	**Documentation**		
	Bidder shall supply all the documentation as mentioned in section 8		
9	**Notification, witness and Hold point**		
	IPR shall monitor the production activity of the Bidder and possible sub-contractors in accordance with an approved Manufacturing and Inspection Plan.		
	Bidder shall incorporate the suggested ITER India's intervetions (as mentioned in table section 9) in the MIPs and arrange the inspections at the appropriate stages of manufacturing.		

10	**Warranty**		
	The bidder shall warranty the Second Calorimeter shall comply fully with the specifications laid down, for material, workmanship and performance.		
	The bidder shall provide a warranty covering repair or replacement of the second calorimeter up to 1 years after the completion of final acceptance at IPR site. If any defects are discovered there in or any defects there in are found to have developed under proper use arising from faulty materials, design or workmanship, bidder shall remedy such defects at his own cost provided he is called up on to do so within the warranty period.		
	Should Contractor fail to rectify, the Purchaser shall have the right to reject or repair or replace at the cost of the Contractor the whole or any portion of the defective second calorimeter.		
	The decision of the Purchaser, notwithstanding any prior approval or acceptance or inspection thereof on behalf of the Purchaser, as to whether or not the second calorimeter supplied by the bidder is defective or any defect has developed within the said warranty period of 1 years after the site acceptance of the second calorimeter or as to whether the nature of the defects requires renewal or replacement, shall be final, conclusive and binding on the bidder.		
Appendix 1 : Technical Requirements for materials			
2	Bidder shall comply with the general requirements specified for procurement of material (section 2 of Appendix 1)		
3	Technical requirements		
3.1	SS 304 L Plates shall be procured in accordance to ASTM A 240 / SA 240 and ASTM A 480 / SA480		
3.2	SS 316 L Seamless pipes shall be procured in accordance to ASTM A 312 / SA 312 and ASTM A 999 / SA 999.		
3.3	SS 304 L forging shall be procured in accordance to ASTM A 182 / SA 182 and ASTM A 788 / SA 788.		
3.4	SS 316 L seamless tubes shall be procured in accordance to ASTM A 213 / SA 213 and ASTM A 1016 / SA 1016.		
3.5	Nickel rod (UNS No. N02201) shall be procured in accordance to ASTM B 160 and ASTM B 880.		
3.6	*CuCrZr Plates / Bar shall meet the requirements specified in section 3.6 of Appendix 1.*		
3.7	*CuCrZr Tubes/Rods shall meet the requirements specified in section 3.6 of Appendix 1.*		
3.8	Filler material shall be procured according to ASME Sec. II Part C SFA 5.9 or equivalent std. Ferrite contents of Stainless-steel filler shall be within 3 to 8%.		

4	Contractor shall provide the Inspection certificate type 3.1 in accordance with EN 10204 for all the procured material.		
5	Packing & transportation of raw material shall meet the requirement specified in Appendix 1.		
Appendix 2: Technical requirements for cleaning			
2	Clean condition: The term "Cleanliness conditions" means the environment and working conditions to be guaranteed and the precautions to be adopted in order to avoid contaminations from oils, greases, shavings, powders, paints etc. on the components under construction. All the assembly operations shall be carried out inside a "Clean Area", as specified in the following section.		
3	- Contractor shall submit “Clean work plan” describing how cleanliness will be maintained throughout the manufacturing process, specific cleaning procedures and controls to maintain cleanliness including handling to ITER India. - Contractor shall deliver a certificate of each items showing compliance with the appropriate specification. - Any proposed deviation from the procedures and processes described in specification need to be accepted in writing by IPR. This is particularly important where the use of any chemical product (solvent, etchant, detergent etc.) other than those specified is proposed.		
4	Cleaning of Vacuum Components		
4.1	*Specified general requirements shall be complied while cleaning of vacuum components.*		
4.2	*Cleaning of Stainless steel component shall be carried out according to section 4.2 of Appendix 2.*		
4.3	*Cleaning of copper / copper alloys shall be carried out according to section 4.3 of Appendix 2.*		
4.4	Following are the acceptable cleaning fluids. - Isopropyl Alcohol - Ethyl Alcohol - Acetone - Axarel 9100 ™ - Citrinox TM - P3 Almeco TM , P36 or T5161 - RBS 25 - RBS A 350 Fluids other than the above may be used subjected to the approval from IPR.		

5	*Clean Area shall meet the requirements specified in section 5 of Appendix 2.*		
6	The cleanliness of component shall be checked by wipe tests on following stages of manufacturing. - During Assembling - During Factory Acceptance Test - After receiving Component at Site		
Appendix 3 : Technical requirements for pickling & passivation			
1	*Pickling & passivation (as applicable) shall be complied with requirements specified in Appendix 3.*		
Appendix 4 : Technical requirements for welding & welding qualifications			
2	Specified general requirements for production welding and welding qualification shall be complied by bidder.		
3	Weld Plan		
	Before fabrication can commence the Contractor shall prepare a Weld Plan and sent the same to IPR for Approval. Weld Plan shall include weld joint mapping identifying all the welds by proper numbering system, applicable WPS, Process used, type of joint with sketch, NDT requirements and welds requiring production proof samples		
	Weld Plan, in conjunction with the following documents shall be submitted to IPR before start of welding activity. - Welding Procedure Specification (WPS) - Welding Procedure Qualification Record (WPQR) - Welder Performance Qualification (WPQ)		
4	Welding process		
	➢ **Electron Beam Welding :** H-T-E assembly weld joints. Joining of Dissimilar metal (i.e SS to Ni / *Inconel*, CuCrZr to Ni/ *Inconel*) and joining of CuCrZr to CuCrZr ➢ **TIG Welding:** Stainless Steel structures & pipe joints		
5	Joint Configuration		
	- The use of welds from both sides makes leak testing difficult and enhances the risk of trapped volumes forming virtual leaks or contaminant traps that are to be avoided. Thus, vacuum sealing welds shall be either internal (i.e. facing the vacuum) or external. The use of stitch welds on the vacuum facing side is prohibited.		

	- All welds which forms the boundary to air or water shall preferably be full penetration welds. Weld joints shall be designed such a way that they are accessible for repair whenever required. Butt welded joints are preferred to fillet or lap joints, since testability is improved. - Fillet, corner, lap and cross joints should be avoided for the welds which form the primary vacuum boundary. Welds shall normally be made in such a way that they can be leak tested at the time of completion.		
8	Welding procedure qualification		
	Contractor shall perform welding procedure qualification in accordance to ISO 15614.		
	Welding procedure qualification shall be performed for each weld process, joint configuration / thickness. , material combinations, welding consumable etc. w.r.t range of approval/ essential variable range as recommended by ISO 15614.		
	Qualification test coupon shall be subjected to all destructive & non-destructive tests as required by ISO 15614. Acceptance criteria for such tests are in accordance to section 8.1.2 of this specification		
	Personnel performing the non-destructive examination shall be competent in accordance to EN 473, ISO 9712 or ASNT Level 2		
	Contractor can use the existing Welding Procedure Qualification Record (WPQR) , if available with them provided that following conditions are met ; • The test must have been performed in the same environment as proposed for production, using the same welding technique, process, joint configuration and welding equipment. • The allowable ranges are the same with regard to essential variables as specified by ISO 15614 • The test must have been witnessed by reputed Third party inspection agency (TPIA) or IPR representative.		
8.1	Acceptance Criteria		
8.1.1	*All destructive test results shall be complied with section 8.1.1 of Appendix 4.*		
8.1.2	*All non-destructive test (during welding qualification & production welding) shall be complied with section 8.1.2 of Appendix 4.*		
9	Welder performance qualification		
	Welder Qualification shall be in accordance with EN287-1, ISO 9606 or ASME Sec. IX. For welding operators ISO 1418 / ASME Sec. IX shall be used.		

	The contractor shall establish and maintain a list of qualified welders and operators. This list shall include their individual identification and range of welds for which they are qualified.		
10	Production welds		
10.1	Non Destructive examination of production welds		
	100% volumetric examination (Radiography or Ultrasonic) shall be performed on production welds forming the water and vacuum boundaries. All fillet welds (structural welds not forming the vacuum boundary) shall be visually tested. Examination methods shall be as per ASME Sec. V / relevant EN ISO Standard. All production welds shall be evaluated in accordance to ISO 5817 Level B criteria. The use of LPT shall be prohibited.		
10.2	Production proof sample		
	Welds where volumetric examination is impractical (e.g. welds that are not full penetration butt welds or accessibility for carrying out the examination is limited) must be covered by production proof sampling (PPS). Each PPS will only represent a specific type of weld and must use the same material, thickness and set –up as the production weld. A PPS must be welded by the same welder otherwise it would not be representative of the production welding. If more than one welder welds the production welds, each welder must perform PPS. PPS's are required for each shift of production welding to represent the welds performed on that shift.		
	PPS shall be sectioned and macro examined in four places (including one stop /start area). Photographs of the macros giving the date the PPS was welded, the welder's identity and identifying the production welds it is covering must be included in the final documentation package.		
	PPS welding may be witnessed by IPR's Representative. All Macros of PPS shall be reviewed by IPR's representative. As the PPS is a representative sample, rejection of the macros will result in rejection of all welds represented by those PPS.		
10.3	All vacuum sealing welds shall be 100% leak tested. Leak testing shall be done as per Appendix 7 of tender doc.		
10.4	Production welds used on all vacuum systems shall be left clean and bright but there is no vacuum requirement to machine the weld zone to match the surface finish of the parent material. All weld regions shall be free from scale, voids, blowholes, etc. and there shall be no visible evidence of inclusions.		
10.5	Repair of production welds		

	The size and magnitude of all leaks found on welds forming a vacuum boundary shall be reported to the IPR. No weld repair shall be performed without qualification of the welding procedure. Welding procedures used for welding repair shall be qualified in accordance with this specification.		
	Any repair welding involving grinding or grinding followed by welding shall be re-examined by all the non-destructive tests as applicable to that joint, acceptance criteria for repair weld remain unchanged.		
	All repair vacuum boundary welds shall be subject to full vacuum leak testing in accordance with the approved procedure in line with Appendix 7 of Tender doc.		
Appendix 5: Technical requirements for pressure testing			
2	Contractor shall submit the pressure testing procedure, calibration cert. of test gauge & pressure test report (as mentioned in section 2) .		
3	Verification of component (prior to pressure testing) shall be in compliance with section 3 of Appendix 5.		
4	Pressure Test shall be carried out in isolated place from work area / pit with appropriate safety precautions and equipment.		
5	Before applying Test pressure, the test equipment shall be inspected to see that it is tight and that all low-pressure filling lines and other appurtenances that should not be subjected to the test pressure have been disconnected or isolated by valves or other suitable means.		
6	Pressure testing general requirements		
6.1	Pressure Test shall be done with dry Nitrogen Gas (N2) or *Argon*.		
6.2	All components shall be subjected to a 15 bar test pressure. Test pressure shall be held for duration not less than one hour.		
6.3	Test procedure shall be in accordance to ASME Sec. VIII Div. 2/ equivalent EN/ISO code.		
6.4	*Test gauge used in pressure testing shall meet the requirements of section 6.4 of Appendix 5.*		
6.5	*Pressurization & Preliminary check shall be done in accordance to section 6.5 of Appendix 5.*		
7	- Visual Examination shall be made to check leakage and permanent deformation for all joints and connections. - Any leakages that are present, except for leakages that may occur at temporary test closures, shall be satisfactory repaired and retested. - The inspector shall reserve the right to reject the Pressure test program if there are any visible signs of permanent distortion and deformations		
8	After pressure testing, the component shall not have		

	- Permanent deformation - Leakage		
Appendix 6 : Technical requirements for inspection & testing			
2	*General requirements specified in section 2 of Appendix 6 shall be complied during inspection & testing of components.*		
3	The inspector shall be permitted free access, at all times while work on the Component is being performed, to all parts of the manufacturer's shop that concern the construction of the component.		
4	The Contractor shall notify the inspector of the progress of all work associated with the manufacturing, inspection, examination and testing of the component. In addition, the manufacturer shall notify the inspector reasonably in advance when any required tests or inspections are to be performed.		
5	Testing & measuring devices used in activities affecting quality shall be controlled, calibrated and adjusted at specified intervals (at least once a year) on or before use to maintain accuracy within limits		
6	The Contractor shall be responsible for assuring that non-destructive examination personnel have been qualified and certified as per EN 473, ISO 9712 or ASNT Level 2 prior to performing or evaluating examinations.		
7	Inspection & Testing		
7.1	Visual inspection All components shall be visually checked and they shall be free from Weld spatter, Surface cracks, Surface porosity and other defects.		
7.2	Dimensional inspection The contractor shall respect the tolerance mentioned on the manufacturing drawings. He shall establish the procedure for dimensional and geometrical shape verification defining the measuring instruments, inspection method and accuracies of measurement, number of reading to be taken etc. The dimensional verifications shall be carried out on parts at each stage as mentioned in approved Manufacturing & Inspection Plan (MIP). Deviations (if any) shall be reported to IPR. The same will be evaluated for its effect on operation condition of component. After this review IPR can take decision regarding acceptance or rejection of component.		
7.3	*Examination of production welds shall be complied with section 7.3 of Appendix 6*		
7.4	*Flow & Pressure drop test of H-T-E shall be carried out in accordance to section 7.4 of Appendix 6*		
7.5	Pressure Testing shall be carried out as per Appendix 5.		

7.6	Leak Testing shall be carried out as per Appendix 7.		
7.7	Other tests like cleanliness check (shall be as per Appendix 2) , Raw material receipt inspections (shall be as per Appendix 1) , weld qualification tests (shall be as per Appendix 4) , qualification test for bellows (shall be as per Appendix 9), Instrumentation tests (shall be as per Appendix 8) etc. shall be carried as indicated in approved Manufacturing & Inspection Plan.		
Appendix 7 : Technical requirements for leak testing			
3	Bidder shall prepare a leak testing procedure (in accordance to section 3 of Appendix 7) & submit to IPR for review & approval.		
4	Requirements		
4.1	General requirements specified shall be complied by bidder.		
4.2	Leak testing during various stage of manufacturing		
	Leak Testing shall be done mainly in following two stages of manufacturing. **Stage 1:** Leak testing of Heat Transfer Element (HTE) assembly (During manufacturing) **Stage 2:** Leak testing of assembled second calorimeter (including HTE assembly)		
	Specified requirements (pre-test condition & test conditions) shall be followed during stage 1 & stage 2 leak tests.		
5	Clean condition shall be maintained during leak testing as specified in section 5 of Appendix 7.		
6	Certification of Personnel		
	The Examination shall be performed by suitably trained/experienced person or personnel certified as per EN 473 or NDT Level 2 as per ASNT Practice.		
7	The measured leak shall be reported in SI units. i.e Pascal cubic meter per second ($Pa.m^3/s$).		
8	The Leak testing equipment shall be appropriately calibrated as required by code / standards.		
9	Sensitivity of He detector shall be 10^{-10} Pa m^3/s (minimum)		
10	Use of vacuum leak detection methods is preferred for leak testing of second calorimeter components/ assembly. Other methods & procedures may be used, but only with the prior approval of the IPR.		
11	Contractor's responsibility		
	The Contractor is responsible for providing all jigs, seals and equipment to allow the leak tightness to be proven across all vacuum boundaries.		

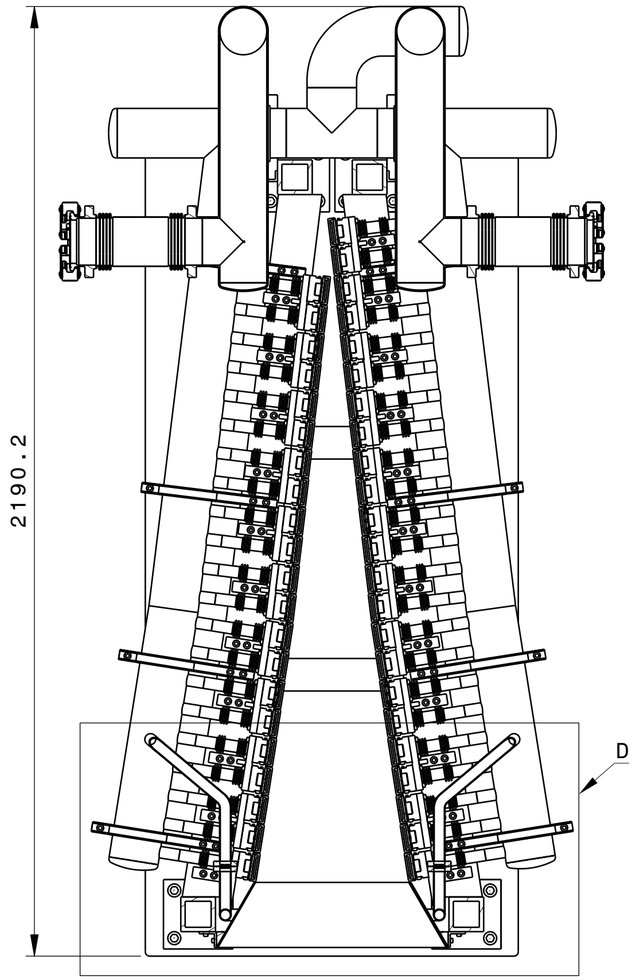
	The Contractor is responsible for the supply of tooling and methodologies for the subsequent removal of jigs, seals, and temporary closure plates etc. which have fitted to components to facilitate the leak testing of such components.		
12	*Acceptance criteria & acceptable leak rate (during leak testing) shall be in compliance with section 12 of Appendix 7.*		
13	*Leak test records shall be prepared in accordance to section 13 of Appendix 7/*		
	Appendix 8 : Technical requirement for thermal sensors		
1	*Manufacture, procurement, testing, inspection, calibration and installation* of *thermal sensor during assembly of second calorimeter at contractor site shall be complied with Appendix 8.*		
	Mineral Insulated cable (MIC) & Kepton insulated thermal sensor extension cable shall be procured in accordance to data sheet provided in section 6 & 7 respectively.		
	Appendix 9: Technical requirement of metallic bellows		
2	**Scope of supply**		
	- Design of Bellows as per the design requirements given by IPR in this specification. - Prepare the Design calculations & manufacturing drawings and send them to IPR for approval. - Qualification of bellows design as per this specification. - Manufacturing, testing & delivery of bellows - Preparation of manufacturing documentation including manufacturing inspection plan, test reports etc. and submit the same to IPR for approval.		
	Contractor can use the bellow from the catalogue, which shall be incompliance with the design requirement as stated in section 3.1.1 and 3.2.1. The corresponding design calculations shall be submitted to IPR for review and approval. In such situation (use of bellow from catalogue), the qualification test of the bellow as stated in section 7 is not required provided that, existing qualifications (for proposed catalogue product) is available with contractor.		
3	Second Calorimeter bellows		
3.1	H-T-E bellows		
	H-T-E bellows shall be design in accordance to design requirements provided in section 3.1.1 of Appendix 9		
3.2	Inlet / outlet cooling header bellows		

	Inlet /Outlet cooling header bellows shall be design in accordance to design requirements provided in section 3.2.1 of Appendix 9		
4	Material		
	Material used for manufacturing of bellows shall comply with the requirements stated in Appendix 1.		
5	Manufacture		
	Bellows shall be manufactured by hydrostatic, rolling or elastomeric forming process.		
6	Welding		
	Welding of bellows shall meet the requirements as specified in Appendix 4.		
7	Qualification of bellows (Type testing)		
	- Prior to manufacture of bellows assemblies, the manufacturer shall qualify a bellow design. The bellows manufacturer shall submit a qualification plan detailing the test to be performed on bellows assemblies to IPR for acceptance. - After the completion of all manufacturing processes, a bellow representative of a batch for a particular design of a bellow shall undergo the following qualification tests. ➢ Fatigue Test ➢ Helium leak test *Important Note: Contractor can use their existing bellow qualification (if already available) in case the qualified design is complying with the design requirement specified in section 3.1.1 & 3.2.1 of this specification.*		
7.1	Fatigue life test		
	Bellow manufacturer shall demonstrate that the bellow taken for the type testing remains mechanically unaltered over the expected life. This can be achieved by carrying out following tests. The test shall be carried out by displacing axially and laterally to the maximum design values, and subjected to an internal 2 MPa pressure. Application of displacement shall be repeated for design no. of cycle of bellow. Leak test shall be performed after this fatigue life test. Alternatively, The test can be performed by displacing only axially by an amount design axial displacement + axial equivalent of design lateral displacement and subjected to an internal 2 MPa pressure. This application of		

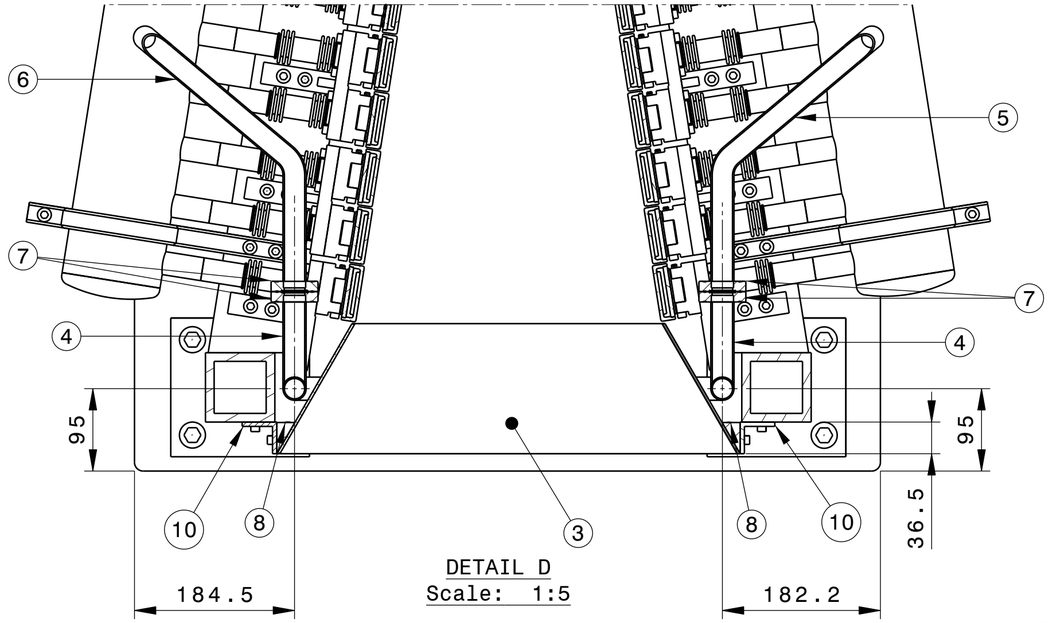
	displacement shall be repeated for the design no. of cycle of the bellow. Leak test shall be performed after this test.		
7.2	Leak testing		
	- Leak testing shall be done at ambient temperature by evacuating the bellow assembly and spray a helium on external surfaces. - Leak testing shall be carried out as per Appendix 7. - Leak rate for bellows assemblies shall be less than 1 x 10^{-10} $Pa.m^3.s^{-1}$ (air equivalent) at maximum operating temperature.		
8	Testing & Inspection of bellows		
8.1	Leak testing		
	The bellows shall be subject to helium leak testing in accordance to Appendix 7.		
8.2	Dimensional inspection		
	Manufacture, shall perform the dimensional inspection of finished bellows w.r.t approved drawings. Dimensional inspection shall be done by calibrated measuring equipment.		
8.3	Pressure Test		
	Each bellows shall be pressure tested at pressure according to ASME B 31.3 / Appendix X of EJMA/ equivalent std. with application of dry N2 Gas.		
9	*Cleaning of Bellows assemblies shall be done in accordance to section 9 of Appendix 9.*		
10	Bellows shall be supplied with mechanical protection (such as the use of metal braiding or removable cover plates) to prevent accidental damage and ingress of matter to the bellows convolutions.		
11	Bellows assemblies should be marked by scribing with a clean sharp point. Chemical etching is prohibited. Dyes, marker pens, paints etc. shall not be used on surfaces.		
12	*Bellow shall be packed & delivered in accordance to section 12 of Appendix 9*		
13	The bellow manufacture shall provide the Material certificate of type 3.1 in accordance with EN 10204 for all bellows assemblies.		

Name & Signature of Authorized Signatory

Official Seal
Date :- ……..



SECTION VIEW C-C



DETAIL D
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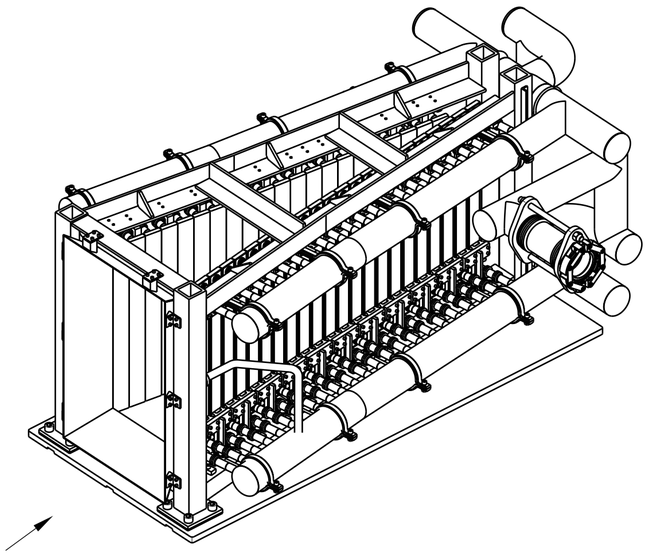
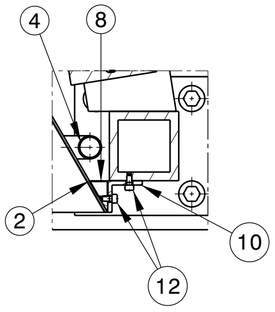


ISOMETRIC VIEW



SECTION VIEW A-A
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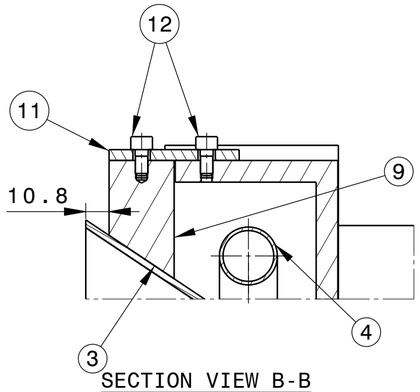

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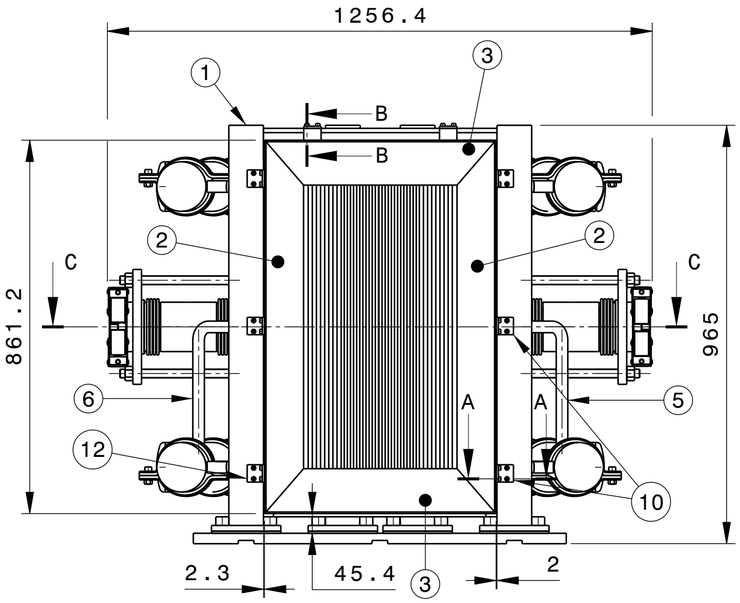

FRONT VIEW
Scale: 1:10

12	-	ISO_4762_M6x12_SOCKET_CAPSCREW	STD	32	
11	01-00-00-00-09	2ND_CAL_SCRAPER_CLAMP	PART	2	
10	01-00-00-00-08	2ND_CAL_SCRAPER_L_CLAMP	PART	6	
9	01-00-00-00-07	2ND_CAL_SCRAPER_H_PLT_BLOCK	PART	2	
8	01-00-00-00-06	2ND_CAL_SCRAPER_V_PLT_BLOCK	PART	6	
7	-	DN25CH_FLANGE	STD	4	
6	01-00-00-00-05	2ND_CAL_SCRAPER_COOLING_PIPE_3	PART	1	
5	01-00-00-00-04	2ND_CAL_SCRAPER_COOLING_PIPE_2	PART	1	
4	01-00-00-00-03	2ND_CAL_SCRAPER_COOLING_PIPE_1	PART	1	
3	01-00-00-00-02	2ND_CAL_SCRAPER_H_PLATE	PART	2	
2	01-00-00-00-01	2ND_CAL_SCRAPER_V_PLATE	PART	2	
1	01-01-00-00-00	2ND_CAL_WITH_SUPPORT_STRUCTURE_ASSY	ASSY	1	
SR.NO.	DRAWING NO.	PART NAME	TYPE	QTY	REMARKS

MATERIAL	-
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

NOTE :-
1.WELD CONFIGURATION SHALL BE INCLUDED IN THE MANUFACTURING DRAWING BY CONTRACTOR.
2.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
3.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID: XXXXXX
LINKED EV5 PT ID: XXXXXX
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REV DATE: DD-MM-YY | PT MATURITY: AB | PT VERSION: A
SHEET SIZE: 594x420 | SCALE: 1:10 | PT Status: W
THIRD ANGLE PROJECTION | NO.OF SHTS: 01

RELEASED BY: DES INT
APPROVED BY: DIV HEAD
CHECKED BY: CHECKER
CONTROLLED BY: RESP OFF
DRAWN BY: DESIGNER

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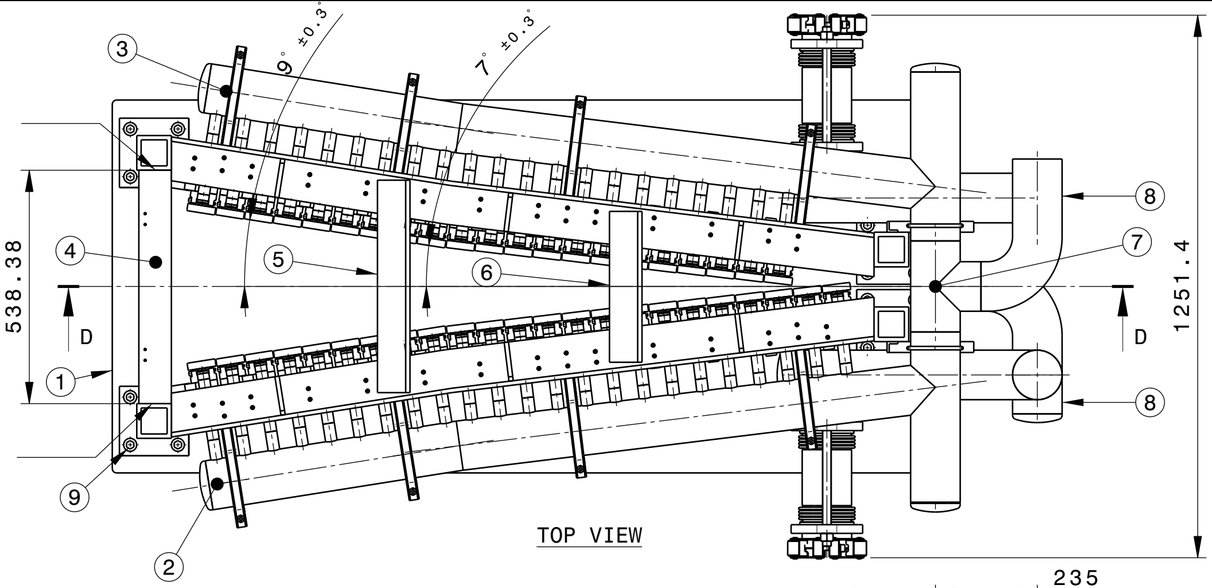
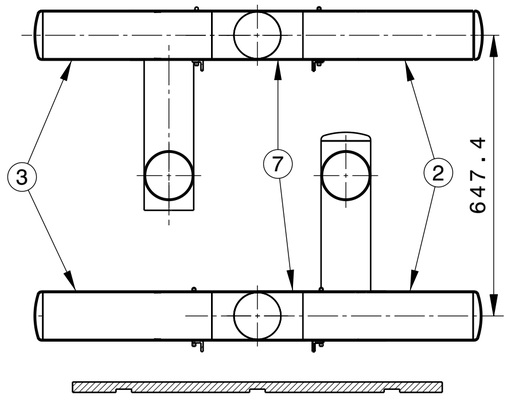
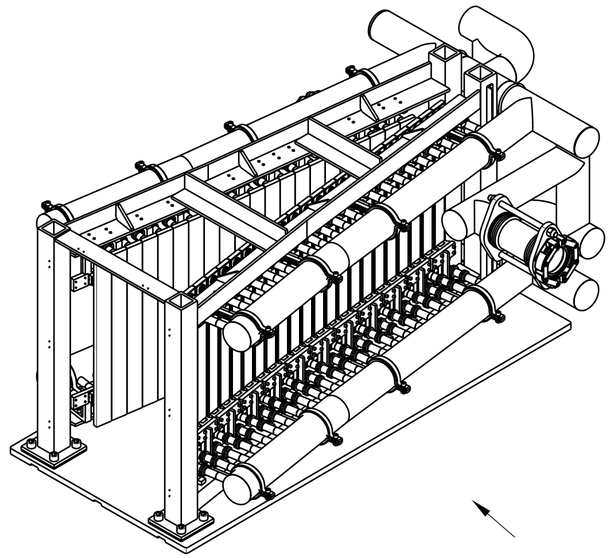
DRAWING TITLE: 2ND_CALORIMETER_ASSY
-
-

PBS 3 LEVELS: NN XX YY | DRAWING NUMBER: 01-00-00-00-00 | SHEET: 01 | REVISION: --A | DR STATUS: W

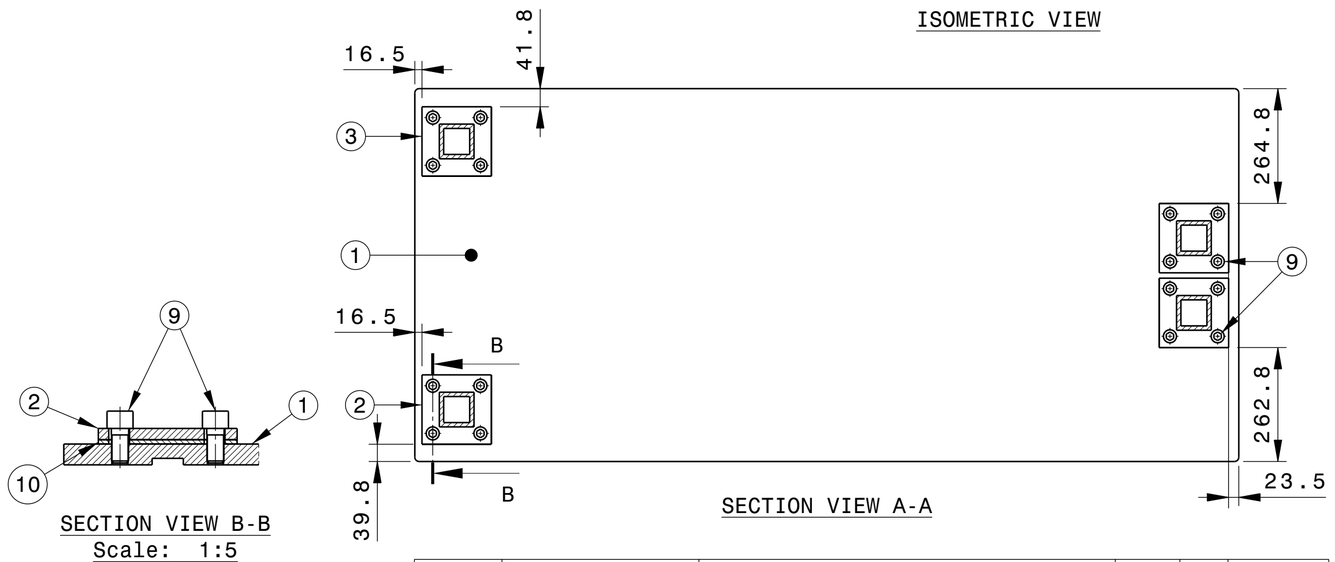




SECTION VIEW C-C



ISOMETRIC VIEW



SECTION VIEW A-A

SECTION VIEW B-B
Scale: 1:5

SR.NO.	DRAWING NO.	PART NAME	TYPE	QTY	REMARKS
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9	-	ISO_4762_M20x40_SOCKET_CAPSCREW	STD	16	
8	01-01-03-00-00	2ND_CAL_HEADER_ASSY_1	ASSY	2	
7	01-01-00-00-05	DN100_TEE	STD	2	
6	01-01-00-00-04	2ND_CAL_MID_SUPPORT_3	PART	2	
5	01-01-00-00-03	2ND_CAL_MID_SUPPORT_2	PART	2	
4	01-01-00-00-02	2ND_CAL_MID_SUPPORT_1	PART	1	
3	01-01-02-00-00	2ND_CAL_LT_HTE_&_SS_ASSY	ASSY	1	
2	01-01-01-00-00	2ND_CAL_RT_HTE_&_SS_ASSY	ASSY	1	
1	01-01-00-00-01	2ND_CAL_BASE_SUPPORT_PLATE	PART	1	

MATERIAL	-
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

NOTE:
1. WELD CONFIGURATION SHALL BE INCLUDED IN THE MANUFACTURING DRAWING BY CONTRACTOR.
2. ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
3. PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

SECTION VIEW D-D

DRW DOC ID: XXXXXX		RELEASED BY: DES INT	IPR GANDHINAGAR
LINKED EV5 PT ID: XXXXXX		APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED. The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.
PBS TITLE: PBS LEVEL 1 / PBS LEVEL 2 / PBS LEVEL 3		CHECKED BY: CHECKER	DRAWING TITLE: 2ND_CAL_WITH_SUPPORT_STRUCTURE_ASSY
REV DATE: DD-MM-YY	PT MATURITY: AB / PT VERSION: A	CONTROLLED BY: RESP OFF	-
SHEET SIZE: 594x420	SCALE: 1:10 / PT Status: W	DRAWN BY: DESIGNER	-
THIRD ANGLE PROJECTION	NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-01-00-00-00 / SHEET: 01 / REVISION: --A / DR STATUS: W

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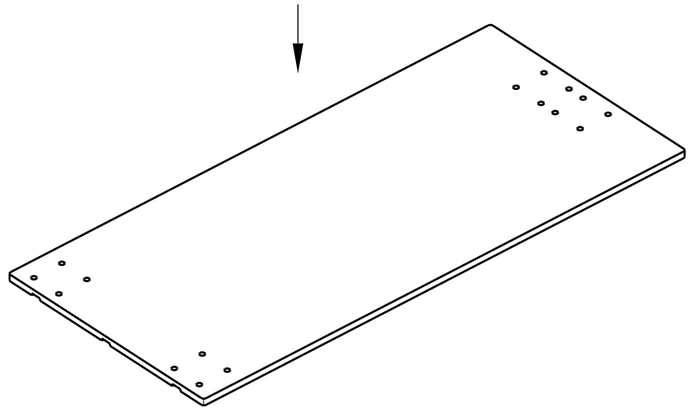
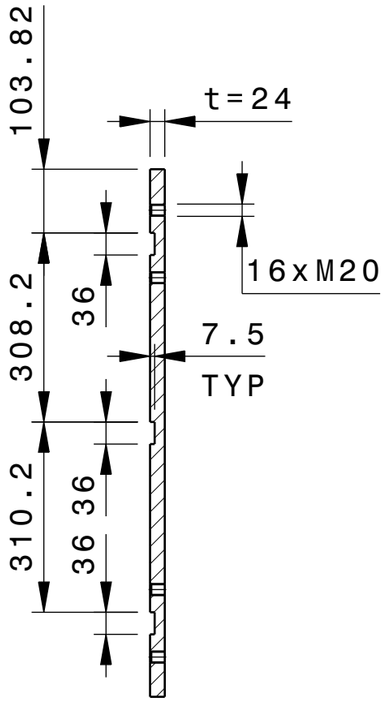
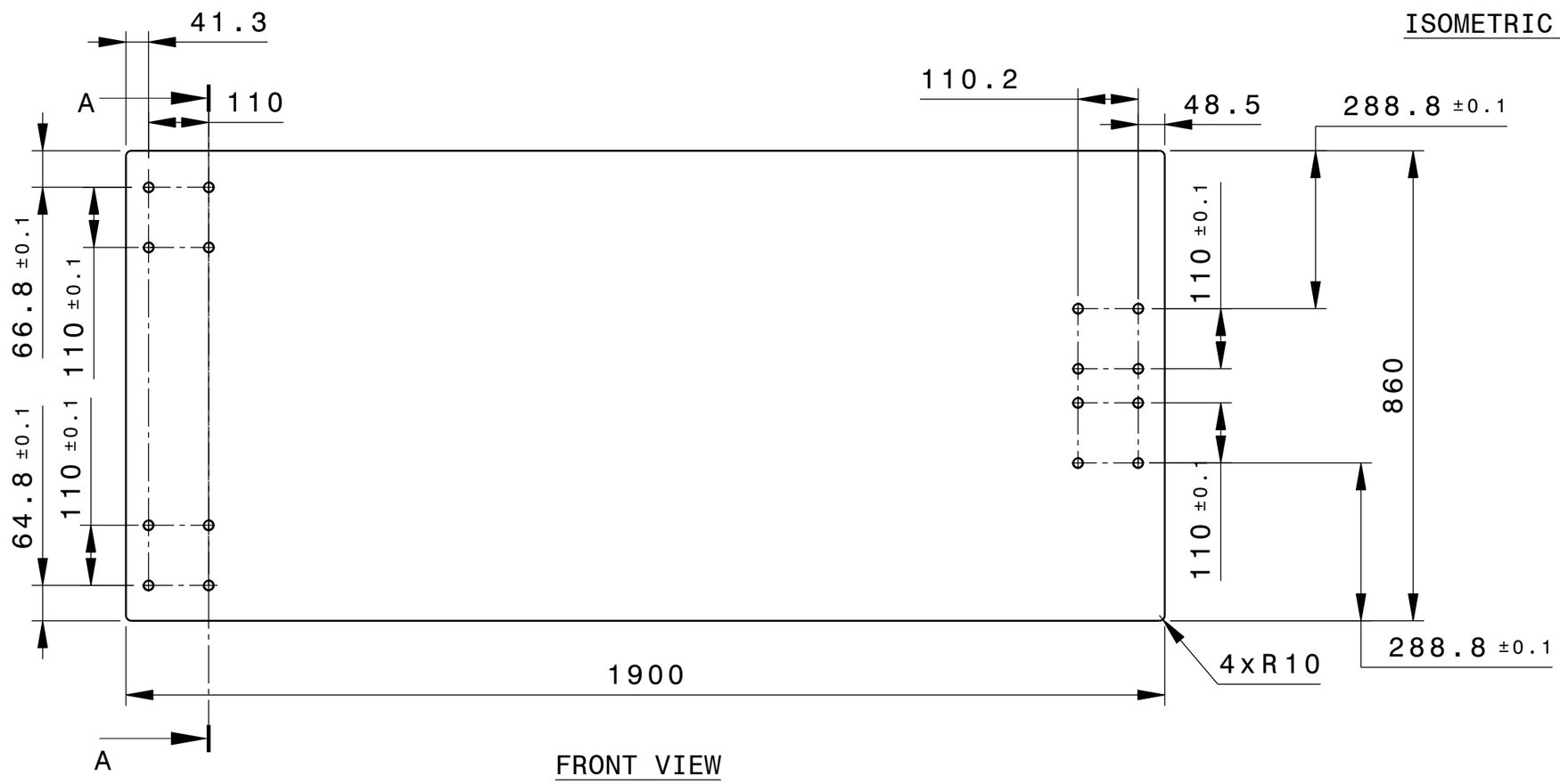


ISOMETRIC VIEW



SECTION VIEW A-A



FRONT VIEW

MATERIAL	SS 304L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

NOTE :-
1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID	XXXXXX	RELEASED BY	DES INT
LINKED EV5 PT ID	XXXXXX	APPROVED BY	DIV HEAD
PBS TITLE	PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3	CHECKED BY	CHECKER
REV DATE	DD-MM-YY	CONTROLLED BY	RESP OFF
PT MATURITY	AB	DRAWN BY	DESIGNER
PT VERSION	A		
SHEET SIZE	420x297		
SCALE	1:10		
PT Status	W		
THIRD ANGLE PROJECTION		NO.OF SHTS	01

IPR GANDHINAGAR

CONFIDENTIAL UNLESS AUTHORISED

DRAWING TITLE
2ND_CAL_BASE_SUPPORT_PLATE
-
-

PBS 3 LEVELS	DRAWING NUMBER	SHEET	REVISION	DR STATUS
NN XX YY	01-01-00-00-01	01	- -A	W

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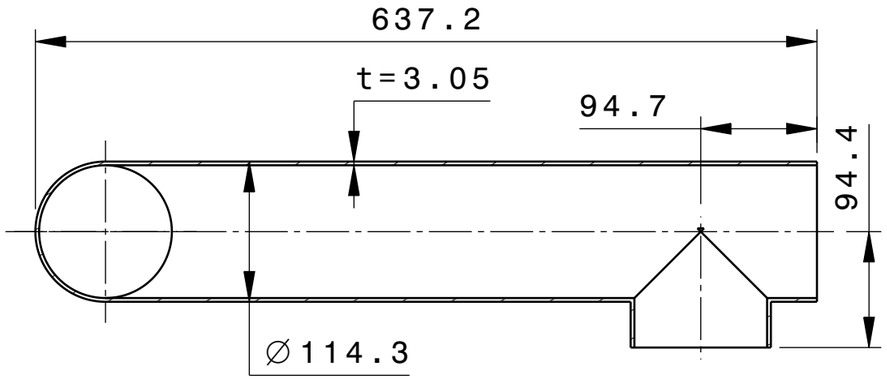
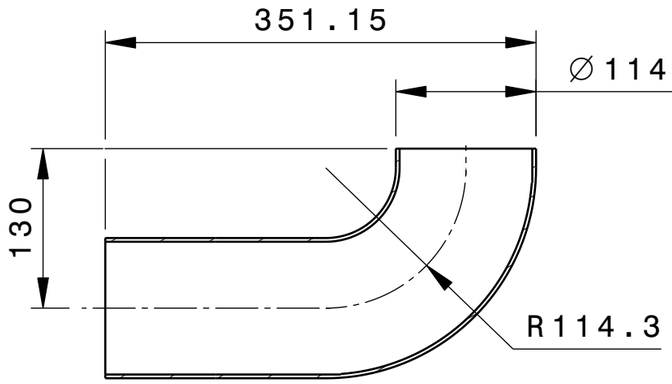
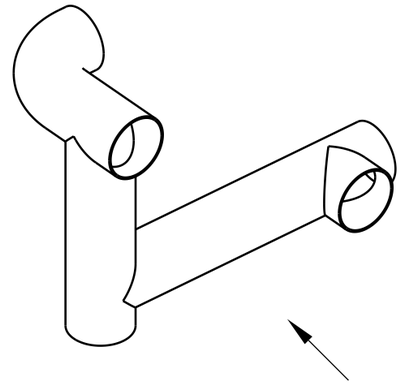


SECTION VIEW A-A



SECTION VIEW B-B



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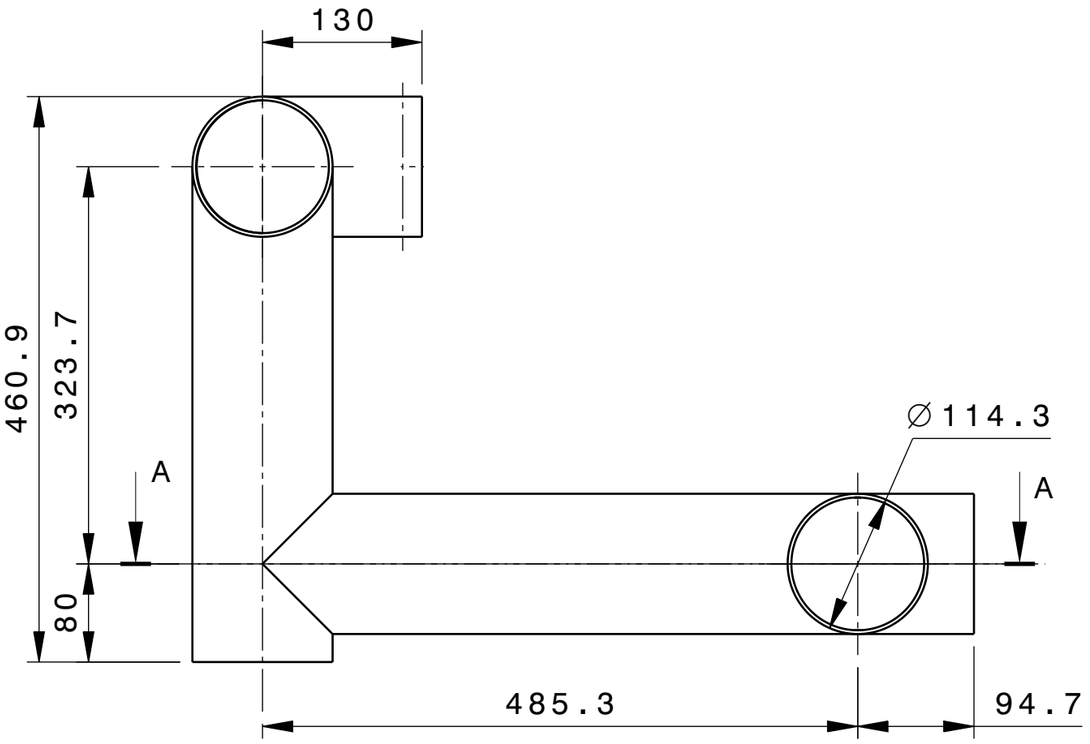
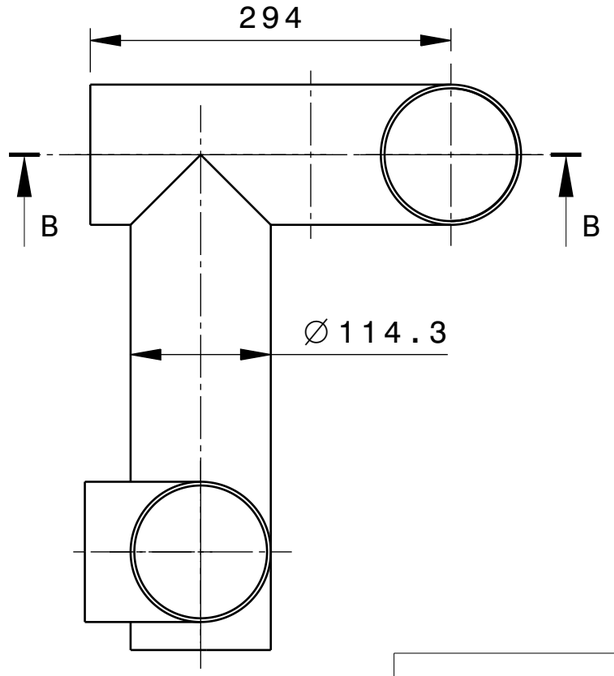


FRONT VIEW



RIGHT VIEW

MATERIAL	SS 316L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

NOTE:

1.THIS COMPONENT SHALL BE FABRICATED BY TIG WELDING. WELD CONFIGURATION SHALL BE INCLUDED IN THE MANUFACTURING DRAWING BY CONTRACTOR.

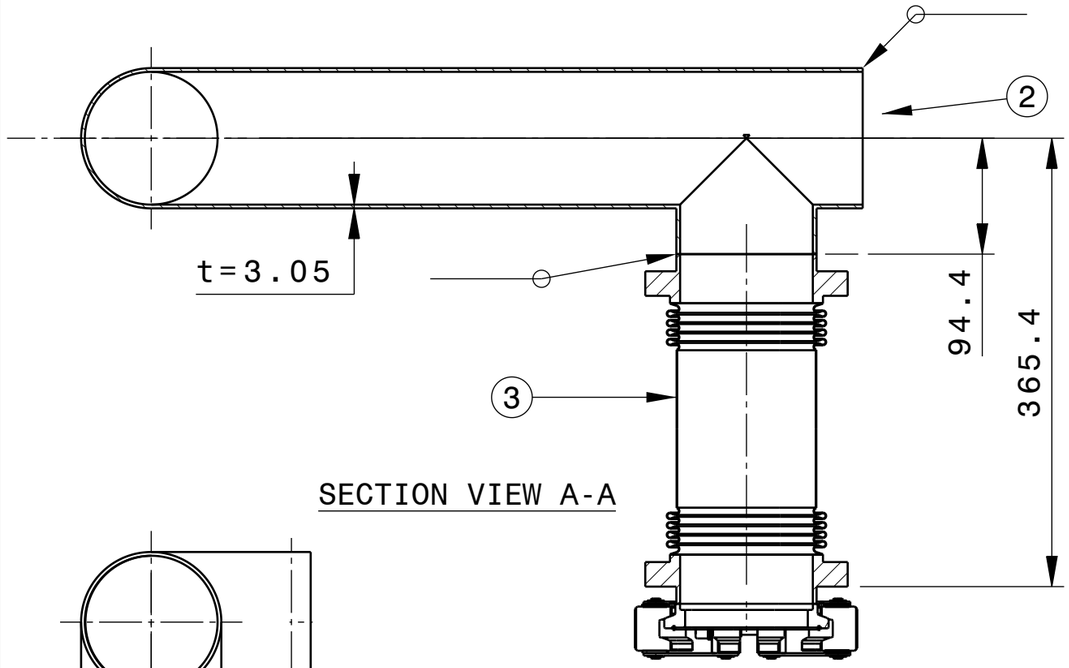
2.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.

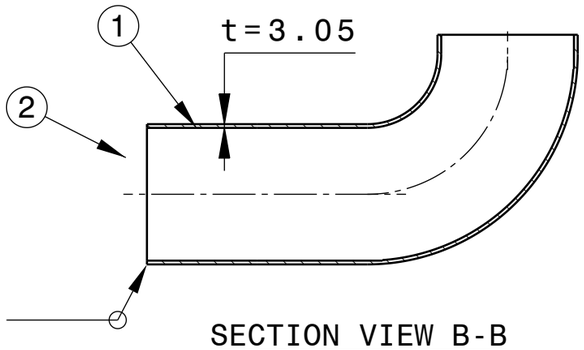
3.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

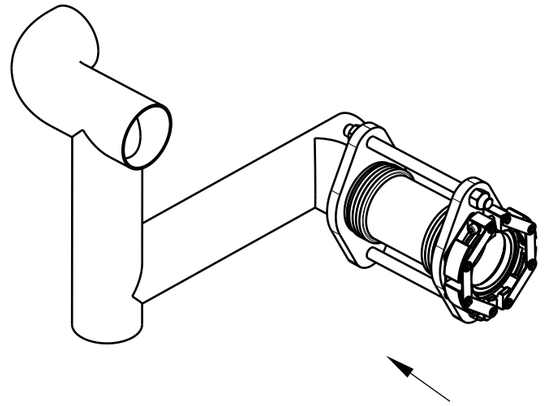
DRW DOC ID	XXXXXX		RELEASED BY	DES INT	IPR GANDHINAGAR
LINKED EV5 PT ID	XXXXXX		APPROVED BY	DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED
PBS TITLE	PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3		CHECKED BY	CHECKER	The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.
REV DATE	PT MATURITY	PT VERSION	CONTROLLED BY	RESP OFF	DRAWING TITLE: 2ND_CAL_HEADER_1
DD-MM-YY	AB	A	DRAWN BY	DESIGNER	-
SHEET SIZE	SCALE	PT Status			-
420x297	1:5	W			
THIRD ANGLE PROJECTION		NO.OF SHTS 01	PBS 3 LEVELS	NN XX YY	DRAWING NUMBER: 01-01-03-00-01

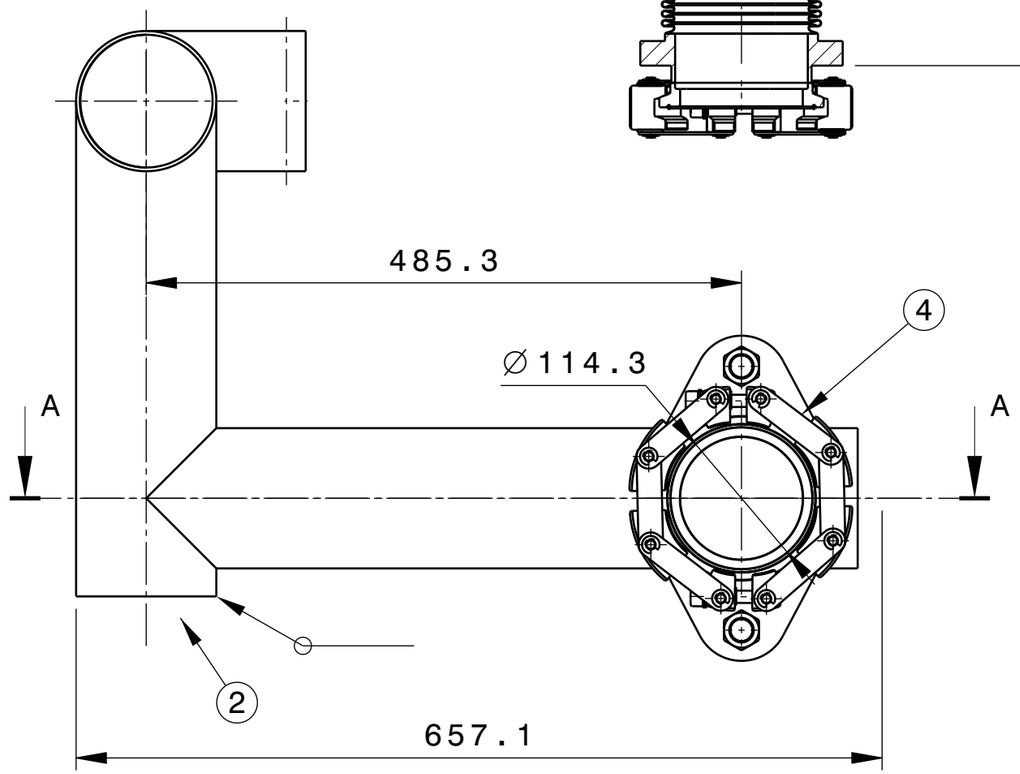
SHEET	REVISION	DR STATUS
01	--A	W

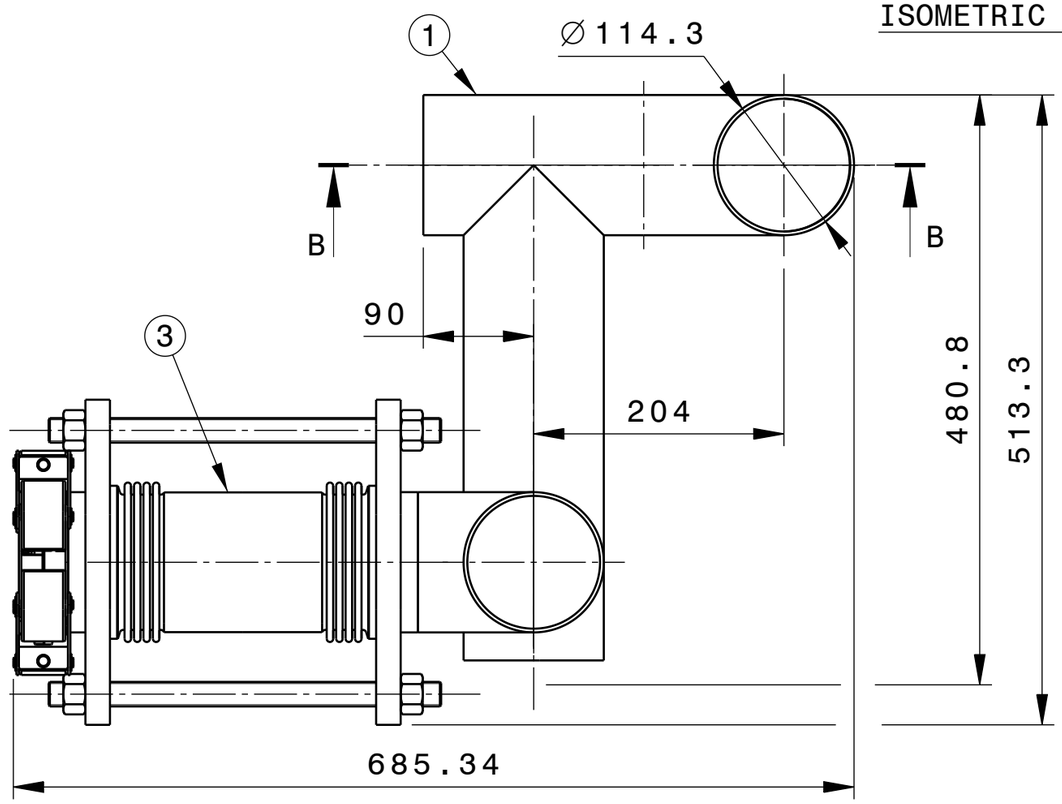
Spacereservation for the banner











SR.NO.	DRAWING NO.	PART NAME	TYPE	QTY	REMARKS
4	-	EVAC FLANGE	STD	1	
3	01-01-03-00-02	COOLING HEADER BELLOW	-	1	ANNEXURE-9
2	01-01-01-00-02	2ND_CAL_HEADER_CAP	ASSY	3	
1	01-01-03-00-01	2ND_CAL_HEADER_1	ASSY	1	

NOTE :-

1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.

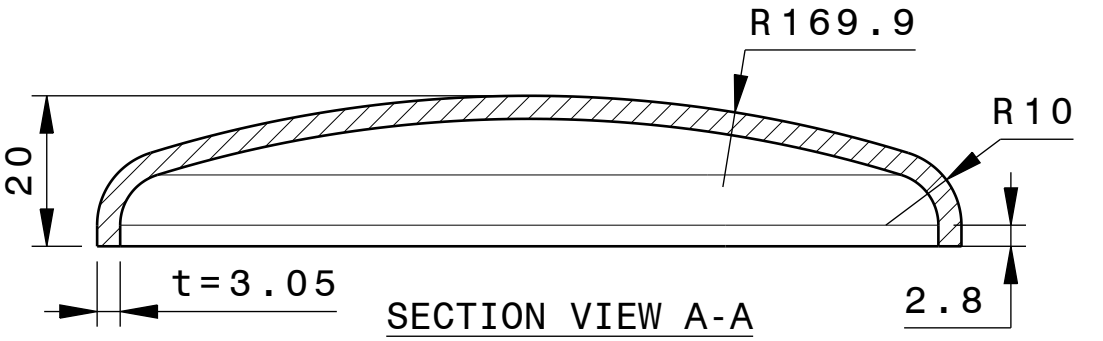
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID	XXXXXX		RELEASED BY	DES INT	IPR GANDHINAGAR
LINKED EV5 PT ID	XXXXXX		APPROVED BY	DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED
PBS TITLE	PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3		CHECKED BY	CHECKER	The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.
REV DATE	PT MATURITY	PT VERSION	CONTROLLED BY	RESP OFF	DRAWING TITLE: 2ND_CAL_HEADER_ASSY_1
DD-MM-YY	AB	A	DRAWN BY	DESIGNER	-
SHEET SIZE	SCALE	PT Status			-
420x297	1:5	W			
THIRD ANGLE PROJECTION		NO.OF SHTS 01	PBS 3 LEVELS	NN XX YY	DRAWING NUMBER: 01-01-03-00-00

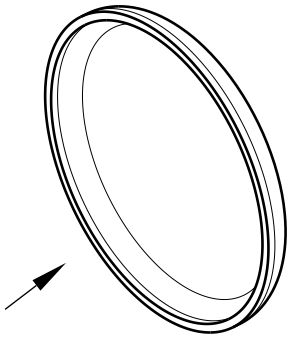
SHEET	REVISION	DR STATUS
01	- -A	W

Spacereservation for the banner

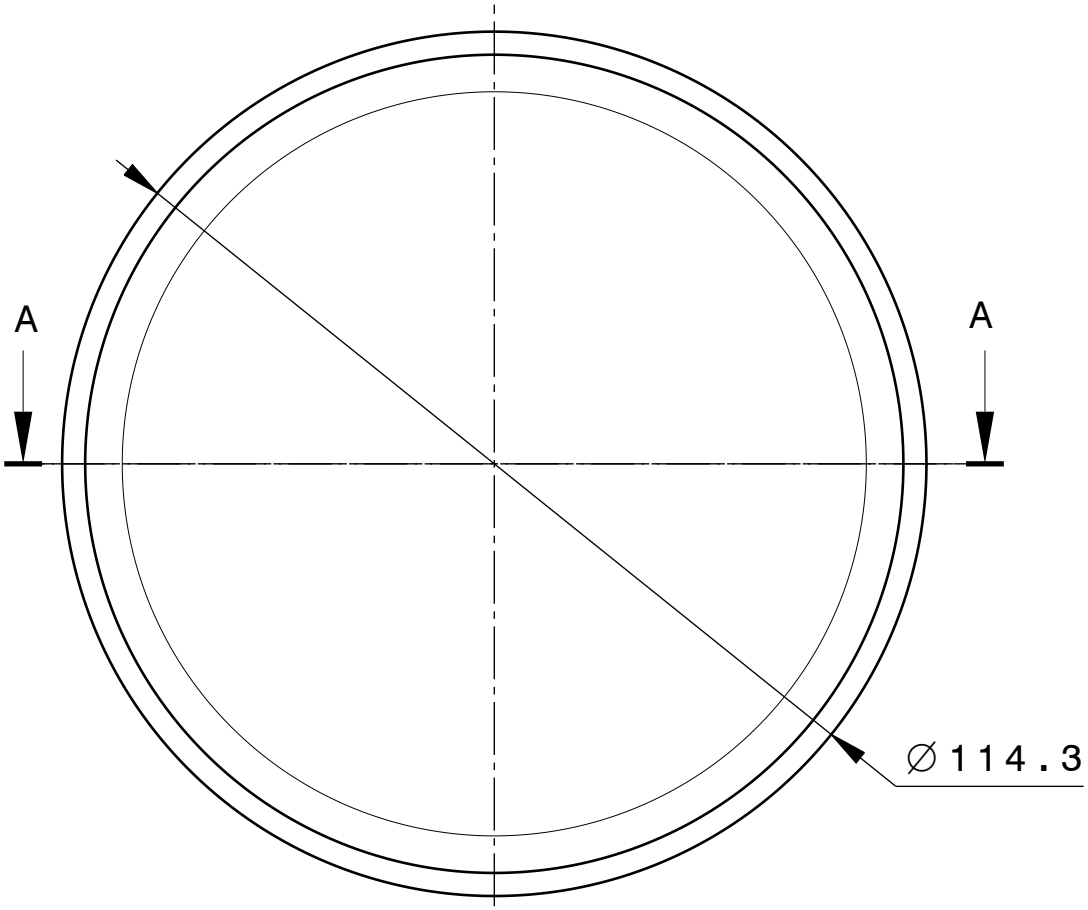
Spacereservation for the banner



SECTION VIEW A-A



ISOMETRIC VIEW



FRONT VIEW

MATERIAL	SS316L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

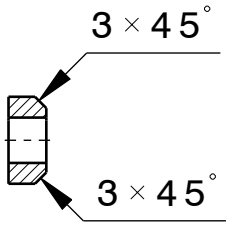
NOTE :-

1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.

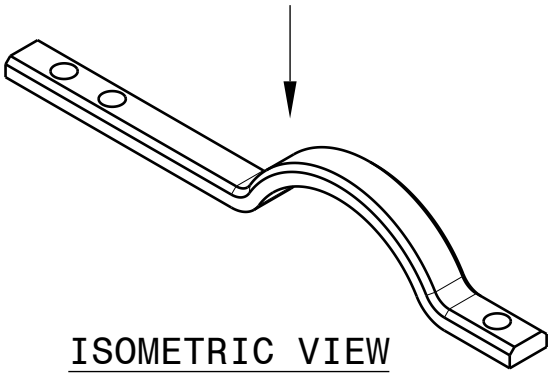
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID: XXXXXX			RELEASED BY: DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID: XXXXXX			APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
PBS TITLE PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3			CHECKED BY: CHECKER	DRAWING TITLE 2ND_CAL_HEADER_CAP	
REV DATE: DD-MM-YY	PT MATURITY: AB	PT VERSION: A	CONTROLLED BY: RESP OFF	-	
SHEET SIZE: 210x297	SCALE: 1:1	PT Status: W	DRAWN BY: DESIGNER	-	
THIRD ANGLE PROJECTION	NO.OF SHTS: 01		PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-01-01-00-02	SHEET: 01 / REVISION: --A / DR STATUS: W

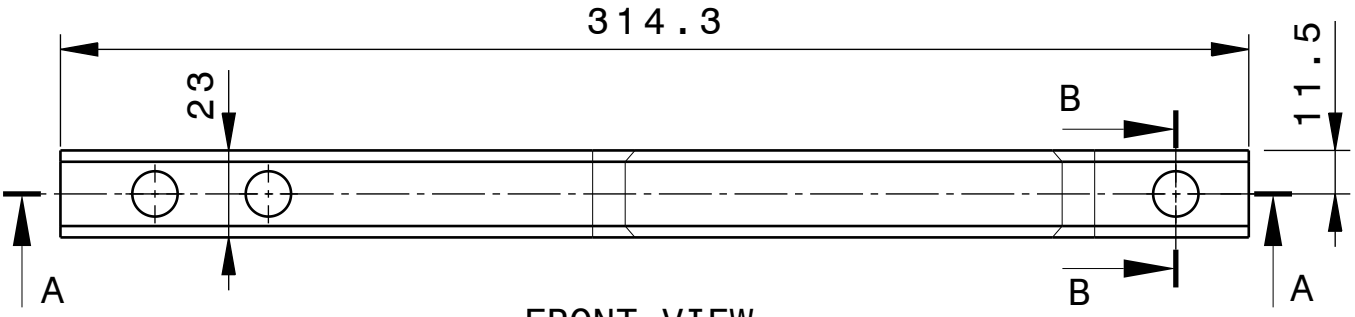
Spacereservation for the banner



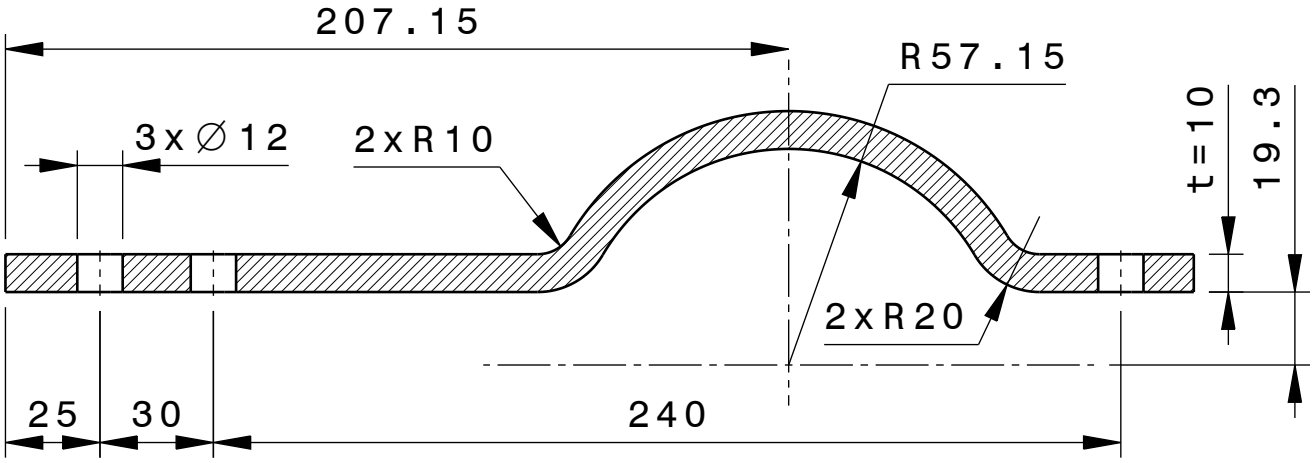
SECTION VIEW B-B



ISOMETRIC VIEW



FRONT VIEW



SECTION VIEW A-A

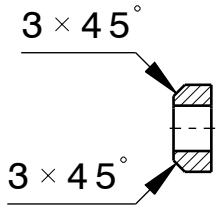
MATERIAL	SS304L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

NOTE :-

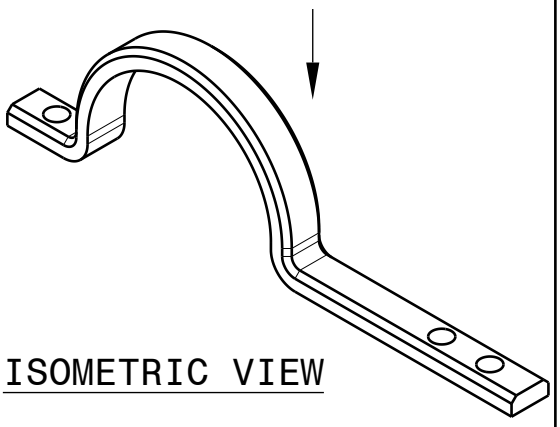
1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.

2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

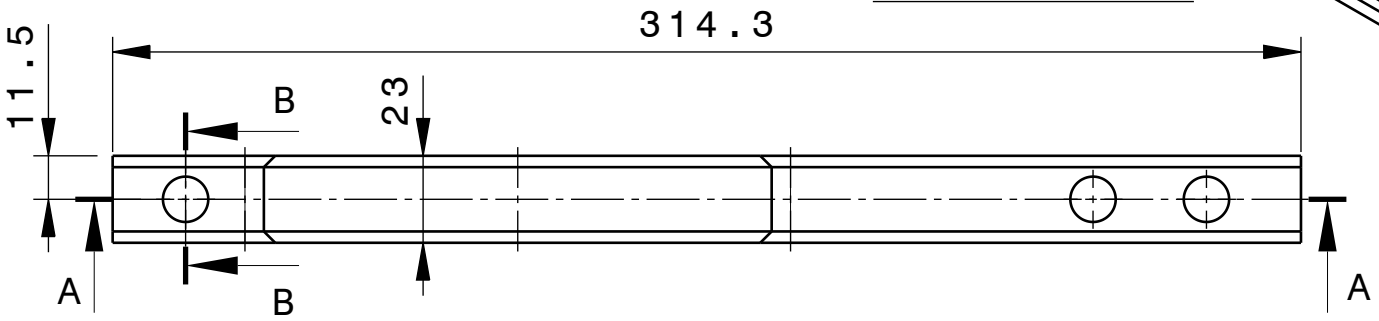
DRW DOC ID: XXXXXX	RELEASED BY: DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID: XXXXXX	APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED	
PBS TITLE: PBS LEVEL 1 / PBS LEVEL 2 / PBS LEVEL 3	CHECKED BY: CHECKER	The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
REV DATE: DD-MM-YY / PT MATURITY: AB / PT VERSION: A	CONTROLLED BY: RESP OFF	DRAWING TITLE: 2ND_CAL_HEADER_CLAMP_1	
SHEET SIZE: 210x297 / SCALE: 1:2 / PT Status: W	DRAWN BY: DESIGNER	- / -	
THIRD ANGLE PROJECTION / NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-01-01-00-03	SHEET: 01 / REVISION: --A / DR STATUS: W



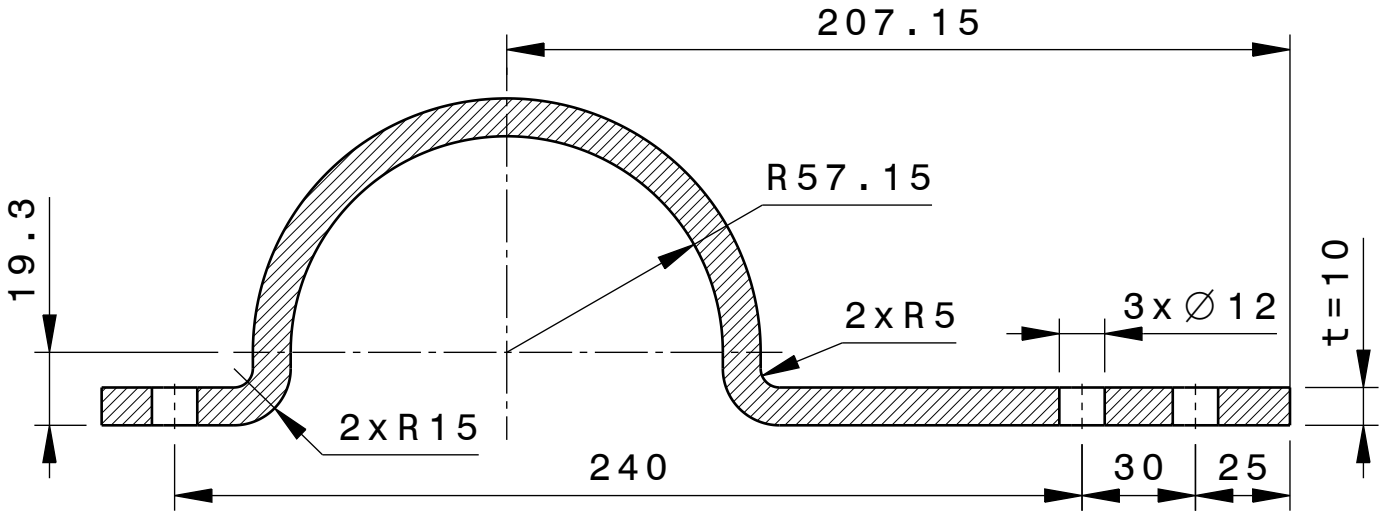
SECTION VIEW B-B



ISOMETRIC VIEW



FRONT VIEW



SECTION VIEW A-A

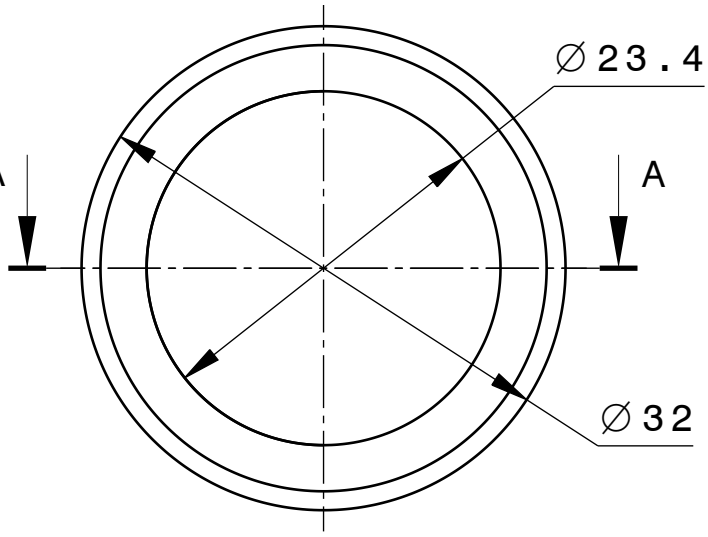
MATERIAL	SS304L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

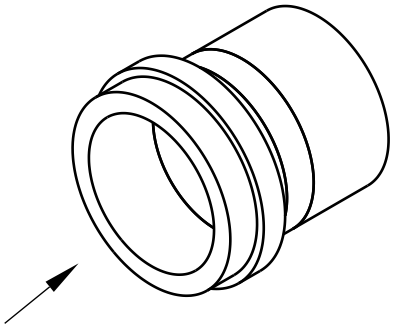
NOTE :-

1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.

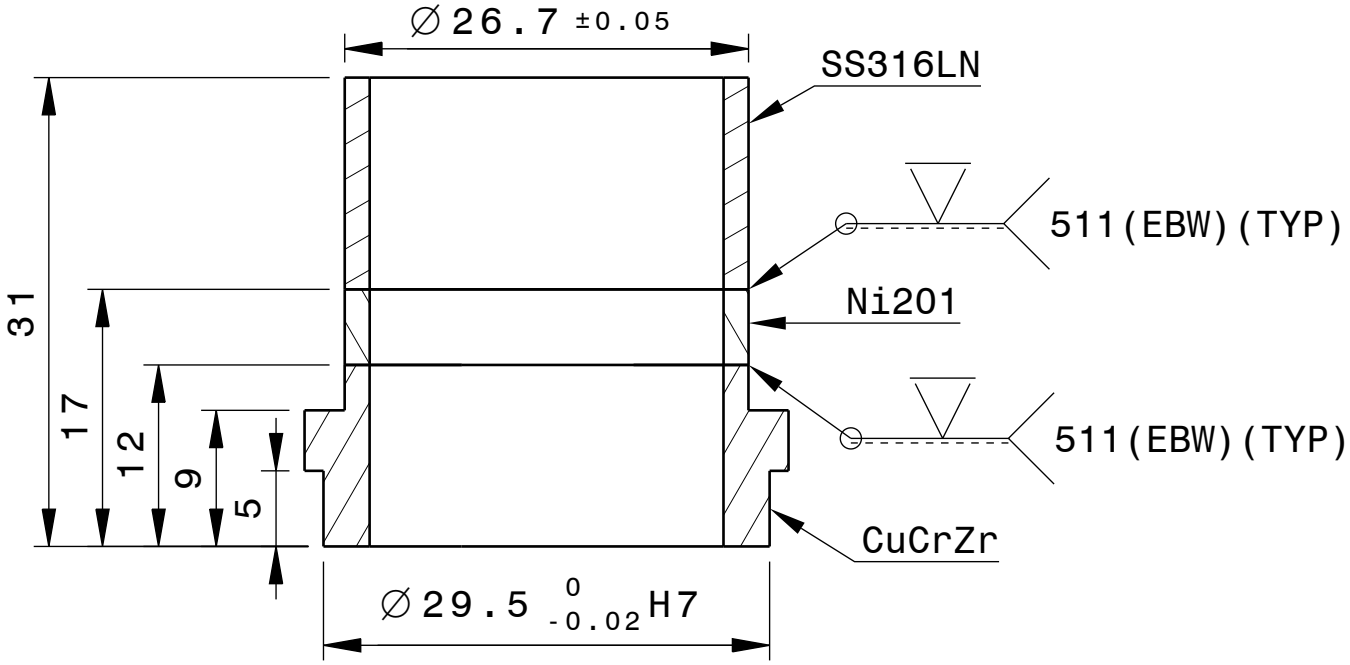
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID: XXXXXX	RELEASED BY: DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID: XXXXXX	APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED	
PBS TITLE: PBS LEVEL 1 / PBS LEVEL 2 / PBS LEVEL 3	CHECKED BY: CHECKER	The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
REV DATE: DD-MM-YY / PT MATURITY: AB / PT VERSION: A	CONTROLLED BY: RESP OFF	DRAWING TITLE: 2ND_CAL_HEADER_CLAMP_2	
SHEET SIZE: 210x297 / SCALE: 1:2 / PT Status: W	DRAWN BY: DESIGNER	- / -	
THIRD ANGLE PROJECTION / NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-01-01-00-04	SHEET: 01 / REVISION: --A / DR STATUS: W





ISOMETRIC VIEW



SECTION VIEW A-A

GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

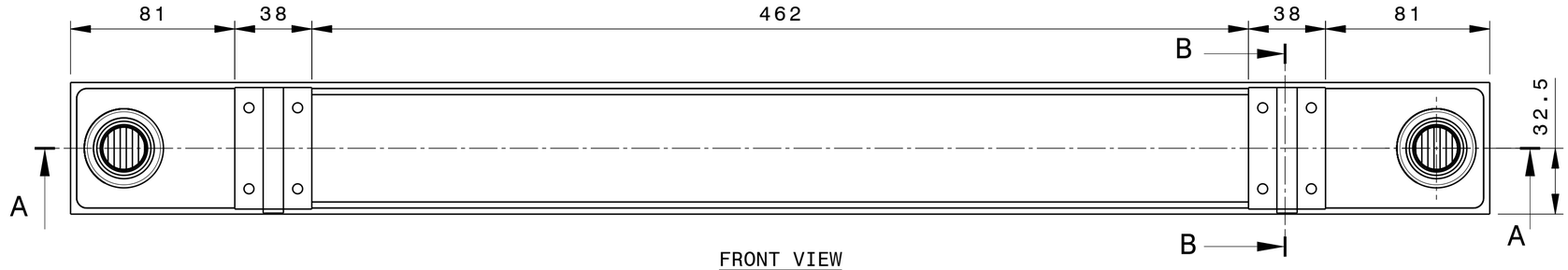
NOTE :-

1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.

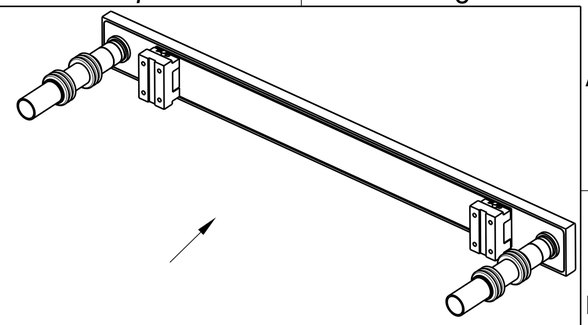
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID: XXXXXX	RELEASED BY: DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID: XXXXXX	APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
PBS TITLE PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3	CHECKED BY: CHECKER	DRAWING TITLE: 2ND_CAL_HTE_ADAPTER -	
REV DATE: DD-MM-YY / PT MATURITY: AB / PT VERSION: A	CONTROLLED BY: RESP OFF	-	
SHEET SIZE: 210x297 / SCALE: 2:1 / PT Status: W	DRAWN BY: DESIGNER		
THIRD ANGLE PROJECTION / NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-01-01-02-03	SHEET: 01 / REVISION: --A / DR STATUS: W

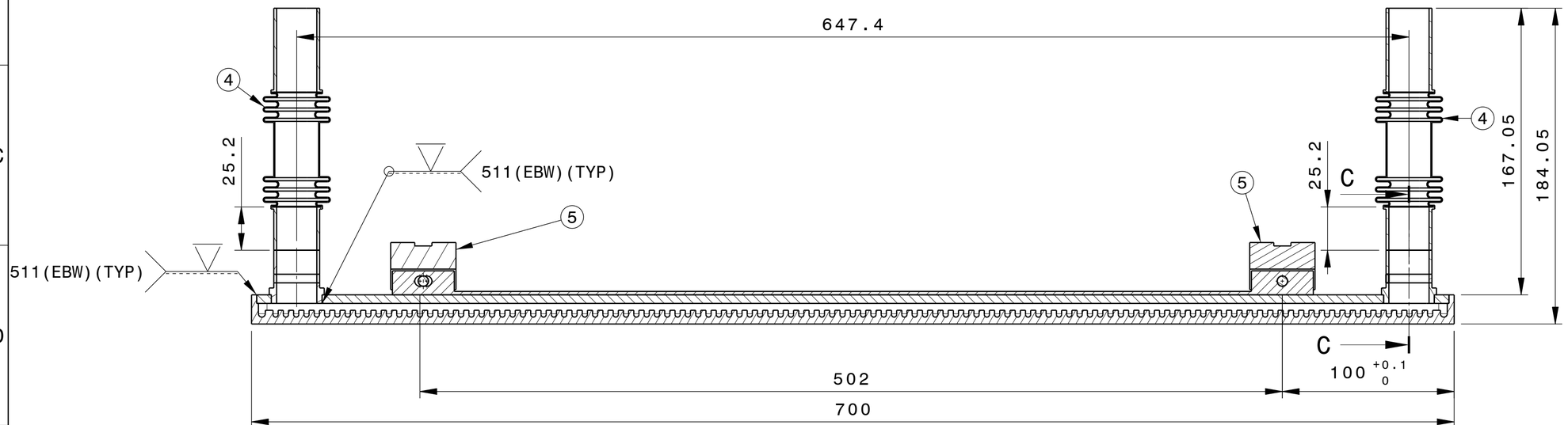
Spacereservation for the banner



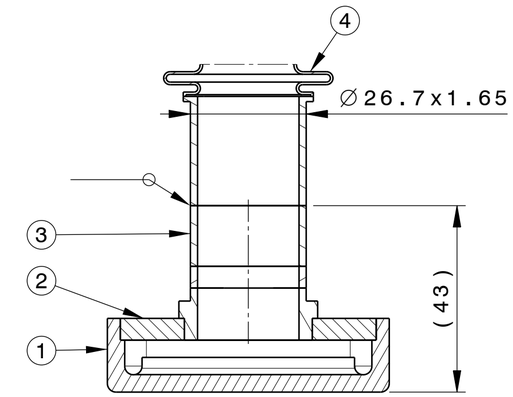
FRONT VIEW



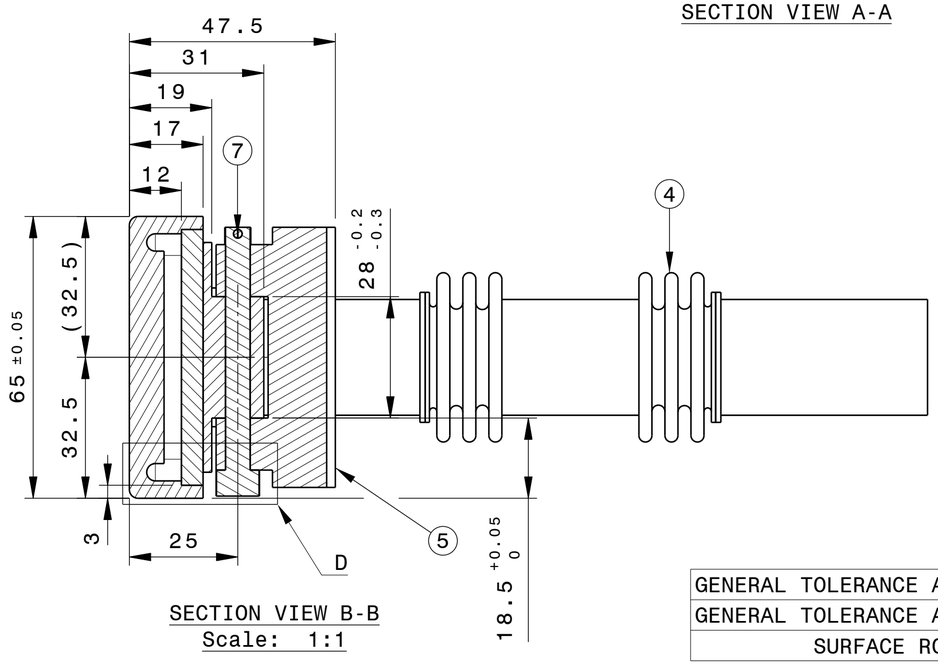
ISOMETRIC VIEW



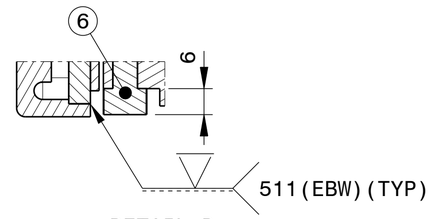
SECTION VIEW A-A



SECTION VIEW C-C
Scale: 1:1



SECTION VIEW B-B
Scale: 1:1



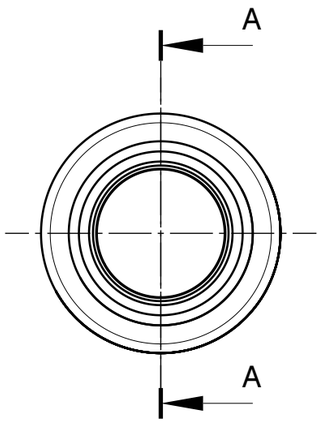
DETAIL D
Scale: 1:1

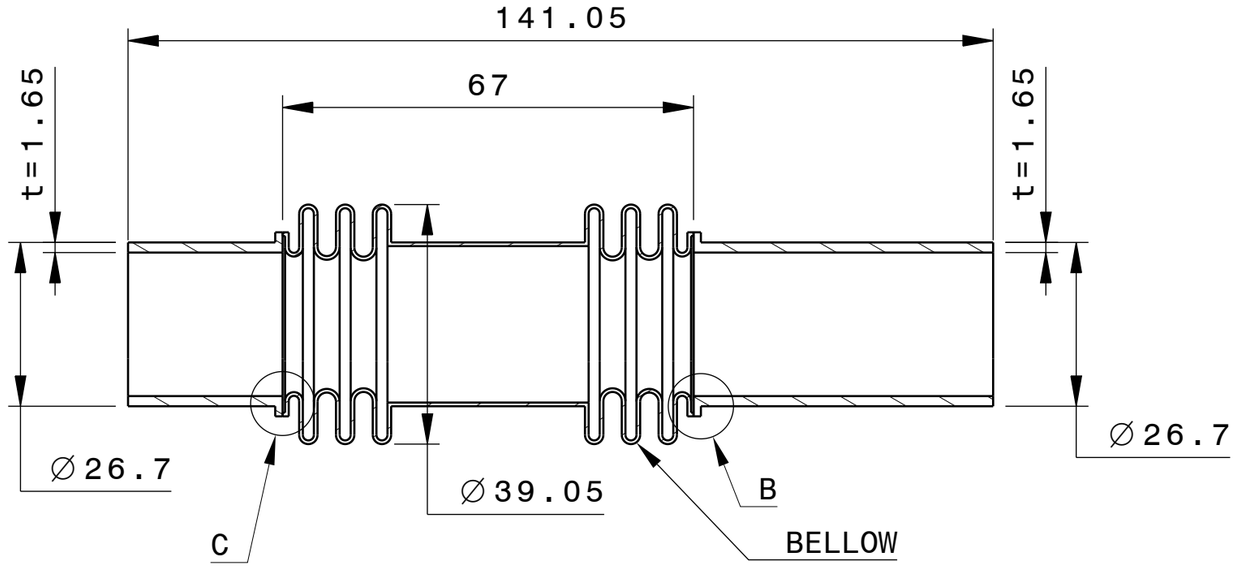
7	-	2	2ND_CAL_HTE_SPLIT_PIN	-	STD
6	01-01-01-02-06	2	2ND_CAL_HTE_PIVOT_PIN	SS304L	PART
5	01-01-01-02-05	2	2ND_CAL_HTE_PIVOT_BLOCK	SS304L	PART
4	01-01-01-02-04	2	2ND_CAL_HTE_BELLOW	ANNEXURE-9	PART
3	01-01-01-02-03	2	2ND CAL HTE ADAPTER	SS316L,CuCrZr & Ni	PART
2	01-01-01-02-02	1	2ND CAL HTE COVER PLATE	CuCrZr	PART
1	01-01-01-02-01	1	2ND CAL HTE FRONT PLATE	CuCrZr	PART
S.NO.	DRAWING NO.	QTY.	PART NUMBER	MATERIAL	TYPE

GENERAL TOLERANCE AS PER ISO 2768-1	f
GENERAL TOLERANCE AS PER ISO 2768-2	H
SURFACE ROUGHNESS	Ra6.3

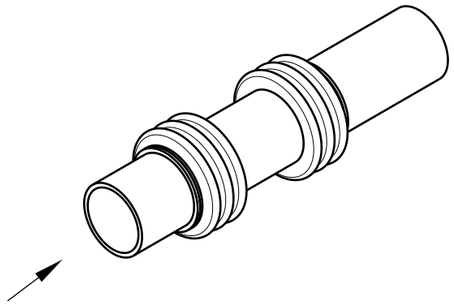
NOTE:
1.THIS COMPONENT SHALL BE FABRICATED BY ELECTRON BEAM WELDING (EBW). WELD CONFIGURATION SHALL BE INCLUDED IN THE MANUFACTURING DRAWING BY CONTRACTOR.
2.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
3.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID	XXXXXX	RELEASED BY	DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID	XXXXXX	APPROVED BY	DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED	
PBS TITLE	PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3	CHECKED BY	CHECKER	The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
REV DATE	DD-MM-YY	PT MATURITY	AB	PT VERSION	A
SHEET SIZE	594x420	SCALE	1:2	PT Status	W
CONTROLLED BY	RESP OFF	DRAWN BY	DESIGNER	DRAWING TITLE	2ND_CAL_HTE_ASSY - -
THIRD ANGLE PROJECTION		NO.OF SHTS	01	PBS 3 LEVELS	NN XX YY
DRAWING NUMBER	01-01-01-02-00	SHEET	01	REVISION	--A
DR STATUS	W				

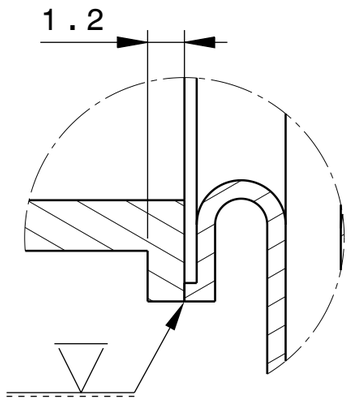




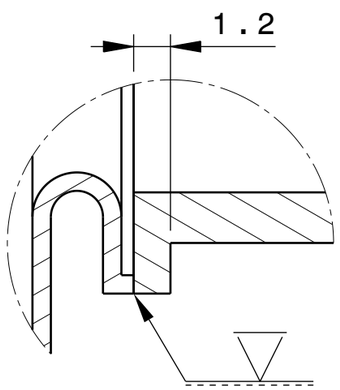
SECTION VIEW A-A



ISOMETRIC VIEW



DETAIL C
Scale: 5:1



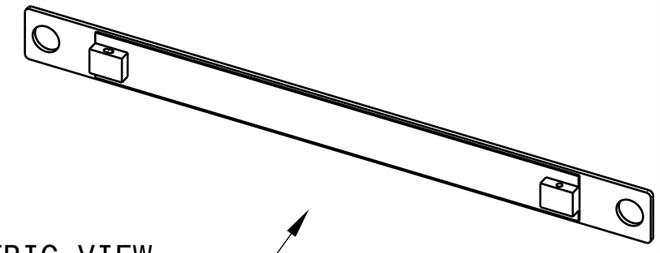
DETAIL B
Scale: 5:1

MATERIAL	SECTION 3.1.1 OF ANNEXURE-9
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

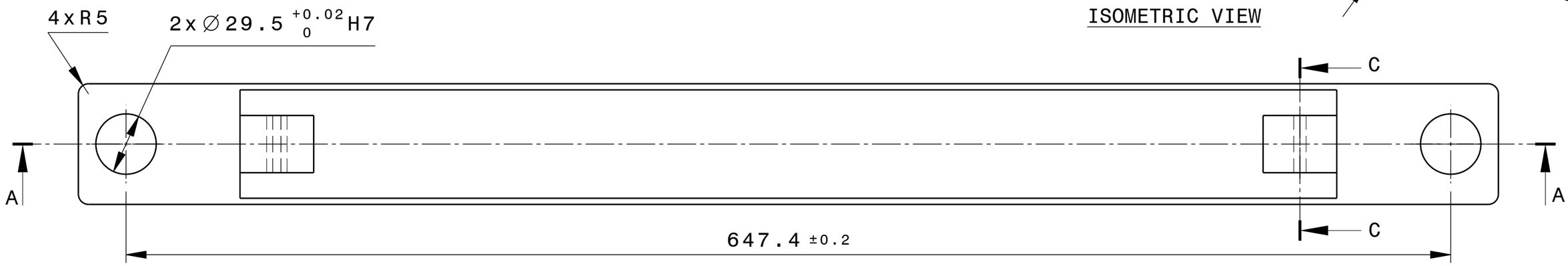
DRW DOC ID	XXXXXX		RELEASED BY	DES INT	IPR GANDHINAGAR
LINKED EV5 PT ID	XXXXXX		APPROVED BY	DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED
PBS TITLE	PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3		CHECKED BY	CHECKER	The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.
REV DATE	PT MATURITY	PT VERSION	CONTROLLED BY	RESP OFF	DRAWING TITLE: 2ND_CAL_HTE_BELLOW -
DD-MM-YY	AB	A	DRAWN BY	DESIGNER	-
SHEET SIZE	SCALE	PT Status			
420x297	1:1	W			
THIRD ANGLE PROJECTION		NO.OF SHTS 01	PBS 3 LEVELS	NN XX YY	DRAWING NUMBER: 01-01-01-02-04

SHEET	REVISION	DR STATUS
01	- -A	W

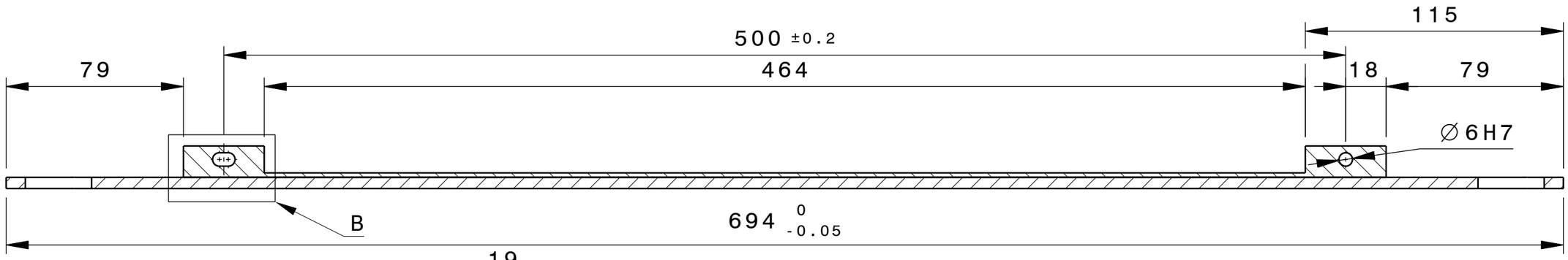
NOTE :-
1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.
3.DESIGN REQUIREMENTS OF BELLOW IS PROVIDED IN ANNEXURE-9.



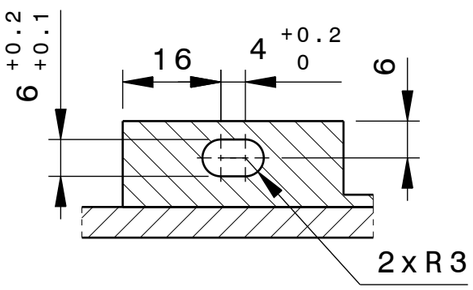
ISOMETRIC VIEW



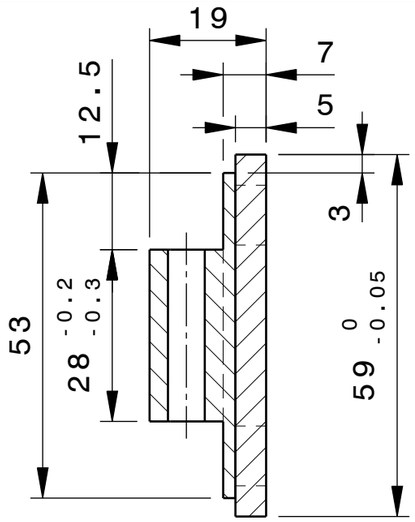
FRONT VIEW



SECTION VIEW A-A



DETAIL B
Scale: 1:1

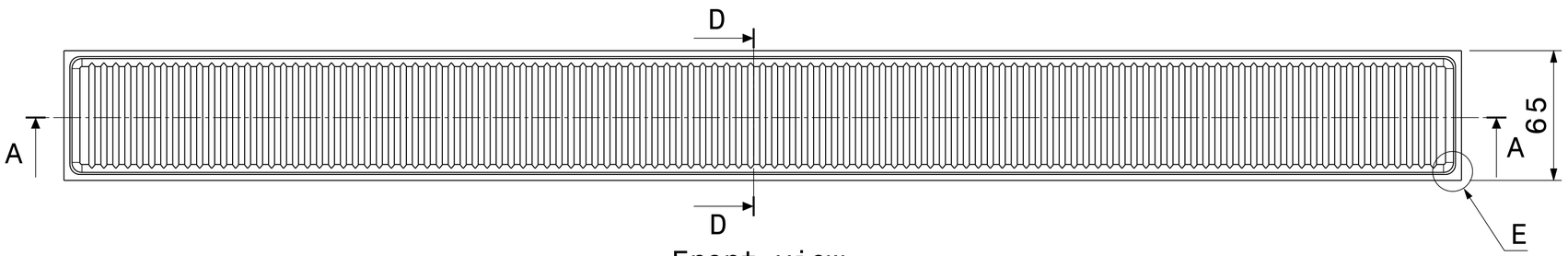


SECTION VIEW C-C
Scale: 1:1

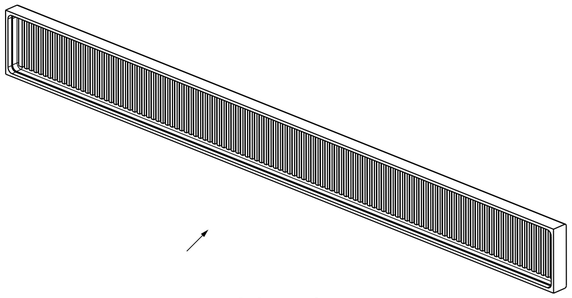
MATERIAL	CuCrZr
GENERAL TOLERANCE AS PER ISO 2768-1	f
GENERAL TOLERANCE AS PER ISO 2768-2	H
SURFACE ROUGHNESS	Ra6.3

NOTE :-
1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

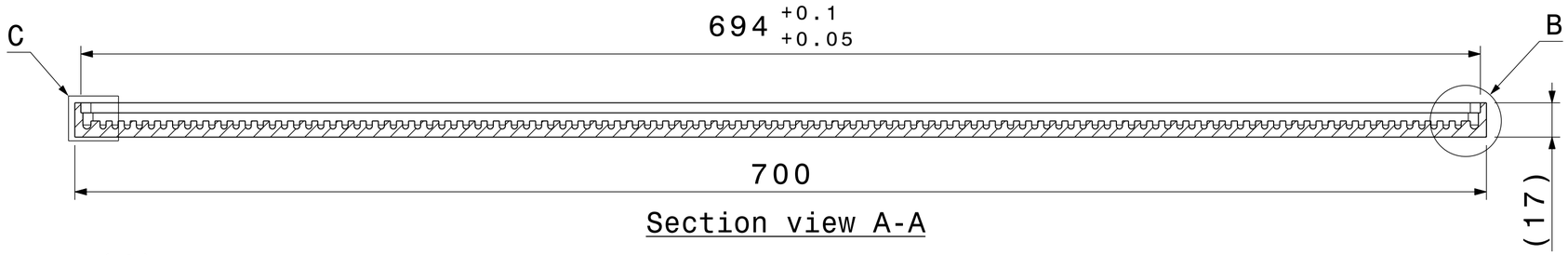
DRW DOC ID	XXXXXX		RELEASED BY	DES INT	IPR GANDHINAGAR
LINKED EV5 PT ID	XXXXXX		APPROVED BY	DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED
PBS TITLE	PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3		CHECKED BY	CHECKER	The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.
REV DATE	PT MATURITY	PT VERSION	CONTROLLED BY	RESP OFF	DRAWING TITLE: 2ND_CAL_HTE_COVER_PLATE - -
DD-MM-YY	AB	A	DRAWN BY	DESIGNER	
SHEET SIZE	SCALE	PT Status			
420x297	1:2	W			
THIRD ANGLE PROJECTION		NO.OF SHTS 01	PBS 3 LEVELS	NN XX YY	DRAWING NUMBER 01-01-01-02-02 / SHEET 01 / REVISION --A / DR STATUS W



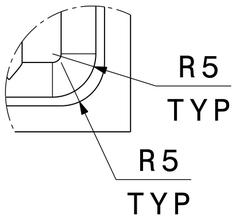
Front view



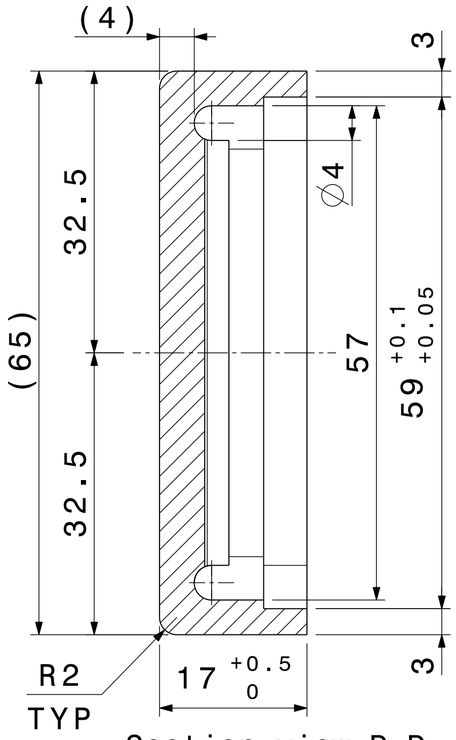
ISO View



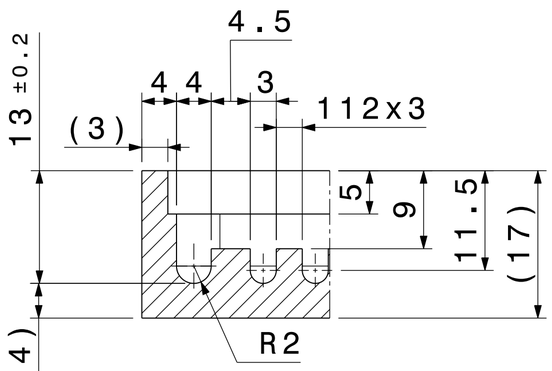
Section view A-A



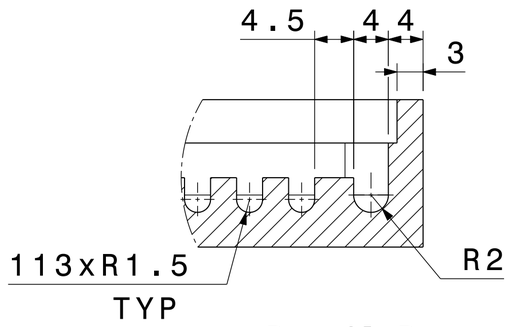
Detail E
Scale: 2:1



Section view D-D
Scale: 2:1



Detail C
Scale: 2:1



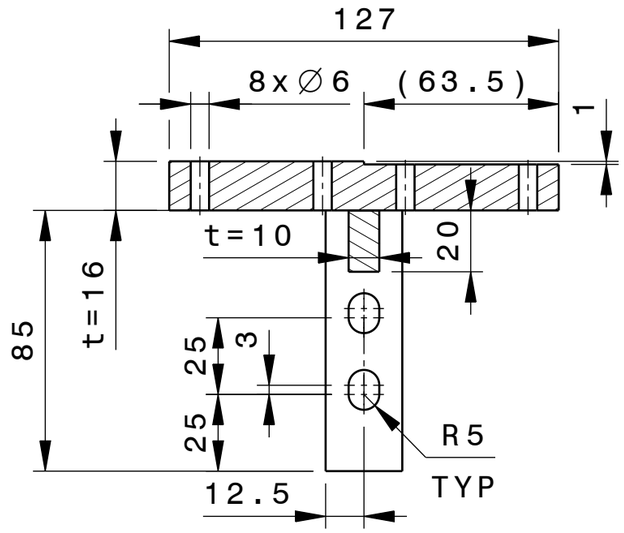
Detail B
Scale: 2:1

MATERIAL	CuCrZr
GENERAL TOLERANCE AS PER ISO 2768-1	f
GENERAL TOLERANCE AS PER ISO 2768-2	H
SURFACE ROUGHNESS	Ra6.3

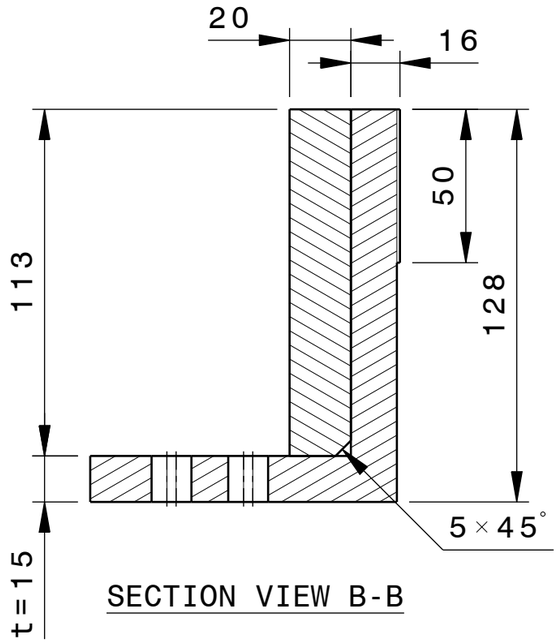
DRW DOC ID: XXXXXX		RELEASED BY: DES INT	IPR GANDHINAGAR
LINKED EV5 PT ID: XXXXXX		APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED
PBS TITLE: PBS LEVEL 1 / PBS LEVEL 2 / PBS LEVEL 3		CHECKED BY: CHECKER	The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.
REV DATE: DD-MM-YY	PT MATURITY: AB / PT VERSION: A	CONTROLLED BY: RESP OFF	DRAWING TITLE: 2ND CAL HTE FRONT PLATE
SHEET SIZE: 594x420	SCALE: 1:2 / PT Status: W	DRAWN BY: DESIGNER	
THIRD ANGLE PROJECTION	NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY / DRAWING NUMBER: 01-01-01-02-01	SHEET: 01 / REVISION: --A / DR STATUS: W

NOTE :-
1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

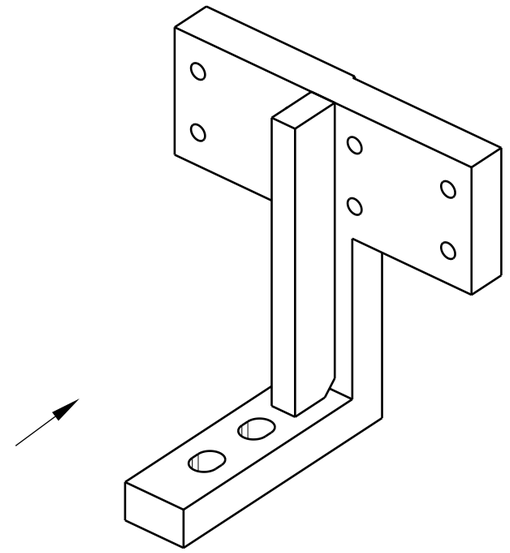
Spacereservation for the banner



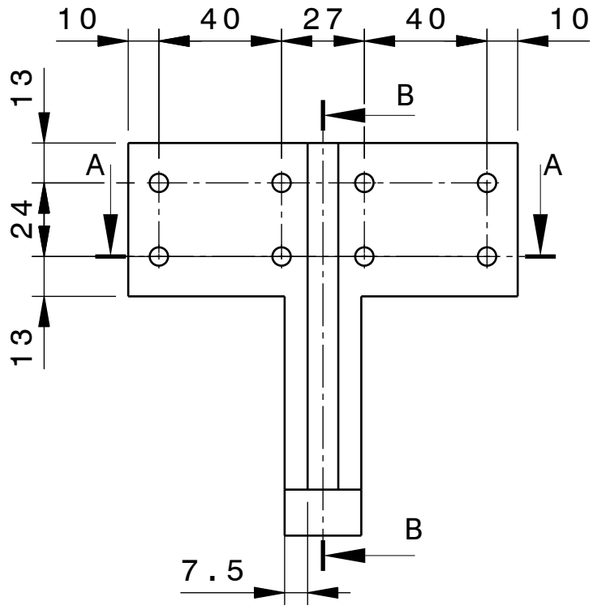
SECTION VIEW A-A



SECTION VIEW B-B



ISOMETRIC VIEW



FRONT VIEW

NOTE:

1.THIS COMPONENT SHALL BE FABRICATED BY TIG WELDING. WELD CONFIGURATION SHALL BE INCLUDED IN THE MANUFACTURING DRAWING BY CONTRACTOR.

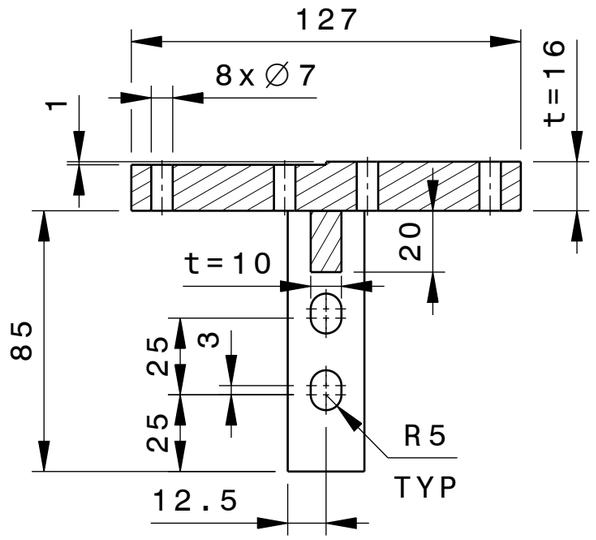
2.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.

3.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

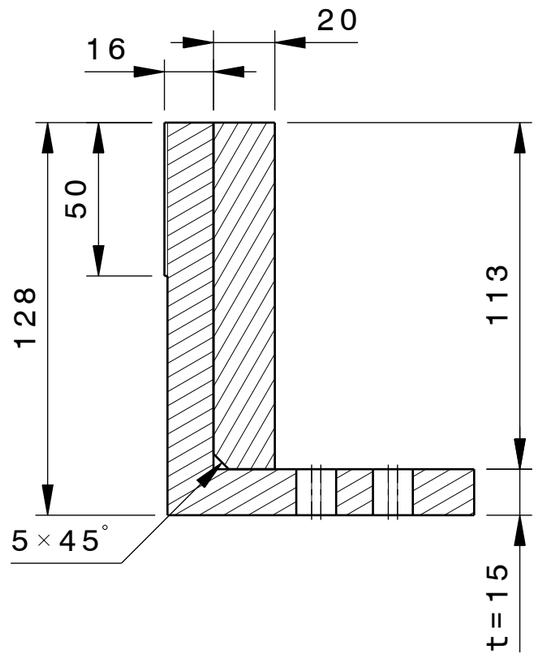
MATERIAL	SS304L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

DRW DOC ID	XXXXXX		RELEASED BY	DES INT	IPR GANDHINAGAR		
LINKED EV5 PT ID	XXXXXX		APPROVED BY	DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.		
PBS TITLE PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3			CHECKED BY	CHECKER	DRAWING TITLE 2ND_CAL_HTE_HOLDING_CLAMP_1 - -		
REV DATE	PT MATURITY	PT VERSION	CONTROLLED BY	RESP OFF			
DD-MM-YY	AB	A	DRAWN BY	DESIGNER			
SHEET SIZE	SCALE	PT Status					
420x297	1:2	W					
THIRD ANGLE PROJECTION	NO.OF SHTS 01		PBS 3 LEVELS	NN XX YY	DRAWING NUMBER	01-01-01-00-05	SHEET 01 / REVISION --A / DR STATUS W

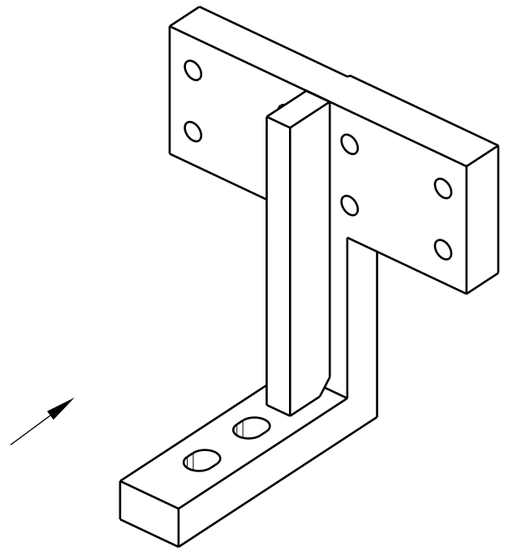
Spacereservation for the banner



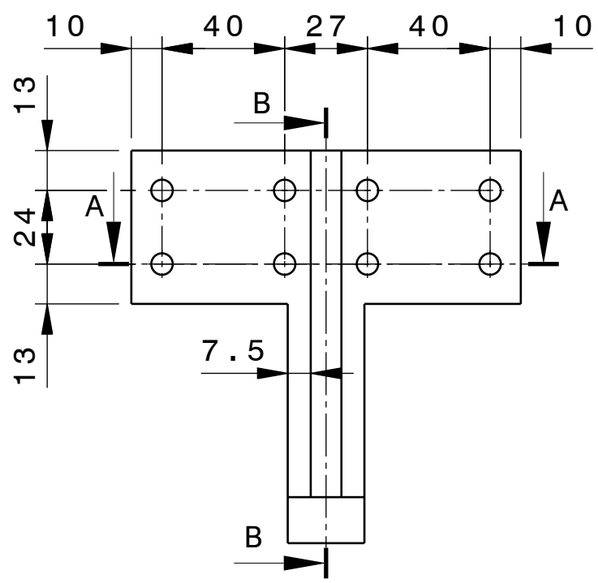
SECTION VIEW A-A



SECTION VIEW B-B



ISOMETRIC VIEW



FRONT VIEW

NOTE:

1.THIS COMPONENT SHALL BE FABRICATED BY TIG WELDING. WELD CONFIGURATION SHALL BE INCLUDED IN THE MANUFACTURING DRAWING BY CONTRACTOR.

2.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.

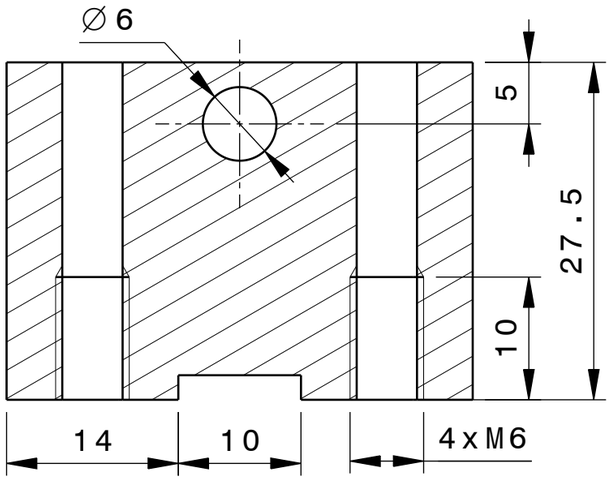
3.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

MATERIAL	SS304L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

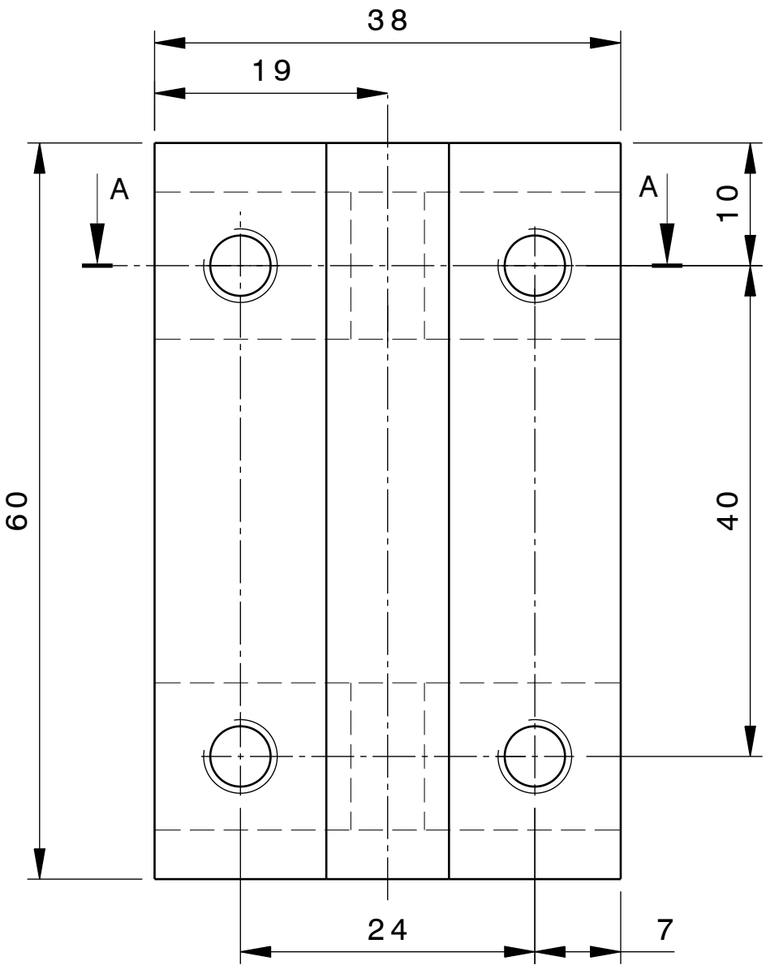
DRW DOC ID	XXXXXX	RELEASED BY	DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID	XXXXXX	APPROVED BY	DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED	
PBS TITLE	PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3	CHECKED BY	CHECKER	The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
REV DATE / PT MATURITY / PT VERSION	DD-MM-YY / AB / A	CONTROLLED BY	RESP OFF	DRAWING TITLE	2ND_CAL_HTE_HOLDING_CLAMP_2
SHEET SIZE / SCALE / PT Status	420x297 / 1:2 / W	DRAWN BY	DESIGNER	-	
THIRD ANGLE PROJECTION	NO.OF SHTS 01	PBS 3 LEVELS	NN XX YY	DRAWING NUMBER	01-01-01-00-06

SHEET	REVISION	DR STATUS
01	- -A	W

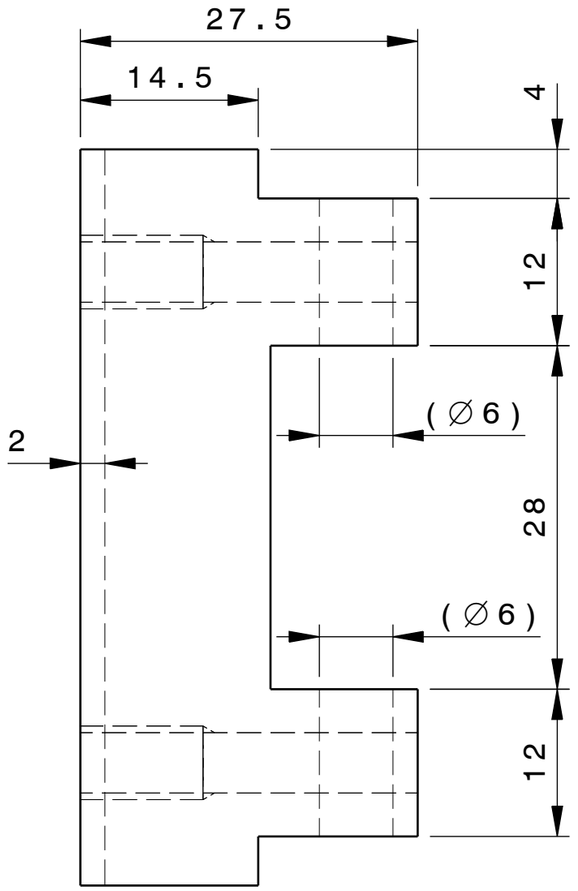
Spacereservation for the banner



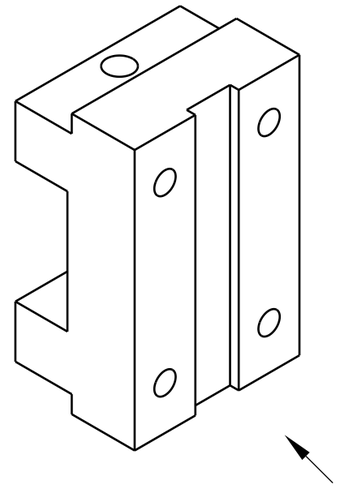
SECTION VIEW A-A



FRONT VIEW



RIGHT VIEW



ISOMETRIC VIEW

MATERIAL	SS304L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

NOTE :-

1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.

2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID: XXXXXX			RELEASED BY: DES INT
LINKED EV5 PT ID: XXXXXX			APPROVED BY: DIV HEAD
PBS TITLE: PBS LEVEL 1 / PBS LEVEL 2 / PBS LEVEL 3			CHECKED BY: CHECKER
REV DATE: DD-MM-YY	PT MATURITY: AB	PT VERSION: A	CONTROLLED BY: RESP OFF
SHEET SIZE: 420x297	SCALE: 2:1	PT Status: W	DRAWN BY: DESIGNER
THIRD ANGLE PROJECTION		NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY

IPR GANDHINAGAR

CONFIDENTIAL UNLESS AUTHORISED

DRAWING TITLE: 2ND_CAL_HTE_PIVOT_BLOCK

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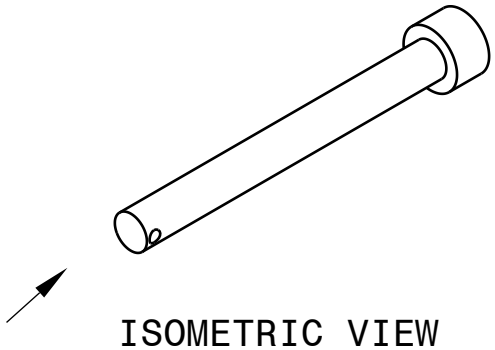
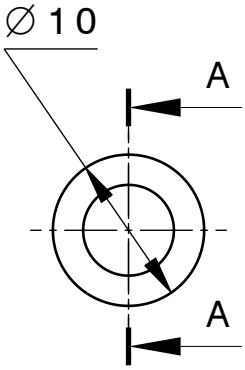
DRAWING NUMBER	SHEET	REVISION	DR STATUS
01-01-01-02-05	01	--A	W

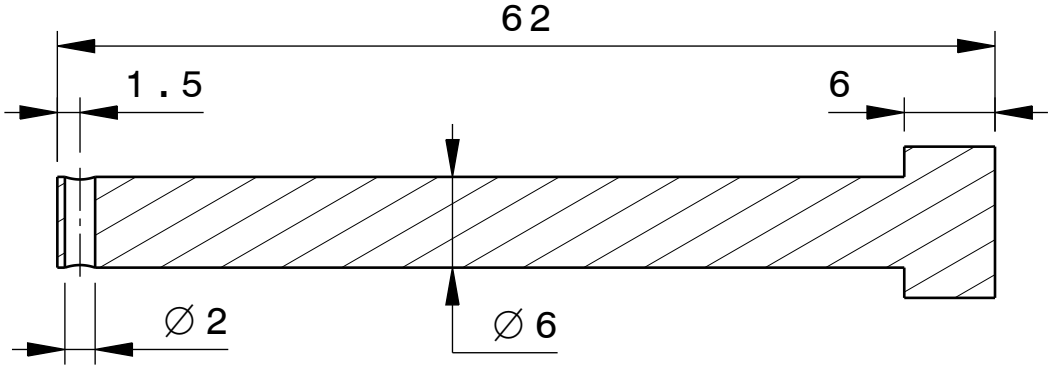
Spacereservation for the banner



ISOMETRIC VIEW



FRONT VIEW



SECTION VIEW A-A

MATERIAL	SS304L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

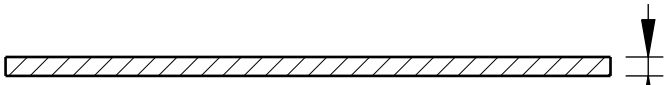
NOTE :-

1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.

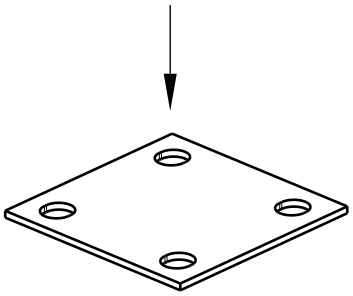
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID: XXXXXX	RELEASED BY: DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID: XXXXXX	APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
PBS TITLE PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3	CHECKED BY: CHECKER	DRAWING TITLE 2ND_CAL_HTE_PIVOT_PIN - -	
REV DATE: DD-MM-YY / PT MATURITY: AB / PT VERSION: A	CONTROLLED BY: RESP OFF		
SHEET SIZE: 210x297 / SCALE: 2:1 / PT Status: W	DRAWN BY: DESIGNER		
THIRD ANGLE PROJECTION / NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-01-01-02-06	SHEET: 01 / REVISION: --A / DR STATUS: W

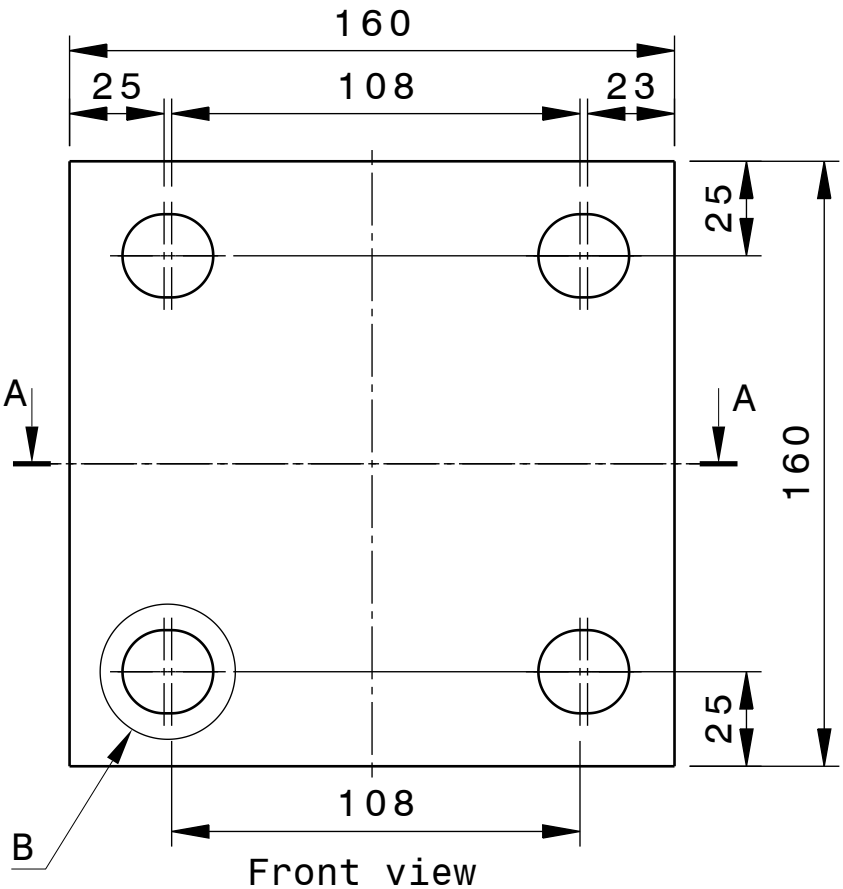
Spacereservation for the banner



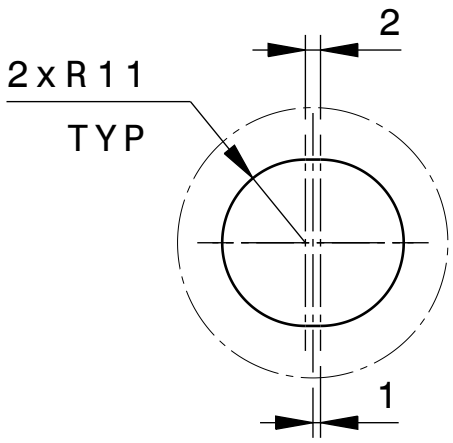
Section view A-A
Scale: 1:2



Isometric view
Scale: 1:5



Front view
Scale: 1:2



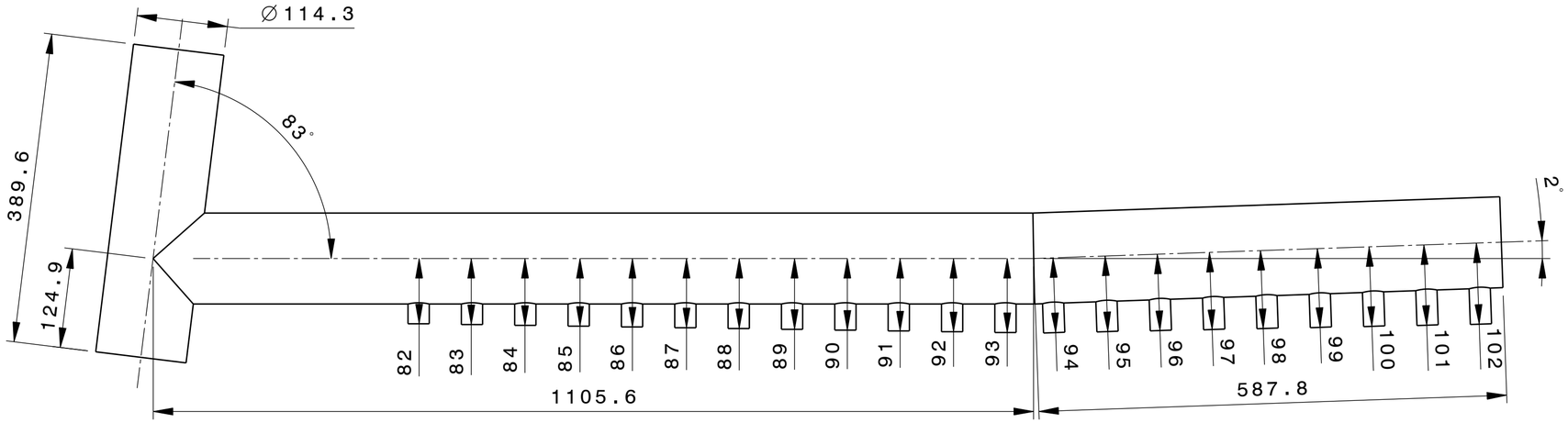
Detail B
Scale: 1:1

MATERIAL	PEEK
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

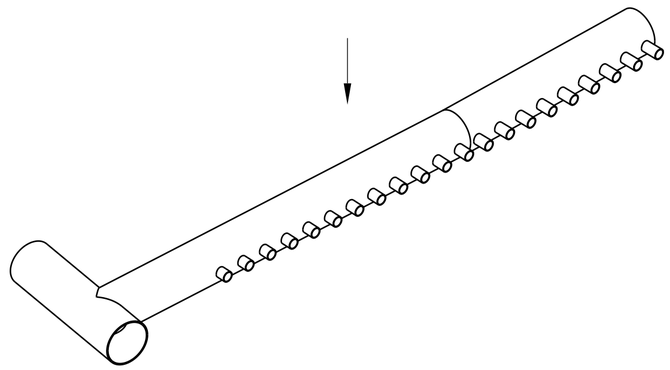
NOTE :-
1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID: XXXXXX	RELEASED BY: DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID: XXXXXX	APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
PBS TITLE PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3	CHECKED BY: CHECKER	DRAWING TITLE: 2ND_CAL_INSULATION_PLATE - -	
REV DATE: DD-MM-YY / PT MATURITY: AB / PT VERSION: A	CONTROLLED BY: RESP OFF		
SHEET SIZE: 210x297 / SCALE: 1:2 / PT Status: W	DRAWN BY: DESIGNER		
THIRD ANGLE PROJECTION / NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-01-00-00-06	SHEET: 01 / REVISION: --A / DR STATUS: W

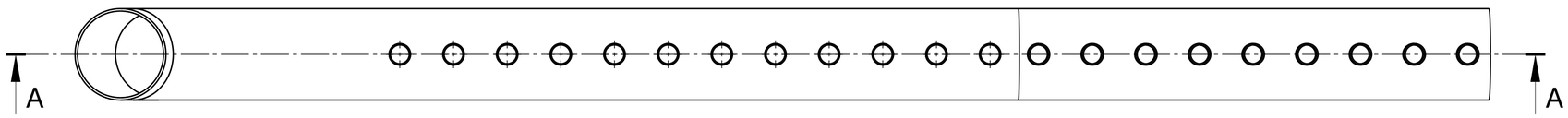
Spacereservation for the banner



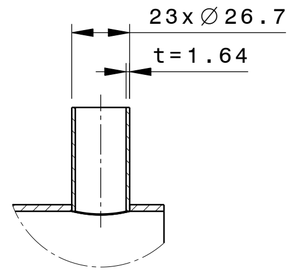
FRONT VIEW



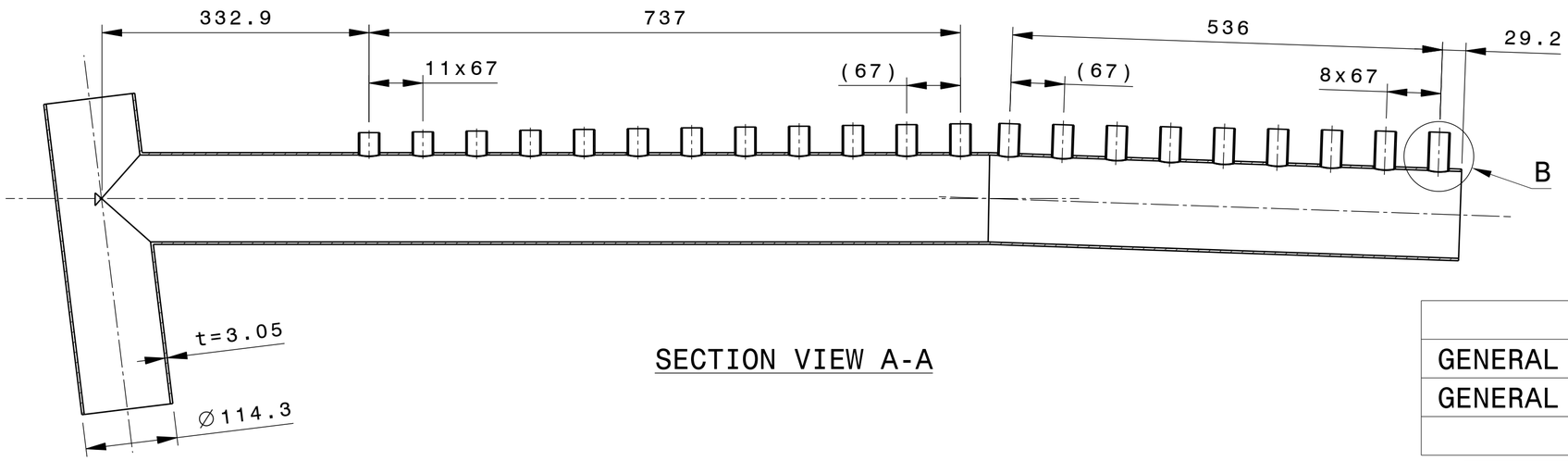
ISOMETRIC VIEW



BOTTOM VIEW



DETAIL B
Scale: 1:2



SECTION VIEW A-A

MATERIAL	SS316L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

NOTE:

1.THIS COMPONENT SHALL BE FABRICATED BY TIG WELDING. WELD CONFIGURATION SHALL BE INCLUDED IN THE MANUFACTURING DRAWING BY CONTRACTOR.

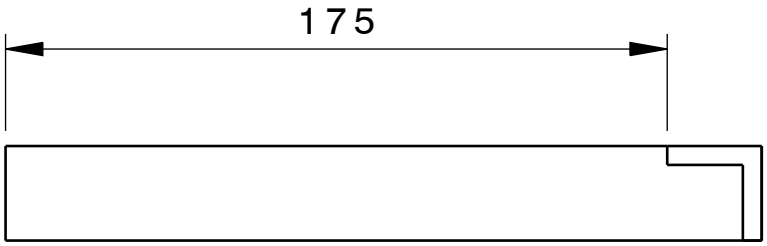
2.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.

3.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

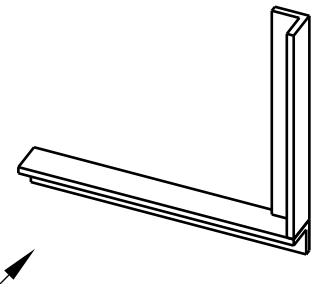
DRW DOC ID: XXXXXX			RELEASED BY: DES INT	IPR GANDHINAGAR
LINKED EV5 PT ID: XXXXXX			APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED
PBS TITLE: PBS LEVEL 1 / PBS LEVEL 2 / PBS LEVEL 3			CHECKED BY: CHECKER	The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.
REV DATE: DD-MM-YY	PT MATURITY: AB	PT VERSION: A	CONTROLLED BY: RESP OFF	DRAWING TITLE: 2ND_CAL_LT_HEADER
SHEET SIZE: 594x420	SCALE: 1:5	PT Status: W	DRAWN BY: DESIGNER	-
THIRD ANGLE PROJECTION	NO.OF SHTS: 01		PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-01-02-00-01

SHEET	REVISION	DR STATUS
01	--A	W

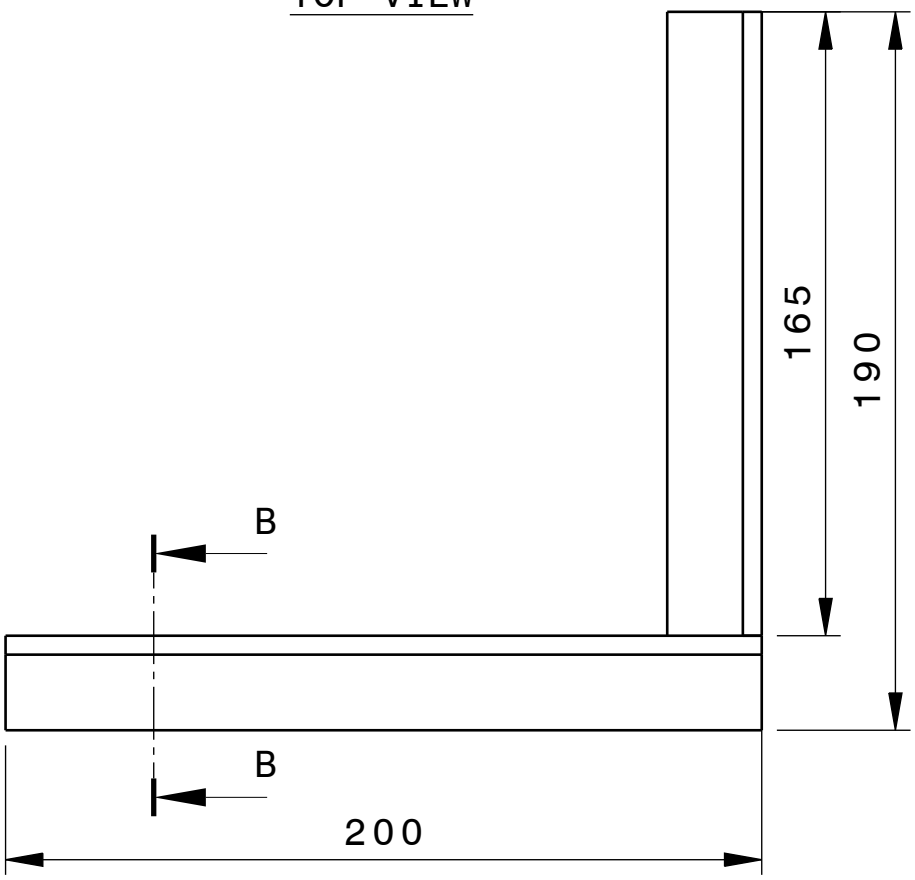
Spacereservation for the banner



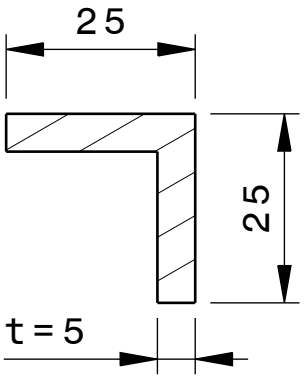
TOP VIEW



ISOMETRIC VIEW



FRONT VIEW



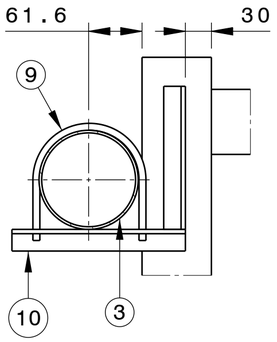
SECTION VIEW B-B
Scale: 1:1

MATERIAL	SS304L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

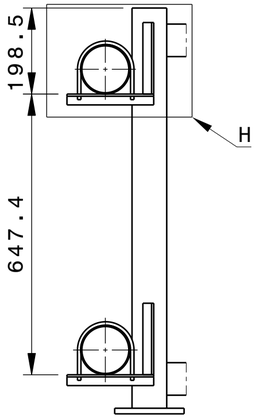
NOTE:
1.THIS COMPONENT SHALL BE FABRICATED BY TIG WELDING. WELD CONFIGURATION SHALL BE INCLUDED IN THE MANUFACTURING DRAWING BY CONTRACTOR.
2.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
3.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID: XXXXXX	RELEASED BY: DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID: XXXXXX	APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
PBS TITLE PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3	CHECKED BY: CHECKER	DRAWING TITLE: 2ND_CAL_LT_HEADER_SUPPORT -	
REV DATE: DD-MM-YY / PT MATURITY: AB / PT VERSION: A	CONTROLLED BY: RESP OFF	-	
SHEET SIZE: 210x297 / SCALE: 1:2 / PT Status: W	DRAWN BY: DESIGNER		
THIRD ANGLE PROJECTION / NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-01-02-00-02	SHEET: 01 / REVISION: --A / DR STATUS: W

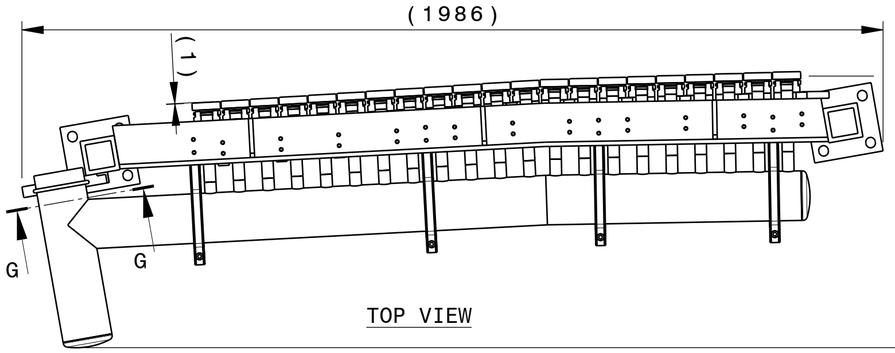
Spacereservation for the banner



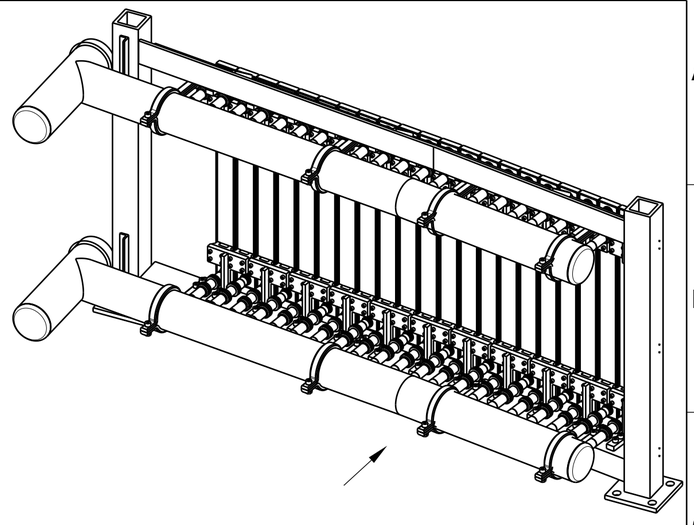
DETAIL H
Scale: 1:5



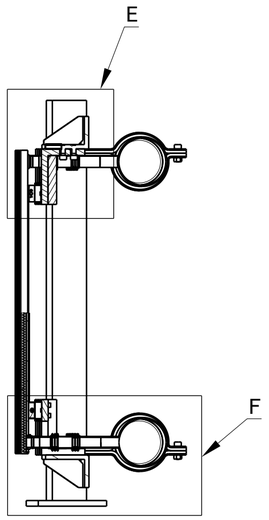
SECTION VIEW G-G



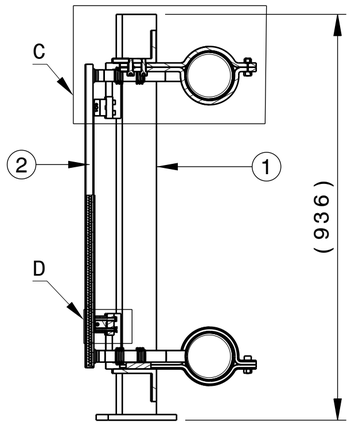
TOP VIEW



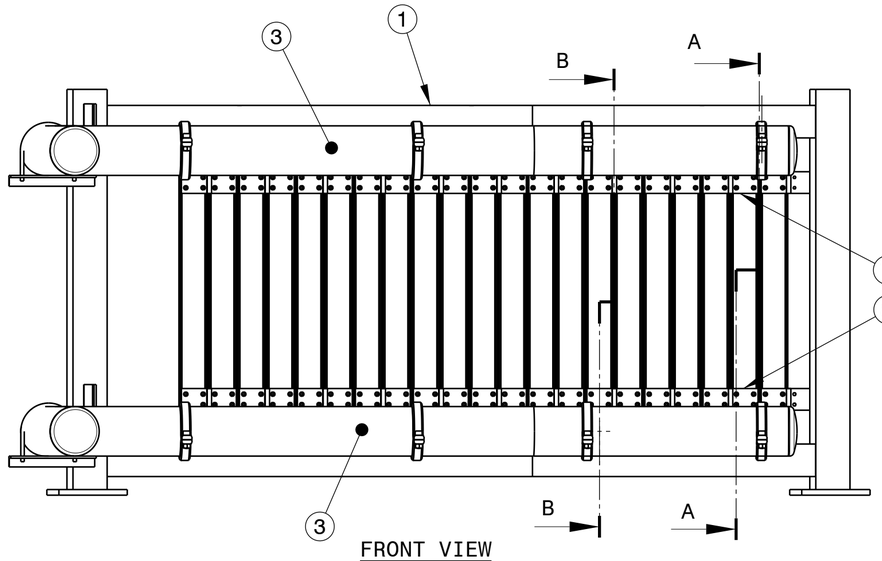
ISOMETRIC VIEW



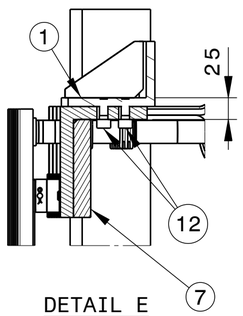
SECTION VIEW B-B



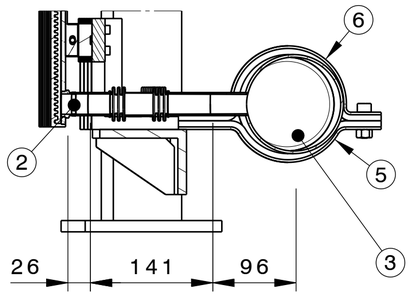
SECTION VIEW A-A



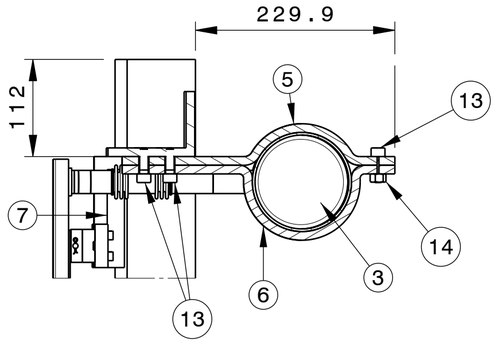
FRONT VIEW



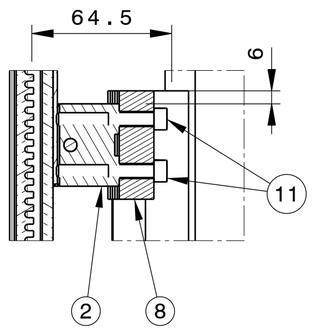
DETAIL E
Scale: 1:5



DETAIL F
Scale: 1:5



DETAIL C
Scale: 1:5



DETAIL D
Scale: 1:2

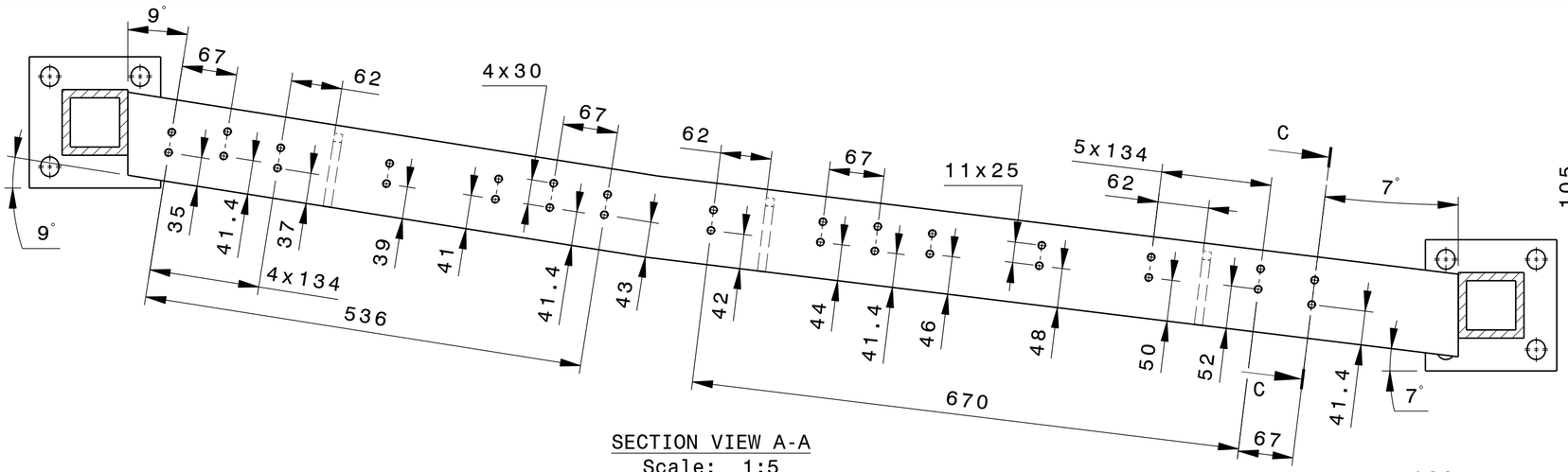
SR.NO.	DRAWING NO.	PART NAME	TYPE	QTY	REMARKS
14	-	ISO_4034_M10_NUT	STD	8	
13	-	ISO_4762_M10x30_SOCKET_CAPSCREW	STD	24	
12	-	ISO_4762_M10x25_SOCKET_CAPSCREW	STD	44	
11	-	ISO_4762_M6x45_SOCKET_CAPSCREW	STD	168	
10	01-01-01-00-08	2ND_CAL_U_CLAMP	PART	2	
9	01-01-02-00-02	2ND_CAL_LT_HEADER_SUPPORT	PART	2	
8	01-01-01-00-06	2ND_CAL_HTE_HOLDING_CLAMP_2	PART	11	
7	01-01-01-00-05	2ND_CAL_HTE_HOLDING_CLAMP_1	PART	11	
6	01-01-01-00-04	2ND_CAL_HEADER_CLAMP_2	PART	8	
5	01-01-01-00-03	2ND_CAL_HEADER_CLAMP_1	PART	8	
4	01-01-01-00-02	2ND_CAL_HEADER_CAP	PART	4	
3	01-01-02-00-01	2ND_CAL_LT_HEADER	PART	2	
2	01-01-01-02-00	2ND_CAL_HTE_ASSY	ASSY	21	
1	01-01-02-01-00	2ND_CAL_LT_SUPP_STRUCTURE_ASSY	ASSY	1	

NOTE:
1.THIS COMPONENT SHALL BE FABRICATED BY TIG WELDING. WELD CONFIGURATION SHALL BE INCLUDED IN THE MANUFACTURING DRAWING BY CONTRACTOR.
2.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
3.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

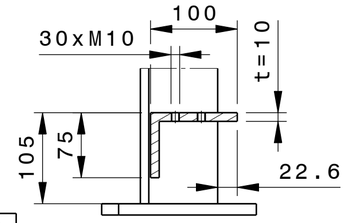
MATERIAL	-
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

DRW DOC ID: XXXXXX		RELEASED BY: DES INT	IPR GANDHINAGAR
LINKED EV5 PT ID: XXXXXX		APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED
PBS TITLE: PBS LEVEL 1 / PBS LEVEL 2 / PBS LEVEL 3		CHECKED BY: CHECKER	The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.
REV DATE: DD-MM-YY	PT MATURITY: AB / PT VERSION: A	CONTROLLED BY: RESP OFF	DRAWING TITLE: 2ND_CAL_LT_HTE_&_SS_ASSY - -
SHEET SIZE: 594x420	SCALE: 1:10 / PT Status: W	DRAWN BY: DESIGNER	
THIRD ANGLE PROJECTION	NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-01-02-00-00 / SHEET: 01 / REVISION: --A / DR STATUS: W

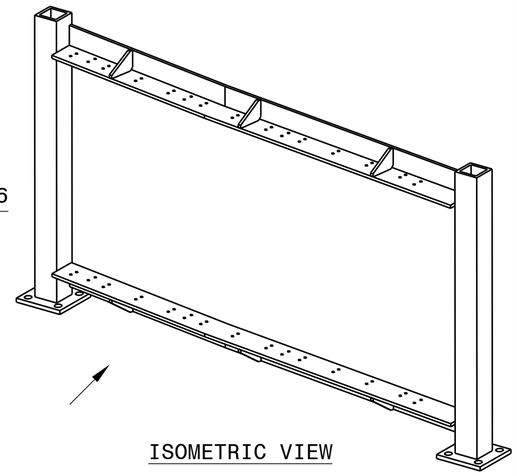
Spacereservation for the banner



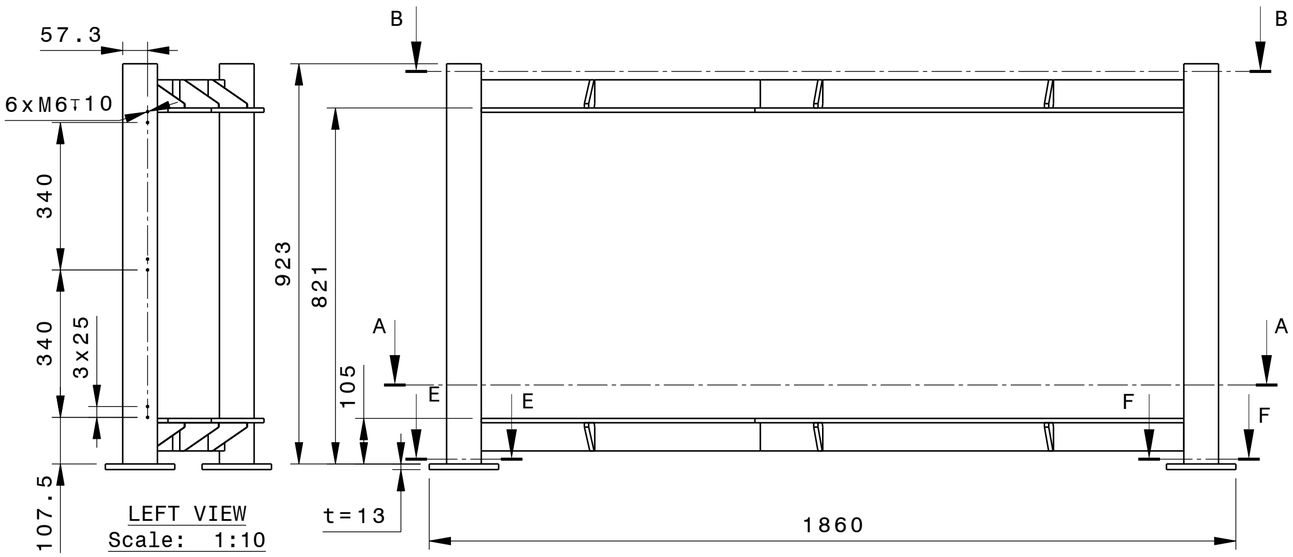
SECTION VIEW A-A
Scale: 1:5



SECTION VIEW C-C
Scale: 1:5

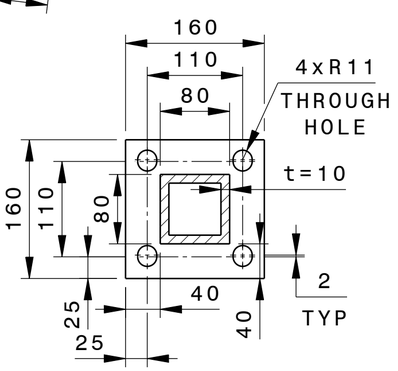


ISOMETRIC VIEW

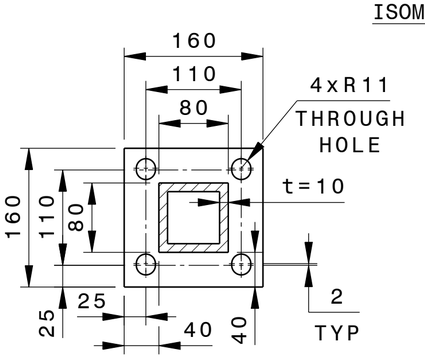


LEFT VIEW
Scale: 1:10

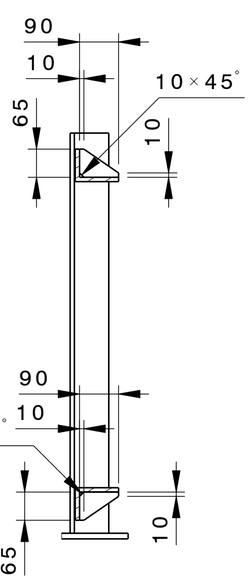
FRONT VIEW



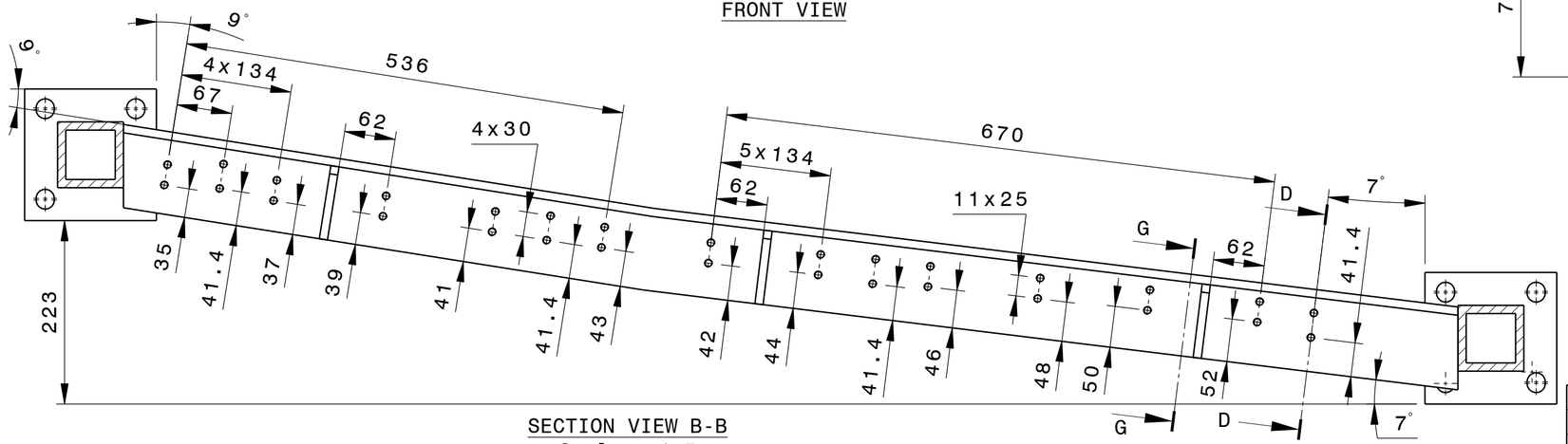
SECTION VIEW E-E
Scale: 1:5



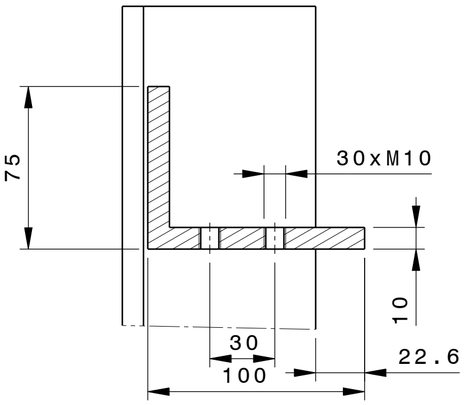
SECTION VIEW F-F
Scale: 1:5



SECTION VIEW G-G
Scale: 1:10



SECTION VIEW B-B
Scale: 1:5



SECTION VIEW D-D
Scale: 1:2

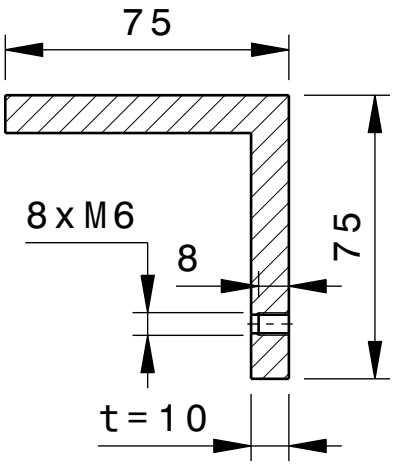
NOTE :-
1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

NOTE:
1.THIS COMPONENT SHALL BE FABRICATED BY TIG WELDING. WELD CONFIGURATION SHALL BE INCLUDED IN THE MANUFACTURING DRAWING BY CONTRACTOR.
2.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
3.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

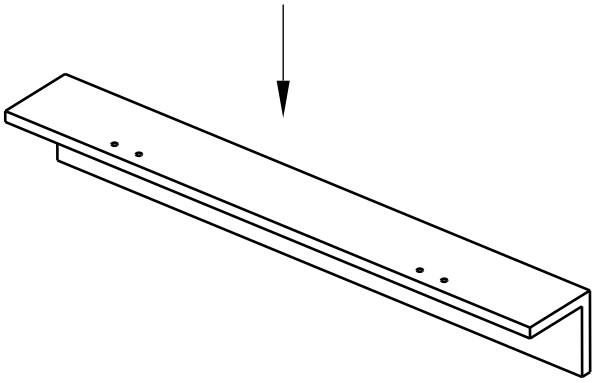
MATERIAL	SS304L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

DRW DOC ID	XXXXXX		RELEASED BY	DES INT	IPR GANDHINAGAR
LINKED EV5 PT ID	XXXXXX		APPROVED BY	DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED
PBS TITLE	PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3		CHECKED BY	CHECKER	The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.
REV DATE	DD-MM-YY	PT MATURITY: AB / PT VERSION: A	CONTROLLED BY	RESP OFF	DRAWING TITLE: 2ND_CAL_LT_SUPP_STRUCTURE_ASSY
SHEET SIZE	594x420	SCALE: 1:10 / PT Status: W	DRAWN BY	DESIGNER	-
THIRD ANGLE PROJECTION		NO.OF SHTS: 01	PBS 3 LEVELS	NN XX YY	DRAWING NUMBER: 01-01-02-01-00 / SHEET: 01 / REVISION: - -A / DR STATUS: W

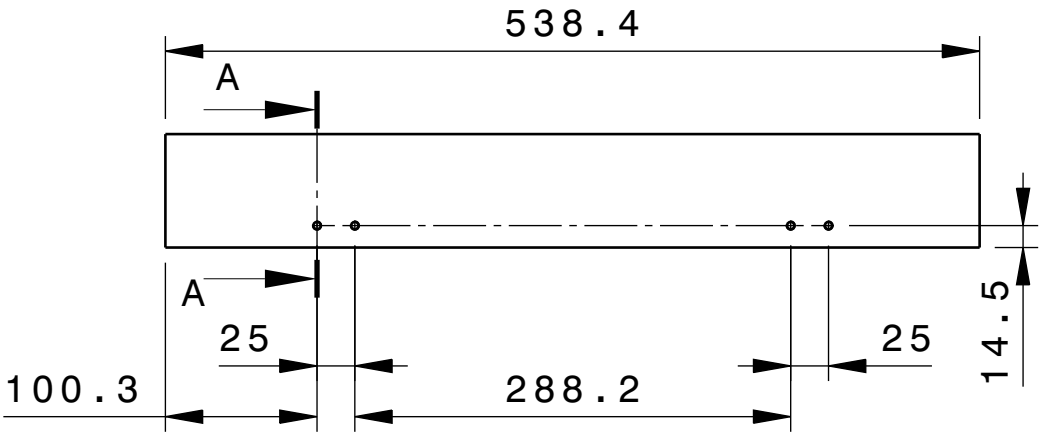
Spacereservation for the banner



SECTION VIEW A-A
Scale: 1:2



ISOMETRIC VIEW



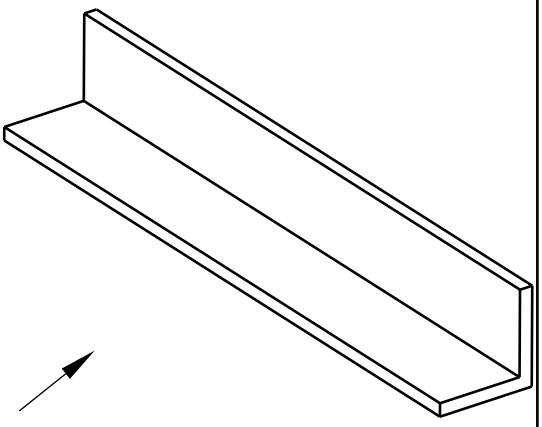
FRONT VIEW

MATERIAL	SS 304L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

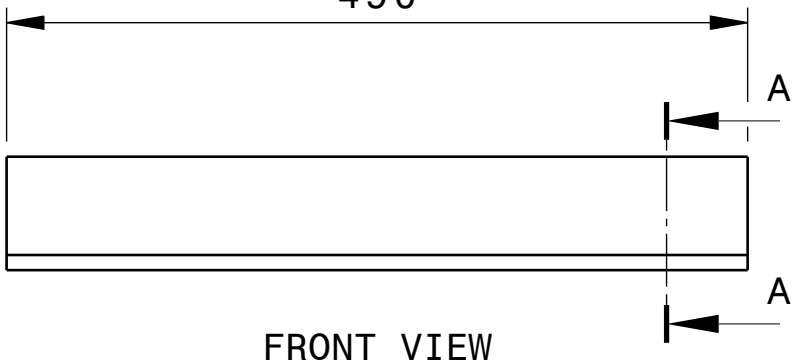
NOTE :-
1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID: XXXXXX	RELEASED BY: DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID: XXXXXX	APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
PBS TITLE PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3	CHECKED BY: CHECKER	DRAWING TITLE 2ND_CAL_MID_SUPPORT_1 - -	
REV DATE: DD-MM-YY / PT MATURITY: AB / PT VERSION: A	CONTROLLED BY: RESP OFF		
SHEET SIZE: 210x297 / SCALE: 1:5 / PT Status: W	DRAWN BY: DESIGNER		
THIRD ANGLE PROJECTION / NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-01-00-00-02	SHEET: 01 / REVISION: --A / DR STATUS: W

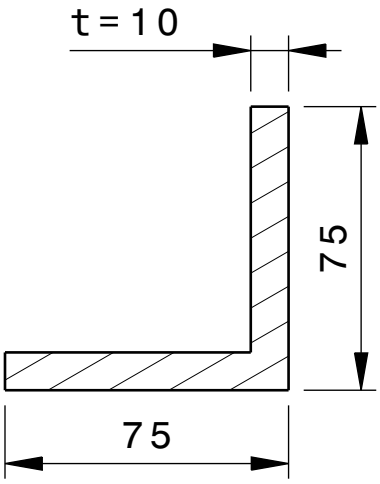
Spacereservation for the banner



ISOMETRIC VIEW



FRONT VIEW



SECTION VIEW A-A
Scale: 1:2

MATERIAL	SS 304L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

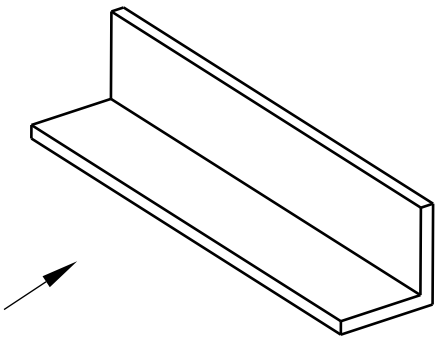
NOTE :-

1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.

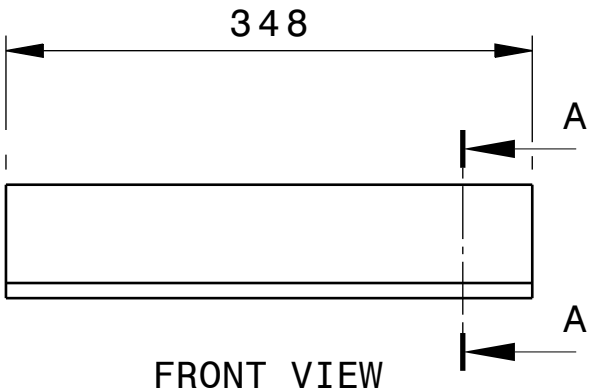
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID: XXXXXX	RELEASED BY: DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID: XXXXXX	APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
PBS TITLE PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3	CHECKED BY: CHECKER	DRAWING TITLE 2ND_CAL_MID_SUPPORT_2 - -	
REV DATE: DD-MM-YY / PT MATURITY: AB / PT VERSION: A	CONTROLLED BY: RESP OFF		
SHEET SIZE: 210x297 / SCALE: 1:5 / PT Status: W	DRAWN BY: DESIGNER		
THIRD ANGLE PROJECTION / NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-01-00-00-03	SHEET: 01 / REVISION: --A / DR STATUS: W

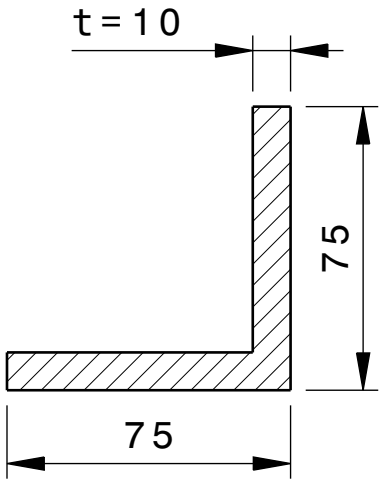
Spacereservation for the banner



ISOMETRIC VIEW



FRONT VIEW



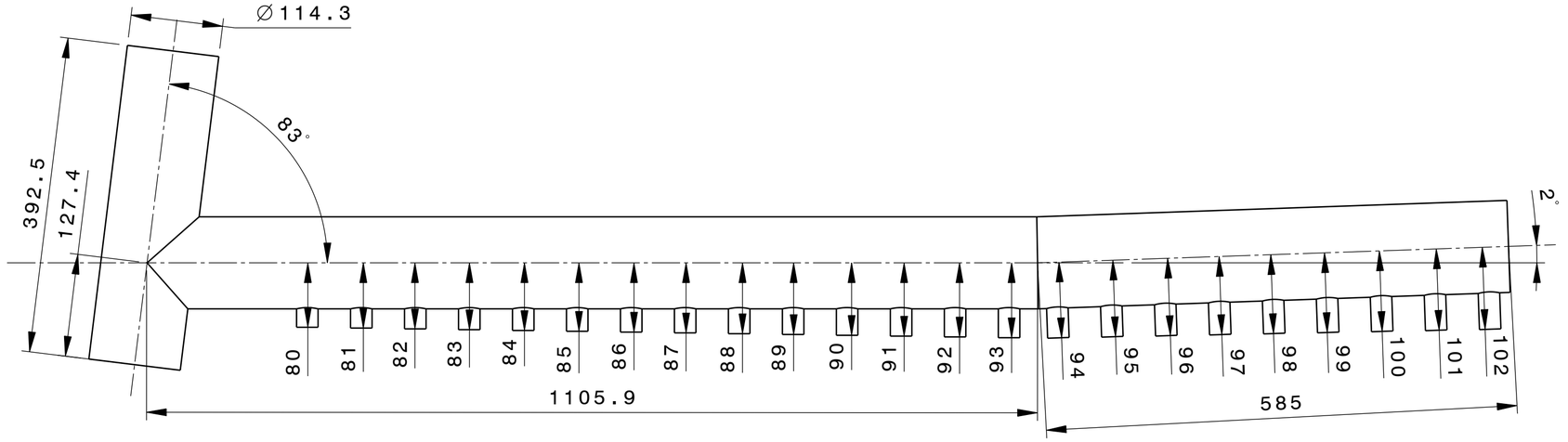
SECTION VIEW A-A
Scale: 1:2

MATERIAL	SS 304L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

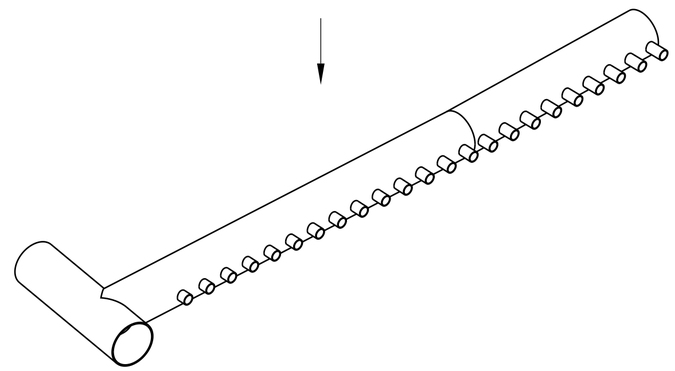
NOTE :-
1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID: XXXXXX			RELEASED BY: DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID: XXXXXX			APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
PBS TITLE PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3			CHECKED BY: CHECKER	DRAWING TITLE 2ND_CAL_MID_SUPPORT_3 - -	
REV DATE: DD-MM-YY	PT MATURITY: AB	PT VERSION: A	CONTROLLED BY: RESP OFF		
SHEET SIZE: 210x297	SCALE: 1:5	PT Status: W	DRAWN BY: DESIGNER		
THIRD ANGLE PROJECTION	NO.OF SHTS: 01		PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-01-00-00-04	SHEET: 01 / REVISION: --A / DR STATUS: W

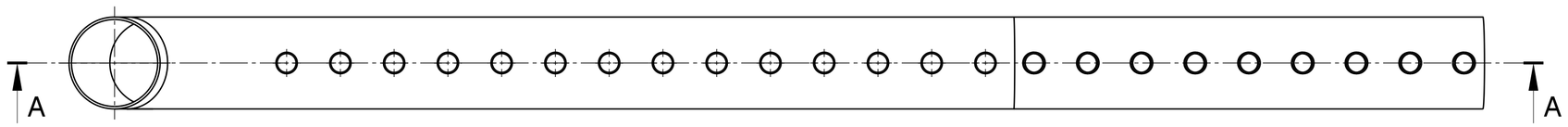
Spacereservation for the banner



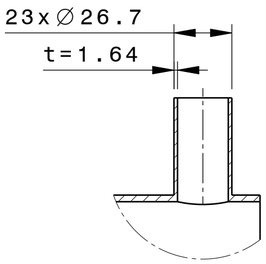
FRONT VIEW



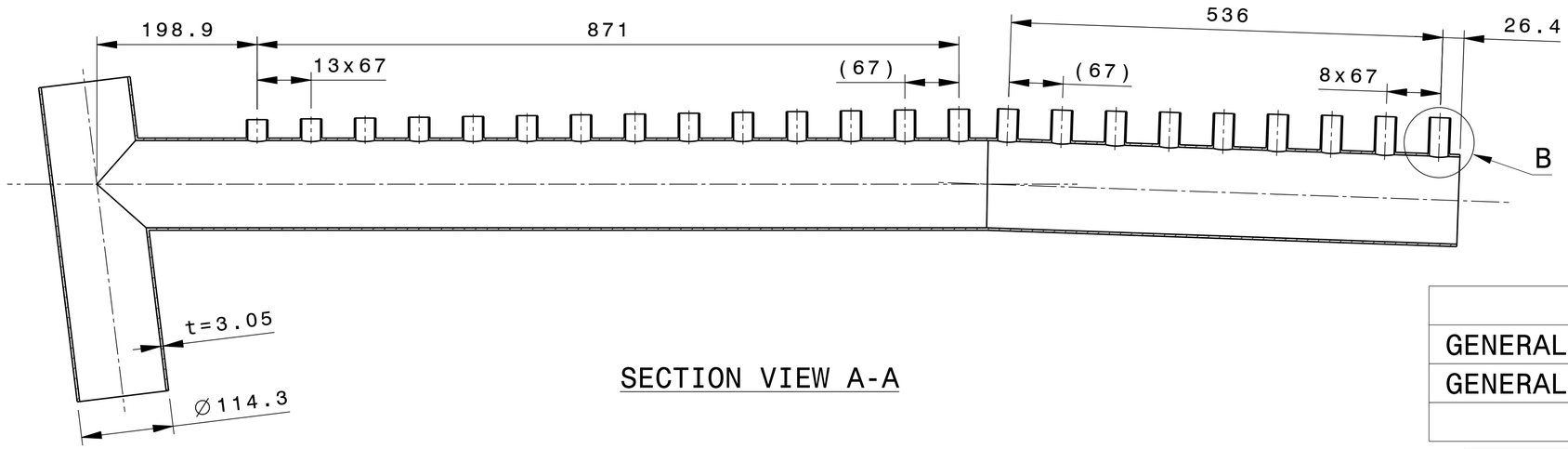
ISOMETRIC VIEW



BOTTOM VIEW



DETAIL B
Scale: 1:2



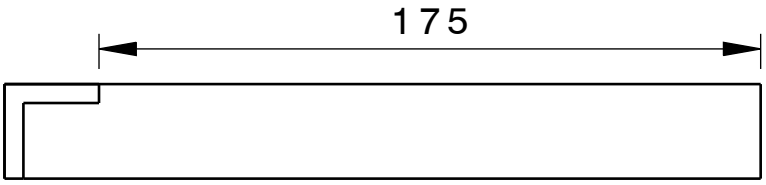
SECTION VIEW A-A

MATERIAL	SS316L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

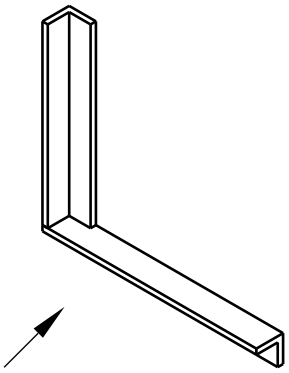
NOTE:
1.THIS COMPONENT SHALL BE FABRICATED BY TIG WELDING. WELD CONFIGURATION SHALL BE INCLUDED IN THE MANUFACTURING DRAWING BY CONTRACTOR.
2.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
3.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID: XXXXXX			RELEASED BY: DES INT	IPR GANDHINAGAR
LINKED EV5 PT ID: XXXXXX			APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED
PBS TITLE: PBS LEVEL 1 / PBS LEVEL 2 / PBS LEVEL 3			CHECKED BY: CHECKER	The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.
REV DATE: DD-MM-YY	PT MATURITY: AB	PT VERSION: A	CONTROLLED BY: RESP OFF	DRAWING TITLE: 2ND_CAL_RT_HEADER
SHEET SIZE: 594x420	SCALE: 1:5	PT Status: W	DRAWN BY: DESIGNER	-
THIRD ANGLE PROJECTION	NO.OF SHTS: 01		PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-01-01-00-01 / SHEET: 01 / REVISION: --A / DR STATUS: W

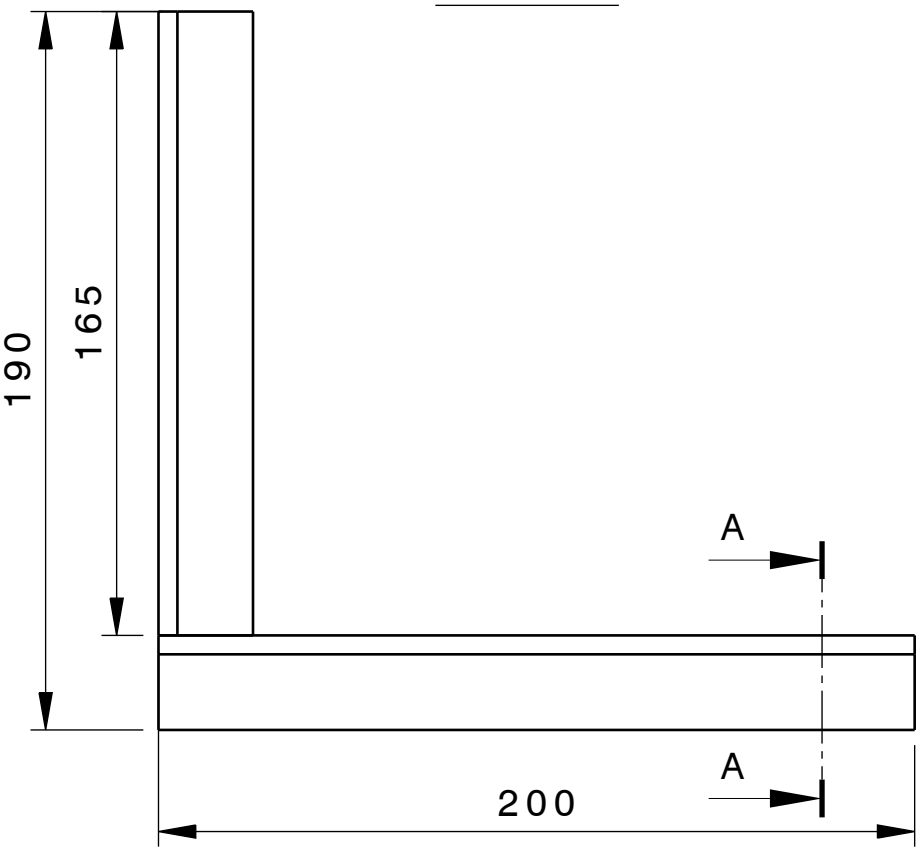
Spacereservation for the banner



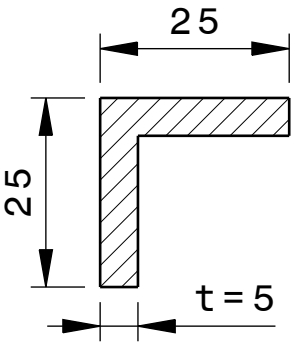
TOP VIEW



ISOMETRIC VIEW



FRONT VIEW



SECTION VIEW A-A
Scale: 1:1

MATERIAL	SS304L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

NOTE:

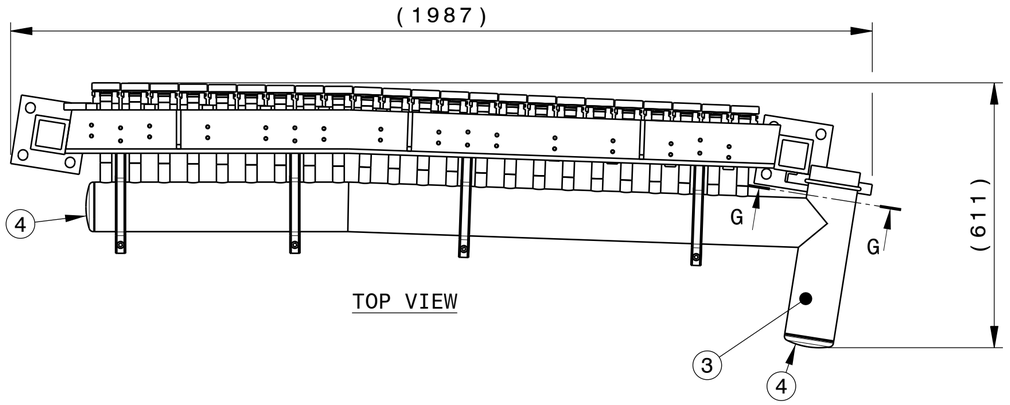
1.THIS COMPONENT SHALL BE FABRICATED BY TIG WELDING. WELD CONFIGURATION SHALL BE INCLUDED IN THE MANUFACTURING DRAWING BY CONTRACTOR.

2.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.

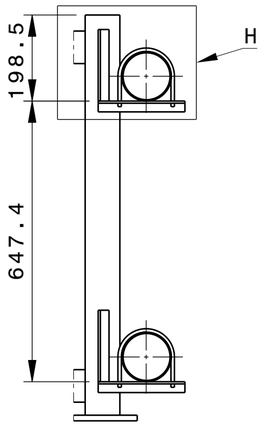
3.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID: XXXXXX			RELEASED BY: DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID: XXXXXX			APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
PBS TITLE PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3			CHECKED BY: CHECKER	DRAWING TITLE 2ND_CAL_RT_HEADER_SUPPORT - -	
REV DATE: DD-MM-YY	PT MATURITY: AB	PT VERSION: A	CONTROLLED BY: RESP OFF		
SHEET SIZE: 210x297	SCALE: 1:2	PT Status: W	DRAWN BY: DESIGNER		
THIRD ANGLE PROJECTION	NO.OF SHTS: 01		PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-01-01-00-07	SHEET: 01 / REVISION: --A / DR STATUS: W

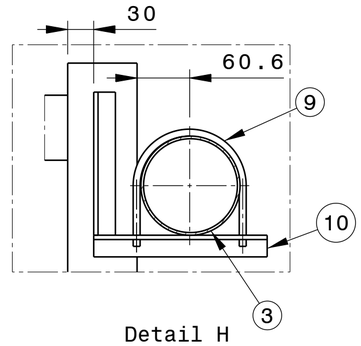
Spacereservation for the banner



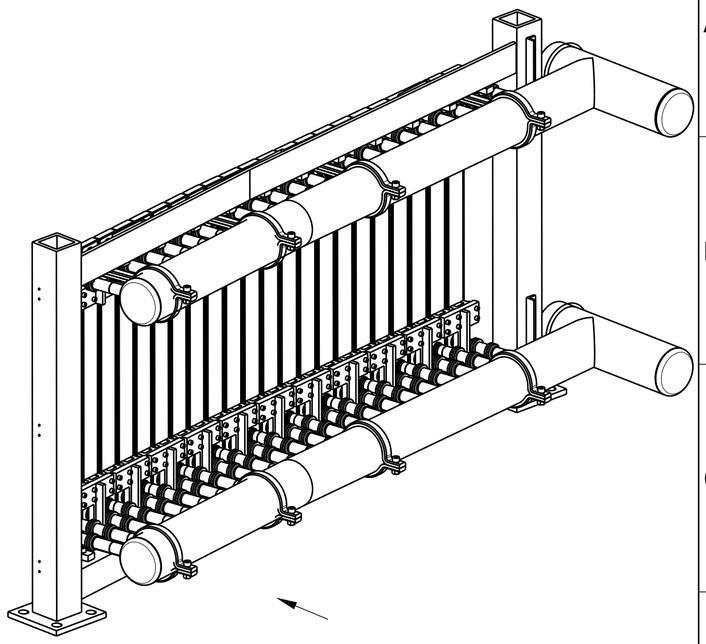
TOP VIEW



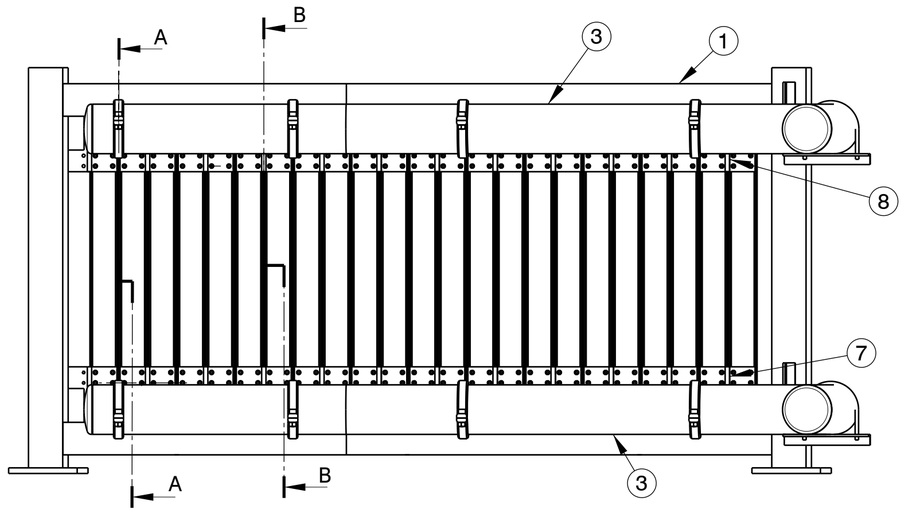
Section view G-G
Scale: 1:10



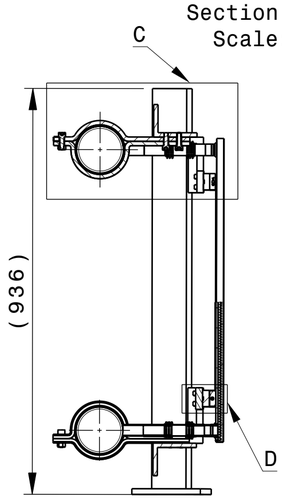
Detail H
Scale: 1:5



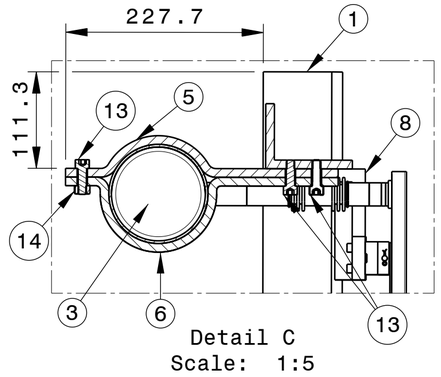
ISOMETRIC VIEW



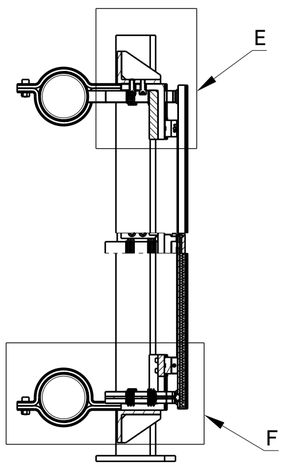
FRONT VIEW



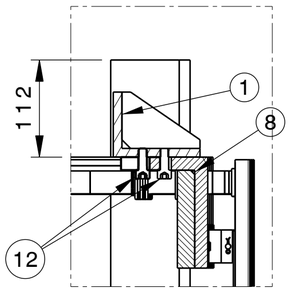
Section view A-A
Scale: 1:10



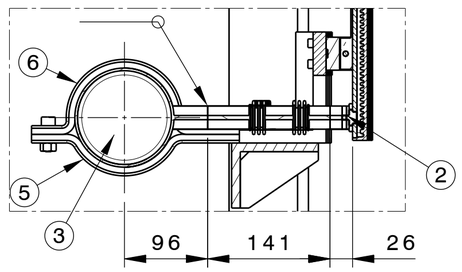
Detail C
Scale: 1:5



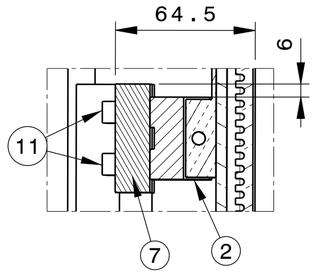
Section view B-B
Scale: 1:10



Detail E
Scale: 1:5



Detail F
Scale: 1:5



Detail D
Scale: 1:2

MATERIAL	-
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

NOTE:

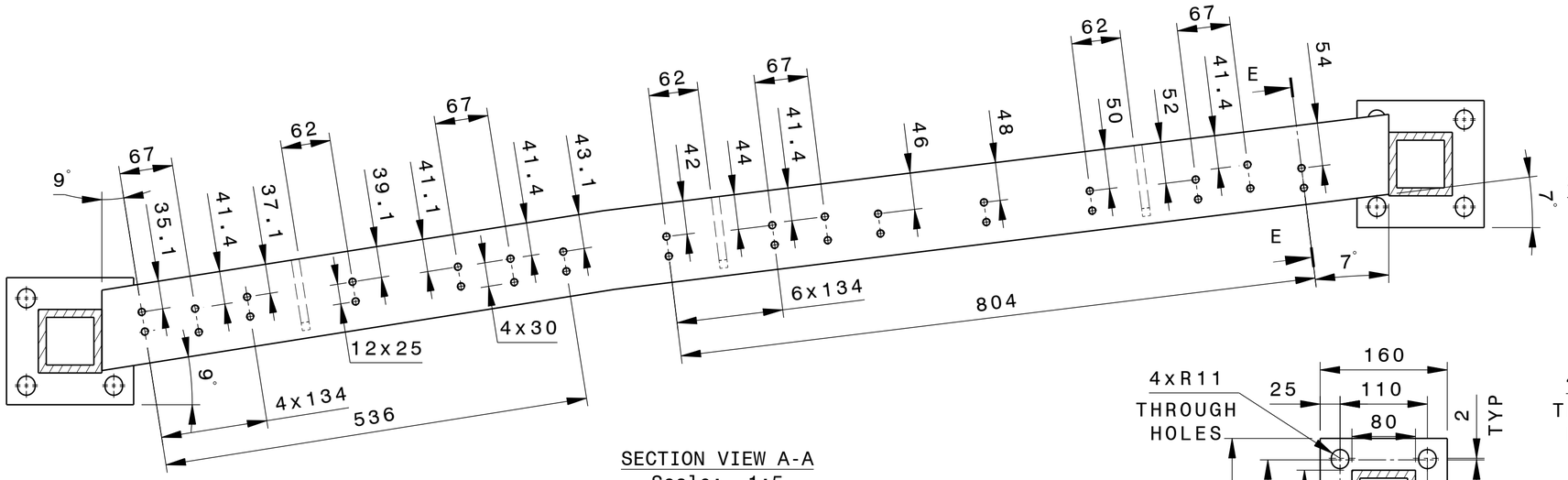
1.THIS COMPONENT SHALL BE FABRICATED BY TIG WELDING. WELD CONFIGURATION SHALL BE INCLUDED IN THE MANUFACTURING DRAWING BY CONTRACTOR.

2.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.

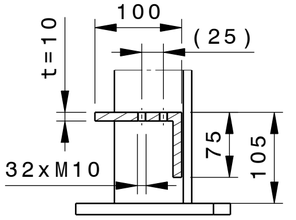
3.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

SR.NO.	DRAWING NO.	PART NAME	TYPE	QTY	REMARKS
14	-	ISO_4034_M10_NUT	STD	8	
13	-	ISO_4762_M10x30_SOCKET_CAPSCREW	STD	24	
12	-	ISO_4762_M10x25_SOCKET_CAPSCREW	STD	48	
11	-	ISO_4762_M6x45_SOCKET_CAPSCREW	STD	184	
10	01-01-01-00-08	2ND_CAL_U_CLAMP	PART	2	
9	01-01-01-00-07	2ND_CAL_RT_HEADER_SUPPORT	PART	2	
8	01-01-01-00-06	2ND_CAL_HTE_HOLDING_CLAMP_2	PART	12	
7	01-01-01-00-05	2ND_CAL_HTE_HOLDING_CLAMP_1	PART	12	
6	01-01-01-00-04	2ND_CAL_HEADER_CLAMP_2	PART	8	
5	01-01-01-00-03	2ND_CAL_HEADER_CLAMP_1	PART	8	
4	01-01-01-00-02	2ND_CAL_HEADER_CAP	PART	4	
3	01-01-01-00-01	2ND_CAL_RT_HEADER	PART	2	
2	01-01-01-02-00	2ND_CAL_HTE_ASSY	ASSY	23	
1	01-01-01-01-00	2ND_CAL_RT_SUPP_STRUCTURE_ASSY	ASSY	1	

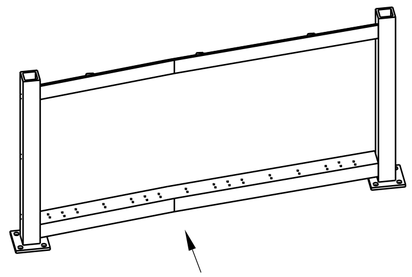
DRW DOC ID: XXXXXX		RELEASED BY: DES INT	IPR GANDHINAGAR		
LINKED EV5 PT ID: XXXXXX		APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED		
PBS TITLE: PBS LEVEL 1 / PBS LEVEL 2 / PBS LEVEL 3		CHECKED BY: CHECKER	The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.		
REV DATE: DD-MM-YY	PT MATURITY: AB	CONTROLLED BY: RESP OFF	DRAWING TITLE: 2ND_CAL_RT_HTE_&_SS_ASSY		
SHEET SIZE: 594x420	SCALE: 1:10	DRAWN BY: DESIGNER	-		
THIRD ANGLE PROJECTION	NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-01-01-00-00	SHEET: 01	REVISION: --A / DR STATUS: W



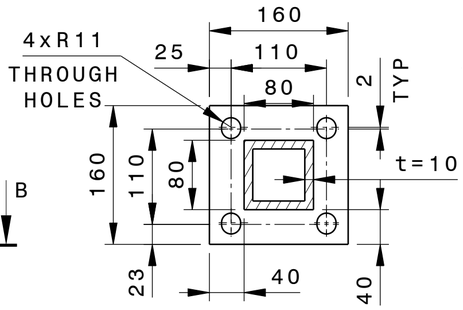
SECTION VIEW A-A
Scale: 1:5



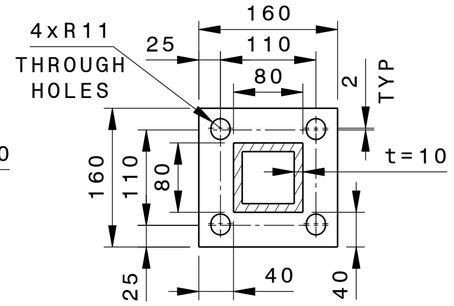
SECTION VIEW E-E
Scale: 1:5



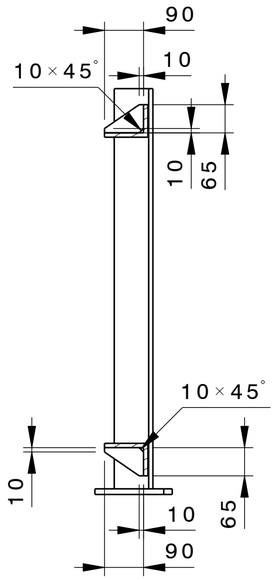
ISOMETRIC VIEW



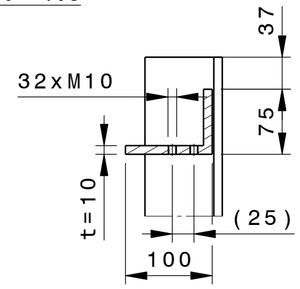
SECTION VIEW C-C
Scale: 1:5



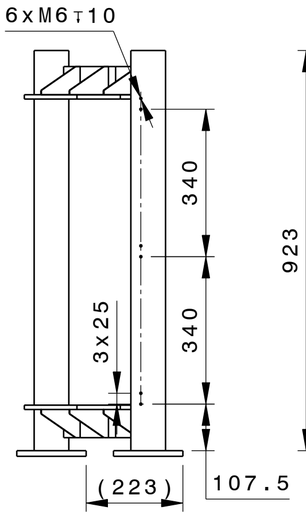
SECTION VIEW D-D
Scale: 1:5



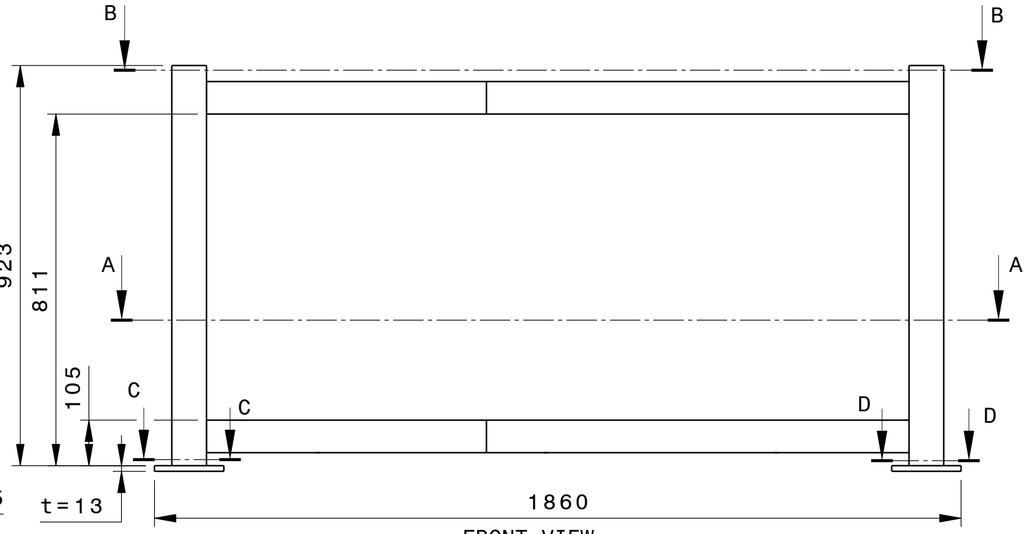
SECTION VIEW G-G



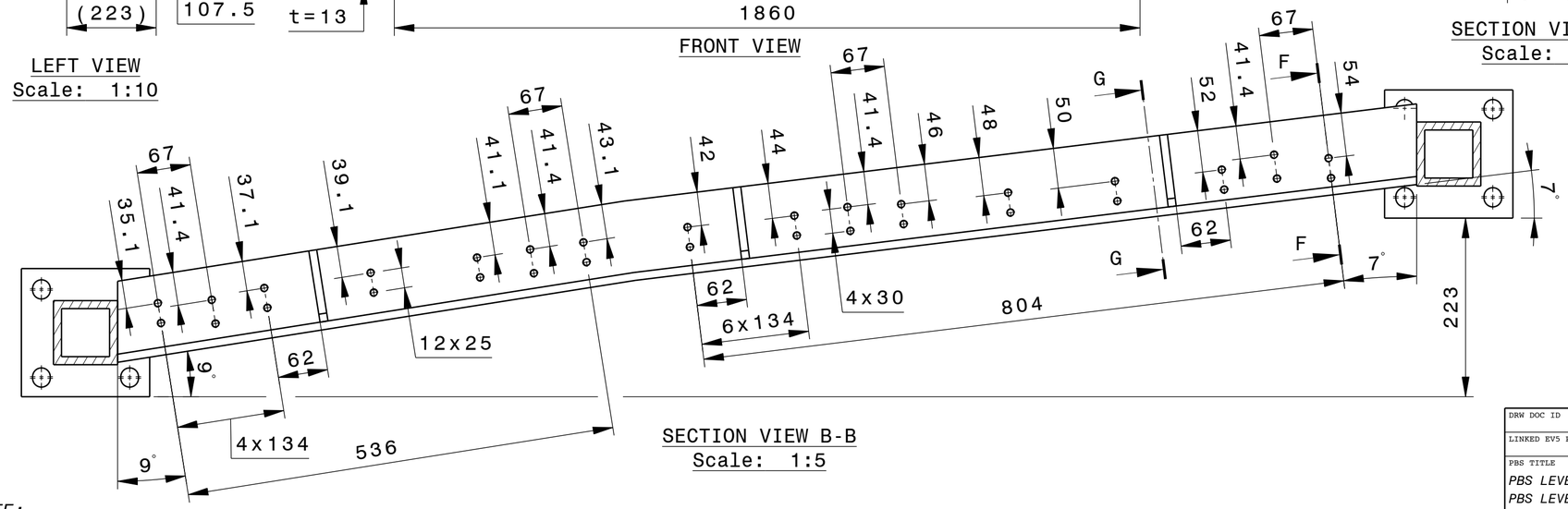
SECTION VIEW F-F
Scale: 1:5



LEFT VIEW
Scale: 1:10



FRONT VIEW



SECTION VIEW B-B
Scale: 1:5

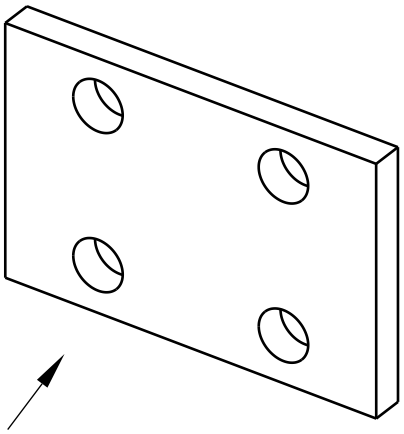
MATERIAL	SS304L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

NOTE:
1.THIS COMPONENT SHALL BE FABRICATED BY TIG WELDING. WELD CONFIGURATION SHALL BE INCLUDED IN THE MANUFACTURING DRAWING BY CONTRACTOR.
2.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
3.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

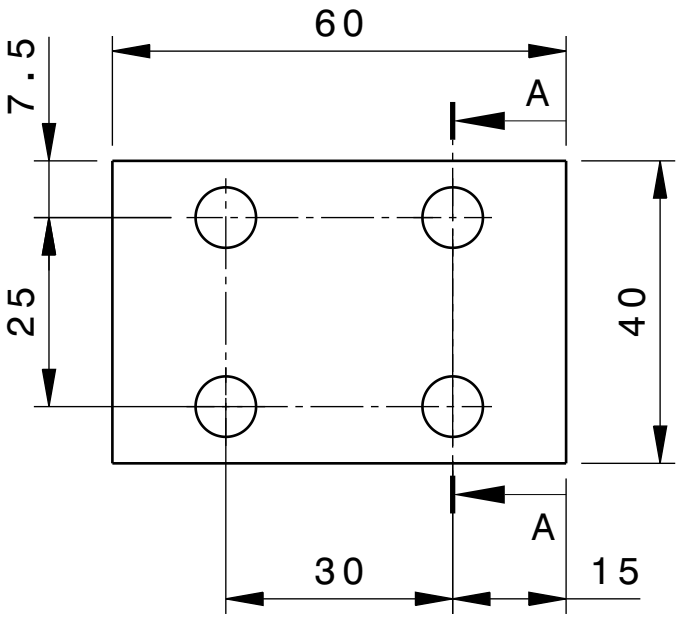
DRW DOC ID	XXXXXX	RELEASED BY	DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID	XXXXXX	APPROVED BY	DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED. The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
PBS TITLE	PBS LEVEL 1 / PBS LEVEL 2 / PBS LEVEL 3	CHECKED BY	CHECKER		
REV DATE	DD-MM-YY	PT MATURITY	AB	PT VERSION	A
SHEET SIZE	594x420	SCALE	1:10	PT Status	W
THIRD ANGLE PROJECTION		NO.OF SHTS	01	CONTROLLED BY	RESP OFF
				DRAWN BY	DESIGNER
DRAWING TITLE	2ND_CAL_RT_SUPP_STRUCTURE_ASSY - -				

PBS 3 LEVELS	DRAWING NUMBER		SHEET	REVISION	DR STATUS
NN XX YY	01-01-01-01-00		01	--A	W

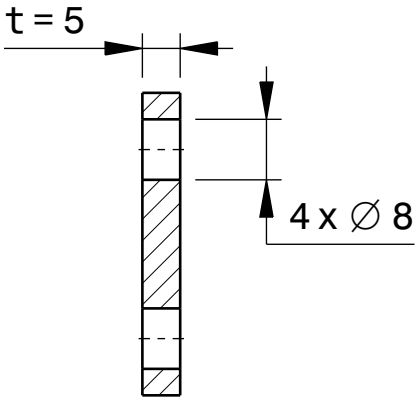
Spacereservation for the banner



ISOMETRIC VIEW



FRONT VIEW



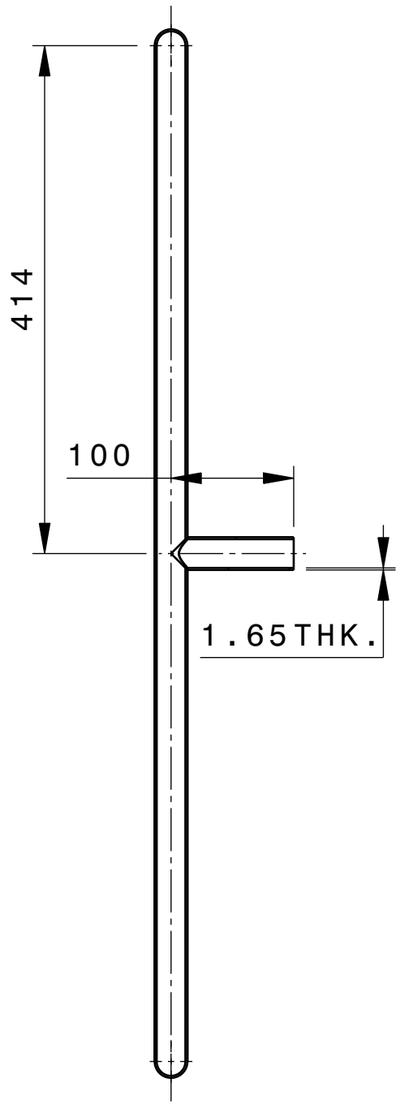
SECTION VIEW A-A

MATERIAL	SS304L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

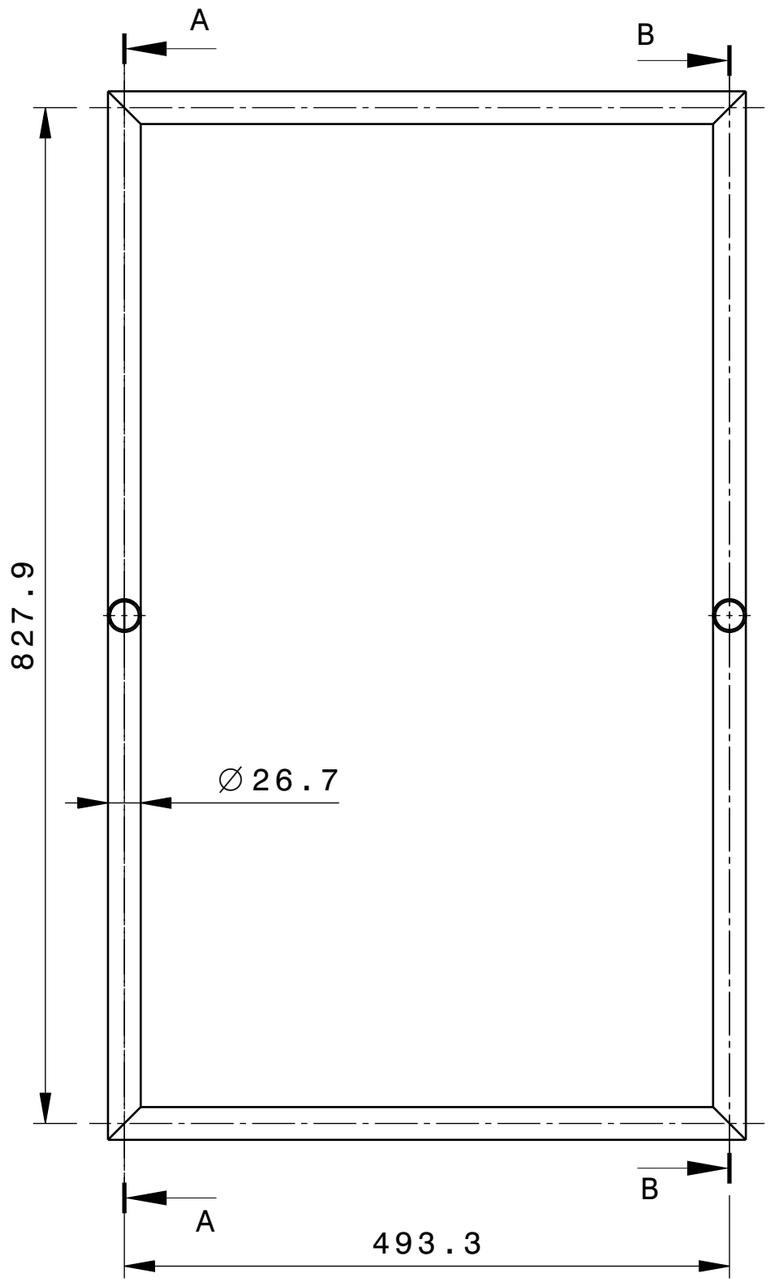
NOTE :-
1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID: XXXXXX	RELEASED BY: DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID: XXXXXX	APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
PBS TITLE PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3	CHECKED BY: CHECKER	DRAWING TITLE 2ND_CAL_SCRAPER_CLAMP - -	
REV DATE: DD-MM-YY / PT MATURITY: AB / PT VERSION: A	CONTROLLED BY: RESP OFF		
SHEET SIZE: 210x297 / SCALE: 1:1 / PT Status: W	DRAWN BY: DESIGNER		
THIRD ANGLE PROJECTION / NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-00-00-00-09	SHEET: 01 / REVISION: --A / DR STATUS: W

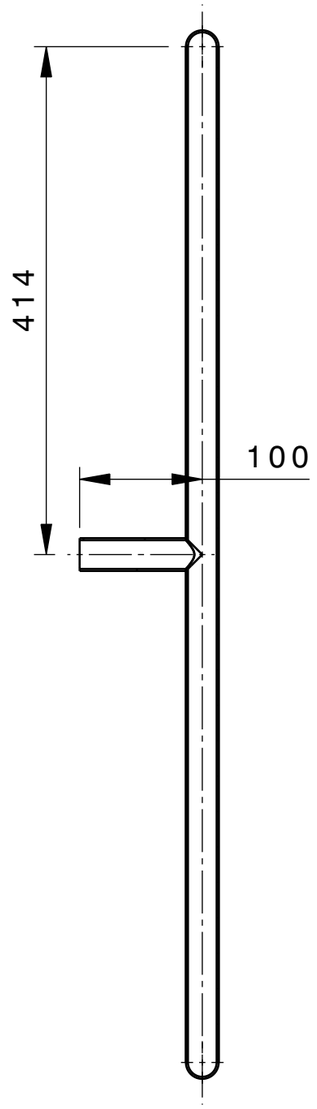
Spacereservation for the banner



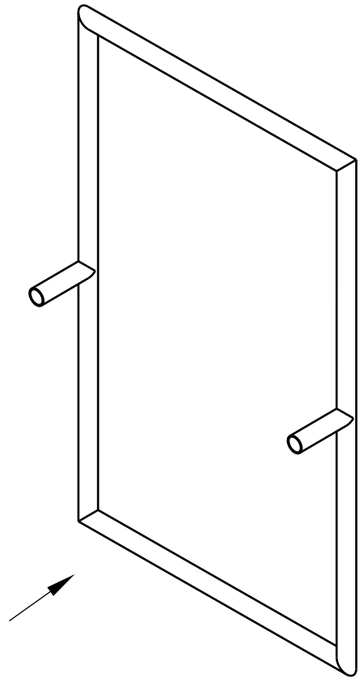
SECTION B-B



FRONT VIEW



SECTION A-A



ISOMETRIC VIEW

MATERIAL	SS 316L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

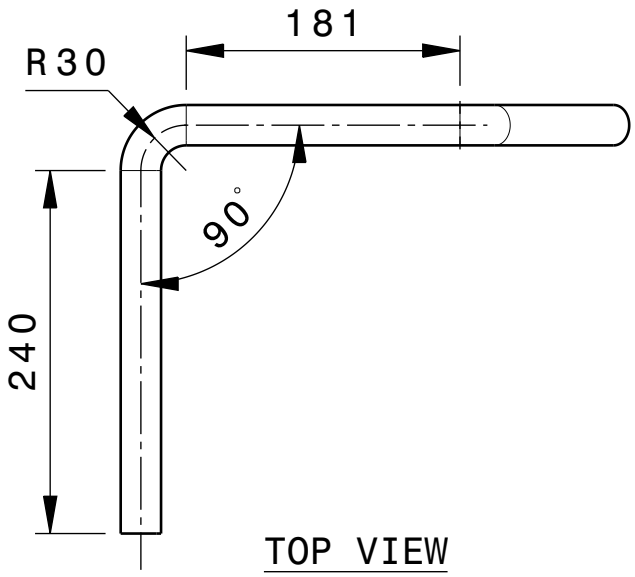
NOTE :-
1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID	XXXXXX		RELEASED BY	DES INT	IPR GANDHINAGAR
LINKED EV5 PT ID	XXXXXX		APPROVED BY	DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED
PBS TITLE	PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3		CHECKED BY	CHECKER	The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.
REV DATE	PT MATURITY	PT VERSION	CONTROLLED BY	RESP OFF	DRAWING TITLE: 2ND_CAL_SCRAPER_COOLING_PIPE_1
DD-MM-YY	AB	A	DRAWN BY	DESIGNER	-
SHEET SIZE	SCALE	PT Status			-
420x297	1:5	W			
THIRD ANGLE PROJECTION		NO.OF SHTS 01	PBS 3 LEVELS	NN XX YY	DRAWING NUMBER: 01-00-00-00-03

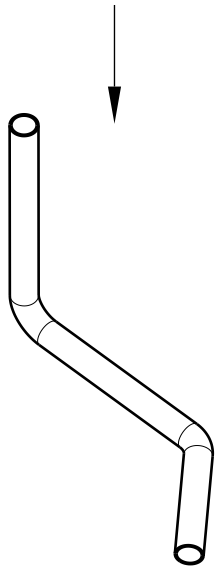
SHEET	REVISION	DR STATUS
01	- -A	W

Spacereservation for the banner

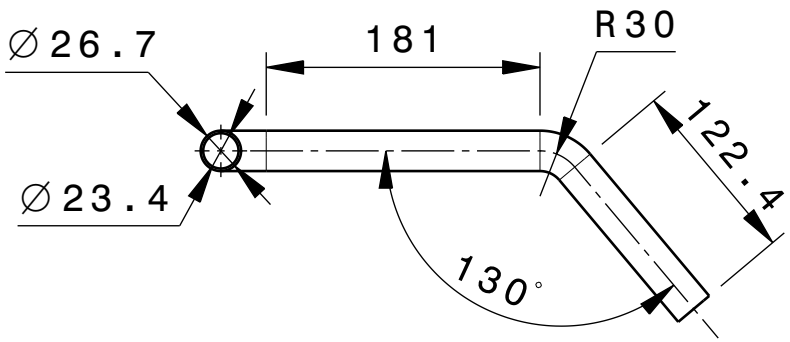
Spacereservation for the banner



TOP VIEW



ISOMETRIC VIEW



FRONT VIEW

MATERIAL	SS316L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

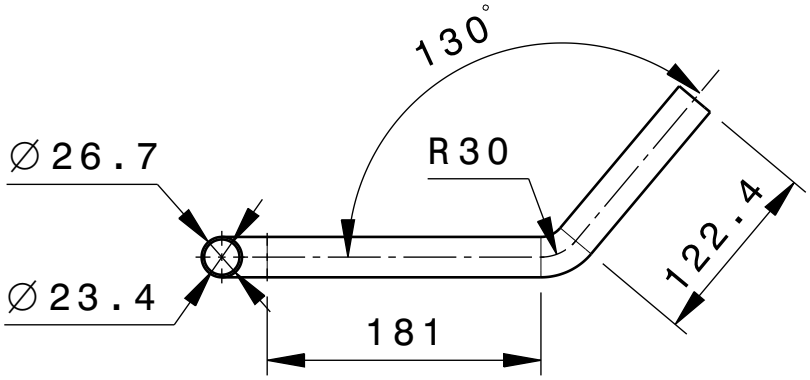
NOTE :-

1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.

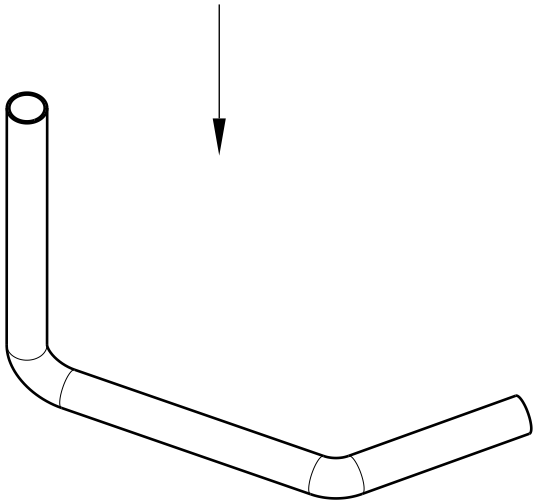
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID: XXXXXX	RELEASED BY: DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID: XXXXXX	APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
PBS TITLE PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3	CHECKED BY: CHECKER	DRAWING TITLE 2ND_CAL_SCRAPER_COOLING_PIPE_2	
REV DATE: DD-MM-YY / PT MATURITY: AB / PT VERSION: A	CONTROLLED BY: RESP OFF	-	
SHEET SIZE: 210x297 / SCALE: 1:5 / PT Status: W	DRAWN BY: DESIGNER	-	
THIRD ANGLE PROJECTION / NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-00-00-00-04	SHEET: 01 / REVISION: --A / DR STATUS: W

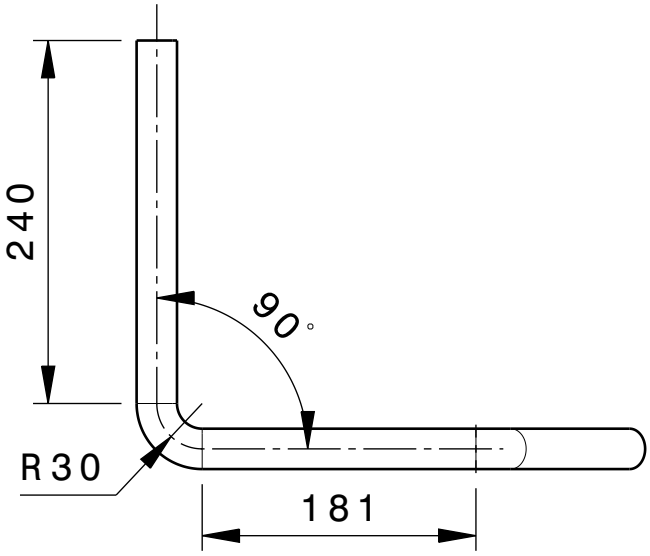
Spacereservation for the banner



FRONT VIEW



ISOMETRIC VIEW



BOTTOM VIEW

MATERIAL	SS316L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

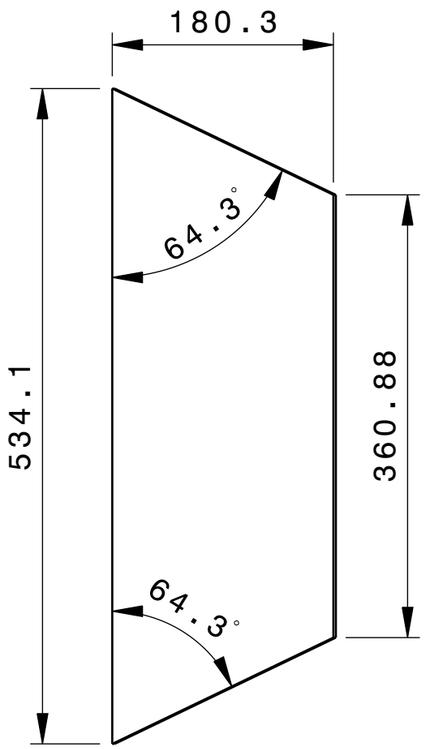
NOTE :-

1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.

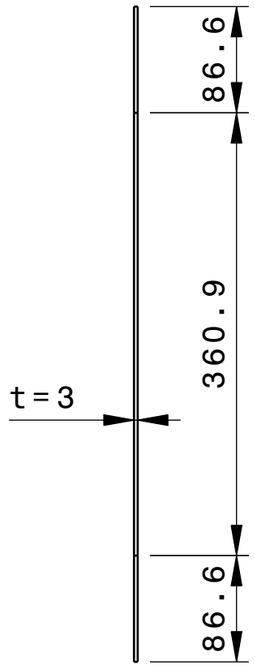
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID: XXXXXX	RELEASED BY: DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID: XXXXXX	APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
PBS TITLE PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3	CHECKED BY: CHECKER	DRAWING TITLE 2ND_CAL_SCRAPER_COOLING_PIPE_3 - -	
REV DATE: DD-MM-YY / PT MATURITY: AB / PT VERSION: A	CONTROLLED BY: RESP OFF		
SHEET SIZE: 210x297 / SCALE: 1:5 / PT Status: W	DRAWN BY: DESIGNER		
THIRD ANGLE PROJECTION / NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-00-00-00-05	SHEET: 01 / REVISION: --A / DR STATUS: W

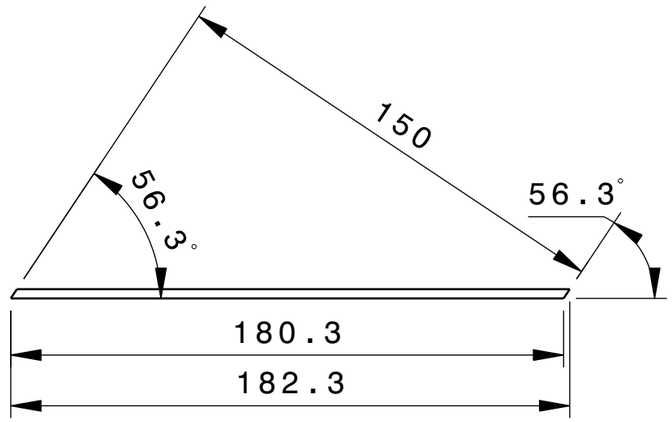
Spacereservation for the banner



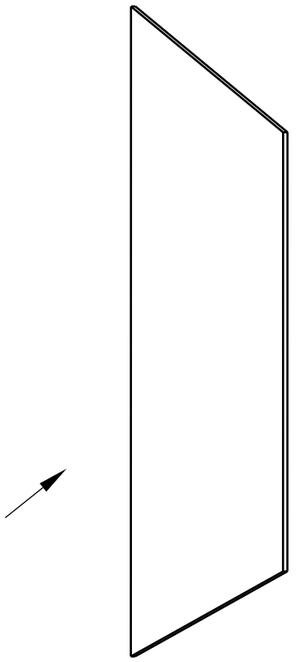
FRONT VIEW



RIGHT VIEW



TOP VIEW
Scale: 1:2



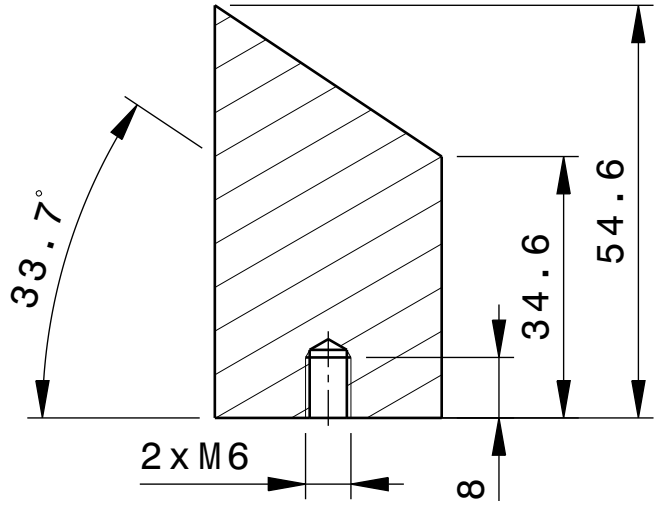
ISOMETRIC VIEW

MATERIAL	OF Copper
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

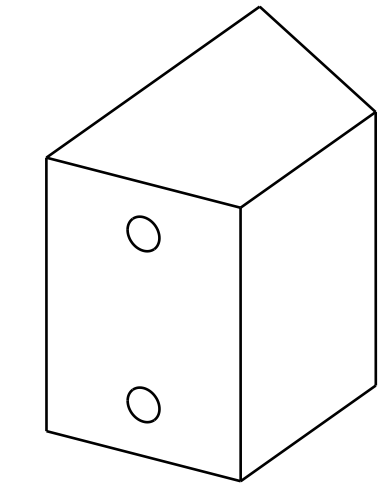
DRW DOC ID: XXXXXX			RELEASED BY: DES INT	IPR GANDHINAGAR				
LINKED EV5 PT ID: XXXXXX			APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.				
PBS TITLE PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3			CHECKED BY: CHECKER	DRAWING TITLE 2ND_CAL_SCRAPER_H_PLATE - -				
REV DATE: DD-MM-YY	PT MATURITY: AB	PT VERSION: A	CONTROLLED BY: RESP OFF					
SHEET SIZE: 420x297	SCALE: 1:5	PT Status: W	DRAWN BY: DESIGNER					
THIRD ANGLE PROJECTION		NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-00-00-00-02		SHEET: 01	REVISION: --A	DR STATUS: W

NOTE :-
1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

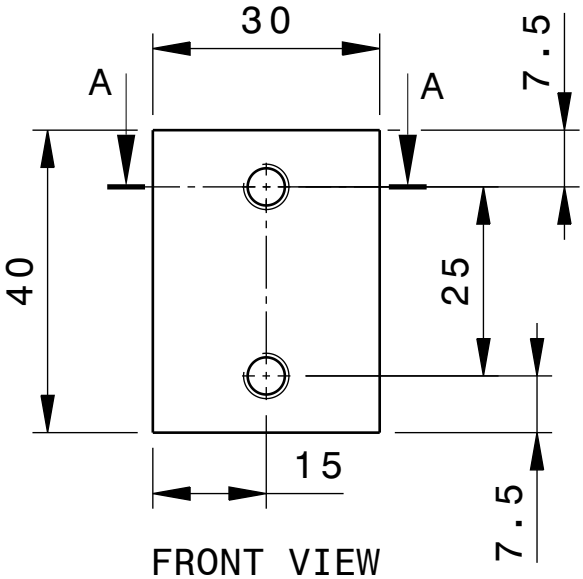
Spacereservation for the banner



SECTION VIEW A-A



ISOMETRIC VIEW



FRONT VIEW

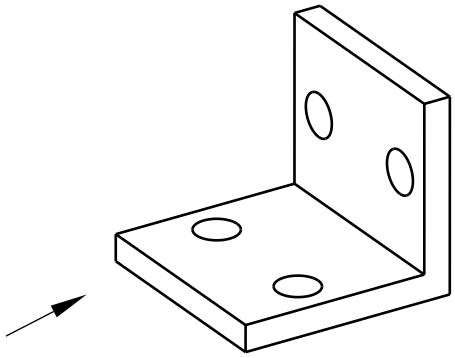
MATERIAL	SS 304L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

NOTE :-

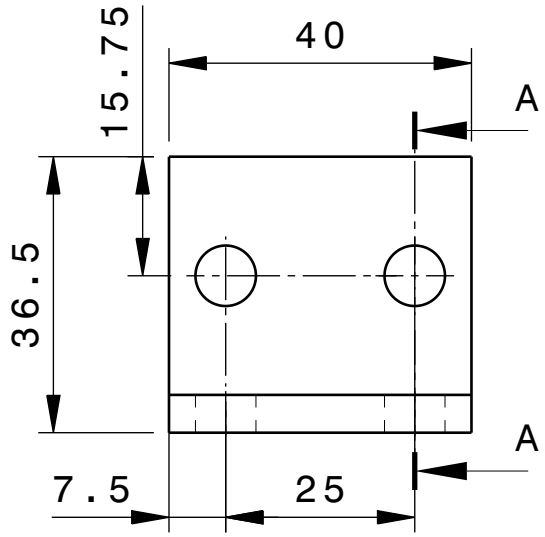
1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.

2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

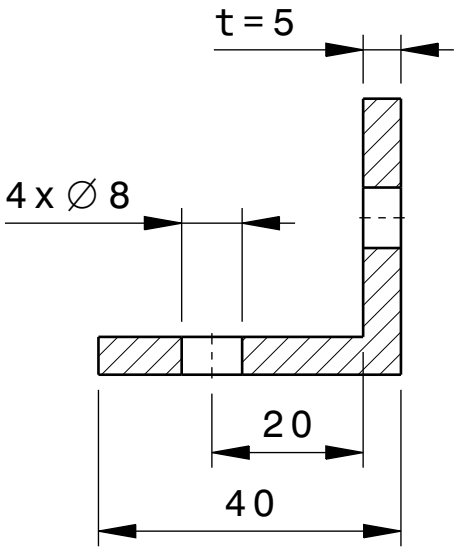
DRW DOC ID: XXXXXX	RELEASED BY: DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID: XXXXXX	APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
PBS TITLE PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3	CHECKED BY: CHECKER	DRAWING TITLE: 2ND_CAL_SCRAPER_H_PLT_BLOCK - -	
REV DATE: DD-MM-YY / PT MATURITY: AB / PT VERSION: A	CONTROLLED BY: RESP OFF		
SHEET SIZE: 210x297 / SCALE: 1:1 / PT Status: W	DRAWN BY: DESIGNER		
THIRD ANGLE PROJECTION / NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-00-00-00-07	SHEET: 01 / REVISION: --A / DR STATUS: W



ISOMETRIC VIEW



FRONT VIEW



SECTION VIEW A-A

MATERIAL	SS 304L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

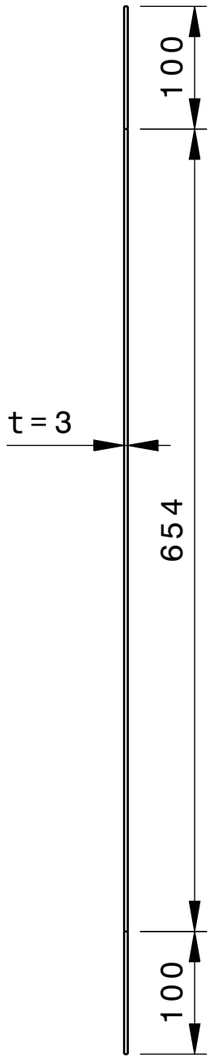
NOTE :-

1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.

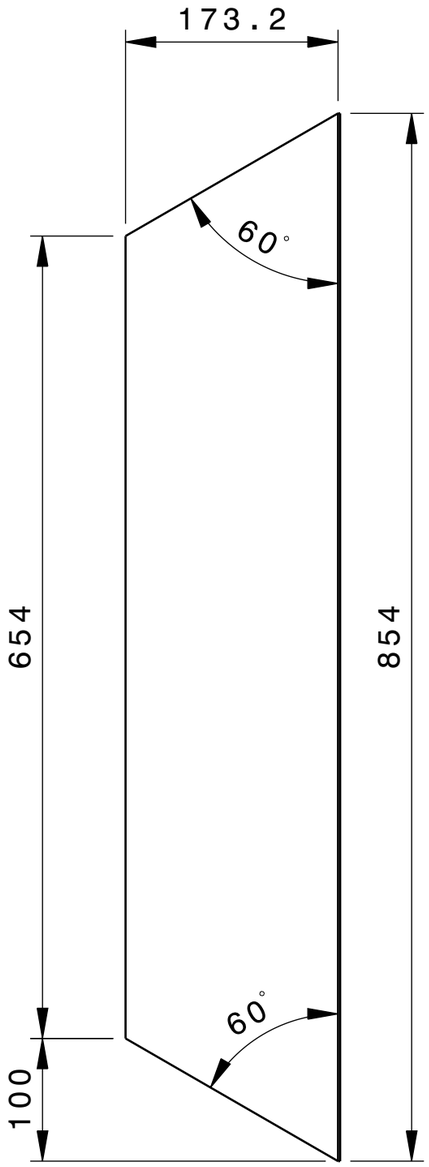
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID: XXXXXX	RELEASED BY: DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID: XXXXXX	APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
PBS TITLE PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3	CHECKED BY: CHECKER	DRAWING TITLE: 2ND_CAL_SCRAPER_L_CLAMP - -	
REV DATE: DD-MM-YY / PT MATURITY: AB / PT VERSION: A	CONTROLLED BY: RESP OFF		
SHEET SIZE: 210x297 / SCALE: 1:1 / PT Status: W	DRAWN BY: DESIGNER		
THIRD ANGLE PROJECTION / NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-00-00-00-08	SHEET: 01 / REVISION: --A / DR STATUS: W

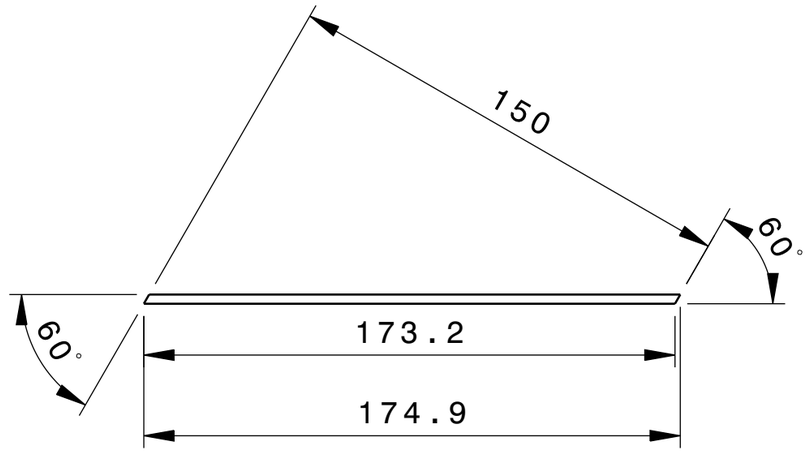
Spacereservation for the banner



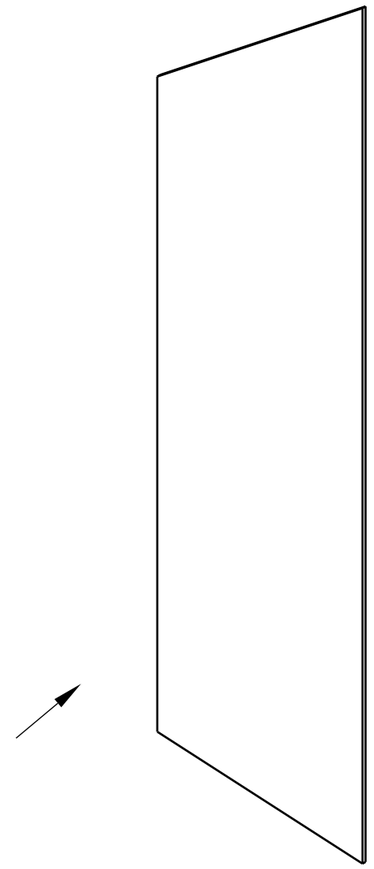
LEFT VIEW



FRONT VIEW



TOP VIEW
Scale: 1:2



ISOMETRIC VIEW

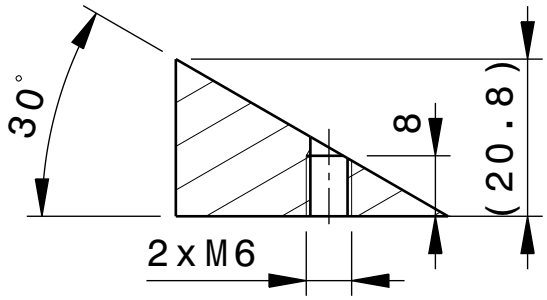
MATERIAL	OF Copper
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

NOTE :-
1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

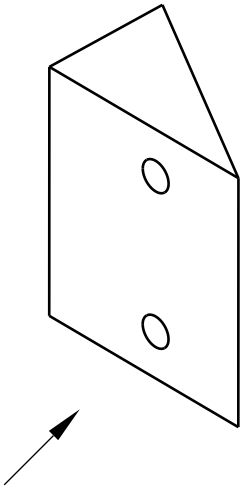
DRW DOC ID: XXXXXX			RELEASED BY: DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID: XXXXXX			APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED	
PBS TITLE: PBS LEVEL 1 / PBS LEVEL 2 / PBS LEVEL 3			CHECKED BY: CHECKER	The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
REV DATE: DD-MM-YY	PT MATURITY: AB	PT VERSION: A	CONTROLLED BY: RESP OFF	DRAWING TITLE: 2ND_CAL_SCRAPER_V_PLATE - -	
SHEET SIZE: 420x297	SCALE: 1:5	PT Status: W	DRAWN BY: DESIGNER		
THIRD ANGLE PROJECTION		NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-00-00-00-01	SHEET: 01 / REVISION: - -A / DR STATUS: W

Spacereservation for the banner

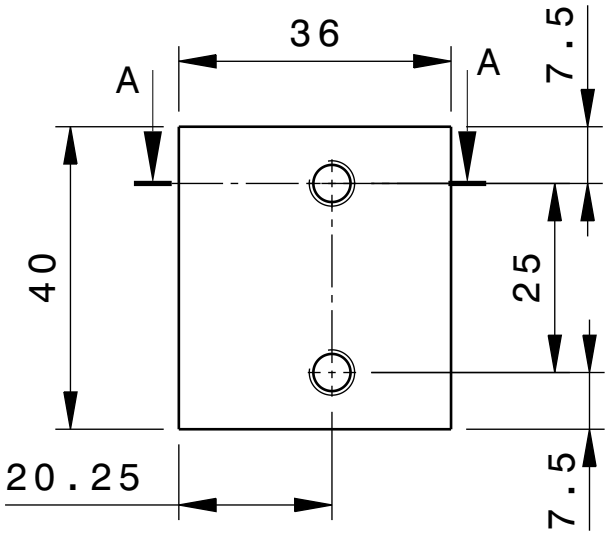
Spacereservation for the banner



SECTION VIEW A-A



ISOMETRIC VIEW



MATERIAL	SS 304L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

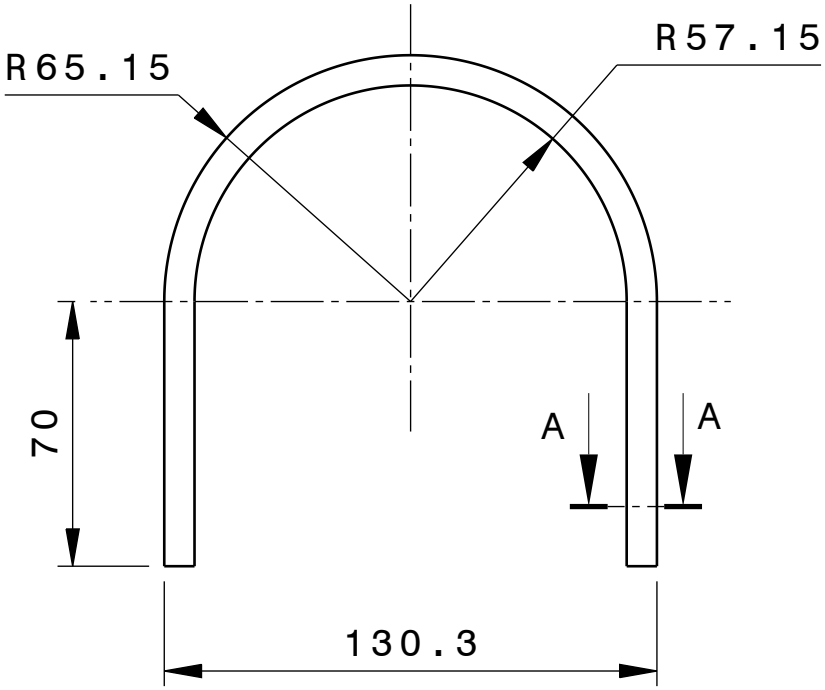
NOTE :-

1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.

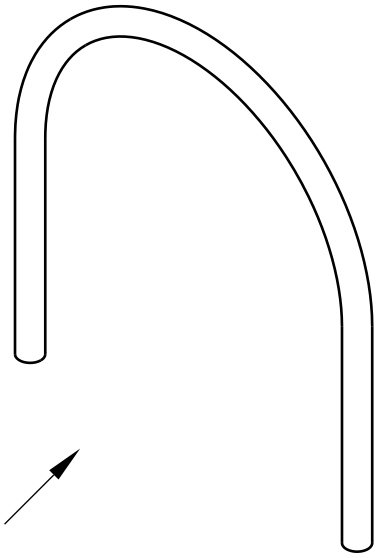
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID: XXXXXX			RELEASED BY: DES INT	IPR GANDHINAGAR			
LINKED EV5 PT ID: XXXXXX			APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.			
PBS TITLE PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3			CHECKED BY: CHECKER	DRAWING TITLE: 2ND_CAL_SCRAPER_V_PLT_BLOCK -			
REV DATE: DD-MM-YY	PT MATURITY: AB	PT VERSION: A	CONTROLLED BY: RESP OFF	-			
SHEET SIZE: 210x297	SCALE: 1:1	PT Status: W	DRAWN BY: DESIGNER				
THIRD ANGLE PROJECTION		NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-00-00-00-06	SHEET: 01	REVISION: --A	DR STATUS: W

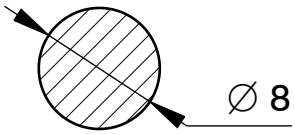
Spacereservation for the banner



FRONT VIEW



ISOMETRIC VIEW



SECTION VIEW A-A
Scale: 2:1

MATERIAL	SS304L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

NOTE :-
1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID: XXXXXX	RELEASED BY: DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID: XXXXXX	APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
PBS TITLE PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3	CHECKED BY: CHECKER	DRAWING TITLE: 2ND_CAL_U_CLAMP - -	
REV DATE: DD-MM-YY / PT MATURITY: AB / PT VERSION: A	CONTROLLED BY: RESP OFF		
SHEET SIZE: 210x297 / SCALE: 1:2 / PT Status: W	DRAWN BY: DESIGNER		
THIRD ANGLE PROJECTION / NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-01-01-00-08	SHEET: 01 / REVISION: --A / DR STATUS: W

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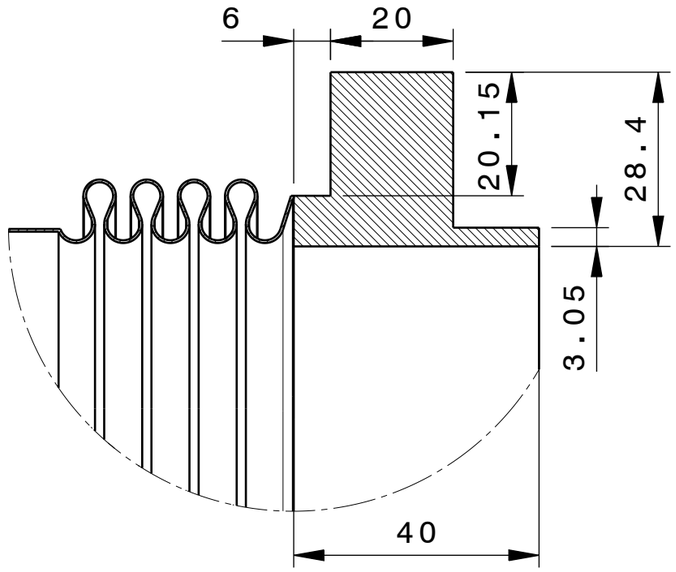
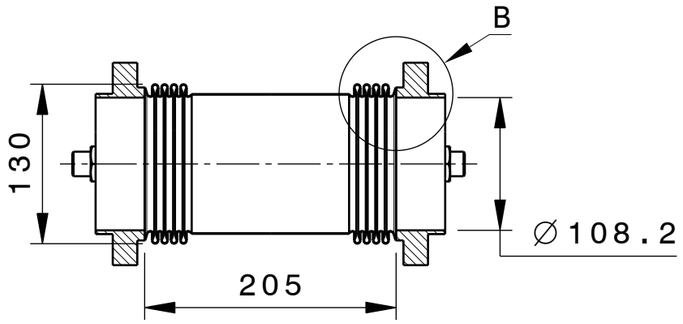
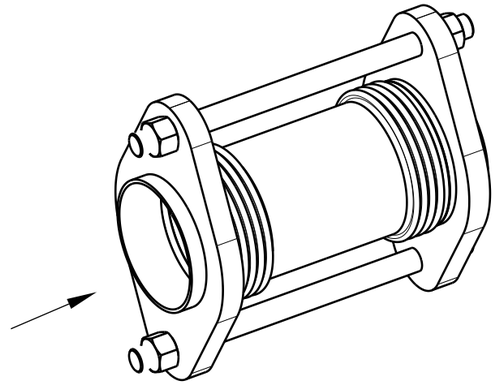


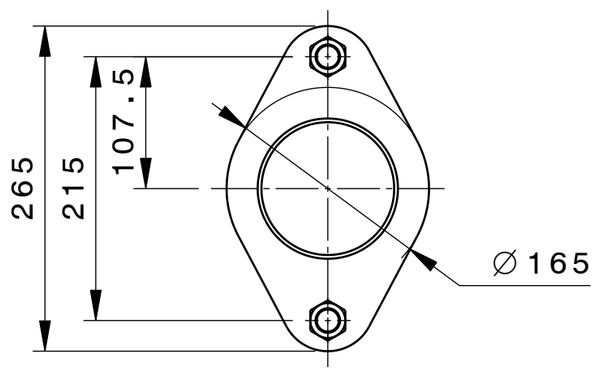
Detail B
Scale: 1:1



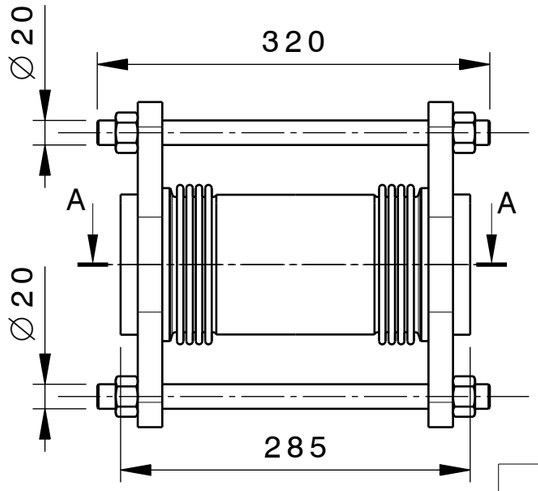
Section view A-A



Isometric view



Front view



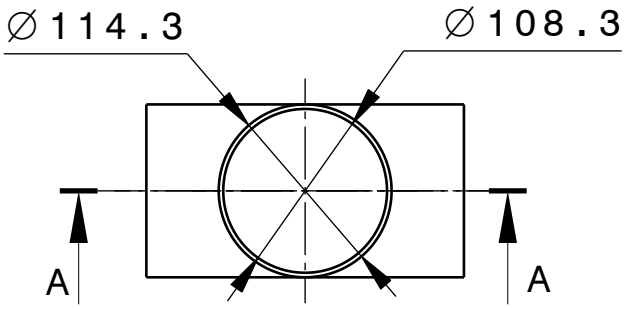
Right view

MATERIAL	SECTION 3.2.1 OF ANNEXURE-9
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

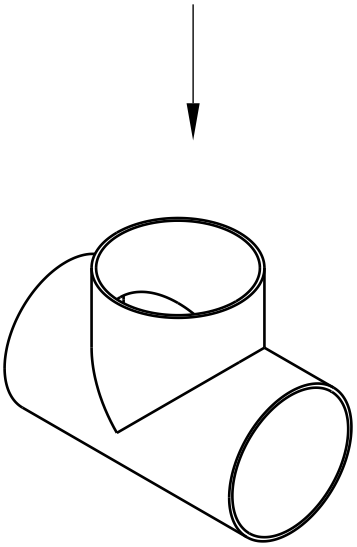
DRW DOC ID: XXXXXX			RELEASED BY: DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID: XXXXXX			APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
PBS TITLE: PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3			CHECKED BY: CHECKER	DRAWING TITLE: COOLING_HEADER_BELLOW - -	
REV DATE: DD-MM-YY	PT MATURITY: AB	PT VERSION: A	CONTROLLED BY: RESP OFF		
SHEET SIZE: 420x297	SCALE: 1:5	PT Status: W	DRAWN BY: DESIGNER		
THIRD ANGLE PROJECTION	NO.OF SHTS: 01		PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-01-03-00-02	SHEET: 01 / REVISION: --A / DR STATUS: W

NOTE :-
1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.
3.DESIGN REQUIREMENTS OF BELLOW IS PROVIDED IN ANNEXURE-9.

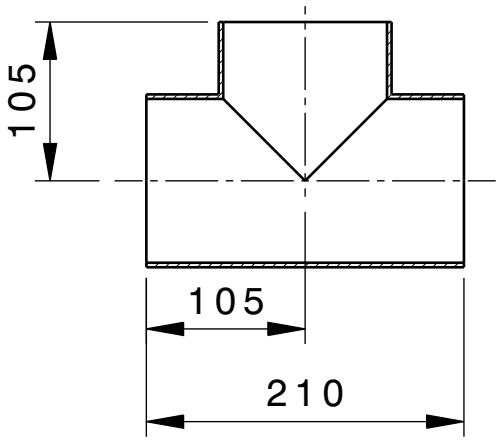
Spacereservation for the banner



FRONT VIEW



ISOMETRIC VIEW



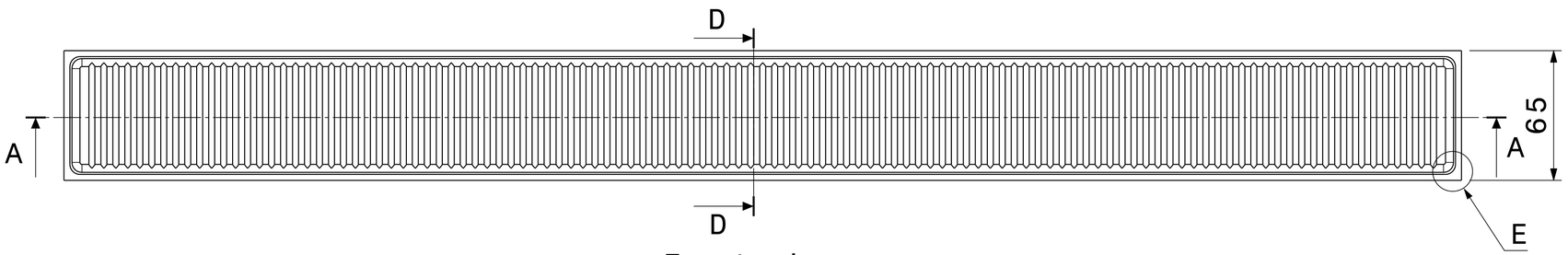
SECTION VIEW A-A

MATERIAL	SS316L
GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

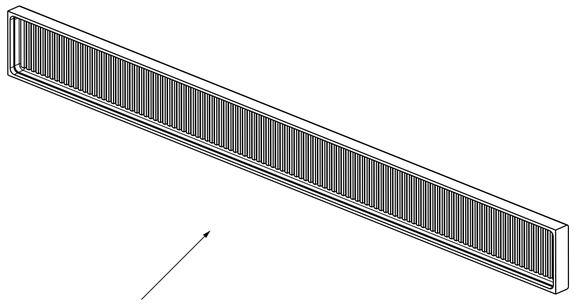
NOTE :-
1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID: XXXXXX			RELEASED BY: DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID: XXXXXX			APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
PBS TITLE PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3			CHECKED BY: CHECKER	DRAWING TITLE DN100_TEE - -	
REV DATE: DD-MM-YY	PT MATURITY: AB	PT VERSION: A	CONTROLLED BY: RESP OFF		
SHEET SIZE: 210x297	SCALE: 1:5	PT Status: W	DRAWN BY: DESIGNER		
THIRD ANGLE PROJECTION	NO.OF SHTS: 01		PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-01-00-00-05	SHEET: 01 / REVISION: --A / DR STATUS: W

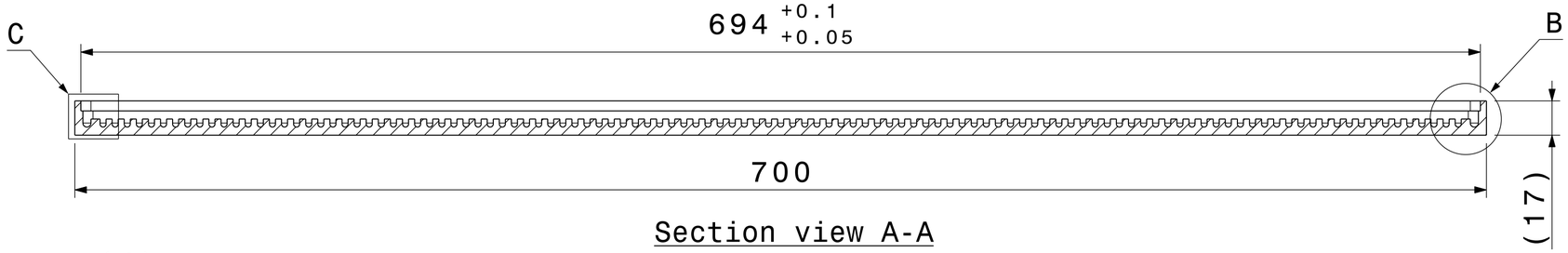
Spacereservation for the banner



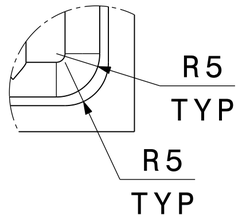
Front view



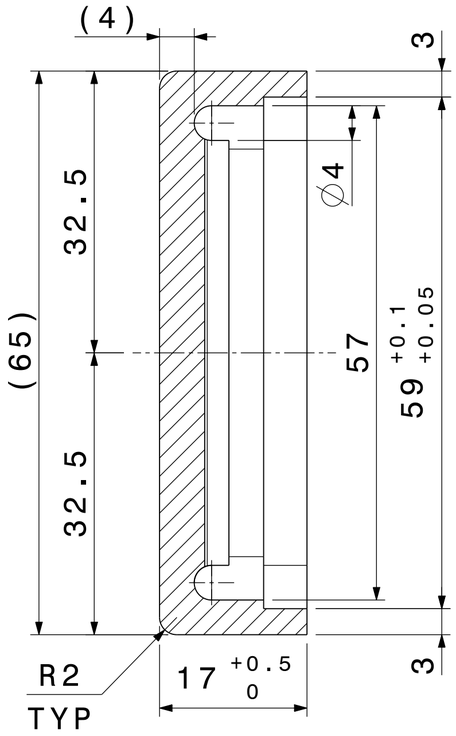
ISO View



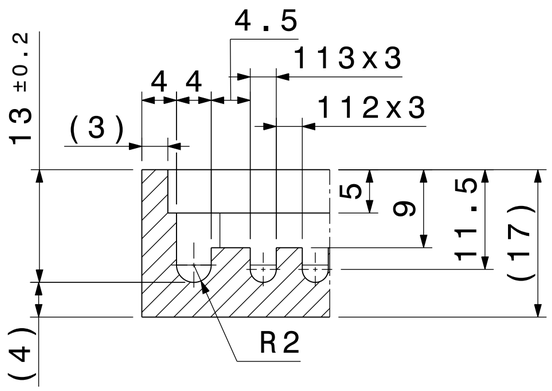
Section view A-A



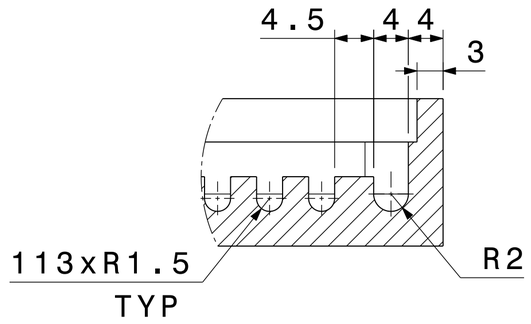
Detail E
Scale: 2:1



Section view D-D
Scale: 2:1



Detail C
Scale: 2:1

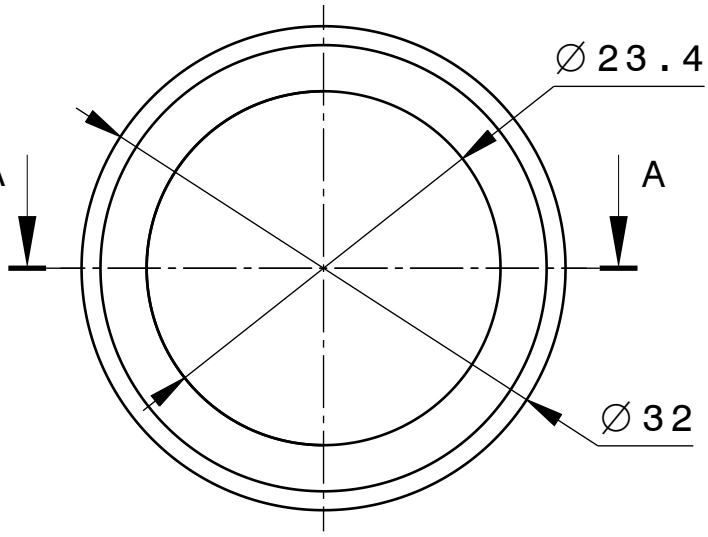


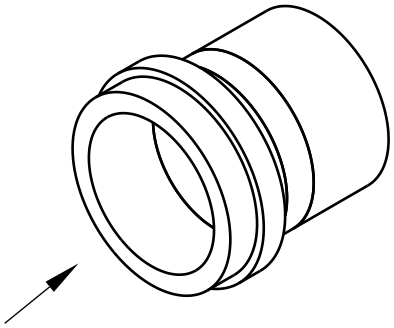
Detail B
Scale: 2:1

MATERIAL	CuCrZr
GENERAL TOLERANCE AS PER ISO 2768-1	f
GENERAL TOLERANCE AS PER ISO 2768-2	H
SURFACE ROUGHNESS	Ra6.3

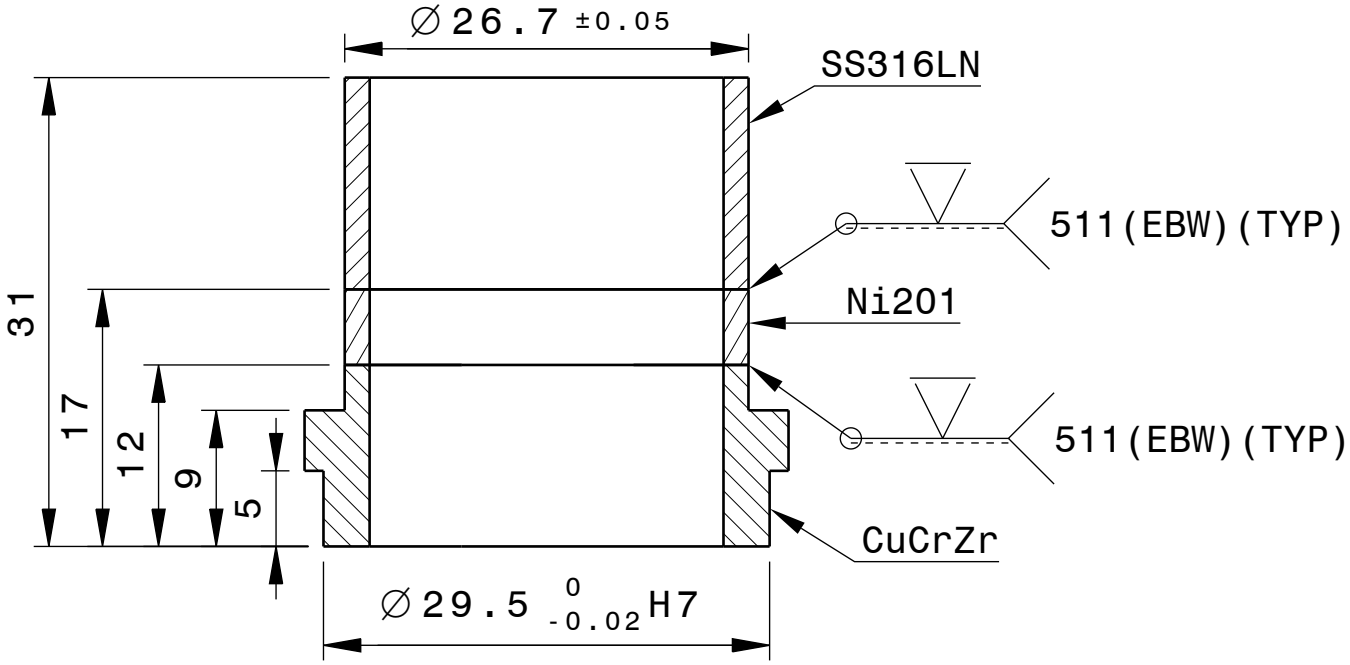
DRW DOC ID	XXXXXX		RELEASED BY	DES INT	IPR GANDHINAGAR
LINKED EV5 PT ID	XXXXXX		APPROVED BY	DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED. The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.
PBS TITLE	PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3		CHECKED BY	CHECKER	
REV DATE	DD-MM-YY	PT MATURITY: AB / PT VERSION: A	CONTROLLED BY	RESP OFF	DRAWING TITLE: 2ND CAL HTE FRONT PLATE
SHEET SIZE	594x420	SCALE: 1:2 / PT Status: W	DRAWN BY	DESIGNER	
THIRD ANGLE PROJECTION		NO.OF SHTS: 01	PBS 3 LEVELS	NN XX YY	DRAWING NUMBER: 01-01-01-02-01 / SHEET: 01 / REVISION: --A / DR STATUS: W

NOTE :-
1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.





ISOMETRIC VIEW



SECTION VIEW A-A

GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

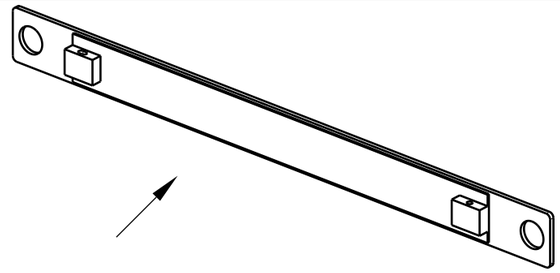
NOTE :-

1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.

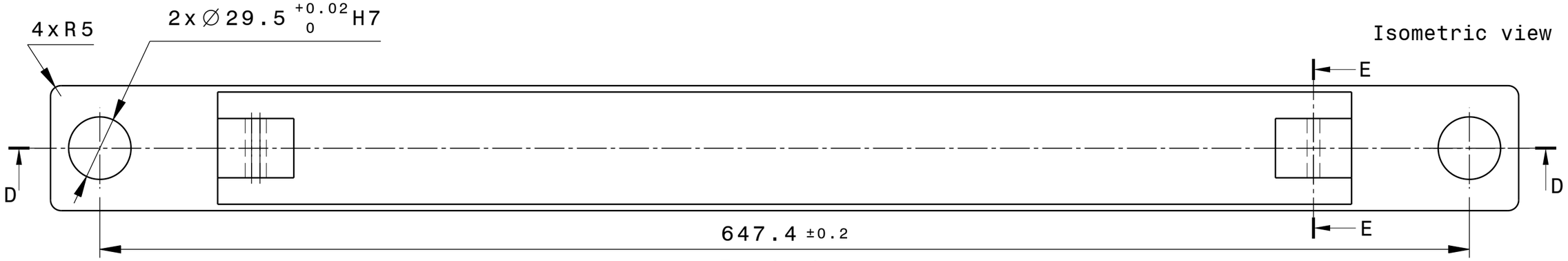
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID: XXXXXX	RELEASED BY: DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID: XXXXXX	APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
PBS TITLE PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3	CHECKED BY: CHECKER	DRAWING TITLE: 2ND_CAL_HTE_ADAPTER - -	
REV DATE: DD-MM-YY / PT MATURITY: AB / PT VERSION: A	CONTROLLED BY: RESP OFF		
SHEET SIZE: 210x297 / SCALE: 2:1 / PT Status: W	DRAWN BY: DESIGNER		
THIRD ANGLE PROJECTION / NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: 01-01-01-02-03	SHEET: 01 / REVISION: --A / DR STATUS: W

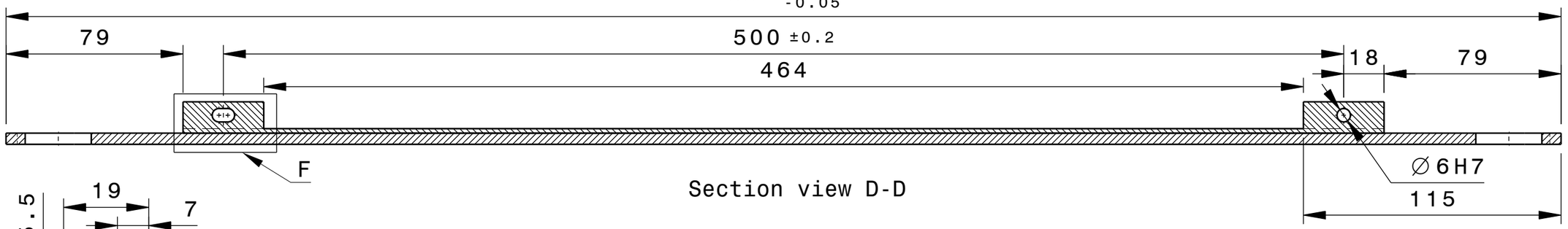
Spacereservation for the banner



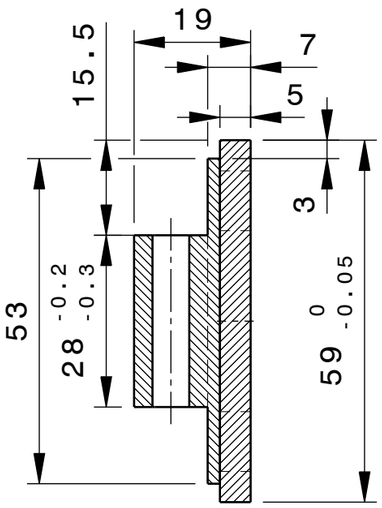
Isometric view



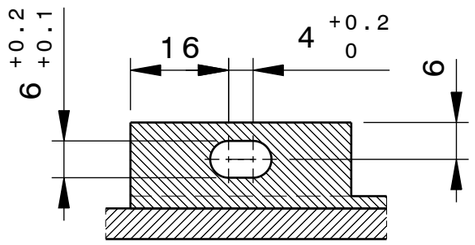
Front view



Section view D-D



Section view E-E
Scale: 1:1

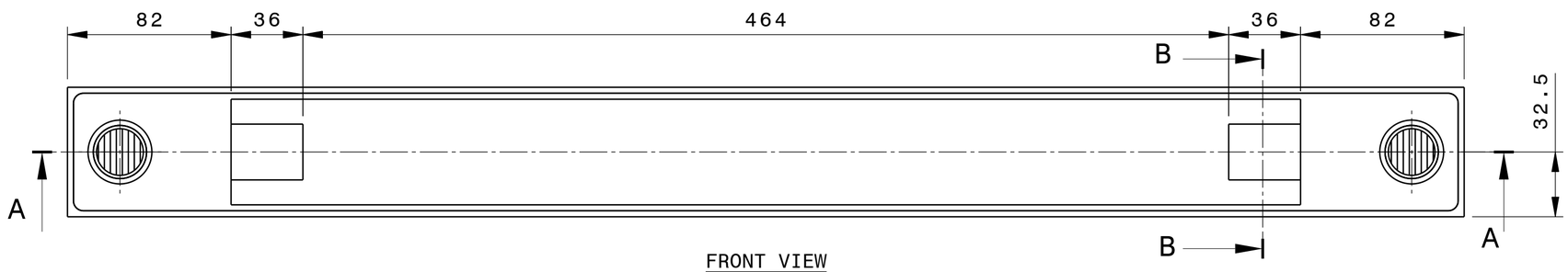


Detail F
Scale: 1:1

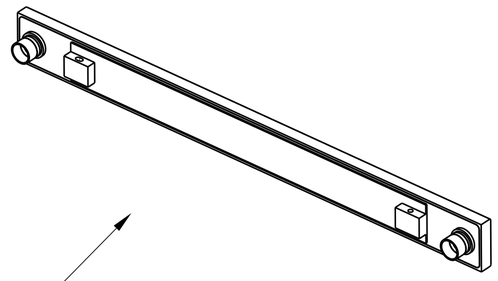
MATERIAL	CuCrZr
GENERAL TOLERANCE AS PER ISO 2768-1	f
GENERAL TOLERANCE AS PER ISO 2768-2	H
SURFACE ROUGHNESS	Ra6.3

NOTE :-
1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

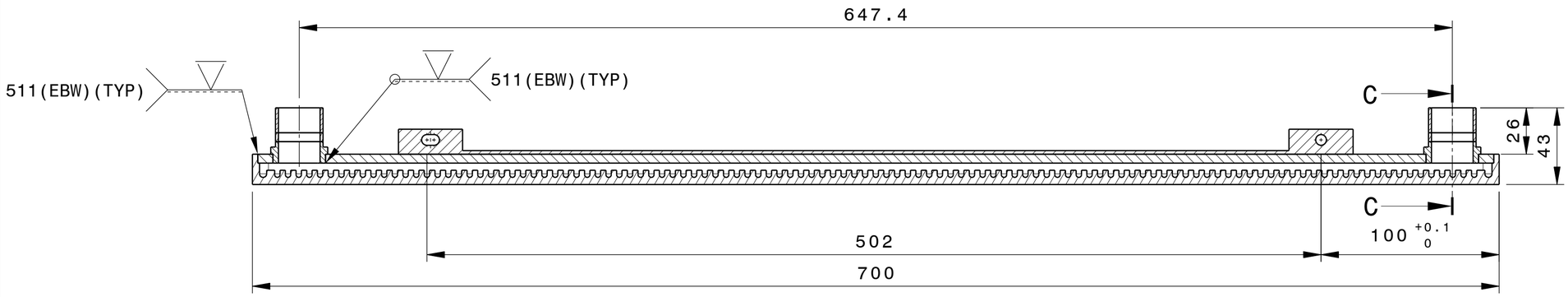
DRW DOC ID	XXXXXX		RELEASED BY	DES INT	IPR GANDHINAGAR
LINKED EV5 PT ID	XXXXXX		APPROVED BY	DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED
PBS TITLE	PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3		CHECKED BY	CHECKER	The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.
REV DATE	PT MATURITY	PT VERSION	CONTROLLED BY	RESP OFF	DRAWING TITLE: 2ND_CAL_HTE_COVER_PLATE
DD-MM-YY	AB	A	DRAWN BY	DESIGNER	-
SHEET SIZE	SCALE	PT Status			-
420x297	1:2	W			
THIRD ANGLE PROJECTION		NO.OF SHTS 01	PBS 3 LEVELS	NN XX YY	DRAWING NUMBER 01-01-01-02-02 / SHEET 01 / REVISION --A / DR STATUS W



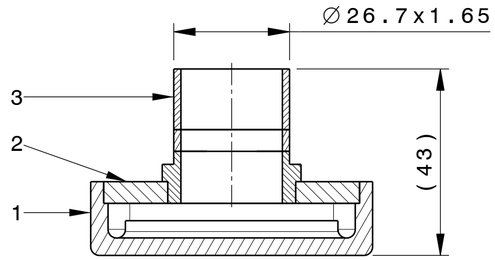
FRONT VIEW



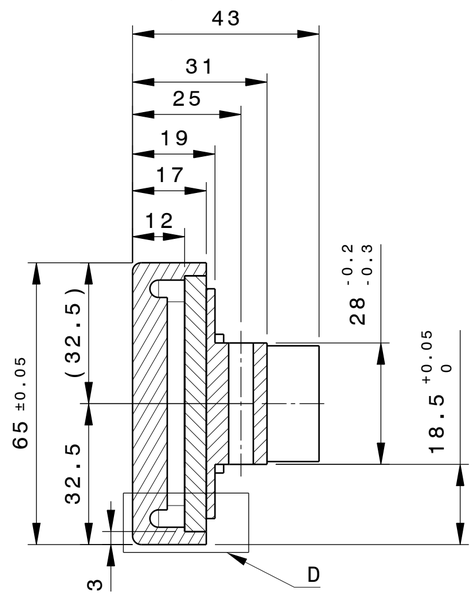
ISOMETRIC VIEW



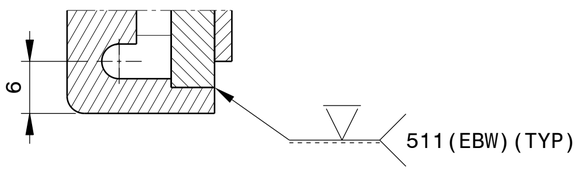
SECTION VIEW A-A



SECTION VIEW C-C
Scale: 1:1



SECTION VIEW B-B
Scale: 1:1



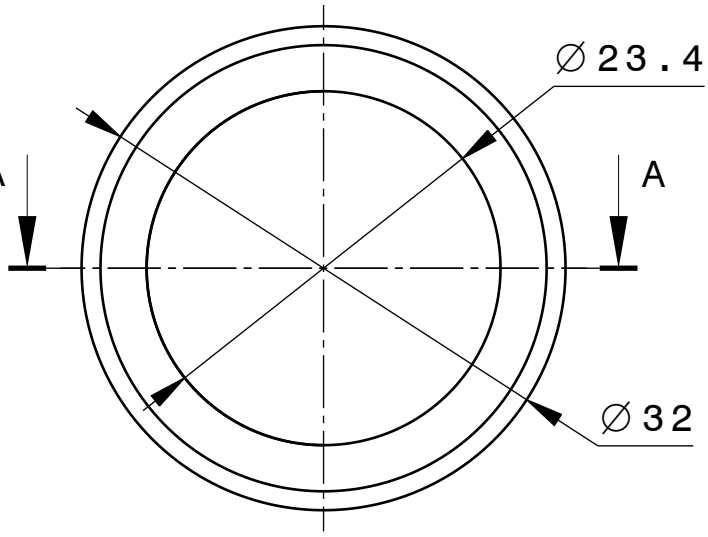
Detail D
Scale: 2:1

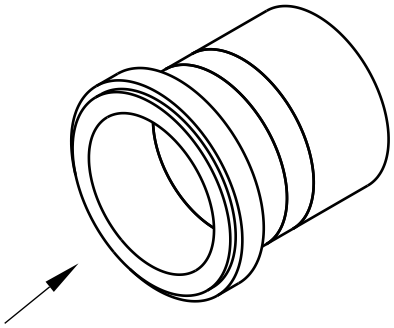
GENERAL TOLERANCE AS PER ISO 2768-1	f
GENERAL TOLERANCE AS PER ISO 2768-2	H
SURFACE ROUGHNESS	Ra6.3

S.NO.	DRAWING NO.	QTY.	PART NUMBER	MATERIAL	TYPE
3	01-01-01-02-03	2	2ND CAL HTE ADAPTER	SS316L,CuCrZr & Ni	PART
2	01-01-01-02-02	1	2ND CAL HTE COVER PLATE	CuCrZr	PART
1	01-01-01-02-01	1	2ND CAL HTE FRONT PLATE	CuCrZr	PART

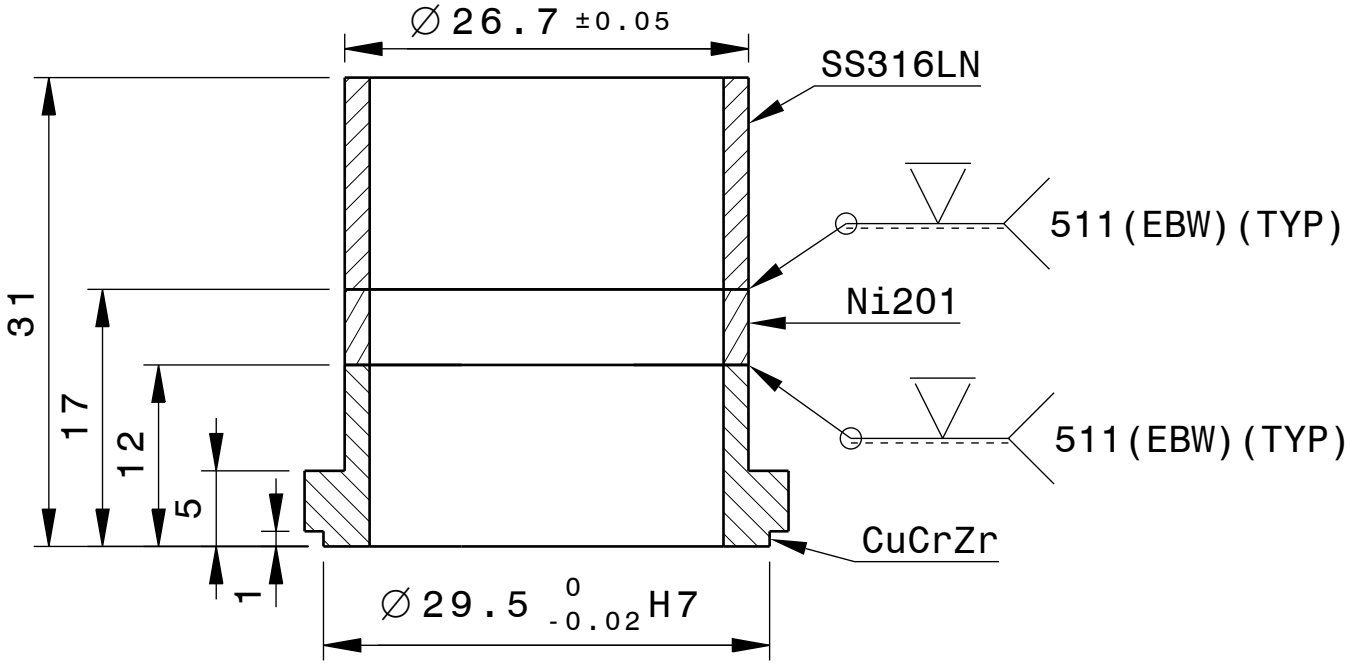
NOTE:
1.THIS COMPONENT SHALL BE FABRICATED BY ELECTRON BEAM WELDING (EBW). WELD CONFIGURATION SHALL BE INCLUDED IN THE MANUFACTURING DRAWING BY CONTRACTOR.
2.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
3.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID: XXXXXX		RELEASED BY: DES INT	IPR GANDHINAGAR
LINKED EV5 PT ID: XXXXXX		APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED
PBS TITLE: PBS LEVEL 1 / PBS LEVEL 2 / PBS LEVEL 3		CHECKED BY: CHECKER	The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.
REV DATE: DD-MM-YY	PT MATURITY: AB / PT VERSION: A	CONTROLLED BY: RESP OFF	DRAWING TITLE: HTE_ASSY_TYPE_1 - -
SHEET SIZE: 594x420	SCALE: 1:2 / PT Status: W	DRAWN BY: DESIGNER	
THIRD ANGLE PROJECTION	NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: HTE-T1-00-00 / SHEET: 01 / REVISION: --A / DR STATUS: W





ISOMETRIC VIEW



SECTION VIEW A-A

GENERAL TOLERANCE AS PER ISO 2768-1	m
GENERAL TOLERANCE AS PER ISO 2768-2	K
SURFACE ROUGHNESS	Ra6.3

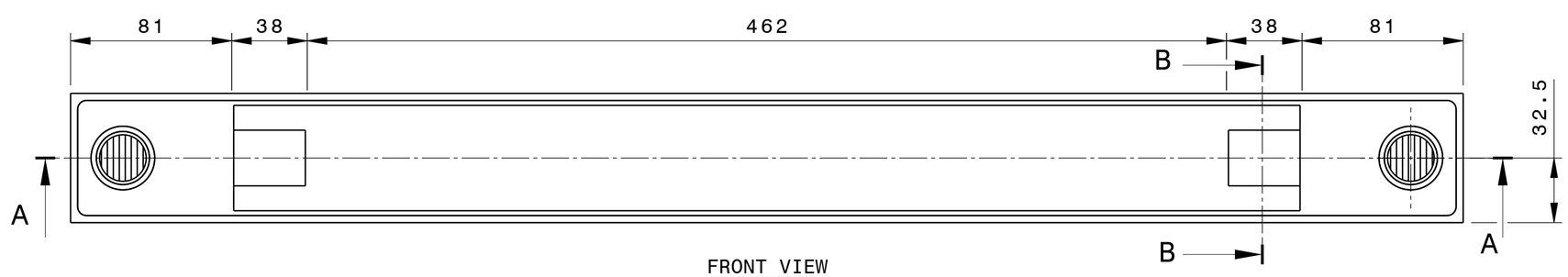
NOTE :-

1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.

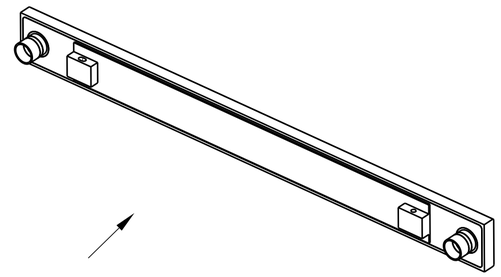
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID: XXXXXX	RELEASED BY: DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID: XXXXXX	APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
PBS TITLE PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3	CHECKED BY: CHECKER	DRAWING TITLE: HTE_ADAPTOR_TYPE_2 - -	
REV DATE: DD-MM-YY / PT MATURITY: AB / PT VERSION: A	CONTROLLED BY: RESP OFF		
SHEET SIZE: 210x297 / SCALE: 2:1 / PT Status: W	DRAWN BY: DESIGNER		
THIRD ANGLE PROJECTION / NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: HTE-T2-00-03	SHEET: 01 / REVISION: --A / DR STATUS: W

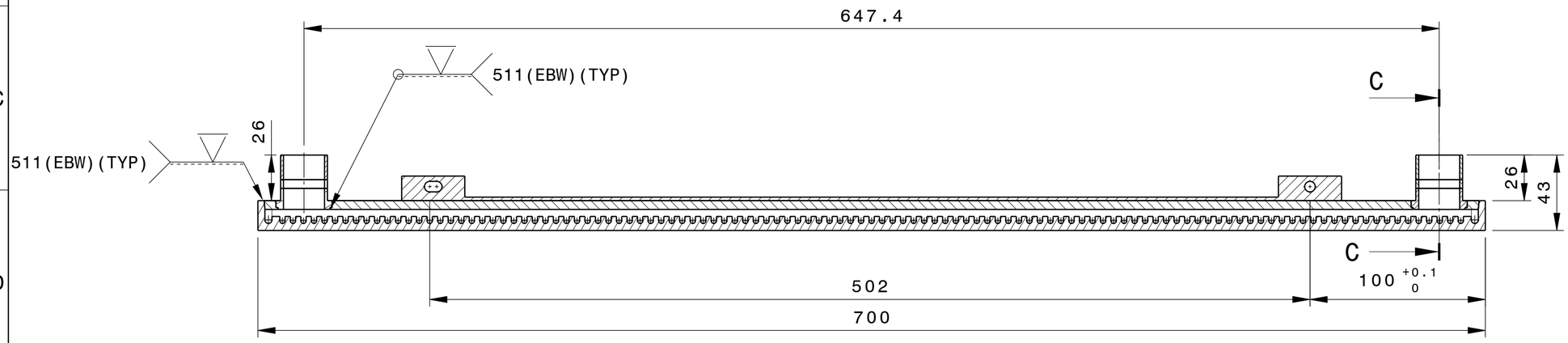
Spacereservation for the banner



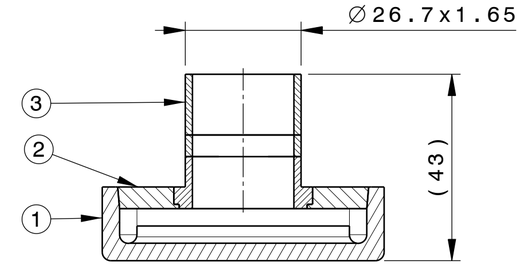
FRONT VIEW



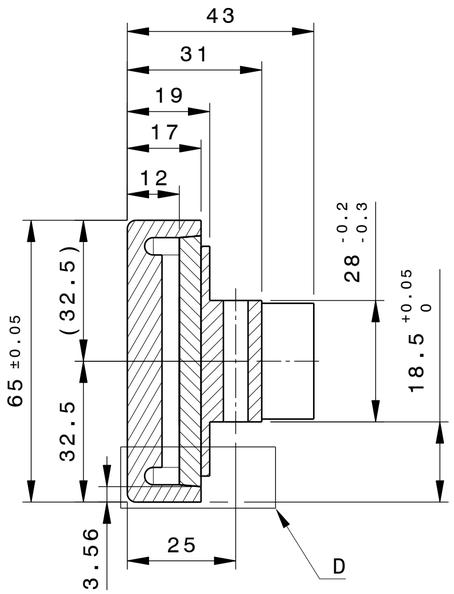
ISOMETRIC VIEW



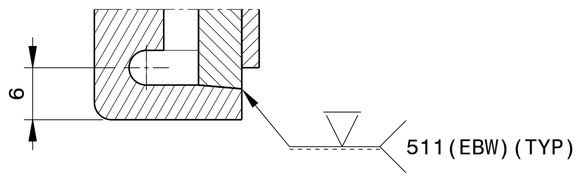
SECTION VIEW A-A



SECTION VIEW C-C
Scale: 1:1



SECTION VIEW B-B
Scale: 1:1



DETAIL D
Scale: 2:1

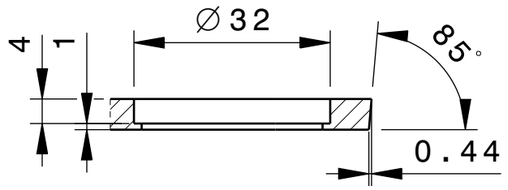
GENERAL TOLERANCE AS PER ISO 2768-1	f
GENERAL TOLERANCE AS PER ISO 2768-2	H
SURFACE ROUGHNESS	Ra6.3

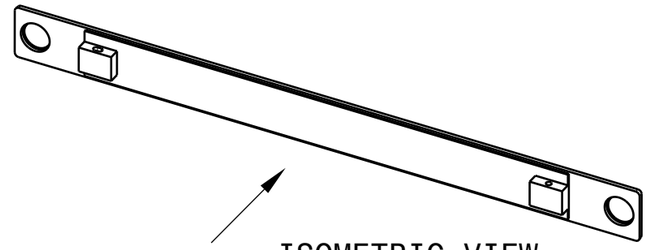
S.NO.	DRAWING NO.	QTY.	PART NUMBER	MATERIAL	TYPE
3	HTE-T2-00-03	2	HTE ADAPTOR TYPE 2	SS316L,CuCrZr & Ni	PART
2	HTE-T2-00-02	1	HTE COVER PLATE TYPE 2	CuCrZr	PART
1	HTE-T2-00-01	1	HTE FRONT PLATE TYPE 2	CuCrZr	PART

DRW DOC ID: XXXXXX			RELEASED BY: DES INT	IPR GANDHINAGAR	
LINKED EV5 PT ID: XXXXXX			APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED	
PBS TITLE: PBS LEVEL 1 / PBS LEVEL 2 / PBS LEVEL 3			CHECKED BY: CHECKER	The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.	
REV DATE: DD-MM-YY	PT MATURITY: AB	PT VERSION: A	CONTROLLED BY: RESP OFF	DRAWING TITLE: HTE_ASSY_TYPE_2	
SHEET SIZE: 594x420	SCALE: 1:2	PT Status: W	DRAWN BY: DESIGNER	-	
THIRD ANGLE PROJECTION		NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: HTE-T2-00-00	SHEET: 01 / REVISION: --A / DR STATUS: W

NOTE:
1.THIS COMPONENT SHALL BE FABRICATED BY ELECTRON BEAM WELDING (EBW). WELD CONFIGURATION SHALL BE INCLUDED IN THE MANUFACTURING DRAWING BY CONTRACTOR.
2.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
3.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

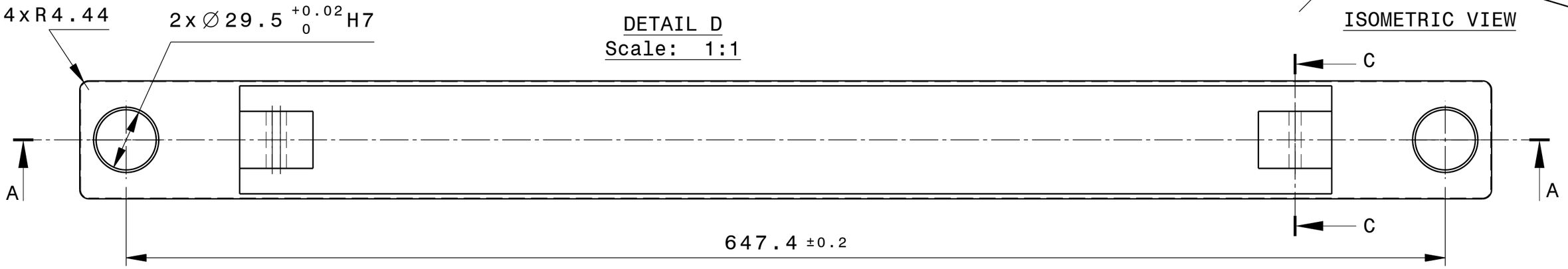
Spacereservation for the banner



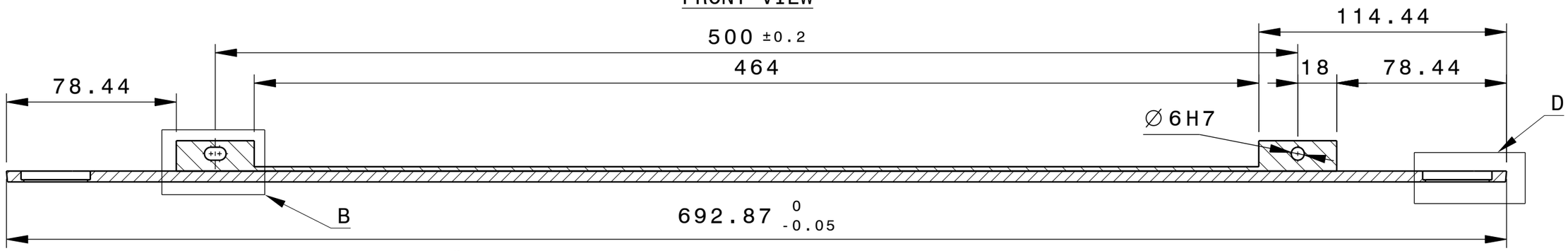


ISOMETRIC VIEW

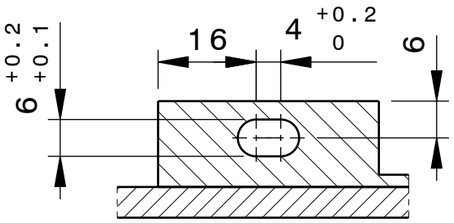
DETAIL D
Scale: 1:1



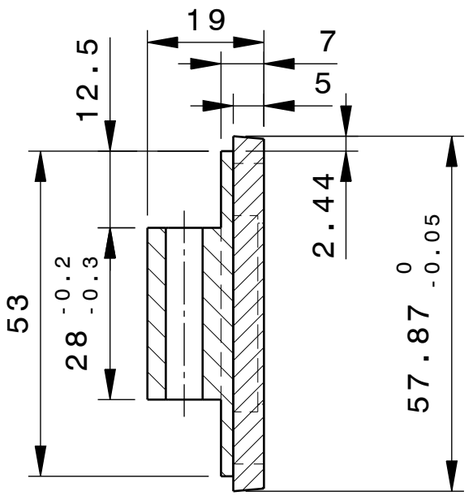
FRONT VIEW



SECTION VIEW A-A



DETAIL B
Scale: 1:1



SECTION VIEW C-C
Scale: 1:1

MATERIAL	CuCrZr
GENERAL TOLERANCE AS PER ISO 2768-1	f
GENERAL TOLERANCE AS PER ISO 2768-2	H
SURFACE ROUGHNESS	Ra6.3

NOTE :-
1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.
2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

DRW DOC ID	XXXXXX	RELEASED BY	DES INT
LINKED EV5 PT ID	XXXXXX	APPROVED BY	DIV HEAD
PBS TITLE	PBS LEVEL 1 PBS LEVEL 2 PBS LEVEL 3	CHECKED BY	CHECKER
REV DATE	DD-MM-YY	CONTROLLED BY	RESP OFF
PT MATURITY	AB	DRAWN BY	DESIGNER
PT VERSION	A		
SHEET SIZE	420x297		
SCALE	1:2		
PT Status	W		
THIRD ANGLE PROJECTION		NO.OF SHTS	01

IPR GANDHINAGAR

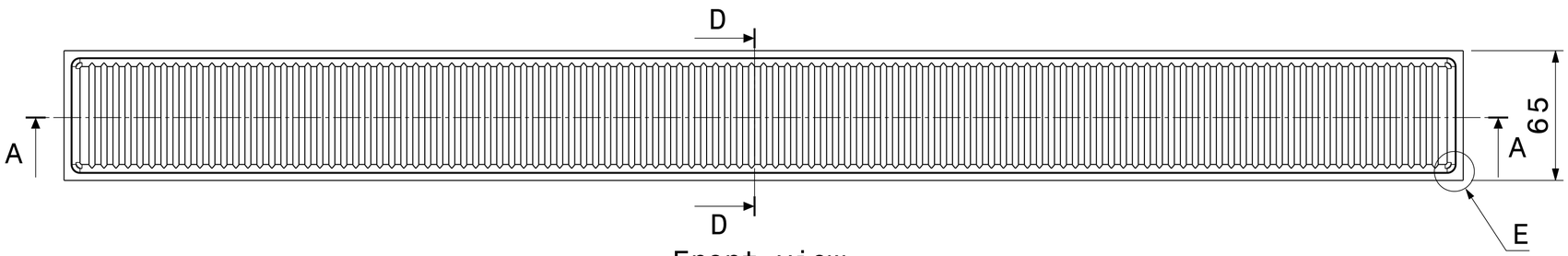
CONFIDENTIAL UNLESS AUTHORISED

The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.

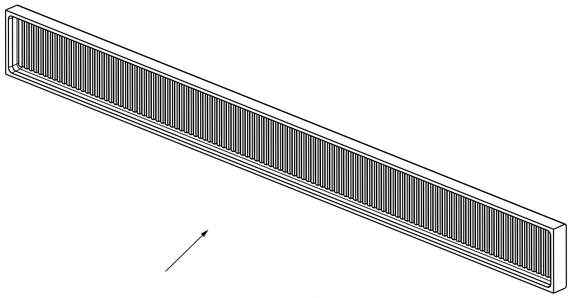
DRAWING TITLE
HTE_COVER_PLATE_TYPE_2
-
-

PBS 3 LEVELS	DRAWING NUMBER		SHEET	REVISION	DR STATUS
NN XX YY	HTE-T2-00-02		01	--A	W

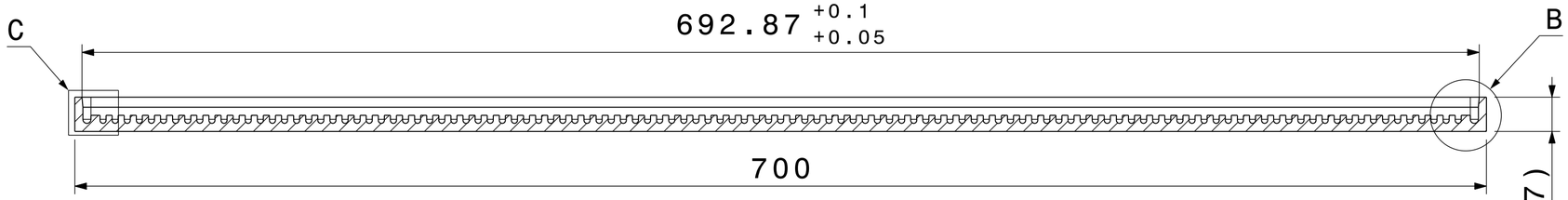
Spacereservation for the banner



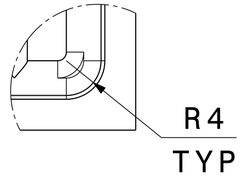
Front view



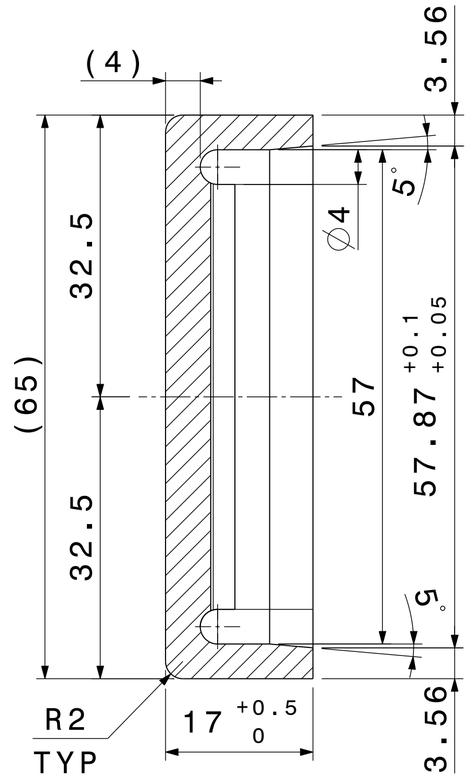
ISO View



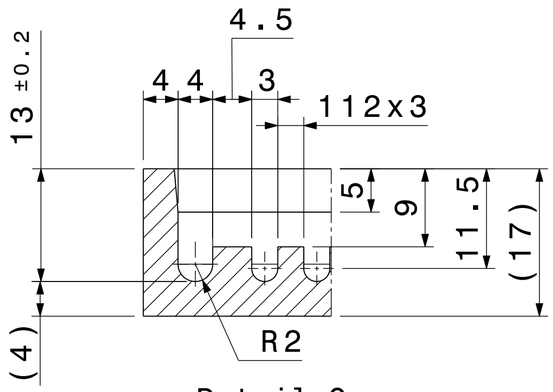
Section view A-A



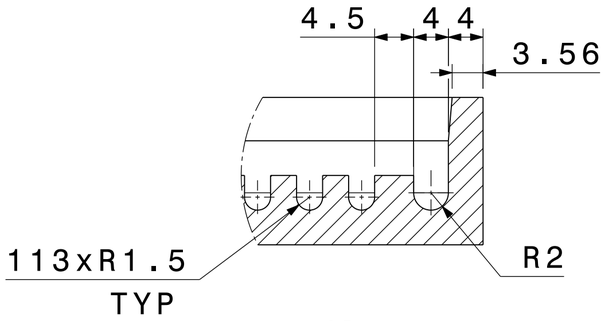
Detail E
Scale: 2:1



Section view D-D
Scale: 2:1



Detail C
Scale: 2:1



Detail B
Scale: 2:1

MATERIAL	CuCrZr
GENERAL TOLERANCE AS PER ISO 2768-1	f
GENERAL TOLERANCE AS PER ISO 2768-2	H
SURFACE ROUGHNESS	Ra6.3

DRW DOC ID: XXXXXX		RELEASED BY: DES INT	IPR GANDHINAGAR
LINKED EV5 PT ID: XXXXXX		APPROVED BY: DIV HEAD	CONFIDENTIAL UNLESS AUTHORISED
PBS TITLE: PBS LEVEL 1 / PBS LEVEL 2 / PBS LEVEL 3		CHECKED BY: CHECKER	The information on this drawing is confidential under the terms of the IPR agreement.This information shall not be transmitted to anyone who is not authorised to receive it.
REV DATE: DD-MM-YY	PT MATURITY: AB / PT VERSION: A	CONTROLLED BY: RESP OFF	DRAWING TITLE: HTE_FRONT_PLATE_TYPE_2
SHEET SIZE: 594x420	SCALE: 1:2 / PT Status: W	DRAWN BY: DESIGNER	
THIRD ANGLE PROJECTION	NO.OF SHTS: 01	PBS 3 LEVELS: NN XX YY	DRAWING NUMBER: HTE-T2-00-01 / SHEET: 01 / REVISION: --A / DR STATUS: W

NOTE :-

1.ALL DIMENSIONS ARE IN millimeters UNLESS STATED.

2.PART SHALL BE FREE FROM SHARP CORNERS,BURRS & SHARP EDGES.

SECTION 'E':

PRICE SCHEDULE

Validate Print Help

Item Rate BoQ

Tender Inviting Authority: Head - Purchase Section

Name of Work: Design, Drawings, Manufacturing, Fabrication, Testing & Inspection, Factory Acceptance Tests, Supply and Site Acceptance Tests of Second Calorimeter alongwith Mandatory Spares at IPR as per the detailed specifications mentioned in the tender document.

Tender No: IPR/TN/PUR/TPT/ET/21-22/041 Dated 04/02/2022

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	**Design, Drawings, Manufacturing, Fabrications, Testing & Inspections, Factory Acceptance Tests, Supply and Site Acceptance Tests of Second Calorimeter alongwith Mandatory Spares at IPR as per the detailed specifications mentioned in the tender document.**					
1.01	Design, Drawings, Manufacturing, fabrication, testing and supply including unloading of Second Calorimeter (alongwith mandatory spares) as mentioned in technical specification	1.000	System		**0.00**	INR Zero Only
1.02	Site Acceptance test of Second Calorimeter assembly at IPR site	1.000	Job		**0.00**	INR Zero Only
Total in Figures					**0.00**	INR Zero Only
Quoted Rate in Words		**INR Zero Only**				