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

Notice Inviting Tender
(NIT)

निविदा सूचना TENDER NOTICE NO: IPR/TN/PUR/TPT/ET/22-23/003 दिनांकित DATED 23-06-2022

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/22-23/003 दिनांकित DATED 23-06-2022

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	Fabrication, Inspection, Testing and Supply of ION Extractor Grids as per the details mentioned in technical specifications of the tender document
निविदा शुल्क / Tender Fee	Not Applicable
बयाना राशि जमा)ईएमडी / (Earnest Money Deposit (EMD)	**Rs. 2,38,000.00 (RUPEES TWO LAKHS THIRTY EIGHT THOUSAND ONLY)** **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	**23-06-2022 at 18:00 Hrs.**
दस्तावेज़ डाउनलोड /बिक्री प्रारंभ तिथि / Document Download / Sale Start Date	**23-06-2022 at 18:00 Hrs.**
स्पष्टीकरण प्रारंभ तिथि / Seek Clarification Start Date	**23-06-2022 at 18:00 Hrs.**
स्पष्टीकरण समाप्ति तिथि / Seek Clarification End Date	**07-07-2022 by 17:00 Hrs.**
आईपीआर द्वारा स्पष्टीकरण का जवाब / Response to Clarification by IPR	**22-07-2022** by **17.00 Hrs**
बोली जमा करने की तिथि / Bid Submission Start Date	**23-07-2022** at **10.00 Hrs**
बोली जमा करने की अंतिम तिथि / Bid Submission Closing Date	**16-08-2022** 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)	**17-08-2022** 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 14-07-2022 @ 10:30 बजे पर वीडियो कॉन्फ्रेंस के माध्यम से विक्रेताओं के साथ प्री-बिड मीटिंग आयोजित की जाएगी। इच्छुक विक्रेताओं को 11-07-2022 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/ptgdywnjJjfVBruZ6

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 13-07-2022 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 **14-07-2022** @ 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 **11-07-2022**:

https://forms.gle/ptgdywnjJjfVBruZ6

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 **13-07-2022.** 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 submittingtheir 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 usernameand assign a password for their accounts.
3) Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the CPP Portal.
4) Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (Class III Certificates with signing key usage) issued by any Certifying Authority recognized by CCA India (e.g. Sify / nCode / eMudhra etc.), with their profile.
5) Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSC's to others which may lead to misuse.
6) Bidder then logs in to the site through the secured log-in by entering their user ID /password and the password of the DSC / e-Token.

SEARCHING FOR TENDER DOCUMENTS

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

PREPARATION OF BIDS

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

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

SUBMISSION OF BIDS

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

6) The server time (which is displayed on the bidders' dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission.

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

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

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

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

ASSISTANCE TO BIDDERS

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

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

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Form No: e_IPR-PUR-103

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 workmanshipintheplantorfromfaultyerectionoftheplantbythecontractor,butotherwise 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/22-23/003 Dated: 23/06/2022

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

7.3 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 successful receipt and acceptance of goods as per **Annexure-I.REV** within thirty days from the date of issue of contract. The Bank Guarantee shall be valid till satisfactory completion of acceptance tests a IPR site in 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

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% basic price of contract value will be paid as an advance against approval of the following 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

- Fabrication Drawing of Prototype Acceleration Grid, Acceleration Grid, Deceleration Grid, Earth Grid and its Fixtures for Phase-1 and 2,
- Quality Documents including Quality Assurance Plan (QAP), Manufacturing and Inspection Plan (MIP), Quality Procedure (s), NDT Procedure (s),
- Execution Schedule.

b) 10% of contract value with applicable taxes will be paid against Delivery & Acceptance of OFE Copper Plates as per the deliverable mentioned in Table-2 of Section-D of tender documents at IPR and on receipt of Proforma Invoice in triplicate.

c) 10% of contract value with applicable taxes will be paid against Delivery & Acceptance of Deliverables of Phase-1(Prototype Acceleration Grid and its fixtures) as per the details mentioned in Clause No. 3 – Bidders Scope of Work of Section-D of tender documents at IPR and on receipt of Proforma Invoice in triplicate.

d) 50% of contract value with applicable taxes will be paid on completion of the following milestone.

- 20% of contract value with applicable taxes after factory acceptance & delivery at IPR site of Acceleration Grid and its fixtures (Phase-2) and its physical verification by representative of IPR and on receipt of Invoice in triplicate
- 15% of contract value with applicable taxes after factory acceptance & delivery at IPR site of Deceleration Grid and its fixtures (Phase-2) and its physical verification by representative of IPR and on receipt of Invoice in triplicate
- 15% of contract value with applicable taxes after factory acceptance & delivery at IPR site of Earth Grid and its fixtures (Phase-2) and its physical verification by representative of IPR and on receipt of Invoice in triplicate

e) Balance 20% of basic contract value + 100% of all other applicable taxes will be paid after successful site acceptance of all deliverable items at IPR site and on receipt of final invoice.

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

Annexure – IX

Following Annexures of Form No. IPR-P-100 is/are replaced with the following

Annexure – I.REV

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-I.REV

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 till issuance of final acceptance by IPR 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 till issuance of final acceptance by IPR. 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 till issuance of final acceptance by IPR 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)

IPR Enquiry/ Tender No. & Date	**IPR/TN/PUR/TPT/ET/22-23/003 dated 23/06/2022**

COMMERCIAL TERMS & CONDITIONS

IPR Enquiry/Tender No	
Item Description	Fabrication, Inspection, Testing and Supply of ION Extractor Grids as per the details mentioned in technical specifications of 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	**Fabrication, Inspection, Testing and Supply of ION Extractor Grids as per the details mentioned in technical specifications of the tender document**

Sr. No.	Detailed Criteria	Documents required to submit / upload
1	ISO9001-2015 Requirements	***Bidder must submit the valid certificate.***
2	Bidder should have minimum 3 year experience as on date of publish of Tender in precision CNC machining of copper works of minimum size 300 mm × 300 mm to achieve the final tolerance of minimum of 50 µm in milling work and tolerance of minimum 10 µm in drilling of hole.	***a) Bidder should submit UN-PRICED purchase order* for performing the CNC Machining works along with the material details.*** ***(b) Bidder should submit applicable records which prove that bidder has achieved the tolerance of minimum 50µm in milling and minimum 10µm in drilling of hole for the submitted purchase order***
3	Bidder should have in-house facilities of AUTOCAD/CATIA for drawing preparation and CNC machining to execute the scope of this tender	***Bidder should submit the list of facilities/instruments available in-house **.***
4	Bidder should have in-house facilities to carryout CMM (Coordinate Measuring Machine) measurement, Ultrasonic measurement, surface roughness measurement, Radiography Test and Electro-polishing to execute the scope of this tender Or Bidder should have access to the out-sourced facility. The prime responsibility for execution of the work will lies within the primary contractor (Bidder who is quoting the job).	***Bidder should submit the list of facilities/instruments available in-house **.*** ***Or*** ***The Bidder should submit the details of sub-contractor as per the Annexure-1 (below) to IPR for approval.***
5	Company/firm's annual financial turnover (gross) as average of the three financial years i.e. 2016-2017, 2017-2018, and 2018-2019 should be over Rs. 50 lakhs.	***Bidder should submit audited balance sheet for financial year 2016-2017, 2017-2018, and 2018-2019***
*	Bidder can mask the price in Purchase order.	
**	IPR has a right to visit the bidder's premises to verify that facilities and operations are ongoing.	
Note	Reputed Bidders with experience in precision CNC machining of OFE copper who can meet the above eligibility criteria are invited to submit their offer along with requisite documents. Great emphasis will be put in selection of Bidders for the grid fabrication work on the quality of equipment and facility (CNC machine, CMM, electro-polishing), ability and competency of the Bidders to do good quality work according to the time schedule in close coordination	

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

Annexure-I of Qualifying Requirement
Details of Sub-contractor to be submitted by Bidder

Our firm _____ (Name of Firm/Company) has studied the various requirements given in Tender document(s) for "Fabrication, Inspection, Testing and Supply of Ion Extractor Grids". Herewith we are informing you that we are planning to sub-contract the following scope of work to the sub-contractor. Applicable details are as follows:

Sr. No.	Details	Information provided by bidder
1	Scope of work planned to be sub-contract	
2	Name and Details of sub-contractor	
3	Sub-contractor experience (in years) to execute the sub-contract work	
4	Bidder's experience with sub-contractor for other contracts.	
5	Status of scope of work confirmation with sub-contractor	
6	Expected time of deliverable	

Note 1: The Annexure-I to be repeated in case if bidder is planned to sub-contract scope of work to more than one sub-contractor.
Note 2: Bidder will make sure that he will not proposed any sub-contractor which is/are blacklisted by any agency of Government of India.
IPR deserves the right to ask additional information / documents of sub-contractor to make sure that sub-contractor has necessary competency to complete the given work.

We are aware that our firm /Company is fully responsible to execute the entire scope of work given in the tender document even some of the work is planned to sub-contract to the contractor(s).

Date:

Name and designation of the Bidder:

Company Official Seal / Stamp along with signature

Fabrication, Inspection, Testing and Supply of Ion Extractor Grids

Institute for Plasma Research
Bhat, Gandhinagar
Gujarat, India

Table of Contents

1. Project Introduction

Neutral beam injection (NBI) system produces energetic neutral hydrogen beams *(H^o)*. Injection of neutral beams is an efficient and a promising technique for heating and current drive in the tokamak fusion plasma. The heart of any NBI system is an ion extractor system. Its function is to generate an intense and well collimated ion beams. The ion extractor system consists of three grids made of OFE copper. The first grid, called *acceleration grid*, is maintained at 55 kV positive potential. Its function is to extract ions from ion source and then it is subsequently accelerated to the desired energy. The accelerated ion beams exit at ground potential through the *earth grid.* A *deceleration grid*, maintained at a negative potential of -2.5 kV is placed in between the acceleration grid and the earth grid. Acceleration grid is divided into two halves (Left and Right) each having 387 apertures. The acceleration grid has thickness of 4.2 mm at extraction area and 9 mm at manifold area. Diameter of each shaped apertures varies from 11.2 mm to 8 mm. Acceleration grid receives 1.75 MW/m^2 heat load. Active cooling is provided by dense network of wavy semi-circular (R1.1 mm) 22 cooling channels laid down between the rows of apertures. Water is supplied to the inlet manifolds from SS304L stub pipe of inner diameter of 9 mm. Both Deceleration grid and Earth grids are less complex in comparison to acceleration grid. Deceleration grid has conical shaped aperture of diameter varying from 6.5 mm to 8.8 mm and straight cooling channels of rectangular cross-section of 2×1.5 mm^2. Earth grid has straight cylindrical apertures each of diameter of 8 mm and also straight cooling channels of the same rectangular cross-section as Deceleration grid.

Ion extractor grids are high vacuum compatible components so its fabrication is complex and technically challengeable. Fabrication of grid needs expertise of (*i*) precision CNC milling & drilling on OFE copper base plate (ii) electro-deposition of OFE copper of 2.9 ±0.1 mm thickness (may vary for different Grids) (iii) facility for acceptance tests e.g. CMM measurement, Ultrasonic measurement (resolution of 0.05 mm), vacuum baking [180^o C to 200^o C (max.) at < 10^{-4} mbar], pressure test (16 bar and 17 bar Nitrogen gas and 16 bar Helium gas) and vacuum leak tightness test at room temperature as per Table- 6. Bidders shall visit the IPR and discuss the technical details with IPR representative for a complete understanding of the scope of work before submitting the quotation. IPR visit and technical discussion are mandatory for the Bidders.

There are 3 (three) parties involved in this project work: (a) Institute for Plasma Research (IPR), Gandhinagar will carry out inspection and acceptance tests e.g. vacuum baking, leak and pressure test (b) The Raja Ramanna Centre for Advance Technology, Indore (RRCAT) will do the OFE copper electro-deposition work and (c) Selected bidder will be responsible for precision CNC machining of OFE copper grid and fixtures as per drawings given in the tender document. Bidder responsibility is also to execute the different activities / operation as per the information provided in tender document e.g. electro-polishing, radiography test (preferable of gamma ray), witness of acceptance tests, dimensional inspection, packaging and transport etc. during the fabrication and supply of Ion extractor grids and fixtures to IPR.

IPR drawings for ion extractor grids are engineering drawings and Bidder shall prepare the fabrication/manufacturing drawings with due consideration on final manufacturing process requirement.

IPR drawings for fixtures are conceptual. Bidder shall study these drawings and prepare the fabrication/manufacturing drawings with due consideration on final manufacturing process requirement.

Prior to the execution of work, Bidder shall visit/discuss with the IPR to make an assessment of the required dimensional tolerances in the process as well as final manufacturing drawings of ion extractor grids and fixtures. IPR visit and technical discussion are mandatory for the bidders.

2. Required Expertise/Experience and Facilities for the entire work

2(a) Bidder's

1. Precision CNC milling & drilling on OFE copper base plate.
2. CMM measurement, Surface roughness measurement, Ultrasonic measurement (resolution of 0.05 mm)
3. Electro-polishing of OFE copper grids.
4. Radiography (preferably gamma ray)

2(b) IPR and RRCAT, Indore

1. Electro-deposition of OFE copper of 2.9 ±0.1 mm thickness (may vary for different Grids)
2. Facility for acceptance tests e.g., vacuum baking [180^{o} C to 200^{o} C (max.) at < 10^{-4} mbar], pressure test (16 bar and 17 bar Nitrogen gas and 16 bar Helium gas) and vacuum leak tightness test at room temperature as per Table- 6.

3. Bidder Scope of Work

Bidder needs an expertise of (*i*) precision CNC milling & drilling on OFE copper grids and fixtures as per drawings mentioned in the tender document (*ii*) CMM and other measurements (e.g. Ultrasonic measurement, surface roughness) for quality control and assurance (*iii*) Electro-polishing of OFE copper grids. Following Table-1 defines the list of deliverables for each phase:

Table-1

List of deliverable ion extractor grids and fixtures

	Item Description		Quantity
Phase-1	Prototype Acceleration Grid (PAG) (400 mm × 150 mm with 10 nos. of cooling channels)		01
	Fixtures for fabrication of prototype acceleration grid		07
Phase-2	Acceleration Grid (AG)	Acceleration Grid - Left	01
		Acceleration Grid - Right	01
		Fixtures for Acceleration Grid fabrication	07
	Deceleration Grid (DG)	Deceleration Grid - Left	01
		Deceleration Grid - Right	01
		Fixtures for Deceleration Grid fabrication	04
	Earth Grid (EG)	Earth Grid - Left	01
		Earth Grid - Right	01
		Fixtures for Earth Grid fabrication	03

Execution of the scope of work is divided in the following two phases.

Phase 1: Fabrication of Prototype Acceleration Grid and Fixtures

IPR will supply OFE copper base plate (as per **Annexure-I**) of actual size. Bidder needs to cut the same to obtain the required size of the prototype acceleration grid as per drawings (**Annexure-II**). Bidder will fabricate the Prototype Acceleration Grid (PAG) and CNC machining fixtures of PAG as per drawings provided in the tender document (**Annexure-II** and **Annexure-III**).

The purpose of fabrication of prototype acceleration grid is to establish the fabrication and inspection route and technology / methodology to achieve IPR specified tolerances mentioned in the drawings.

It is to be noted that only after successful completion Phase-1 (i.e. successful fabrication of Prototype Acceleration Grid as per specifications mentioned in the tender document), Bidder shall allow to start Phase-2 work. Bidder must close all Non Compliance Reports (NCR) if any prior to submit the results of Phase -1 to IPR. Bidder will also submit the remedial and corrective action in case of major NCR prior to start the Phase-2 work to IPR.

Phase 2: Fabrication of Acceleration Grid, Deceleration Grid, Earth Grid and Fixtures

Bidder will fabricate the Acceleration Grid (Left & Right), Deceleration Grid (Left & Right), Earth Grid (Left & Right) and all the fixtures of CNC machining as per drawings (**Annexure-IV**). IPR will supply OFE copper base plate (as per **Annexure-I**) of actual size.

Following activities / operations to be performed by bidder.

1. Bidder scope includes preparation of engineering and fabrication/manufacturing drawings of the ion extractor grids and fixtures mentioned in Table-1.

2. The Bidder needs to submit both hard copy and soft copy **(.STP file/.catpart/.catproduct/.catdrawing)** of 2D and 3D AUTOCAD/CATIA engineering and fabrication/manufacturing drawings of all grids and all the fixtures to IPR for approval.

3. The Bidder will identify the techniques and technologies required in the fabrication of ion extractor grid including electro-polishing. The grid fabrication route shall be discussed with IPR. The Bidder needs to submit the document on the fabrication route to IPR for approval. Only after receiving IPR's approval, the Bidder can start the fabrication work of ion extractor grids and fixtures. IPR representatives will witness the fabrication of prototype acceleration grid and all the actual size ion extractor grids and fixtures.

4. Bidder scope is to procure the following materials

(*a*) Aluminium alloy, 6061T6 (for fixtures materials required for CNC machining)

(b) G10/Epoxy sheet (for fabrication of fixture required for electro-deposition. This material must be compatible and non-conducting fixture for OFE copper electro-deposition chemical bath solution).

(c) Bidder needs to procure OFE copper plates as per Table -2 and delivered to IPR (This material is required for anode material of electro-deposition of all grids and also to perform the CNC machining trial purpose.) IPR will supply the required OFE copper plates to bidder to perform the CNC trials as per requirement at different phases of the work. Packing, transits insurance and transportation from IPR to bidder's place is in IPR's scope of work.

The procurement of all the above mentioned materials shall be informed to IPR. Bidder shall submit all procurement documents to IPR for approval. All the necessary materials test certificates and associate records need to submit to IPR for approval.

5. CNC machining of Grids (as per drawings of tender document) consists of following stages

1st Stage (Before electro-deposition work): CNC milling and drilling work on FW SS304L stub rod, milling of water cooling channels and manifolds in OFE copper grid base plates as per drawings mentioned in the tender document.

Ultrasonic measurement needs to be done to identify any defect at friction weld joint area before and after CNC machining of S304L stub rod. Ultrasonic measurement also needs to be done to measure the OFE copper thickness before and after CNC machining.

Note: After 1st stage of CNC machining, 1 mm thick OFE copper electro-deposition work (not in Bidder's scope) shall be done and then Liquid Crystal Display (LCD) test (not in Bidder's scope) and radiography test shall be carried out to confirm if any local blockage in any water manifold and cooling channel in any grid (Prototype Acceleration Grid/Acceleration Grid/Deceleration Grid/Earth Grid) occurred during electro-deposition. Generally this type of blockage does not occur but if unlikely such blockage found in any water manifold or cooling channel then local CNC machining needs to be done without extra cost to clear the blockage. After that local electro-deposition work needs to be done. Then to confirm the blockage fee area in manifold or cooling channel again LCD and radiography test are required.

2nd Stage (After electro-deposition work): CNC machining to be done to make outer contour, thickness and drilling of apertures etc. as per drawings mentioned in the tender document.

6. Fabrication of fixtures for CNC machining and for OFE copper electro-deposition work. Total quantity of fixtures is mentioned in Table - 3 (Deliverables) of the tender document.

7. CMM measurement of Grids and Fixtures dimensions as per IPR approved drawings e.g.

(i) Flatness, surface roughness (before and after electro-polishing)
(ii) Position, width & depth of water manifolds and cooling channels
(iii) Positions and diameter of 387 numbers of apertures
(iv) Detailed dimension of 10 numbers of randomly selected shaped apertures

Dimensional inspection of all CNC machined grids, FW stub pipes and fixtures.

8. Cleaning and Cleanliness Inspection of Grids and Fixtures

9. **Electro-polishing** and Inspection

10. **Radiography (preferably Gamma ray)** of all the grid plates (after 1st layer of OFE copper electro-deposition) for checking of blockage in water manifolds and cooling channels. Depending on the requirement the radiography test may be repeated. Bidder must submit Radiography test report to IPR.

11. Following packaging and transportation activities are required

(i) Packaging, Loading and Transportation of OFE Copper Plates, CNC machined grids and fixtures, other materials if any to IPR

Bidder will discuss with IPR and take the appropriate amount of insurance of all items prior to start the transportation process.

(ii) Packaging, Loading and Transportation of grids and fixtures to RRCAT, Indore for Electro-deposition work and other acceptance test place if required and pick up the same from these places.

(iii) Packaging, Loading and Transportation of grids and fixtures to Radiography test place and pick up the same from test place.

12. Supply of storage container: Bidder needs to supply suitable container for each grid for safe storage at IPR.

After final CNC machining and electro-polishing of grid, Bidder needs to pack each of the grid sealed plastic bag with Nitrogen gas purged inside so that grid surfaces can be prevented from oxidation and keep it inside suitable storage container and delivered to IPR.

13. Preparation of Quality Assurance documents: Bidder will identify and discuss the techniques and technologies required in the fabrication of ion extractor grid with IPR. Bidder will prepare and submit Manufacturing and Inspection Plan, Quality Procedures and Work Instructions to IPR for review and approval.

14. Preparation of work execution schedule: Bidder will prepare and submit the schedule for the entire grid fabrication work to IPR for review and approval.

IPR has suggested a work execution schedule **(Annexure-V)** which includes the scope of RRCAT, Indore work etc. and this can be taken as a reference. Before final preparation and submission of work execution schedule, Bidder should discuss in details about the works mentioned in the schedule.

15. Bidder will also procure/fabricate miscellaneous item which may be required at any stage of fabrication and acceptance tests i.e. small fixture may be required to hold the job etc., without any cost.

Table - 2

Technical Specification for Oxygen Free Electronic (OFE) Copper Plate (UNS C10100)

I. Required Size, Quantity and Weight of OFE copper

S.N.	Dimension (mm)	Nos.
1	$500^{+5/-0}$mm (L) × $400^{+5/-0}$ mm (W) × $12.5^{+0.2/-0.2}$ mm (T)	10
2	$500^{+5/-0}$ mm (L) × $400^{+5/-0}$ mm (W) × $25^{+0.2/-0.2}$ mm (T)	2

II. Physical, Mechanical and Thermal Properties requirement (at Room Temperature)

S.N.	Parameter	Value
1	Material	OFE Copper
2	Form	Plate
3	Standard	ASTM B152M or equivalent international standard
4	UNS No.	C10100
5	Cu purity (weight %)	99.99
6	Impurity (ppm)	As per ASTM B152M Table-1 or equivalent international standard
7	Density(kg/m^3)	8890-8940
8	Temper	H02
9	Tensile Strength (MPa)	255-315
10	Rockwell Hardness	77-89
11	Electrical Resistivity(ohm.g/m^2)	0.15614 (should not exceed this value)

III. Required Test report/certificates

S.N.	Type of Test/Examination	Codes & Standards
1	Test Method for Determination of Copper in Unalloyed Copper	ASTM E53 or equivalent international standard
2	Chemical analysis test certificates for purity and impurity in OFE copper C10100	ASTM B152M or equivalent international standard
3	Tensile Test	ASTM E8 or equivalent international standard
4	Test of Rockwell Hardness	ASTM E18 or equivalent international standard
5	Test for Detection of Cuprous Oxide (Hydrogen Embrittlement Susceptibility) in OFE Copper	ASTM B577 or equivalent international standard
6	Electrical resistivity of OFE copper C10100	ASTM B193 or equivalent international standard
7	Dimension and Surface Flatness Measurement	ASTM B272 or equivalent international standard
8	Ultrasonic examination	ASME Section V or equivalent international standard
9	Visual examination	ASME Section V, Article 9 or equivalent international standard

In addition to the deliverable items listed in Table – 1, **bidder will also procure OFE copper plates as described in Table – 2** and will pack and deliver to IPR. These plates shall be used as anode material for electro-deposition as well as to perform the CNC machining trial purpose. Bidder must ensure that he will get the testing report approval prior to start the packaging and transportation activity.

Acceptance criteria: All CMTR reports to be submitted from OEM (Certificate 3.1 or 3.2) / NABL accredited lab for mechanical, chemical and physical properties

Note: IPR shall receive these OFE copper plates from the Bidder. Then IPR will supply the same as FIM to electro-deposition work and CNC machining trial work.

4. IPR Scope of Work

(a) IPR will supply hard copy of the engineering drawings of all grids [Prototype Acceleration grid, Acceleration Grid (Left & Right), Deceleration Grid (Left & Right) and Earth Grid (Left & Right)] and all fixtures.

(b) IPR will supply the required material of OFE Copper plates to bidder to perform the CNC trials as per requirement at Phase-1 and Phase-2 of the work. Packing, transits insurance and transportation from IPR to bidder's place is in IPR's scope of work.

(c) IPR will supply OFE copper plates with friction welded SS304L stub rods as per requirement for 1st stage of CNC machining for all the grids as a Free Issue Material (FIM). Acceptance will be done by Bidder.

(d) OFE copper electro-deposition work

Bidder will be a part of incoming and final inspection and acceptance of OFE copper electro-deposition work to avoid any conflict. Applicable inspection and acceptance plan will be jointly prepared by IPR and Bidder.

Note: IPR is in process to sign a Memorandum of Understanding (MOU) with RRCAT, Indore to perform the OFE Copper electro-deposition work.

(e) IPR representatives shall witness (i) CNC machining work of all the grids (Prototype Acceleration Grid, Acceleration Grid, Deceleration Grid and Earth Grid) (ii) CMM measurement of all the grids and all the fixtures etc. as per drawings (iii) electro-polishing and Radiography test of all grids. Final manufacturing and inspection plan will be agreed and approved by IPR prior to start of each phase work.

5. Technologies for Manufacturing of Grid

(*a*) **Joining of dissimilar metals (*Not in Bidder's scope*)** of SS304L rod to OFE copper base plate by Friction Welding (FW) for making stub pipe for water header to supply water to the cooling channels lies in between the rows of the apertures. IPR has successfully developed this dissimilar joint and will supply friction welded OFE copper plates to the Bidder as a free issue material. Drawing of centre to centre distance of two SS304L stub rods each of 60 mm length, 16 mm diameter are friction welded at two designated location (**1** & **2**) on OFE copper plate for Acceleration, Deceleration and Earth grid are given in **Annexure-I.**

(*b*) **Precision CNC machining** for milling and drilling work on OFE copper plate with specified tolerances.

(*c*) **Electro-deposition** of copper of 2.9 ±0.1 mm thickness for making embedded water cooling channels. (**Not in Bidder's scope**)

6. Suggested Ion Extractor Grid Fabrication Method

The fabrication steps are shown in Fig.1 and may be followed during manufacturing of ion extractor grid. It begins with Friction Welding (FW) of 16 mm OD, 60 mm length SS304L stub rod on OFE copper base plate with penetration length of ~ 2 mm shown in Fig.1 (*a*).

(a) FW is chosen because it a circumferential weld joint between SS304L rod to OFE copper plate and it's joining strength (264 MPa) is greater than OFE copper and lower that SS304L metal. After FW joint, substantial CNC machining work e.g. milling and drilling can be done on SS304L stub rod without loss of welded joint strength. In this respect FW has an advantage over other welding from impurity contamination during welding.

(b) Then CNC machining work for cutting, milling and drilling of SS304L stub rod (length 60 mm, OD 16 mm) for making stub pipe of 12 mm OD of 30 mm length and 9 mm ID with weld neck end shown in Fig.1 (*b*).

(c) CNC machined cooling channel and manifold grooves on OFE copper base plate are filled with special wax and then the wax surface area is conductvising with silver paint shown in Fig.1(*c*). This would make electrical conductivity of entire upper surface of OFE copper base plate which is immersed inside electro-deposition bath and 2.9 ±0.1mm thickness (may vary for different Grids)

(d) OFE copper is electrodeposited shown in Fig. 1(*d*).

(e) Then the electro-deposited plate is heated to 80° C and wax is removed from cooling channel and manifold grooves.

(f) Then CNC machining is to be done for final thickness. In this way embedded cooling channel and manifold grooves are formed as shown in Fig. 1(*e*). It is to be noted that in the electro-deposition technique copper is deposited on the base plate in the ionic form and joining strength is equal to tensile strength of OFE copper base plate. For this reason electro-deposition technique is very successful. Making of embedded cooling channels have also tried out by vacuum brazing of sandwich of two grid plates. Past experience shows that cooling channel is blocked due to flow of brazing material during brazing process and may not be suitable for grid fabrication.

(g) Finally apertures are drilled and CNC milling work is carried out for final thickness and outer contour of the grid shown in Fig. 1(*f*).

During beam operation acceleration grid received heat load of 1.75 MW/m^2 and to remove this heat load cooling water of velocity 13 *m/s* is passed through the cooling channel and pressure drop is 9 bar. Due to this high heat load and high water pressure vacuum brazing joint over cooling channel is opened up and water leakage appears which causes accident in experiment. This type of accident generally does not occur in grid where cooling channels are made by electro-deposition technique.

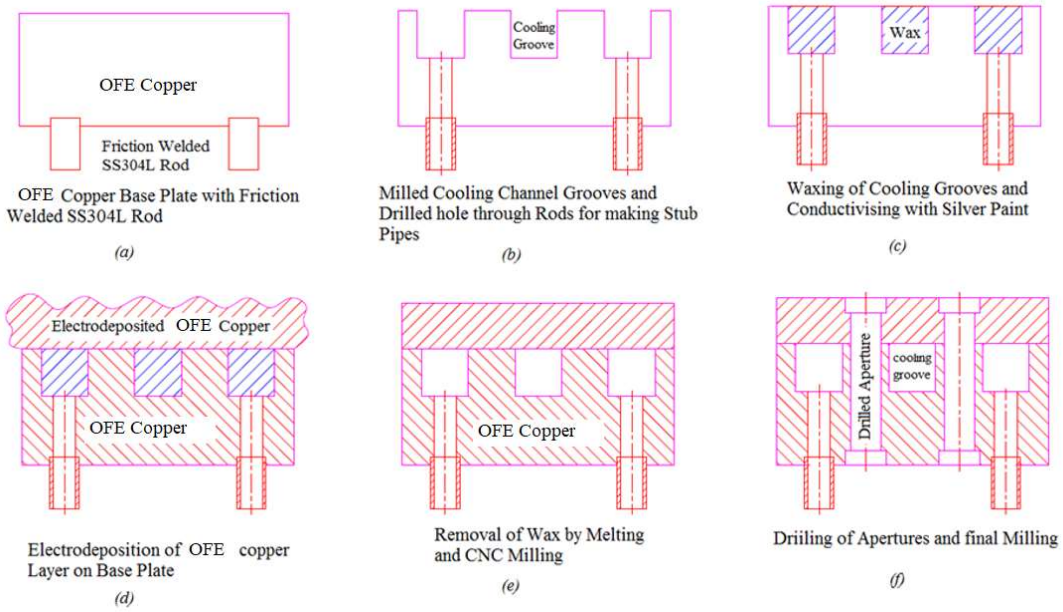


Fig1: Schematic illustration of various steps followed in fabrication in extractor grids including formation of embedded cooling channels by Electro-deposition technique

Summary of the suggested execution plan for ion extractor grid fabrication is given below:

(*i*) Dimensional check of Friction Welded (FW) SS304L rod (L 60 mm, OD 16 mm) to OFE copper base plate of size 440 mm (L) × 330 mm (W) × thickness varied from 9 - 21 mm for different grids. The penetration length of stub rod inside OFE copper plate is ~ 2mm. Ultrasonic Test (UT) of weld joint and QC.

(*ii*) CNC machining work for cutting, milling and drilling of FW SS304L stub rod (length 60 mm, OD 16 mm) for making stub pipe of 12 mm OD of 30 mm length and 9 mm ID with weld neck end for all the grids as per drawings mentioned in **Annexure-I**. The centre to centre distance of two stub pipes as per drawings must be achieved. This work also includes OFE copper machining near the friction welded stub rod end area. ID hole of 9 mm in stub pipe needs to be extended up to 2 mm inside OFE copper plate.

(*iii*) Quality Control (QC)

(*iv*) Packaging, Loading and transportation of CNC machined FW OFE copper base plates from Bidder's premises to RRCAT, Indore for leak test of the FW joint. After the leak test Bidder shall pick up FW grid base plates at RRCAT and bring back to Bidder's place for further CNC machining.

(*v*) 1st stage of CNC machining for required thickness, water manifolds and cooling channels on OFE copper base plate.

(*vi*) CMM measurement of CNC machined OFE copper base plate for QC.

(*vii*) Cleaning of CNC machined base plate or Pre-waxing procedure for electro-deposition.

(*viii*) Surface check for cleanliness.

(*ix*) Packaging, Loading and transportation of grid plates, fixtures and materials etc. from Bidder's premises to RRCAT, Indore for OFE copper electro-deposition.

(*x*) Filling of wax in cooling channels and manifolds **(not in Bidder's scope).**

(*xi*) Putting conductive silver paint on wax area of manifold and cooling channels **(not in Bidder's scope).**

(*xii*) *1st layer of OFE copper electro-deposition* **(not in Bidder's scope).**

(*xiii*) Ultrasonic measurement of the 1st electro-deposited OFE copper thickness **(not in Bidder's scope)** with resolution of 0.05 mm.

(*xiv*) Removing wax, cleaning water manifold and cooling channels **(not in Bidder's scope).**

(*xv*) **Flowing test** (by Liquid crystal Sheets at 25^{o}C – 40^{o}C for checking the continuity of cooling channels **(not in Bidder's scope).**

(*xvi*) Packaging, Loading and transportation from RRCAT to Radiography test place

(*xvii*) **Radiography test** (preferably gamma ray) for checking the continuity of manifolds and cooling channels.

(*xviii*) Packaging, Loading and transportation to acceptance test place

(xix) 4 cycles vacuum baking at 180^{o} C to 200^{o} C (max.), 1 hour at < 10^{-4} mbar **(not in Bidder's scope).**

(*xx*) Integral leak test in a Poly Ethylene (PE) bag **(not in Bidder's scope).**

(xxi) Packaging, Loading and transportation to RRCAT

(*xxii*) *2nd layer of OFE copper electro-deposition* **(not in Bidder's scope).**

(*xxiii*) Packaging, Loading and transportation of electro-deposited OFE grid plate to Bidder's place for QC and final CNC machining.

(*xxiv*) Ultrasonic measurement of total (1st& 2nd) electro-deposited OFE copper thickness with resolution of 0.05 mm.

(*xxv*) QC of electro-deposited OFE grid plate.

(*xxvi*) 2nd stage CNC machining for cutting outer contour and required thickness of the grid base plate.

(*xxvii*) 2nd stage CNC machining for drilling and shaping of apertures.

(*xxviii*) CMM measurement for final QC.

(*xxix*) Ultrasonic measurement of copper thickness with resolution of 0.05 mm.

(*xxx*) Cleaning of CNC machined grid plate.

(*xxxi*) Packaging, Loading and transportation of grid plates to acceptance test place.

(*xxxii*) 4 cycles vacuum baking at 180° C to 200° C (max.), 1 hour at 10^{-4} mbar **(not in Bidder's scope).**

(*xxxiii*) Pressure test at 17 bar Nitrogen gas for 30 min (1 cycle) outside vacuum chamber and pressure test at 16 bar Nitrogen for 1 min (9 cycles) inside vacuum chamber ($<10^{-4}$ mbar) at room temperature **(not in Bidder's scope).**

(*xxxiv*) Integral leak test in a PE bag at 16 bar Helium gas pressure **(not in Bidder's scope).**

(*xxxv*) Electro-polishing of grid plates.

(*xxxvi*) 4 cycles vacuum baking at 180° C to 200° C (max.), 1 hour at $< 10^{-4}$ mbar **(not in Bidder's scope).**

(*xxxvii*) Final leak test with 16 bar Helium gas pressure inside a vacuum chamber ($<10^{-4}$ mbar) for 14 min at room temperature **(not in Bidder's scope).**

(*xxxviii*) Final surface control e.g. measurement of surface roughness (before and after electro-polishing), surface flatness check (suitable instrument e.g. by ruler) and cleaning.

(*xxxix*) Final packaging of grids and fixtures with suitable storage container and delivered to IPR.

Note: The above mentioned suggested fabrication route is for reference only. Bidder can adopt their own manufacturing route for obtaining the specified tolerances mentioned in this tender document with approval from IPR.

7. General precautions during machining of Ion Extractor Grid

Ion extractor grids are high vacuum compatible components so during CNC machining the following precautions need to comply.

1. Maintain cleanliness throughout the manufacturing process to avoid contamination, use clean powder free latex gloves for handling finished components.
2. Avoid use of oil and grease and use Sulphur, Silicone compound and chlorine free water miscible fresh cutting fluid during machining.
3. All the tolerances and surface finish shall be achieved using cutting tools only. Use of grinding, buffing, lapping or any abrasive material for controlling the tolerance and the surface finish of vacuum exposed surfaces shall be strictly prohibited.

8. Criticality Involved in Fabrication of Ion Extractor Grid

Manufacturing of ion extractor grids has many technical challenges to achieve the specified tolerances mentioned in the drawings (**Annexure - I to IV and Annexure-VI**). Prime requirements of the grids are: surface flatness of 100 µm, surface roughness (R_z) of 2.5 µm at extraction area and (R_z) 6.3 µm at other surface area respectively and position tolerance of aperture of ± 40 µm.

9. Brief description of CNC Machining and OFE copper Electro-deposition work for fabrication of Ion Extractor Grids

9.1 1st Stage CNC Machining (Before OFE copper electro-deposition)

- First friction welded SS304L stub rod joints are tested by ultrasonic measurement for any weld defect present. Then CNC machining work is done on both SS304L stub rod (Fig.2) for making stub pipe of 12 mm OD and 9 mm ID as per drawing (**Annexure-VI**). During CNC milling and drilling work on SS304L stub rod if any FW joint defect is found then OFE copper base will be rejected. New friction welded SS304L stub rod to OFE copper base plate will be taken and if both weld joints are ok, then only next step of the CNC machining work would take place. During this work if any technical issue arises same can be resolved by mutual discussion between Bidder and IPR. It is to be noted that IPR will supply friction welded OFE copper base plate to the Bidder as a Free Issue Material (FIM)

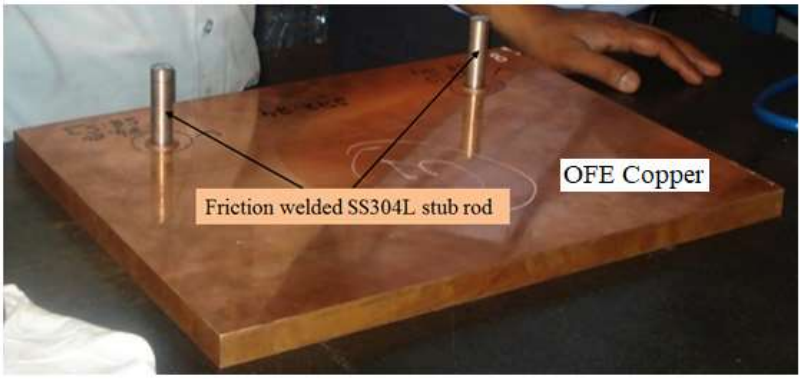


Fig. 2 Friction welded SS304L rod with OFE copper plate (IPR will provide it as a FIM)

- CNC milling for required thicknesses, milling of water cooling channels and manifolds
- CMM measurement and QC

9.2 2nd Stage of CNC Machining (After OFE copper electro-deposition)

- CNC machining for cutting outer contour, milling thickness, Tongue and groove etc.
- Drilling apertures
- CMM measurement for QC

9.3 OFE copper Electro-deposition – I (1st layer of deposition) (Not in Bidder's scope)

- Pre waxing (visual checking & cleaning) procedure
- Waxing the water manifold and cooling channel grooves
- 1st layer of electro-deposited of OFE copper on different grids are mentioned below:

Description	Thickness of 1st layer of OFE electro-deposited copper (mm)
Prototype Acceleration Grid	0.7±0.1
Acceleration Grid	0.7±0.1
Deceleration grid	0.7±0.1
Earth Grid	0.75±0.1

- Measurement of first electro-deposited copper layer (by Ultrasonic measurement)
- Removal of wax and cleaning the manifolds and cooling channels
- Checking the continuity of the manifolds and cooling channels by Liquid Crystal Sheets (LCS) at 25°C – 40°C display and Radiography test (preferably with Gamma ray).

9.4 OFE Electro-deposition – II (Final layer of deposition) (Not in Bidder's scope)

- Final layer of OFE electro-deposition copper on different grids are mentioned below

Description	Thickness of final layer of OFE electro-deposited copper (mm)
Prototype Acceleration Grid	2.9 ±0.1
Acceleration Grid	2.9 ±0.1
Deceleration Grid	2.4 ±0.1
Earth Grid	2.8 ±0.1

- Measurement of final layer of OFE electro-deposited copper by ultrasonic measurement.

10. Fabrication of Fixtures for CNC machining of ion extractor grids

The suggested grid fabrication route mentioned in **Section 6** indicates that different types of fixtures are required for each type of grid e.g. Prototype Acceleration Grid, Acceleration Grid, Deceleration Grid and Earth Grid. The purpose of the fixture is to provide 3D constrained strong base support during CNC operation and to attain the required grid flatness and different tolerances as per respective drawings mentioned in the tender document. There should not be any change in dimension before/after fixture clamping due to material expansion. Numbers of fixtures are anticipated for the fabrication of grids for different steps. Related drawings are appended in the **Annexure-III.** Table - 3 shows the number of fixtures required (tentatively) for different grid with drawing numbers. Table - 3 is only providing fixture requirement, not the fabrication sequence. These fixtures are completely conceptual in nature and are tentative. Bidder shall study the fixture drawings (provided by IPR) and can add, modify or obsolete as per the facility available at Bidder site. Bidder shall submit the detailed report with drawings for the fixture requirement at each fabrication step to IPR for approval.

The fixture drawings provided is based on the grid drawings. IPR shall provide the free issue material (FIM) as OFE copper plates with SS304L stub rod friction welded. There may be dimension variation in the centre to centre distance of two friction welded stub rod. IPR shall provide inspection report of friction welded stub rods. Bidder shall study the same and do the required alteration (e.g. keeping larger diameter of through hole in the fixtures for easy passage of SS304L stub rods during CNC machining) while preparing the fixture drawings.

Table - 3

Name of the Fixtures for Different Grids

Grid	**Local Machining: / Thickness/ Profiling/ Channel/ Header/Contour (Top side or Opposite to FW stub pipe side)**	**Local Machining: Stub pipe/ Thickness/ (Bottom side or FW stub pipe side)**	**Electro-deposition** *Note1	**Aperture Drilling Stub Side**	**Aperture Drilling Other Side**	**Drilling apertures of rows: 1& 2, 5& 6, 9& 10, 13& 14, 17&18, 21&22**	**Drilling apertures of rows: 3& 4, 7& 8, 11&12, 15&16, 19&20**	**Total**
Prototype Acceleration	*PGF1*	*PGF2*	*PGF3*	*PGF4*	*PGF5*	*PGF6*	*PGF7*	07
Acceleration	*AGF1*	*AGF2*	*AGF3*	*AGF4*	*AGF5*	*AGF6*	*AGF7*	07
Deceleration	*DGF1*	-	*DGF2*	-	*DGF1*	*DGF3*	*DGF4*	04
Earth	*EGF1*	-	*EGF2*	*EGF3*	-	*EGF3*	*EGF3*	03

PGF: Prototype Grid Fixture, AGF: Acceleration Grid Fixture, DGF: Deceleration Grid Fixture, EGF: Earth Grid Fixture

**Note1: Epoxy/G10 Material shall be used to fabricate Electro-deposition Fixtures.*

Aluminium alloy, 6061T6 material compatible with OFE Copper shall be used to fabricate all other fixtures.

Bidder shall fabricate the fixtures based on the available FIM (OFE copper plate with SS304L stub rod friction welded) for different grids (Prototype Acceleration Grid, Acceleration Grid, Deceleration Grid and Earth Grid) to accommodate the small variation in centre to centre distance of two SS304L stub rods. If there is any discrepancies found same shall be informed to IPR, technical discussion can be done with IPR for solution and approval.

11. Instruction to Bidder

- The Bidder is requested to be study in detail the scope of work, specifications mentioned in the tender document, drawings of grids and fixtures, and other respective terms and conditions as applicable.
- The Bidder is requested to visit the IPR and discussed with concerned person to have a better understanding of work.
- Complete manufacturing and inspection & acceptance test plan is to be finalized based on the actual manufacturing process and agreed responsibilities between the Bidder and IPR.
- Drawings and technical information given in the Tender Document cannot be shared with any third party without the prior permission of IPR.

The Bidder shall enclose following with the offer:

(a) The entire original tender documents and drawings duly endorsed.

(b) Technical information about the facility of CNC machining, electro-deposition of OFE copper and acceptance test facility. If the Bidder does not have all the facility as mentioned above then the technical information about facility of the sub-contractor must be provided to IPR.

(c) Bidder should submit the bid through e-tender portal. The quantities specified in the tender are provisional. IPR reserves the right to change the drawings and specifications of the job. In that case if cost variation is minor then the Bidder shall not be entitled to claim any extras charge. These variations shall be permitted until such time Bidders shop drawings are approved by IPR.

(d) The Bidder should submit the list of skilled manpower.

(e) The Bidder shall provide work execution schedule along with the offer to justify the specified completion period including inspection and acceptance tests.

(f) Documentary evidence for having executed similar works. They should include performance certificate from client clearly indicating full details of nature of work, work order number and date, client address, value of work as per work order and period of completion as per work order and as per actual.

12. Free Issue Materials (FIM)

(a) IPR will supply all the required OFE copper base plates with friction welded SS304L stub rods for 1st stage of CNC machining of all grids as per following Table- 4. Bidder must

take appropriate insurance for the FIM till the delivery of the final machined grids at IPR site.

(b) IPR will supply OFE copper base plates as FIM to the bidder for CNC machining trial as per requirement at different phase of the work. Bidder must take appropriate insurance for this FIM till the delivery at IPR site.

Table-4

SS304L stub rod Friction Welded (FW) to OFE copper plates

	Description of OFE copper Plates	Work Description	Qty.	Total Cost (Rs.)
Phase-1	440 mm × 330 mm × 9 mm (FW)	PAG Fabrication	02	2,00,000
Phase-2	440 mm × 330 mm × 9 mm (FW)	AG Fabrication	02	2,00,000
	440 mm × 330 mm × 10 mm (FW)	DG Fabrication	02	2,00,000
	440 mm × 330 mm × 21 mm (FW)	EG Fabrication	02	3,50,000
Total cost in Rupees				**9,50,000**

13. Completion Period

The total completion period for fabrication of ion extractor grids is **20 months.** Bidder should submit all 2D engineering and fabrication drawings and 3D models (both soft and hard copy) which are required for fabrication of all ion extractor grids and all CNC machining fixtures drawings within 3 months from the date of LOI/P.O. Work execution (fabrication of fixtures, CNC machining of prototype acceleration grid, acceleration grid, deceleration grid, earth grid, electro-polishing and radiography test of grids) should be completed with the coordination of RRCAT, Indore for Electro-Deposition (ED) and Acceptance Tests (AT) work.

IPR is suggested work execution schedule **(Annexure-V)** and same can be taken as reference.

Bidder must discuss with IPR for preparation and finalise the actual execution time schedule. This time schedule must submit to IPR for approval.

The work is in totality must be completed within the completion time period as per approved Bar chart/ Project schedule.

The Bidder shall provide Bar chart contains the duration and relationship among all activities along with the offer to justify the specified completion period. The bar chart must include the schedule of the following:

(a) 2D and 3D drawings/models of Prototype acceleration grid, Acceleration Grid (2 halves: Left & Right), Deceleration Grid (2 halves: Left & Right) and Earth Grid (2 halves: Left & Right) and all the required fixtures for fabrication.

(b) Documents on fabrication route, acceptance tests and list of sub-contractors who will execute the work.

(c) Prototype acceleration grid: fabrication (CNC machining and OFE copper Electro-deposition), acceptance tests and delivery.

(d) Acceleration Grid Left and Acceleration Grid Right: fabrication (CNC machining and OFE copper Electro-deposition), acceptance tests and delivery.

(e) Deceleration Grid Left and Deceleration Grid Right: fabrication (CNC machining and OFE copper Electro-deposition), acceptance tests and delivery.

(f) Final document on the completion of the work done and acceptance test results etc.

14. Drawings

14.1 Friction Welded OFE Copper Plates

List drawings of friction welded OFE copper plates, Local CNC machining for Prototype Acceleration Grid (PAG), Acceleration Grid (AG), Deceleration Grid (DG) and Earth Grid (EG) are given in **Annexure-I.**

14.2 Prototype Acceleration Grid Drawings

Drawings of prototype acceleration grid are given in **Annexure – II.**

14.3 Fixtures for Prototype Acceleration Grid, Acceleration Grid, Deceleration Grid and Earth Grid.

List of drawings of all the fixtures are given in **Annexure – III.**

Note: *All the given fixture drawings are suggested by IPR but the Bidder can consider any new fixture in addition to the suggested fixtures with approval from IPR.*

14.4 Drawings of Acceleration, Deceleration and Earth Grid

For the list of drawings please refer to **Annexure-IV.**

14.5 Drawings of Acceleration, Deceleration and Earth Grid base plate before Electro deposition

For the list of drawings please refer to **Annexure-VI.**

All the above mentioned drawings shall be used as the basis for the final engineering and manufacturing drawings.

15. Materials

Material for different grids and fixtures are given in the following Table –5.

Table 5

Material Details for Grids and Fixtures

SN	Description	Material
1	Grids	(i) OFE copper base plates with friction welded SS304L stub rods (IPR will provide as a FIM). (ii) OFE Copper plates required for supply of anode material to electro-deposition work and CNC machining trial purpose if any (**scope of Bidder**) as per Table-2 mentioned above.
2	Fixtures for machining	Aluminium alloy, 6061T6 material compatible with OFE copper (**Scope of Bidder**)
3	Fixture for Electro-deposition	G10/Epoxy* (**Scope of Bidder**)
4	Checking of continuity of cooling channels and manifolds	Liquid Crystal Sheets (LCS) at 25°C – 40°C (**Scope of IPR as FIM**)

* Must be compatible with electro-deposition bath chemicals.

Note: Bidder must provide all the test certificates of the procured material to IPR for approval.

16. Sub-Contractors / Suppliers

The Bidder should submit the details of sub-contractor, Bidders and suppliers proposed for any part of work, system components (Mentioned in Bidder's eligibility criterion) to IPR for approval before placing the WO/ PO (Work Order/Purchase Order) by the main Bidder. The decision of the IPR to approve or reject sub-contractors, Bidders and suppliers proposed for any part of work shall be final. After getting approval of IPR, copy of such WO/PO shall be submitted to IPR for confirmation along with all specifications thereafter.

17. General Remarks

The Bidder shall be responsible for the precision CNC machining, dimensional inspection, quality assurance, radiography test, electro-polishing, packaging and transport of all grids and machining fixtures according to the specifications mentioned in this document. Review and approval by the Institute for Plasma Research (IPR) of the fabrication drawings, fabrication route, material test reports, CNC machining, dimensional inspection and quality assurance mentioned in the tender document shall in no way relieve the Bidder of the responsibility. This tender document gives the specifications and drawings of grids and fixtures. Any difficulty during the fabrication at the Bidder's end shall be brought to the attention of the IPR in writing and this shall be resolved by discussion.

18. Inspection and Acceptance Tests

Suggested flow-chart for inspection and acceptance test activities is shown in Fig.3. Bidder must achieve all the dimensions with tolerances mentioned in the drawings of this tender document and perform the acceptance test mentioned in the tender document. The entire measurement report and acceptance test results need to be documented and submit the same to IPR for approval.

IPR representative / appointed Third Party inspection agency inspector will do the (a) witness (either on sampling basis or 100%), (b) Documentation review and (c) Non-compliance agreement including decision on remedial actions for observed non-compliances as agreed in approved Manufacturing and Inspection Plan.

Draft Manufacturing and Inspection Plan which is to be finalized by selected manufacturer based on the actual manufacturing processes, use of records and agreed responsibilities between manufacturer and IPR is given as **Annexure – VII** and **Annexure – VIII**

In addition to the above inspection, two acceptance tests will be performed by IPR representative

(1) Factory Acceptance test: At the premises of Bidder and RRCAT, Indore.

(2) Site Acceptance test at IPR.

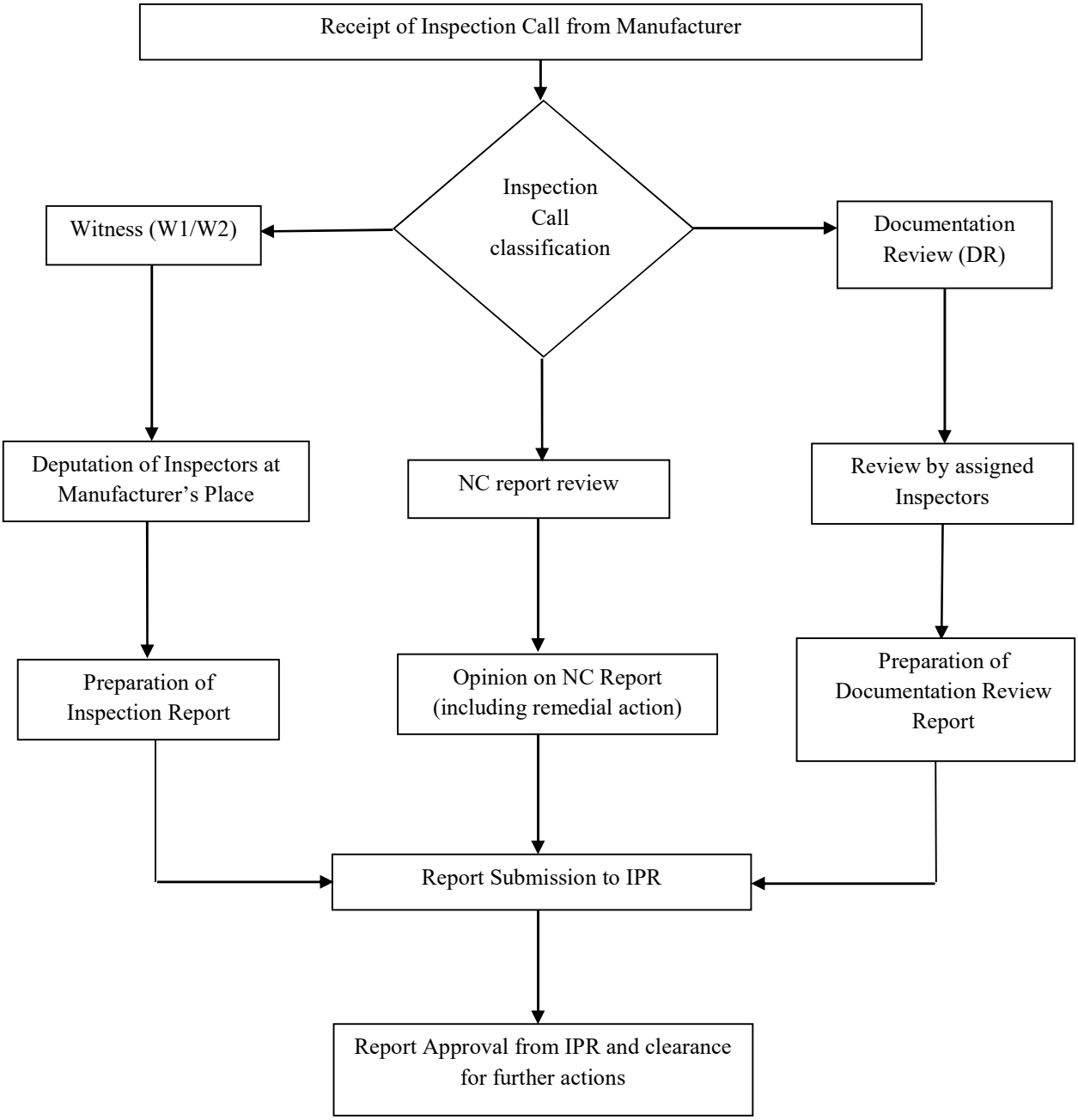


Fig.3 Suggested inspection and acceptance test plan

18.1 Factory Acceptance Test (FAT)

18.1.1 Bidder's work Place

(*a*) **After local CNC machining of friction welded SS304L stub rods to OFE copper plate**

- Dimensional measurement of CNC machined SS304L stub pipes as per drawings mentioned in the tender document.

(*b*) **After 1st stage of CNC machining**

- CMM measurement of the required dimensions as per drawings mentioned in the tender document.

(*c*) **After 1st layer of OFE copper electro-deposition**

- **Radiography test** (preferably with Gamma ray) for checking the continuity of water cooling channels and manifolds of the grids

(*d*) **After 2nd stage of CNC machining**

- CMM measurement of all the required dimensions as per drawings mentioned in the tender document. (e.g. (*i*) surface flatness (*ii*) surface roughness (R_z) (*iii*) position of reference holes (*iv*) position and all other dimension of CNC drilled apertures (387 numbers in each grid half) (*v*) notch thickness and angle of 10 number of randomly selected apertures in Prototype Acceleration Grid, actual size Acceleration Grid - Left and Acceleration Grid - Right (*vi*) all other dimension and thickness mentioned in the approved drawings) (*vii*) Ultrasonic measurement of electro-deposited OFE copper layer.)

(*e*) **After electro-polishing**

- Measurement of surface flatness and surface roughness (R_z) at both extraction area and other surface of grids.

18.1.2 RRCAT's work place

Bidder must participate the following acceptance tests at RRCAT

(*a*) **Before and after 1st layer of OFE copper electro-deposition**

- Leak test of Friction Weld joint of SS304L stub pipe to OFE copper grid base plate.
- Ultrasonic measurement of 1st layer of electro-deposited OFE copper thickness
- Liquid Crystal Display test for checking of water manifolds and cooling channels
- Vacuum baking, leak test in PE-bag.

(b) After 2nd layer of OFE copper electro-deposition

- Ultrasonic measurement of 2ndlayer of electro-deposited OFE copper for QC
- Vacuum baking, integral leak test inside PE bag, Pressure test with 16 bar N_2 gas (inside vacuum chamber) and 17 bar N_2 gas (outside vacuum chamber). Leak test with 16 bar Helium gas pressure inside vacuum chamber as per Table –6 and shown in Fig.4.

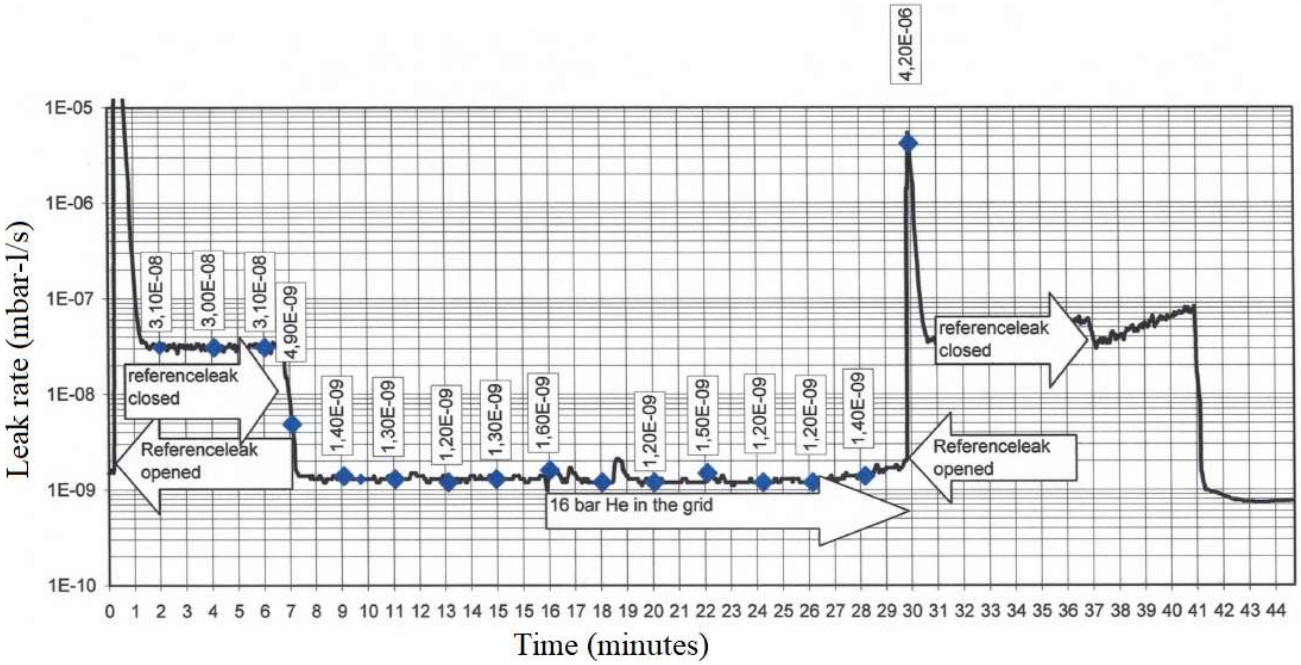


Fig.4 suggested method for final leak test with 16 bar Helium gas pressure (Ref. PINI ion source grid acceptance test).

Table - 6

Vacuum Baking, Pressure Test and Leak Test **(Not in bidder's scope)**

1. Baking in vacuum oven (<1×10^{-4} mbar) at 180^{o}C to 200^{o}C (max.) for 65 minutes					
Description	Start date and time	End date and time	Cycles (65 min ON and 60 min OFF)	Results	Signature of the test operator
Baking of grid plate after 1st electro-deposited OFE copper layer			4		
Baking of grid plate after final CNC machining			4		
Baking of grid plate after electro-polishing			4		
2. Integral leak testing of the grid after baking process in a PE Bag at Room Temperature					
Description	Date	Background	Leak rate	Results	Signature of the test operator
Leak test of grid plate after 1st electro-deposited OFE copper layer		5×10^{-10} *mbar-l/s*	5.1×10^{-10} *mbar-l/s*		
Leak test of grid plate after final CNC machining		3.7×10^{-10} *mbar-l/s*	3.6×10^{-10} *mbar-l/s*		
3. Pressure test at 16 bar Nitrogen gas pressure at Room Temperature					
Description	Date	Duration	Cycles	Results	Signature of the test operator
Pressure test 17 bar Nitrogen gas outside vacuum chamber		30 minutes	1		
Pressure test 16 bar Nitrogen gas inside a vacuum chamber (<1×10^{-4} mbar)		1 minutes each	9		
4. Final test of grid inside vacuum chamber (<1×10^{-4} mbar) with 16 bar Helium gas pressure at Room Temperature					
Instruments	Date	Reference Leak	Reference leak result	Results	Signature of the test operator
Leak Tester (e.g. Balzers HLT 160)		2.9×10^{-8} *mbar-l/s*	3.1×10^{-8} *mbar-l/s*		
	Background	Leak rate (min.)	Leak rate (max.)		
Leak rate (*mbar-l/s*)	1.4×10^{-9}	1.2×10^{-9}	2×10^{-9}		
Name of the operator	**Duration to permeation**				
	14 minutes				

18.2 IPR Site Acceptance test

- Visual inspection for any damage and scratches on the surface of grid
- Measurement of surface flatness of the grids by ruler.

19. Cleaning

The following procedure may be followed for cleaning of all the grids:

- Remove all scales or any other loose materials.
- Blow out drilled and trapped holes with clean, dry, oil-free compressed air.
- Wash in an ultrasonic bath with fresh Trichloroethylene.
- Wash with demineralized/distilled water to prevent oxidation layer on OFE copper surface.
- Place all components individually in polythene bags and seal for storage.

All components shall be stored in a polythene bags with sufficient desiccant to absorb atmospheric moisture. The above storing shall be finished as soon as after the cleaning.

20. Deviations

All the work on ion extractor grids must conform to the IPR specification and tolerances mentioned in the drawings unless a deviation is approved in the form of written change to the specification. Unless otherwise noted, this document with addenda, amendments and revisions in effect on the date of the contract shall apply. Later additions/subtractions may be used by mutual consent between Bidder and IPR without extra cost.

21. Identification of Grids

Each grid shall have an identification mark as mentioned below. The type and position of the identification mark shall be agreed with IPR. Marking of Prototype Acceleration grid is not required.

- AG-IPR-L (Acceleration Grid – IPR – Left half)
- AG-IPR-R (Acceleration Grid – IPR – Right half)
- DG-IPR-L (Deceleration Grid – IPR – Left half)
- DG-IPR-R (Deceleration Grid – IPR – Right half)
- EG-IPR-L (Earth Grid – IPR – Left Half)
- EG-IPR-R (Earth Grid – IPR – Right Half)

22. Packaging, Loading, Pick up and Transportation

The Bidder shall provide suitable packaging container with identification tags for each grids to protect from damages during loading, pick up and transportation of grid plates and fixtures from Bidder's premises

(i) To RRCAT, Indore (for OFE copper electro-deposition) and pick up from RRCAT

(ii) To the acceptance test place and pick up from this place

(iii) To IPR

The Bidder shall be liable for any kind of damages during transport and can take suitable insurance for the same. After completion of the work, Bidder shall also return the remaining material to IPR if any.

23. Information required with the tender Proposal

The following information is required to be submitted with the tender proposal so that IPR may evaluate the technical acceptability of the proposal.

(a) Outline time schedule, preferably in the form of bar chart. Comment on each and every clause in the drawing, technical specification and draft contract, indicating either acceptance or alternative proposals.

(b) Proposal for implementing Quality Control (QC) and Quality Assurance (QA) scheme.

(c) Lists of sub-contractors and the amount of work to be sub-contracted to them.

(d) Details of equipment are available for CNC machining, Quality Control (QC) and acceptance test.

(e) Price bid format is given with Tender document. Bidder is requested to quote each item mentioned in this format and same shall be considered for price comparative statements calculation.

(f) Complete execution plan for Fabrication of grids, fixtures and acceptance tests.

24. Bidder Compliance Matrix

SN	Description	Bidder Compliance
1	Bidder is gone through the entire tender document and understood the job needs to be executed	
2	Bidder is understood the deliverable items and delivery schedule mentioned in the tender document.	
3	Bidder is understood the critical dimensional tolerances mentioned in the drawings and technical challenges involved in the execution of the grid fabrication job mentioned in the tender document.	
4	Bidder is understood the grid fabrication route and confident for execution of the same.	
5	Bidder have facility for preparation of engineering and fabrication drawings and 3D model by CAD/CATIA software	
6	Bidder have CNC machining facility for doing the OFE copper grid fabrication job mentioned in the tender document	
7	Bidder have experience of OFE copper machining of similar kind of job done in the past	
8	Bidder have CMM measurement, surface roughness measurement facility	
9	Bidder have Electro-polishing, Ultrasonic Test and Radiography test facility ***or*** Would like to sub-contract this job.	
10	Bidder needs any prototype test sample fabrication to establish the fabrication route to achieve the dimensional tolerances mentioned in the tender document	

Important Note:

- IPR reserves the right to add / delete any item mentioned in the tender document.
- Bidder is requested to understand all the specifications, terms and conditions of this tender thoroughly, visit IPR and contact the Purchase Officer for any clarification if necessary.
- The Bidder should sign all pages in token of acceptance of the terms and condition and return the same to us.
- Deviations if any shall be clearly specified on separate sheet with all details.

Date Name & Signature of the Bidder

(Official Seal)

Place

Annexure – I

List of Drawings of OFE copper base plate with friction Welded stub rod

S.N.	Description	Drawing No	Title	Dimension (mm)
1	Prototype Acceleration Grid and Acceleration Grid	32010008AA_1 of 3	Friction welded SS304L stub rod to OFE copper base plate of Acceleration Grid	442 × 332 ×9
2		32010008AA_2 of 3	Local CNC machining of friction welded SS304L rod to OFE Copper base plate of Acceleration Grid	
3		32010008AA_3 of 3	Local CNC machining of friction welded SS304L stub rod to OFE Copper base plate of Acceleration Grid (To achieve Required centre to centre distance between stub pipes)	
4	Deceleration Grid	32030004AA_1 of 3	Friction welded SS304L stub rod to OFE copper base plate of Deceleration Grid	441 × 331 × 10
5		32030004AA_2 of 3	Local CNC machining of friction welded SS304L rod to OFE Copper base plate of Deceleration Grid	
6		32030004AA_3 of 3	Local CNC machining of friction welded SS304L stub rod to OFE Copper base plate of Deceleration Grid (To achieve Required center to center distance between stub pipes)	
7	Earth Grid	32040004AA_1 of 3	Friction welded SS304L stub rod to OFE copper base plate of Earth Grid	440 × 332 × 21
8		32040004AA_2 of 3	Local CNC machining of friction welded SS304L rod to OFE Copper base plate of Earth Grid	
9		32040004AA_3 of 3	Local CNC machining of friction welded SS304L stub rod to OFE Copper base plate of Earth Grid (To achieve Required center to center distance between stub pipes)	

Annexure – II

List of drawings of Prototype Acceleration Grid

Description	Drawing No	Title
Prototype Acceleration Grid	32050012	Prototype Acceleration Grid Before Electro-deposition
	32010001AA	Prototype Acceleration Grid After Electro-deposition

Annexure – III

List of drawings of Fixtures for Prototype Acceleration grid and other actual size Grids

S.N	Fixture for	Drawing Number	Description
1	Prototype Acceleration Grid	32010007AA\PGF1	Fixture-1 for Header and Channel Milling opposite to FW stub pipe side
		32010007AA\PGF2	Fixture-2 for Stub local machining, thickness etc. on FW stub pipe side
		32010007AA\PGF3	Fixture-3 for Electro-deposition
		32010007AA\PGF4_1 of 2	Fixture-4 for Aperture Drilling Stub Side
		32010007AA\PGF4_2 of 2	Fixture-4_Details of Holes for Aperture Drilling
		32010007AA\PGF5_1 of 2	Fixture-5 for Aperture Drilling opposite to Stub Side
		32010007AA\PGF5_2 of 2	Fixture-5_Details of Holes for Aperture Drilling
		32010007AA\PGF6_1 of 2	Fixture-6 for To maintain plate flatness
		32010007AA\PGF6_2 of 2	Fixture-6_Details of Holes and Rows for Aperture Drilling
		32010007AA\PGF7_1 of 2	Fixture-7 for To maintain plate flatness
		32010007AA\PGF7_2 of 2	Fixture-7_Details of Holes and Rows for Aperture Drilling
2	Acceleration Grid	32010006AA\AGF1_1 of 2	Fixture-1 for Header and Channel Milling opposite to FW stub pipe side
		32010006AA\AGF1_2 of 2	Fixture-1 for Header and Channel Milling opposite to FW stub pipe side
		32010006AA\AGF2_1 of 2	Fixture-2 for Stub local machining, thickness etc. on FW stub pipe side
		32010006AA\AGF2_2 of 2	Fixture-2 for Stub local machining, thickness etc. on FW stub pipe side
		32010006AA\AGF3	Fixture-3 for Electro-deposition
		32010006AA\AGF4_1 of 2	Fixture-4 for Aperture Drilling Stub Side
		32010006AA\AGF4_2 of 2	Fixture-4_Details of Holes for Aperture Drilling
		32010006AA\AGF5_1 of 2	Fixture-5 for Aperture Drilling opposite to Stub Side
		32010006AA\AGF5_2 of 2	Fixture-5_Details of Holes for Aperture Drilling
		32010006AA\AGF6_1 of 2	Fixture-6 for To maintain plate flatness
		32010006AA\AGF6_2of 2	Fixture-6_Details of Holes and Rows for Aperture Drilling
		32010006AA\AGF7_1 of 2	Fixture-7 for To maintain plate flatness
		32010006AA\AGF7_2 of 2	Fixture-7_Details of Holes and Rows for Aperture Drilling

3	Deceleration Grid	32030003AA\DGF1_1 of 4	Fixture-1 for 2 in 1 Fixture for header, channel milling and aperture drilling
		32030003AA\DGF1_2 of 4	Fixture-1_Details of holes in the portion used for aperture drilling
		32030003AA\DGF1_3 of 4	Fixture-1_Details of holes in the portion used for channel, header milling
		32030003AA\DGF1_4 of 4	Fixture-1_ C/s details of holes in the portion used for aperture drilling.
		32030003AA\DGF2	Fixture-2 for Electro-deposition
		32030003AA\DGF3_1 of 2	Fixture-3 for To maintain plate flatness
		32030003AA\DGF3_2 of 2	Fixture-3_Details of Pockets and Holes of DGF3
		32030003AA\DGF4_1 of 2	Fixture-4 for To maintain plate flatness
		32030003AA\DGF4_2 of 2	Fixture-4_Details of Pockets and Holes of DGF4
4	Earth Grid	32040003AA\EGF1	Fixture-1 for Header and Channel Milling
		32040003AA\EGF2	Fixture-2 for Electro-deposition
		32040003AA\EGF3_1 of 3	Fixture-3 for 2in1 Fixture for Aperture Drilling and Profile Milling
		32040003AA\EGF3_2 of 3	Fixture-3_Details of Holes for Aperture Drilling
		32040003AA\EGF3_3 of 3	Fixture-3_Details of Holes for Profile Milling

Annexure – IV

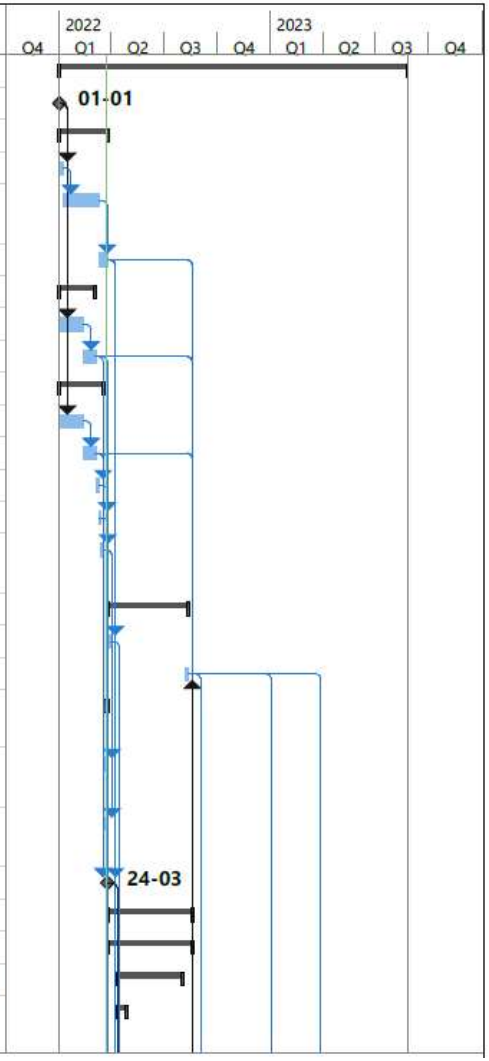
List of drawings of Acceleration, Deceleration and Earth Grid

S.N.	Description	Drawing No.	Title
1	Acceleration Grid	32010005_1 of 10	Acceleration Grid assembly Version without holes
		32010005_2 of 10	Acceleration Grid Left Version without holes
		32010005_3 of 10	Base plate Acceleration Grid Left
		32010005_4 of 10	Acceleration Grid Right Version without holes
		32010005_5 of 10	Base plate Acceleration Grid Right
		32010005_6 of 10	Stiffener for Acceleration Grid Left and Right
		32010005_7 of 10	Floating Screw for Acceleration Grid (M5 ×12)
		32010005_8 of 10	Fixed Screw for Acceleration Grid(M5 × 25)
		32010005_9 of 10	Floating Screw for Acceleration Grid Stiffener
		32010005_10 of 10	Fixed Screw for Acceleration Grid Stiffener
2	Deceleration Grid	32030002_1 of 9	Deceleration Grid Assembly Version without holes
		32030002_2 of 9	Deceleration Grid Left
		32030002_3 of 9	Base plate for Deceleration Grid Left _1of2
		32030002_4 of 9	Base plate for Deceleration Grid Left _2of2
		32030002_5 of 9	Deceleration Grid Right
		32030002_6 of 9	Base plate for Deceleration Grid Right_1of2
		32030002_7 of 9	Base plate for Deceleration Grid Right_2of2
		32030002_8 of 9	Fixed Point Screw (M5 × 25)
		32030002_9 of 9	Floating Point Screw (M5 ×12)
3	Earth Grid	32040002_1 of 15	Earth Grid Assembly
		32040002_2 of 15	Earth Grid Left
		32040002_3 of 15	Base plate for Earth Grid Left _1of2
		32040002_4 of 15	Base plate for Earth Grid Left _2of2
		32040002_5 of 15	Earth Grid Right
		32040002_6 of 15	Base plate for Earth Grid Right_1of2
		32040002_7 of 15	Base plate for Earth Grid Right_2of2
		32040002_8 of 15	Floating Screw for Grid (M5 × 23)
		32040002_9 of 15	Fixed Screw for Grid (M5 × 25)
		32040002_10 of 15	Stiffener, Fixed and Floating Screws for Earth Grid Left
		32040002_11 of 15	Stiffener for Earth Grid Left
		32040002_12 of 15	Floating Screw for Stiffener - Earth Grid
		32040002_13 of 15	Fixed Screw for Stiffener - Earth Grid
		32040002_14 of 15	Stiffener, Fixed and Floating Screws for Earth Grid Right
		32040002_15 of 15	Stiffener for Earth Grid Right

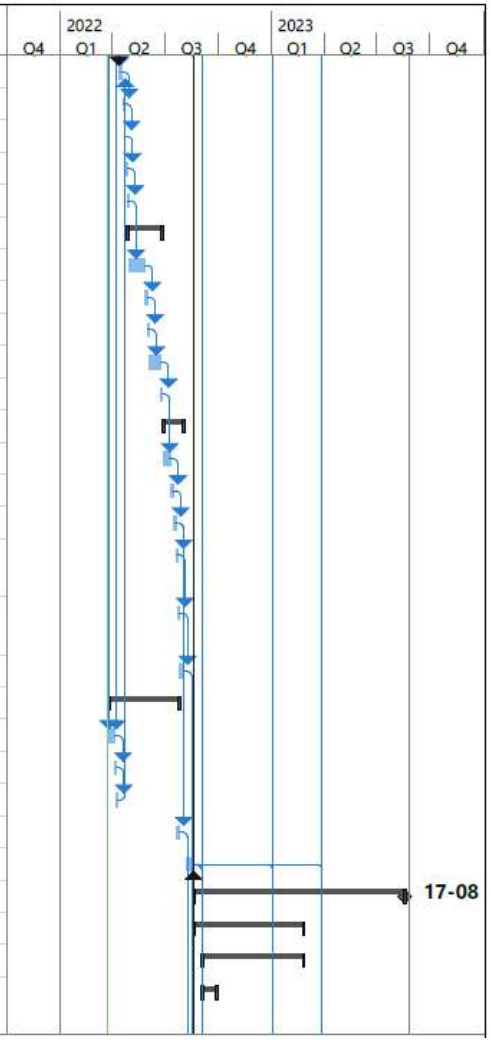
Annexure –V

Suggested work execution Schedule for Ion extractor Grid fabrication

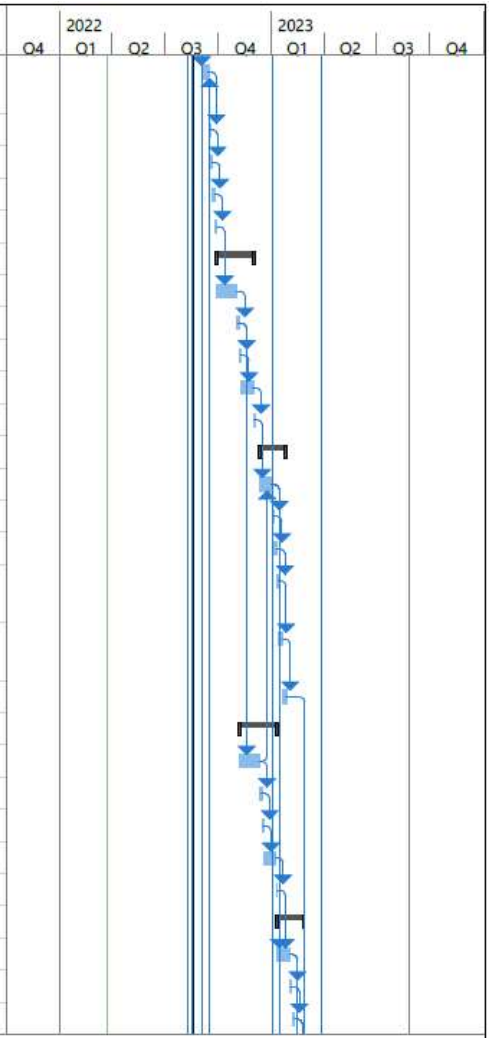
ID	Task Mode	Task Name	Start	Finish
1		**Manufacturing and Supply of Ion extraction grid**	**Sat 01-01-22**	**Thu 24-08-23**
2		Letter of Intent (LOI) / Contract Signature	Sat 01-01-22	Sat 01-01-22
3		**Approval of Engineering / Fabrication drawings and Models**	**Sat 01-01-22**	**Thu 24-03-22**
4		Study of Conceptual Drawings supplied by IPR	Sat 01-01-22	Thu 06-01-22
5		Preparation of Engineering and Fabrication drawings and Models and submission to IPR	Fri 07-01-22	Thu 10-03-22
6		Review and Approval by IPR	Fri 11-03-22	Thu 24-03-22
7		**Approval of Quality Documents**	**Sat 01-01-22**	**Thu 03-03-22**
8		Preparation of Quality documents and submission to IPR	Sat 01-01-22	Thu 10-02-22
9		Review and Approval by IPR	Fri 11-02-22	Thu 03-03-22
10		**Acceptance of Procured raw material**	**Sat 01-01-22**	**Fri 18-03-22**
11		Procurement and submission of test reports to IPR	Sat 01-01-22	Thu 10-02-22
12		Review and acceptance by IPR	Fri 11-02-22	Thu 03-03-22
13		Transporttion of OFE Copper Material from bidder's place to IPR	Fri 04-03-22	Thu 10-03-22
14		Receipt at IPR	Fri 11-03-22	Fri 11-03-22
15		Supply of OFE copper material to exectue trials to establish CNC machining and anode material for electrodeposition	Mon 14-03-22	Fri 18-03-22
16		**Supply of Free Issue Material (OFE Copper plate with stub pipe)**	**Fri 25-03-22**	**Thu 11-08-22**
17		Supply of FIM for Phase - I	Fri 25-03-22	Thu 31-03-22
18		Supply of FIM for Phase - II	Fri 05-08-22	Thu 11-08-22
19		**Trails to establish CNC machining parameters and Electrodeposition parameters**	**Mon 21-03-22**	**Fri 25-03-22**
20		Trails to establish CNC machining parameters by bidder and report submission to IPR	Mon 21-03-22	Fri 25-03-22
21		Trails to establish Electrodeposition parameters by RRCAT and report submission to IPR	Mon 21-03-22	Fri 25-03-22
22		Clearance from IPR to start the Phase - I execution	Thu 24-03-22	Thu 24-03-22
23		**Execution of Phase - I**	**Fri 25-03-22**	**Thu 18-08-22**
24		**Manufacturing and supply of Prototype Acceleration Grid (PAG)**	**Fri 25-03-22**	**Thu 18-08-22**
25		**Fabrication and Delivery of Prototype Acceleration Grid (PAG)**	**Mon 11-04-22**	**Mon 01-08-22**
26		**Local Machining of Stub pipe and OFE Copper plate for PAG (400 mm × 150 mm)**	**Mon 11-04-22**	**Wed 27-04-22**



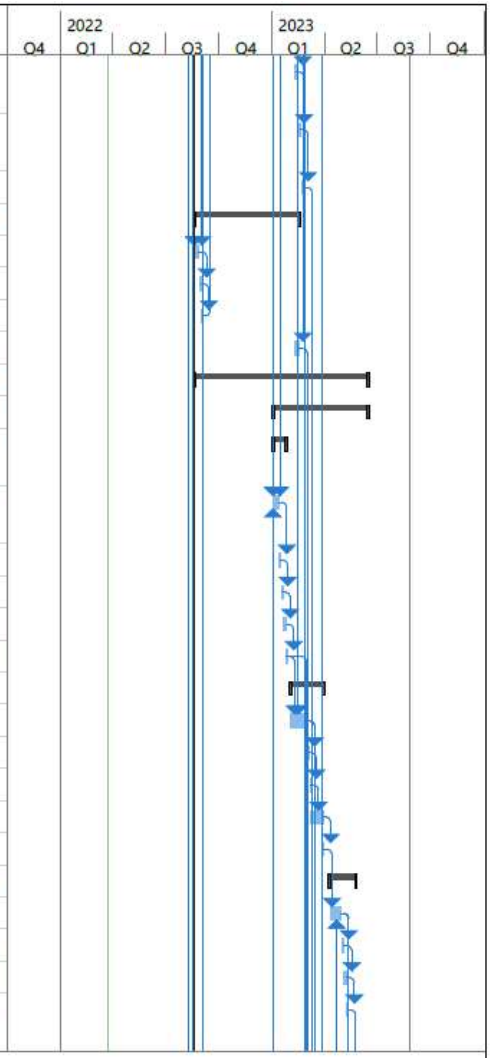
ID	Task Mode	Task Name	Start	Finish
27		Local Machining of Stub pipe and OFE Copper plate for PAG	Mon 11-04-22	Fri 15-04-22
28		Dimension Inspection and acceptance	Mon 18-04-22	Tue 19-04-22
29		Packing and transportation to RRCAT	Wed 20-04-22	Thu 21-04-22
30		Inspection and acceptance at RRCAT	Fri 22-04-22	Mon 25-04-22
31		Packing and Transportation from RRCAT to bidder's place	Tue 26-04-22	Wed 27-04-22
32		**1st stage CNC Machining of PAG (400 mm × 150 mm)**	**Thu 28-04-22**	**Fri 24-06-22**
33		1st stage CNC Machining of PAG	Thu 28-04-22	Wed 25-05-22
34		Inspection and Acceptance of 1st stage CNC Machining	Thu 26-05-22	Mon 30-05-22
35		Packing and Transportation to RRCAT for Electrodeposition	Tue 31-05-22	Wed 01-06-22
36		Electrodeposition, Inspection and Acceptance at RRCAT	Thu 02-06-22	Wed 22-06-22
37		Packing and Transportation from RRCAT to Bidder place	Thu 23-06-22	Fri 24-06-22
38		**2nd stage CNC Machining of PAG (400 mm × 150 mm)**	**Mon 27-06-22**	**Mon 01-08-22**
39		2nd stage CNC Machining of PAG	Mon 27-06-22	Fri 08-07-22
40		Inspection and Acceptance of 2nd stage CNC Machining	Mon 11-07-22	Wed 13-07-22
41		Electro Polishing	Thu 14-07-22	Mon 18-07-22
42		Packing and Transportation from bidder's place to RRCAT for final Inspection and Acceptance test of PAG	Tue 19-07-22	Wed 20-07-22
43		Final Inspection and Factory Acceptance (Vaccum baking, final leak test,etc.) of PAG	Thu 21-07-22	Mon 25-07-22
44		Packing and Transportation from RRCAT to IPR	Tue 26-07-22	Mon 01-08-22
45		**Fabrication and delivery of Fixtures for PAG**	**Fri 25-03-22**	**Mon 25-07-22**
46		Fabrication of Fixtures for PAG	Fri 25-03-22	Mon 04-04-22
47		Inspection and record submission to IPR for approval	Tue 05-04-22	Wed 06-04-22
48		Approval from IPR	Thu 07-04-22	Fri 08-04-22
49		Packing and Transportation from bidder's place to IPR	Tue 19-07-22	Mon 25-07-22
50		Clearance from IPR to start the Phase - II execution	Fri 05-08-22	Thu 18-08-22
51		**Execution of Phase-II**	**Fri 19-08-22**	**Thu 17-08-23**
52		**Manufacturing and supply of Acceleration Grid (AG) Left and Right**	**Fri 19-08-22**	**Fri 24-02-23**
53		**Fabrication of Acceleration Grid**	**Fri 02-09-22**	**Fri 24-02-23**
54		**Local Machining of Stub pipe and OFE Copper plate for AG Left and Right**	**Fri 02-09-22**	**Tue 27-09-22**



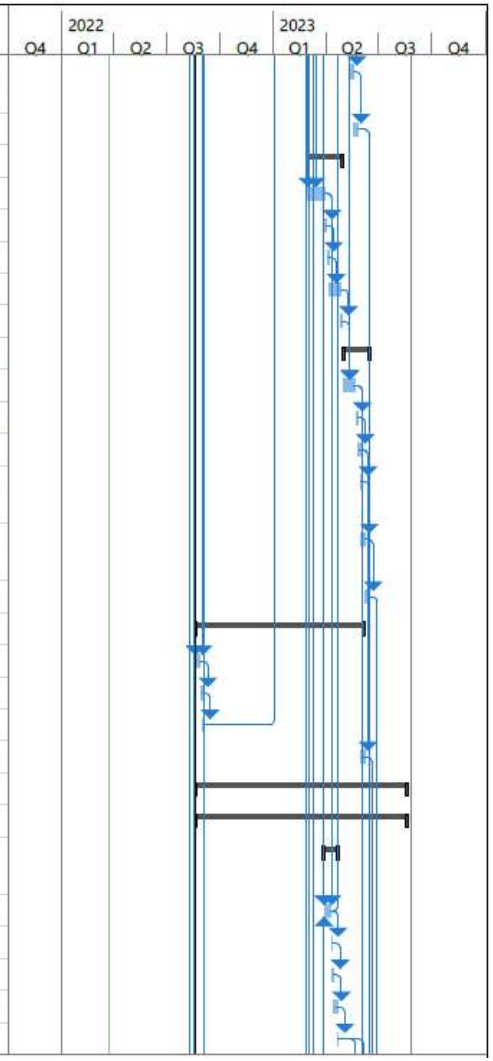
ID	Task Mode	Task Name	Start	Finish
55		Local Machining of Stub pipe and OFE Copper plate for AG-L and AG-R	Fri 02-09-22	Tue 13-09-22
56		Dimension Inspection and acceptance	Wed 14-09-22	Thu 15-09-22
57		Packing and transportation to RRCAT	Fri 16-09-22	Mon 19-09-22
58		Inspection and acceptance at RRCAT	Tue 20-09-22	Fri 23-09-22
59		Packing and Transportation from RRCAT to bidder's place	Mon 26-09-22	Tue 27-09-22
60		**1st stage CNC Machining of AG-L**	**Wed 28-09-22**	**Thu 01-12-22**
61		1st stage CNC machining	Wed 28-09-22	Tue 01-11-22
62		Inspection and Acceptance of 1st stage CNC Machining	Wed 02-11-22	Fri 04-11-22
63		Packing and Transportation to RRCAT for Electrodeposition	Mon 07-11-22	Tue 08-11-22
64		Electrodeposition, Inspection and Acceptance at RRCAT	Wed 09-11-22	Tue 29-11-22
65		Packing and Transportation from RRCAT to Bidder place	Wed 30-11-22	Thu 01-12-22
66		**2nd stage CNC Machining of AG-L**	**Mon 12-12-22**	**Wed 25-01-23**
67		2nd stage CNC machining	Mon 12-12-22	Fri 30-12-22
68		Inspection and Acceptance of 2nd stage CNC Machining	Mon 02-01-23	Wed 04-01-23
69		Electro Polishing	Thu 05-01-23	Mon 09-01-23
70		Packing and Transportation from bidder's place to RRCAT for final Inspection and Acceptance test of AG-L	Tue 10-01-23	Wed 11-01-23
71		Final Inspection and Factory Acceptance (Vaccum baking, final leak test,etc.) of AG-L	Thu 12-01-23	Wed 18-01-23
72		Packing and Transportation from RRCAT to IPR	Thu 19-01-23	Wed 25-01-23
73		**1st stage CNC Machining of AG-R**	**Mon 07-11-22**	**Tue 10-01-23**
74		1st stage CNC machining	Mon 07-11-22	Fri 09-12-22
75		Inspection and Acceptance of 1st stage CNC Machining	Mon 12-12-22	Wed 14-12-22
76		Packing and Transportation to RRCAT for Electrodeposition	Thu 15-12-22	Fri 16-12-22
77		Electrodeposition, Inspection and Acceptance at RRCAT	Mon 19-12-22	Fri 06-01-23
78		Packing and Transportation from RRCAT to Bidder place	Mon 09-01-23	Tue 10-01-23
79		**2nd stage CNC Machining of AG-R**	**Wed 11-01-23**	**Fri 24-02-23**
80		2nd stage CNC machining	Wed 11-01-23	Tue 31-01-23
81		Inspection and Acceptance of 2nd stage CNC Machining	Wed 01-02-23	Fri 03-02-23
82		Electro Polishing	Mon 06-02-23	Wed 08-02-23



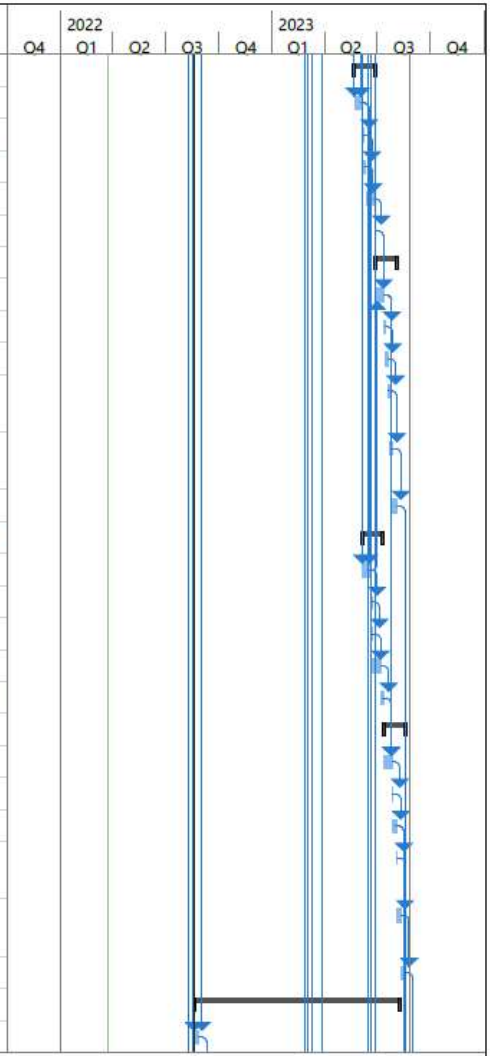
ID	Task Mode	Task Name	Start	Finish
83		Packing and Transportation from bidder's place to RRCAT for final Inspection and Acceptance test of AG-R	Thu 09-02-23	Fri 10-02-23
84		Final Inspection and Factory Acceptance (Vaccum baking, final leak test,etc.) of AG-R	Mon 13-02-23	Fri 17-02-23
85		Packing and Transportation from RRCAT to IPR	Mon 20-02-23	Fri 24-02-23
86		**Fabrication and delivery of Fixtures for AG**	**Fri 19-08-22**	**Wed 15-02-23**
87		Fabrication of Fixtures for AG	Fri 19-08-22	Fri 26-08-22
88		Inspection and record submission to IPR for approval	Mon 29-08-22	Tue 30-08-22
89		Approval from IPR	Wed 31-08-22	Thu 01-09-22
90		Packing and Transportation from bidder's place to IPR	Thu 09-02-23	Wed 15-02-23
91		**Manufacturing and supply of Deceleration Grid (DG) Left and Right**	**Fri 19-08-22**	**Wed 14-06-23**
92		**Fabrication of Deceleration Grid**	**Mon 02-01-23**	**Wed 14-06-23**
93		**Local Machining of Stub pipe and OFE Copper plate for DG Left and Right**	**Mon 02-01-23**	**Wed 25-01-23**
94		Local Machining of Stub pipe and OFE copper plate for DG-L and DG-R	Mon 02-01-23	Wed 11-01-23
95		Dimension Inspection and acceptance	Thu 12-01-23	Fri 13-01-23
96		Packing and transportation to RRCAT	Mon 16-01-23	Tue 17-01-23
97		Inspection and acceptance at RRCAT	Wed 18-01-23	Mon 23-01-23
98		Packing and Transportation from RRCAT to bidder's place	Tue 24-01-23	Wed 25-01-23
99		**1st stage CNC Machining of DG-L**	**Wed 01-02-23**	**Thu 30-03-23**
100		1st stage CNC machining	Wed 01-02-23	Tue 28-02-23
101		Inspection and Acceptance of 1st stage CNC Machining	Wed 01-03-23	Fri 03-03-23
102		Packing and Transportation to RRCAT for Electrodeposition	Mon 06-03-23	Tue 07-03-23
103		Electrodeposition, Inspection and Acceptance at RRCAT	Wed 08-03-23	Tue 28-03-23
104		Packing and Transportation from RRCAT to Bidder place	Wed 29-03-23	Thu 30-03-23
105		**2nd stage CNC Machining of DG-L**	**Mon 10-04-23**	**Wed 24-05-23**
106		2nd stage CNC machining	Mon 10-04-23	Fri 28-04-23
107		Inspection and Acceptance of 2nd stage CNC Machining	Mon 01-05-23	Wed 03-05-23
108		Electro Polishing	Thu 04-05-23	Mon 08-05-23
109		Packing and Transportation from bidder's place to RRCAT for final Inspection and Acceptance test of DG-L	Tue 09-05-23	Wed 10-05-23



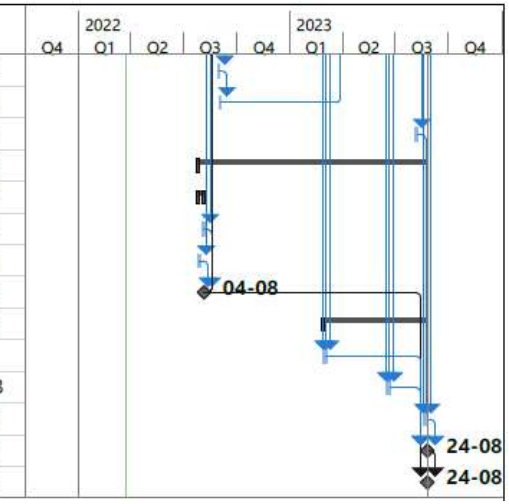
ID	Task Mode	Task Name	Start	Finish
110		Final Inspection and Factory Acceptance (Vaccum baking, final leak test,etc.) of DG-L	Thu 11-05-23	Wed 17-05-23
111		Packing and Transportation from RRCAT to IPR	Thu 18-05-23	Wed 24-05-23
112		**1st stage CNC Machining of DG-R**	**Wed 01-03-23**	**Thu 27-04-23**
113		1st stage CNC machining	Wed 01-03-23	Tue 28-03-23
114		Inspection and Acceptance of 1st stage CNC Machining	Wed 29-03-23	Fri 31-03-23
115		Packing and Transportation to RRCAT for Electrodeposition	Mon 03-04-23	Tue 04-04-23
116		Electrodeposition, Inspection and Acceptance at RRCAT	Wed 05-04-23	Tue 25-04-23
117		Packing and Transportation from RRCAT to Bidder place	Wed 26-04-23	Thu 27-04-23
118		**2nd stage CNC Machining of DG-R**	**Mon 01-05-23**	**Wed 14-06-23**
119		2nd stage CNC machining	Mon 01-05-23	Fri 19-05-23
120		Inspection and Acceptance of 2nd stage CNC Machining	Mon 22-05-23	Wed 24-05-23
121		Electro Polishing	Thu 25-05-23	Mon 29-05-23
122		Packing and Transportation from bidder's place to RRCAT for final Inspection and Acceptance test of DG-R	Tue 30-05-23	Wed 31-05-23
123		Final Inspection and Factory Acceptance (Vaccum baking, final leak test,etc.) of DG-R	Thu 01-06-23	Wed 07-06-23
124		Packing and Transportation from RRCAT to IPR	Thu 08-06-23	Wed 14-06-23
125		**Fabrication and delivery of Fixtures for DG**	**Fri 19-08-22**	**Mon 05-06-23**
126		Fabrication of Fixtures for DG	Fri 19-08-22	Fri 26-08-22
127		Inspection and record submission to IPR for approval	Mon 29-08-22	Tue 30-08-22
128		Approval from IPR	Wed 31-08-22	Thu 01-09-22
129		Packing and Transportation from bidder's place to IPR	Tue 30-05-23	Mon 05-06-23
130		**Manufacturing and supply of Earth Grid (EG) Left and Right**	**Fri 19-08-22**	**Thu 17-08-23**
131		**Fabrication of Earth Grid**	**Fri 19-08-22**	**Thu 17-08-23**
132		**Local Machining of Stub pipe and OFE Copper plate for EG Left and Right**	**Wed 29-03-23**	**Fri 21-04-23**
133		Local Machining of Stub pipe and OFE copper plate for EG-L and EG-R	Wed 29-03-23	Fri 07-04-23
134		Dimension Inspection and acceptance	Mon 10-04-23	Tue 11-04-23
135		Packing and transportation to RRCAT	Wed 12-04-23	Thu 13-04-23
136		Inspection and acceptance at RRCAT	Fri 14-04-23	Wed 19-04-23
137		Packing and Transportation from RRCAT to bidder's place	Thu 20-04-23	Fri 21-04-23



ID	Task Mode	Task Name	Start	Finish
138		**1st stage CNC Machining of EG-L**	**Mon 22-05-23**	**Tue 27-06-23**
139		1st stage CNC Machining	Mon 22-05-23	Fri 02-06-23
140		Inspection and Acceptance of 1st stage CNC Machining	Mon 05-06-23	Wed 07-06-23
141		Packing and Transportation to RRCAT for Electrodeposition	Thu 08-06-23	Fri 09-06-23
142		Electrodeposition, Inspection and Acceptance at RRCAT	Mon 12-06-23	Fri 23-06-23
143		Packing and Transportation from RRCAT to Bidder place	Mon 26-06-23	Tue 27-06-23
144		**2nd stage CNC Machining of EG-L**	**Wed 28-06-23**	**Thu 03-08-23**
145		2nd stage CNC machining	Wed 28-06-23	Tue 11-07-23
146		Inspection and Acceptance of 2nd stage CNC Machining	Wed 12-07-23	Thu 13-07-23
147		Electro Polishing	Fri 14-07-23	Tue 18-07-23
148		Packing and Transportation from bidder's place to RRCAT for final Inspection and Acceptance test of EG-L	Wed 19-07-23	Thu 20-07-23
149		Final Inspection and Factory Acceptance (Vaccum baking, final leak test,etc.) of EG-L	Fri 21-07-23	Thu 27-07-23
150		Packing and Transportation from RRCAT to IPR	Fri 28-07-23	Thu 03-08-23
151		**1st stage CNC Machining of EG-R**	**Mon 05-06-23**	**Mon 10-07-23**
152		1st stage CNC Machining	Mon 05-06-23	Fri 16-06-23
153		Inspection and Acceptance of 1st stage CNC Machining	Mon 19-06-23	Tue 20-06-23
154		Packing and Transportation to RRCAT for Electrodeposition	Wed 21-06-23	Thu 22-06-23
155		Electrodeposition, Inspection and Acceptance at RRCAT	Fri 23-06-23	Thu 06-07-23
156		Packing and Transportation from RRCAT to Bidder place	Fri 07-07-23	Mon 10-07-23
157		**2nd stage CNC Machining of EG-R**	**Wed 12-07-23**	**Thu 17-08-23**
158		2nd stage CNC machining	Wed 12-07-23	Tue 25-07-23
159		Inspection and Acceptance of 2nd stage CNC Machining	Wed 26-07-23	Thu 27-07-23
160		Electro Polishing	Fri 28-07-23	Tue 01-08-23
161		Packing and Transportation from bidder's place to RRCAT for final Inspection and Acceptance test of EG-R	Wed 02-08-23	Thu 03-08-23
162		Final Inspection and Factory Acceptance (Vaccum baking, final leak test,etc.) of EG-R	Fri 04-08-23	Thu 10-08-23
163		Packing and Transportation from RRCAT to IPR	Fri 11-08-23	Thu 17-08-23
164		**Fabrication and delivery of Fixtures for EG**	**Fri 19-08-22**	**Tue 08-08-23**
165		Fabrication of Fixtures for DG	Fri 19-08-22	Fri 26-08-22



ID	Task Mode	Task Name	Start	Finish
166		Inspection and record submission to IPR for approval	Mon 29-08-22	Tue 30-08-22
167		Approval from IPR	Wed 31-08-22	Thu 01-09-22
168		Packing and Transportation from bidder's place to IPR	Wed 02-08-23	Tue 08-08-23
169		**Site Acceptance at IPR**	**Tue 26-07-22**	**Thu 24-08-23**
170		**Site Acceptance of deliverables for Phase - I**	**Tue 26-07-22**	**Thu 04-08-22**
171		Site Acceptance of PAG	Tue 02-08-22	Thu 04-08-22
172		Site Acceptance of Fixtures	Tue 26-07-22	Thu 28-07-22
173		Acceptance of all deliverables for Phase - I	Thu 04-08-22	Thu 04-08-22
174		**Site Acceptance of deliverables for Phase - II**	**Mon 27-02-23**	**Thu 24-08-23**
175		Site Acceptance of AG (L&R) and Fixtures	Mon 27-02-23	Fri 03-03-23
176		Site Acceptance of DG (L&R) and Fixtures	Thu 15-06-23	Wed 21-06-23
177		Site Acceptance of EG (L&R) and Fixtures	Fri 18-08-23	Thu 24-08-23
178		Acceptance of all deliverables for Phase - II	Thu 24-08-23	Thu 24-08-23
179		**Contract Closure**	Thu 24-08-23	Thu 24-08-23



Project: New_24.3.22_Reference
Date: Thu 24-03-22

Task
Split
Milestone
Summary
Project Summary
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
External Tasks
External Milestone
Deadline
Progress
Manual Progress

Annexure – VI

List of Drawings of OFE Copper Base Plate before Electro Deposition

S.N.	Description	Drawing No.	Title
1	Acceleration Grid	32050009	Base plate Acceleration Grid before Electro deposition
2	Deceleration Grid	32050010_1 of 2	Base plate Deceleration Grid before Electro deposition
		32050010_2 of 2	
3	Earth Grid	32050011_1 of 2	Base plate Earth Grid before Electro deposition
		32050011_2 of 2	

Note: Dwg. No. 32050009 is common drawing for both Acceleration Grid Left half and Acceleration Grid Right half before electro-deposition. After final layer of OFE copper electro-deposition on the base plate, further CNC machining shall be carried out for fabrication of Left and Right halves respectively.

Similarly dwg. No. 32050010 and dwg. No. 32050011 are common drawings for Deceleration Grid Left & Right and Earth Grid Left & Right respectively before electro-deposition.

Annexure – VII

Manufacturing and Inspection Plan for Ion extraction grid					
CODE	**ACTIVITY**	**APPLICABLE DOCUMENT**	**RESPONSIBILITY**		**List of Records**
			Manufacturer	**IPR**	
10	Preparation of Manufacturing drawings *(Prototype Acceleration grid, Actual size Acceleration, Deceleration, Earth grids and all required CNC machining fixtures)*	Eng. Drawings	PR		
20	Approval of Mfg. drawings	Mfg. Drawings	HP	HP	Approval from Manu. & IPR
30	Approval of Manufacturing Procedures	Mfg. Procedure	HP	HP	Approval from Manu. & IPR
40.a	Acceptance of OFE copper base plate with Friction Welded (FW) stub rod supplied by IPR including Dimension Inspection and Ultrasonic Testing	Test report, ASME Section V	HP	HP	Material Test certificate and Inspection report.
40.b	Acceptance of Procured (by Bidder) raw material, OFE copper, Aluminium alloy, 6061T6 and G10/Epoxy	Test Report	HP	HP	Signed "HP" point of Annex. VII
Phase-1 (Prototype Acceleration Grid) and Phase-2 [Acceleration grid (left & right), Deceleration grid (left & right) & Earth grid (left& right)]					
50	CNC machining of stub pipe and OFE copper plate near the friction welded stub rod area	Manu. Procedure	PR		Job Card
60	Dimension Inspection	Insp. Procedure	PR	W	Dimension Inspection report
70	Packaging	Manu. Procedure	PR	W	Job Card

80	Loading and Transportation from Bidder's place to RRCAT	Quality Procedure	PR		Job Card
90	Leak Testing and acceptance	Quality Procedure	W	PR	Leak test record
100	Packaging	Manu. Procedure	PR	W	Job Card
110	Loading and Transportation from RRCAT to Bidder's place	Quality Procedure	PR		Job Card
120	CNC Machining of two FW stub rod (for making stub pipe for water header)	Manu. Procedure	PR		Job Card
130	Dimensional Measurement of two stub pipes by CMM	Insp. Procedure	PR	W	Dimension Inspection report
140	CNC milling of thickness, water cooling channels and manifolds	Manu. Procedure	PR		Job Card
150	Dimensional Measurement of machined base plate thickness, cooling channels and manifolds by CMM	Insp. Procedure	PR	W	Dimensional Inspection report
160	Cleaning of CNC machined base plate	Manu. Procedure	PR		Job Card
170	Cleanliness checking	ASME	PR		Job Card
180	Acceptance of 1st stage of CNC machining	Insp. Procedure	HP	HP	Signed MIP
190	Packaging	Manu. Procedure	PR	W	Job Card
200	Loading and Transportation from Bidder's place to RRCAT	Quality Procedure	PR		Job Card
210	Ultrasonic Measurement of 1st layer thickness of ED OFE copper plate at RRCAT	Insp. Procedure	W	PR	Inspection report

220	Radiographic Inspection and acceptance	Insp. Procedure	PR	W	
230	Loading and Transportation from RRCAT to perform further operations	Quality Procedure	PR		Job Card
240	Vacuum Baking: 4 cycles at 180° C to 200° C (max.), 1 hour at $< 10^{-4}$ mbar	Manu. Procedure		PR	Job Card, Baking report
250	Integrated leak test in Poly Ethylene (PE) bag at room temperature	Insp. Procedure	W	PR	Leak test report
260	Ultrasonic Measurement of 2nd layer thickness of ED OFE copper	Insp. Procedure	W	PR	Inspection report
270	Packaging	Manu. Procedure	PR	W	Job Card
280	Loading and Transportation from RRCAT to Bidder's place	Quality Procedure	PR		Job Card
290	2nd stage CNC machining (outer contour, thickness and drilling apertures etc.)	Manu. Procedure	PR		Job Card
300	CMM measurement for final QC	Insp. Procedure	PR	W	Dimensional Inspection report
310	Ultrasonic measurement of copper thickness	Insp. Procedure	PR	W	UT report
320	Cleaning of CNC machined grid plate	Manu. Procedure	PR		Job Card
330	4 cycles vacuum baking at 180° C to 200° C (max.), 1 hour at $<10^{-4}$ mbar	Insp. Procedure & Table -6 given in tender document		PR	Job Card
340	(*a*) Pressure test at 17 bar Nitrogen gas for 30 min (1 cycle) outside of a vacuum chamber at room temperature (*b*) Pressure test at 16 bar Nitrogen for 1 min (9 cycles) inside of the vacuum chamber at room temperature.		W	PR	Pressure Leak test report
350	Integrated leak test in Poly Ethylene (PE) bag		W	PR	Leak test report
360	Electro Polishing	Manu. Procedure	PR	W	Job Card

370	Final surface control e.g. surface roughness (before and after electro-polishing), surface flatness	Manu. Procedure	PR	W	Inspection report
380	4 cycles vacuum baking at 180° C to 200° C (max.), 1 hour at 10^{-4} < mbar	Insp. Procedure & Table -6 given in tender document		PR	Job Card
390	Final leak test with 16 bar Helium gas pressure inside vacuum chamber (<1×10^{-4} mbar)at room temperature		W	PR	Inspection report
400	Cleaning and cleanliness inspection	Manu. Procedure	PR	W	Job Card
410	Packaging and Transport to IPR	Manu. Procedure	PR		Packaging record
420	Site Acceptance	Contract document	HP	HP	Signed acceptance report
XX	Non-Conformance Report Preparation	Quality Procedure	PR		Non-Conformance Report
XX	Non-Conformance Report Review and Approval	Quality Procedure	HP	HP	Non-Conformance Report

Annexure – VIII

Manufacturing and inspection plan for raw material procurement (non-ferrous material, OFE copper plates, Aluminium alloy, 6061T6 & G10/Epoxy)					
CODE	**ACTIVITY**	**APPLICABLE DOCUMENT**	**RESPONSIBILITY**		**List of Records**
			Manufacturer	**IPR**	
10	Receipt of Test report	Material Specification	PR		
20	Review of Test report	Material Specification	PR	DR	Material test records
30	Approval of test report and clearance for use of material		HP	HP	Signed MIP
XX	Non-Conformance Report Preparation	Quality Procedure	PR		Non-Conformance Report
XX	Non-Conformance Report Review and Approval	Quality Procedure	HP	HP	Non-Conformance Report

Definitions for the code used in Manufacturing and Inspection Plan

(1) **PR (Performer)**: This code to be assigned to the activities / operations which will be executed by contractor.

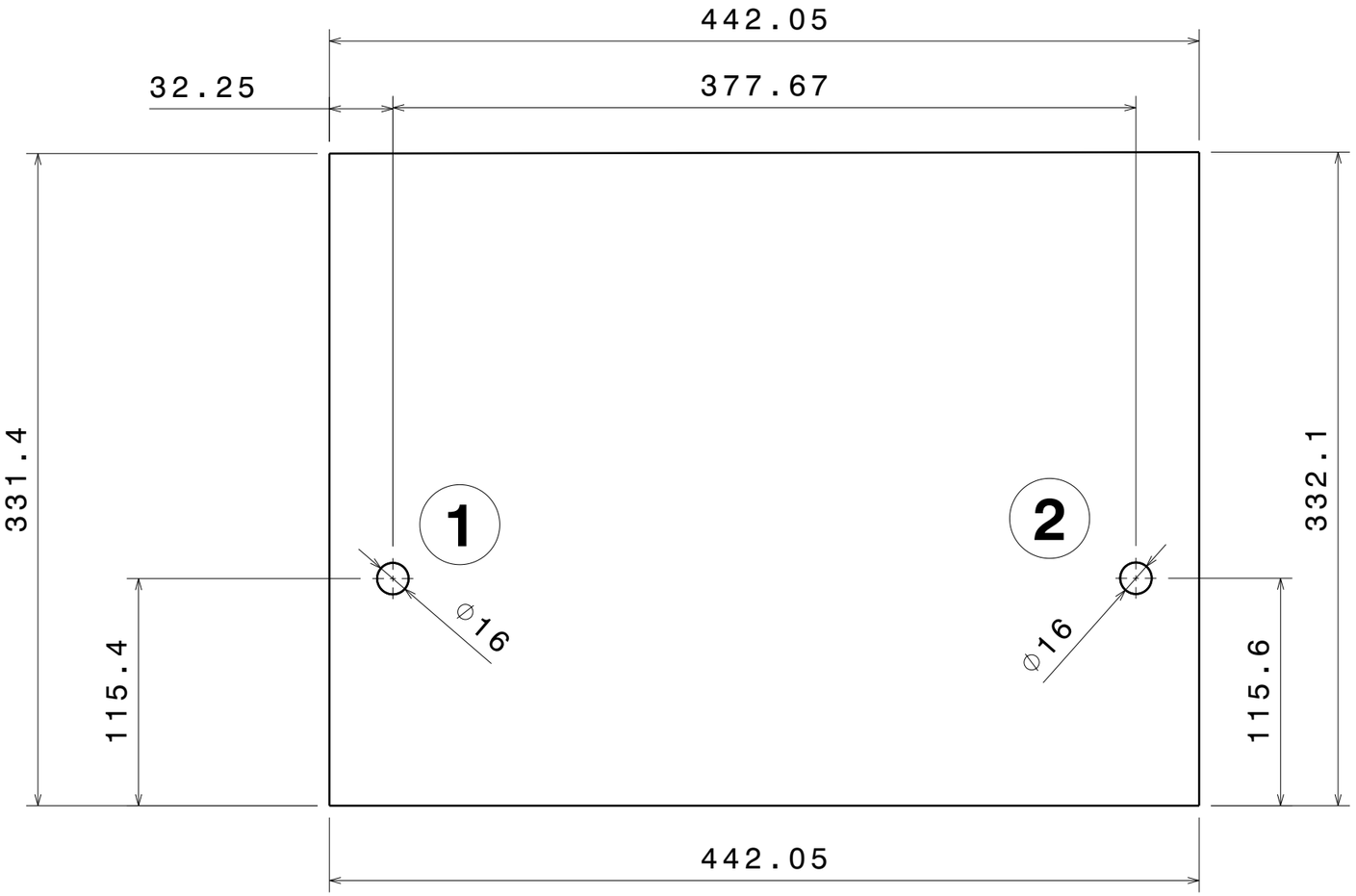
(2) **W (Witness)**: This code to be assigned to the operations / activities which will be witnessed by assigned inspector of purchaser or third party inspection agency (TPIA). In general, all activities will be divide under two groups:

   (a) **W1**: This code to be assigned to the operation / activity for all components which will be 100% witnessed by assigned inspector of purchaser or TPIA.

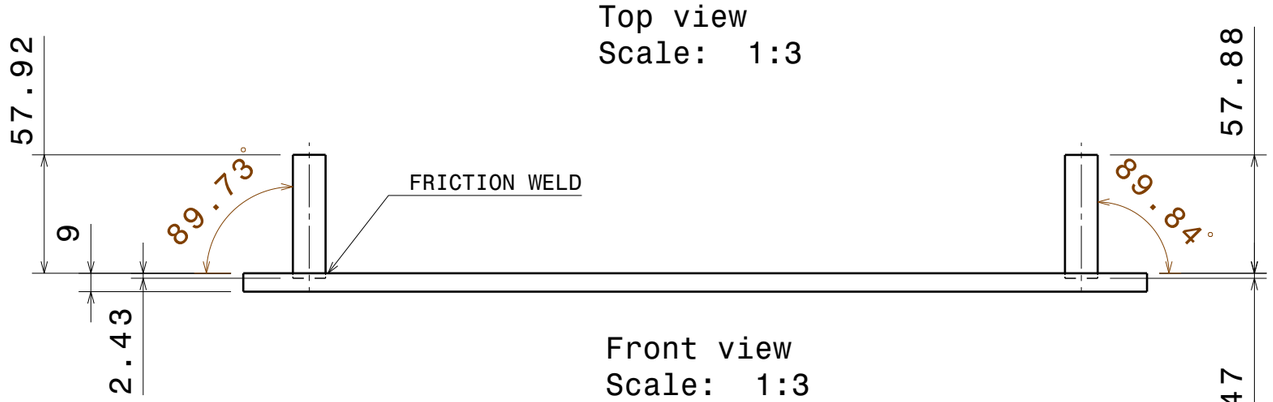
   (b) **W2**: This code to be assigned to the operation / activity which will be witnessed on sample basis. The exact % or number of components/lot will be decided once the qualification program is over. Procedure to select samples will be mutually agreed between purchaser and contractor prior to start the work.

(3) **DR (Document Review)**: This code to be assigned to the operations / activities where inspector of purchaser or TPIA will perform the review of submitted documents to make sure that the execution and results are in-line with the approved procedure / work instruction and the specification. List of documents (records) will be mutually agreed between purchaser and contractor prior to start the work.

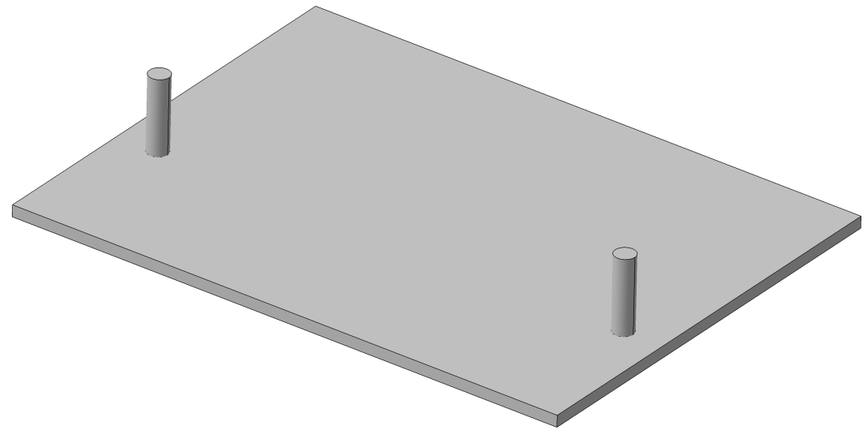
(4) **HP (Hold Point)**: This code to be assigned to the activities / operations where the approval from the responsible entity is required to start the further operation / activity. For example, if "HP" is assigned to some specific activity by IPR, it means that manufacturer cannot proceed further or cannot start the subsequent operation until get the approval from IPR.



Top view
Scale: 1:3



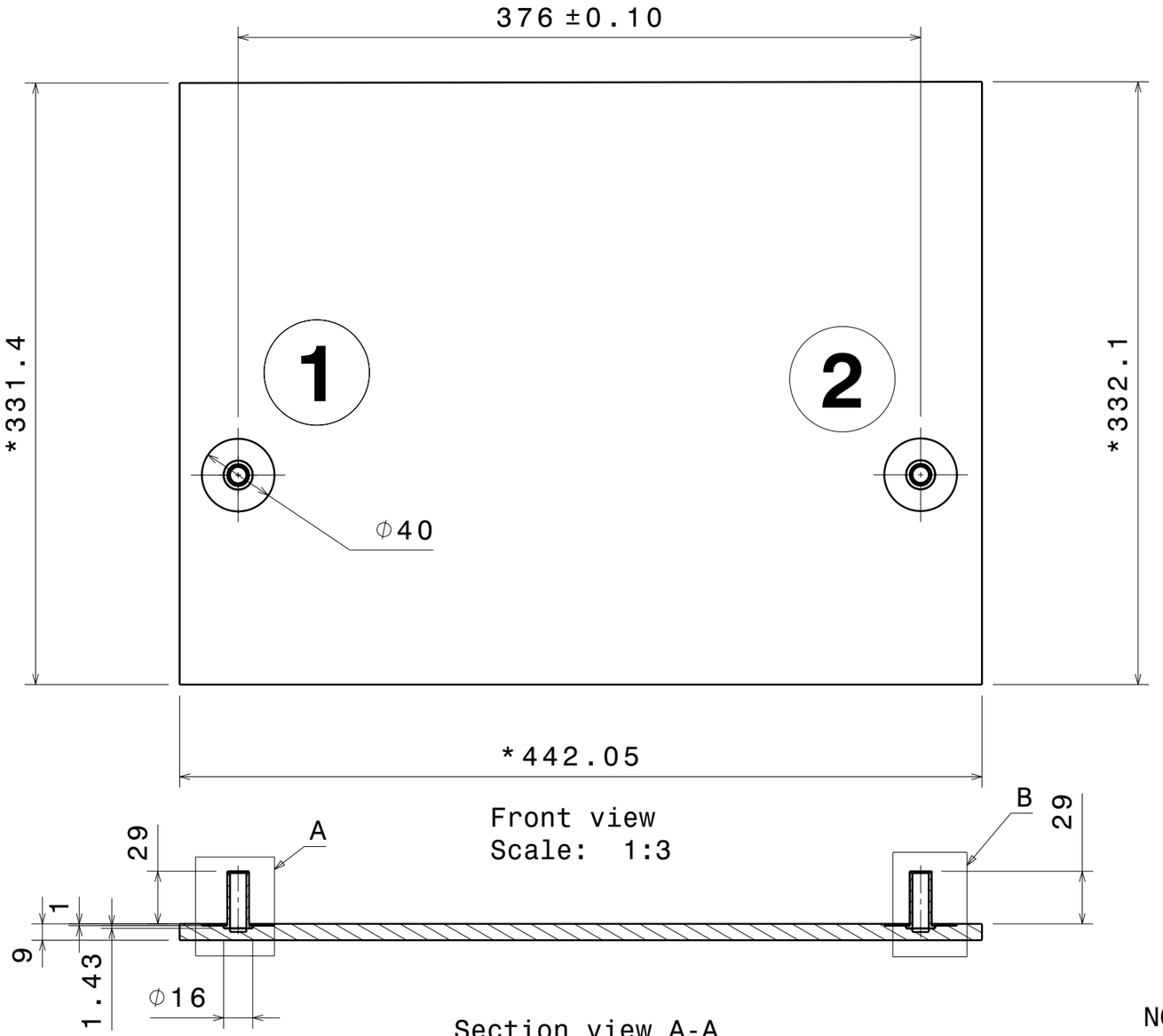
Front view
Scale: 1:3



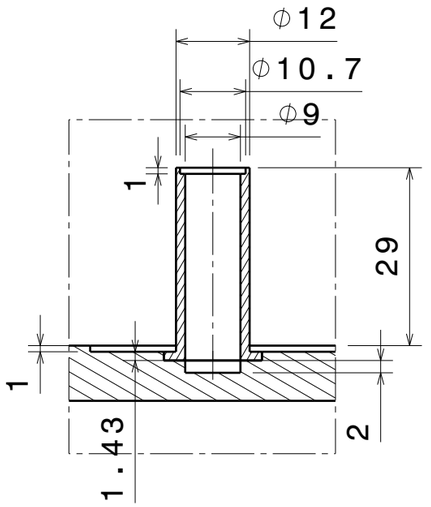
Isometric view
Scale: 1:4

NOTE:
(1) This Drawing is based on one friction welded OFE Copper base plate.
(2) Other OFE copper base plates (IPR will supply) may have small variation in center to center distance of two friction welded SS304L stub rods. The actual required center to center distance may be achived by CNC machining.

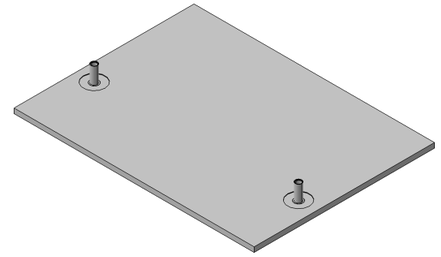
ASS'Y GROUP:		SIZE A3	INSTITUTE FOR PLASMA RESEARCH	
ALL DIMENSIONS ARE IN `mm' UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.	
SCALE	-	DATE	THIRD ANGLE PROJECTION	TITLE: Friction welded SS304L stub rod to OFE copper base plate of Accleration grid (BOX NO.10)
DRAWN	KIRIT	10/02/2021		
CHECKED	MR JANA		REF DRG NO:	REV 00
APPROVED	MR JANA		DRG.NO 32010008AA	SHEET 1 OF 3



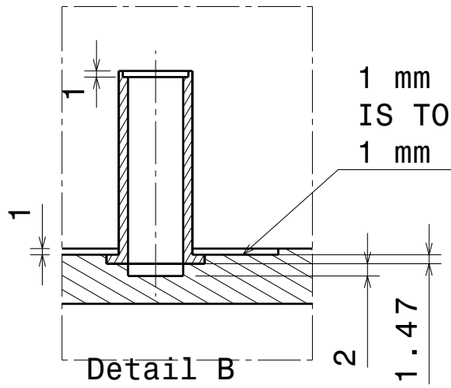
Section view A-A
Scale: 1:3



Detail :A
Scale: 1:1



Isometric view
Scale: 1:8



Detail B
Scale: 1:1

1 mm LOCAL MACHINING
IS TO BE DONE IN 40 mm DIAMETER AND
1 mm DEPTH REGION MENTION IN DRAWING.

NOTES :-
1. THIS DRAWING PROVIDES INFORMATION FOR LEAK TEST WHICH IS REQUIRE TO ENSURE THE FRICTON WELDING BETWEEN SS304L AND OFE COPPER.
2. DIMENSIONS WITH MARK (*) ARE AS PER ACTUAL MEASURMENT AND THESE MAY BE VARIED FOR PLATE TO PLATE.

DRG.NO	▽ 8-25	▽▽ 1.6-8	▽▽▽ 0.025-1.6	▽▽▽▽ < 0.025
CO-ORDINATED BY				

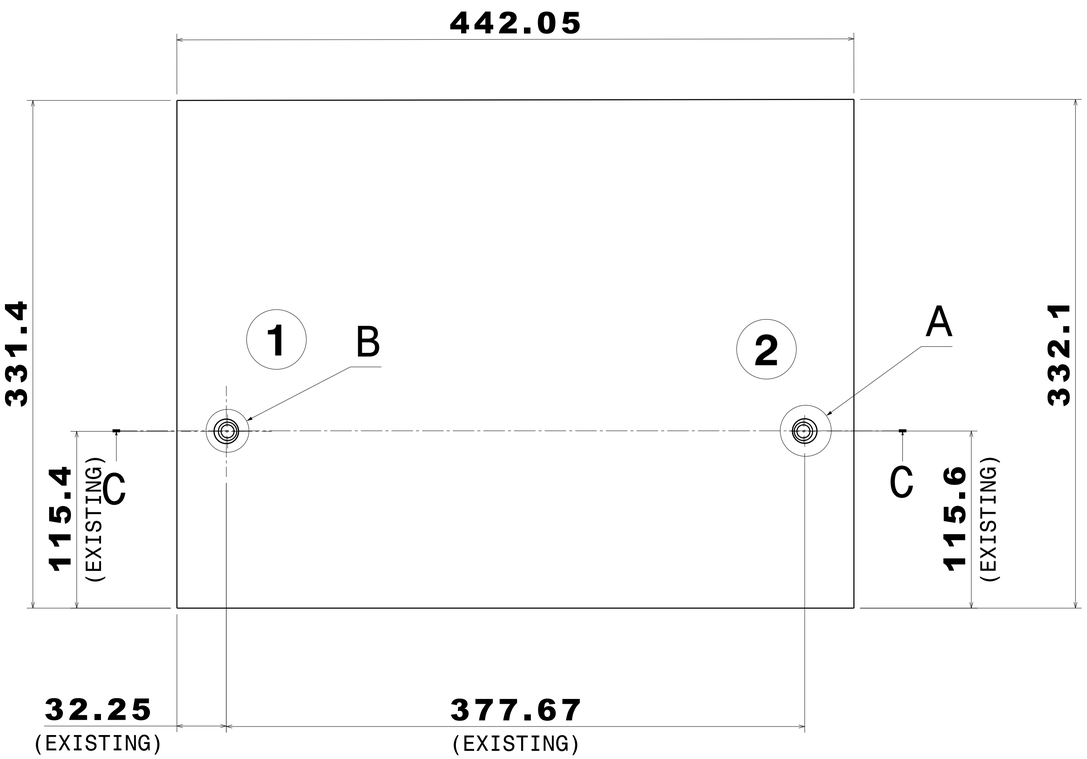
MACHINING DEVIATIONS FOR NON-TOLERANCED DIMENSIONS

LENGTH IN mm OF SHORTER SIDE OF ANGLES				LENGTH OR DIA	UPTO 6	6-30	30-120	120-315
UPTO 10	10-50	50-120	OVER 120-400					
±1°	±0°-30'	±0°-20'	±0°-10'		±0.1	±0.2	±0.3	±0.5

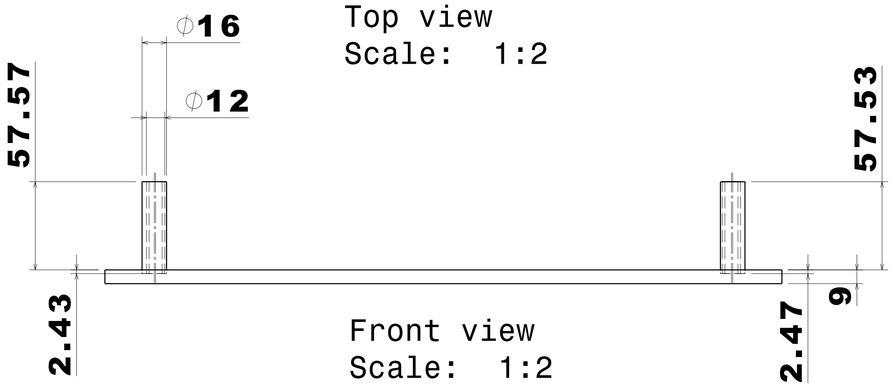
REVISION COLUMN

REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

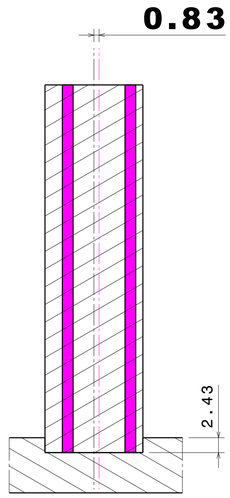
ASS'Y GROUP:		SIZE A3	INSTITUTE FOR PLASMA RESEARCH BHAT, GANDHINAGAR-382 428.
ALL DIMENSIONS ARE IN `mm' UNLESS OTHERWISE STATED			
SCALE	-	DATE	TITLE: LOCAL CNC MACHINING OF FRICTION WELDED SS304L STUB ROD TO OFE COPPER BASE PLATE OF ACCELERATION GRID
DRAWN	VRP	.	THIRD ANGLE PROJECTION
CHECKED	MR JANA		REF DRG NO: — REV 00
APPROVED	MR JANA		DRG.NO 32010008AA — SHEET 2 OF 3



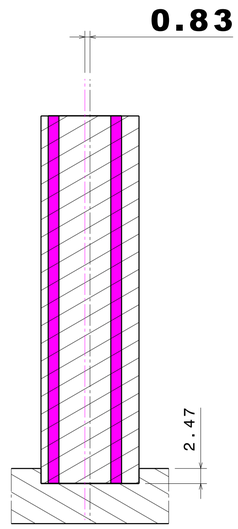
Top view
Scale: 1:2



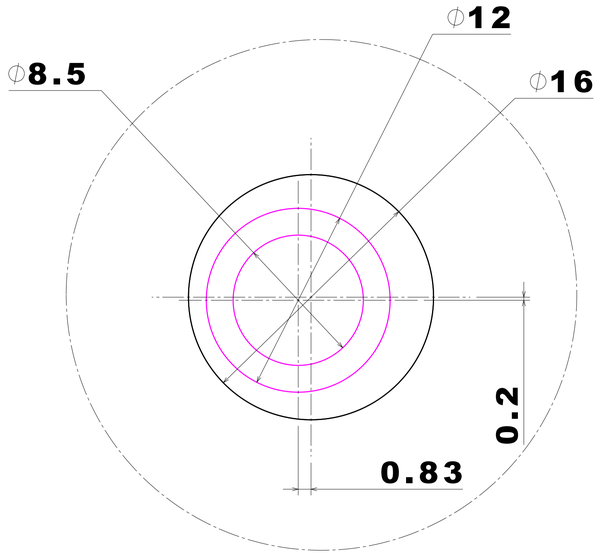
Front view
Scale: 1:2



Detail D
Scale: 2:1



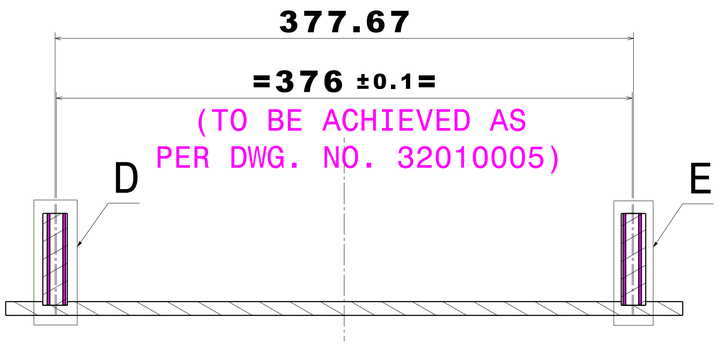
Detail E
Scale: 2:1



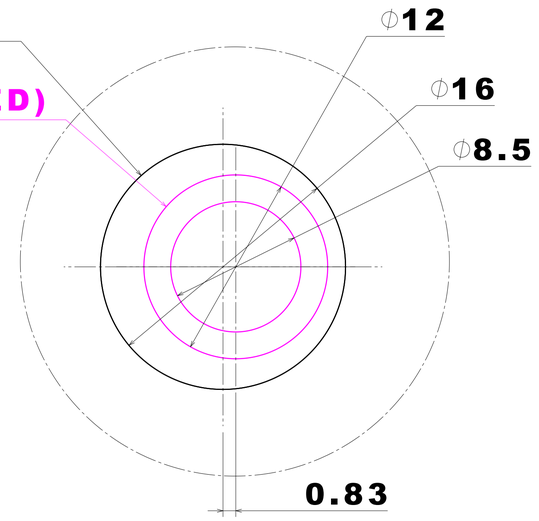
Detail A
Scale: 5:1

(EXISTING)

(TO BE GENERATED)



Section view C-C
Scale: 1:2



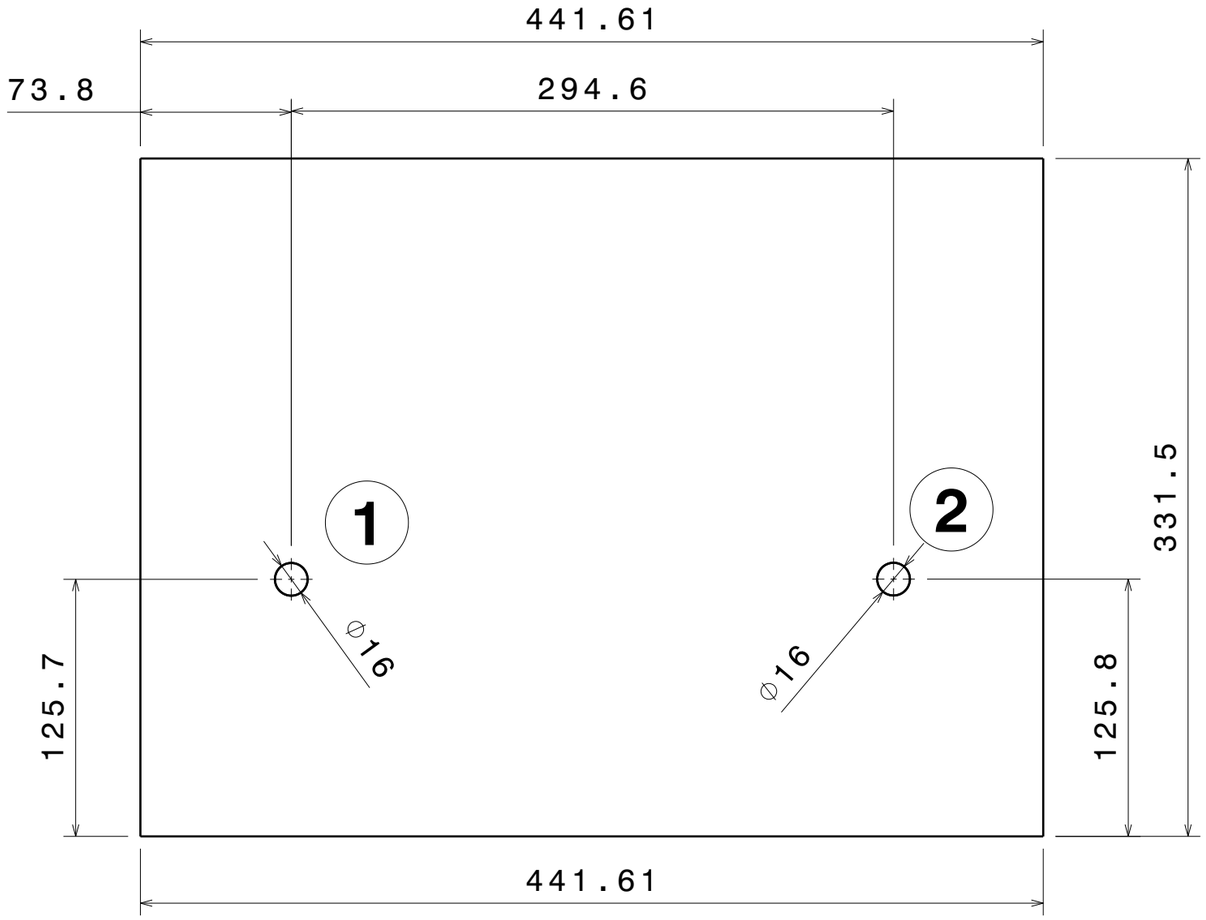
Detail B
Scale: 5:1

Max. roughness (Ra in µm) of N-Class												
N 12	50	N 8	3,2	N 4	0,2							
N 11	20	N 7	1,6	N 3	0,1							
N 10	12,5	N 6	0,8	N 2	0,05							
N 9	6,3	N 5	0,4	N 1	0,0025							

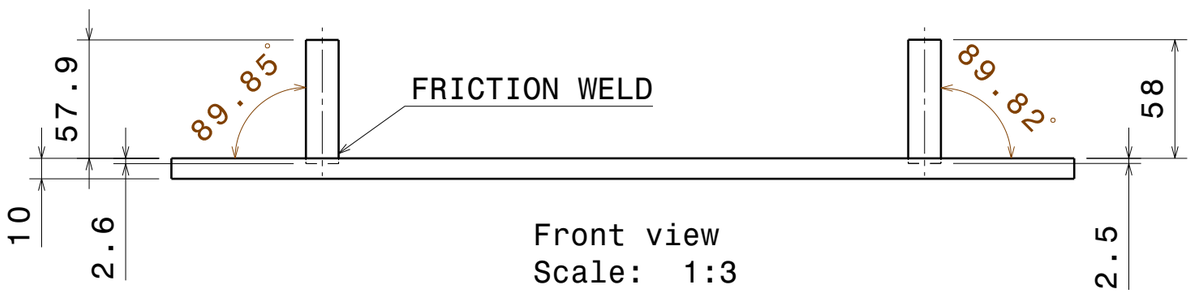
general tolerance ISO 2768 - m							
linear dimensions	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
radii, chamfers	0,2...0,5	>0,5...3	>3...6	>6...30	>30..120	>120...400	
	±0,1	±0,2	±0,5	±1	±2	±4	
angles mm / 100 mm	..10	>10...50	>50...120	>120...400	>400		
	±1,8	±0,9	±0,6	±0,3	±0,15		

metric ISO-threads nut 6H, bolt 6g

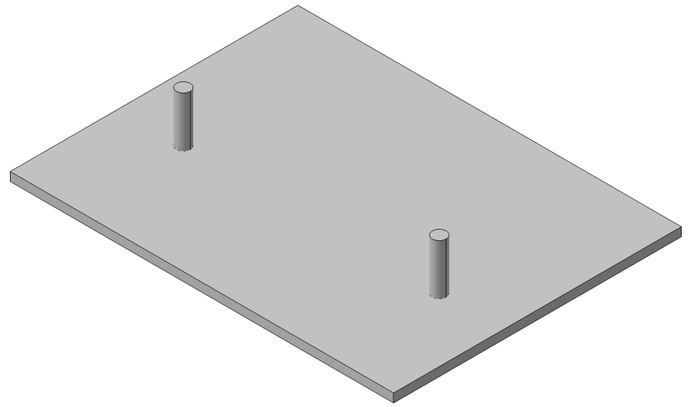
ASS'Y GROUP:		SIZE A3	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN `mm' UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE	-	DATE	TITLE: LOCAL CNC MACHINING OF FRICTION WELDED SS304L STUB ROD TO OFE COPPER BASE PLATE OF ACCELERATION GRID (BOX NO.10) (TO ACHIEVE REQUIRED CENTER TO CENTER DISTANCE BETWEEN STUB PIPES)
DRAWN	KIRIT	12/02/2021	THIRD ANGLE PROJECTION
CHECKED	MR JANA		REF DRG NO: — REV 00
APPROVED	MR JANA		DRG.NO 32010008AA — SHEET 3 OF 3



Top view
Scale: 1:3



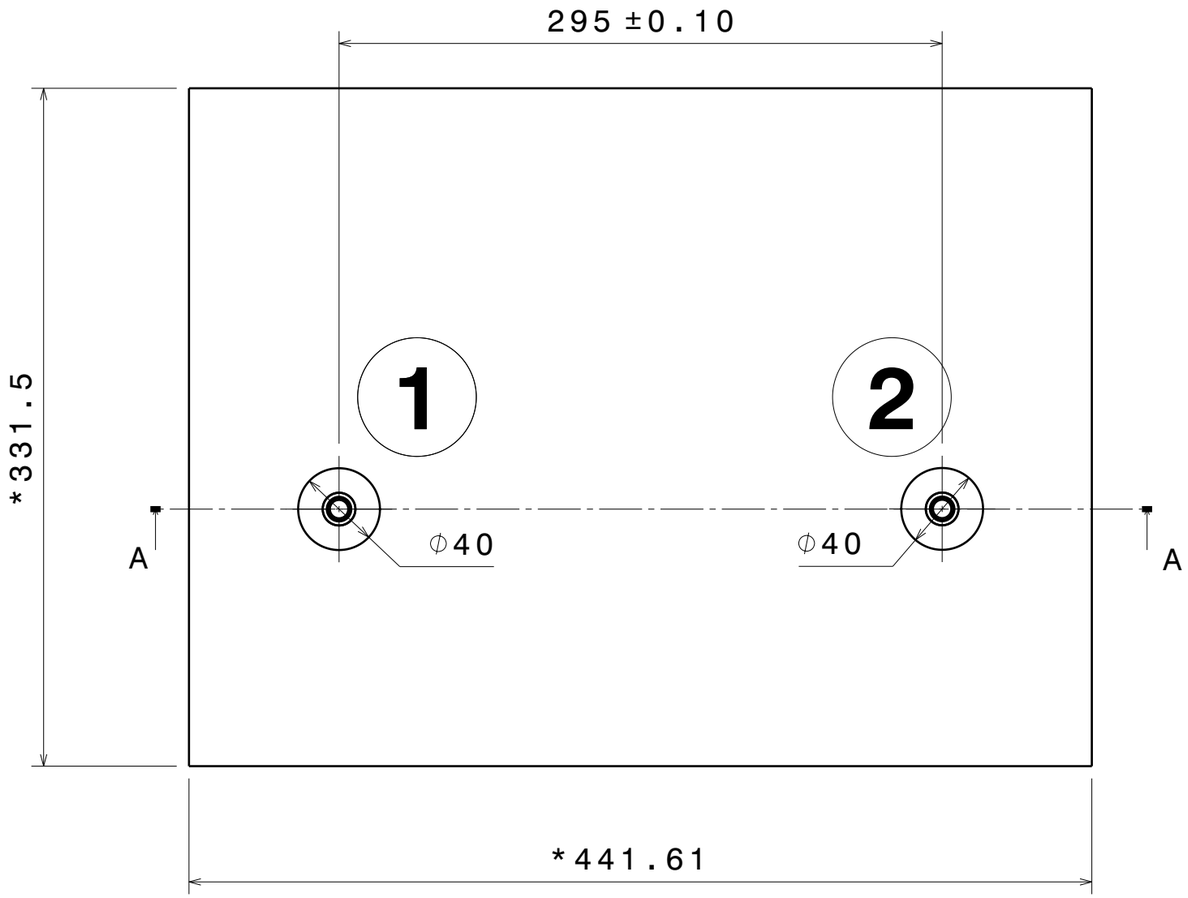
Front view
Scale: 1:3



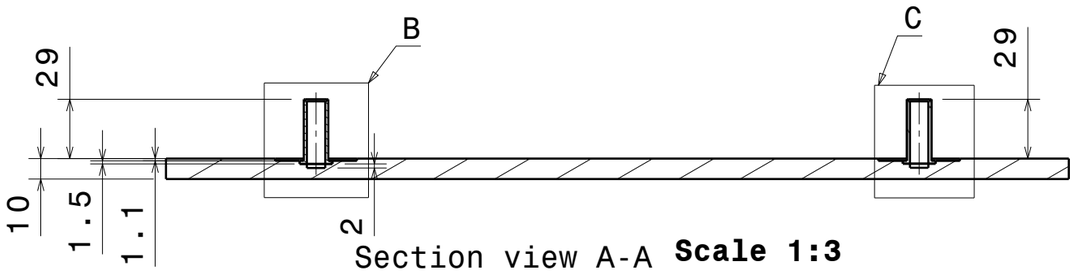
Isometric view
Scale: 1:5

NOTE:
(1) This Drawing is based on one friction welded OFE Copper base plate.
(2) Other OFE copper base plates (IPR will supply) may have small variation in center to center distance of two friction welded SS304L stub rods. The actual required center to center distance may be achived by CNC machining.

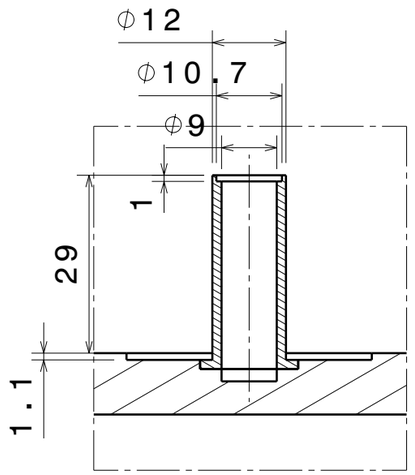
ASS'Y GROUP:		SIZE A3	INSTITUTE FOR PLASMA RESEARCH	
ALL DIMENSIONS ARE IN `mm' UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.	
SCALE	-	DATE	THIRD ANGLE PROJECTION	TITLE: Friction welded SS304L stub rod to OFE copper base plate of Deceleration grid (BOX NO.12)
DRAWN	KIRIT	11/02/2021		
CHECKED	MR JANA		REF DRG NO:	REV 00
APPROVED	MR JANA		DRG.NO 32030004AA	SHEET 1 OF 3



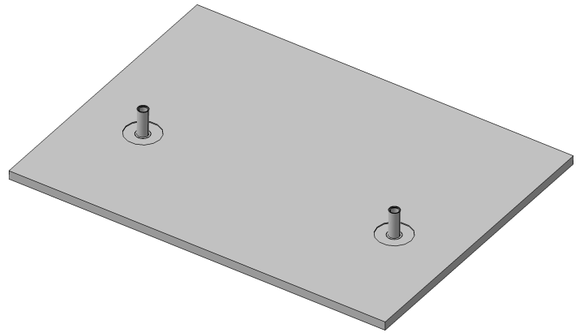
Front view
Scale: 1:3



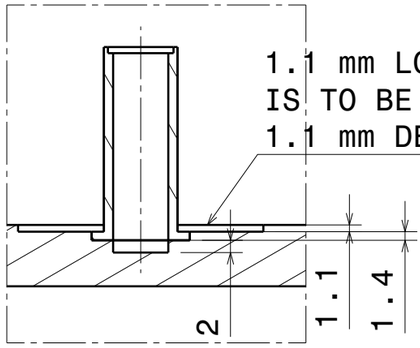
Section view A-A **Scale 1:3**



Detail B
Scale: 1:1



Isometric view
Scale: 1:6



Detail C
Scale: 1:1

NOTES :-

1. THIS DRAWING PROVIDES INFORMATION FOR LEAK TEST WHICH IS REQUIRE TO ENSURE THE FRICTON WELDING BETWEEN SS304L AND OFE COPPER.
2. DIMENSIONS WITH MARK (*) ARE AS PER ACTUAL MEASURMENT AND THESE MAY BE VARIED FOR PLATE TO PLATE.

DRG.NO	▽ 8-25	▽▽ 1.6-8	▽▽▽ 0.025-1.6	▽▽▽▽ < 0.025	REVISION COLUMN	
CO-ORDINATED BY					REV / ZONE / DESCRIPTION / DATE / REMARKS / APPROVED BY	

MACHINING DEVIATIONS FOR NON-TOLERANCED DIMENSIONS								
LENGTH IN mm OF SHORTER SIDE OF ANGLES				LENGTH OR DIA	UPTO 6	6-30	30-120	120-315
UPTO 10	10-50	50-120	OVER 120-400					
±1°	±0°-30'	±0°-20'	±0°-10'		±0.1	±0.2	±0.3	±0.5

ASS'Y GROUP:		SIZE A3	
ALL DIMENSIONS ARE IN `mm' UNLESS OTHERWISE STATED			
SCALE	-	DATE	
DRAWN	VRP	.	
CHECKED	MR JANA		
APPROVED	MR JANA		

INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR-382 428.

THIRD ANGLE PROJECTION

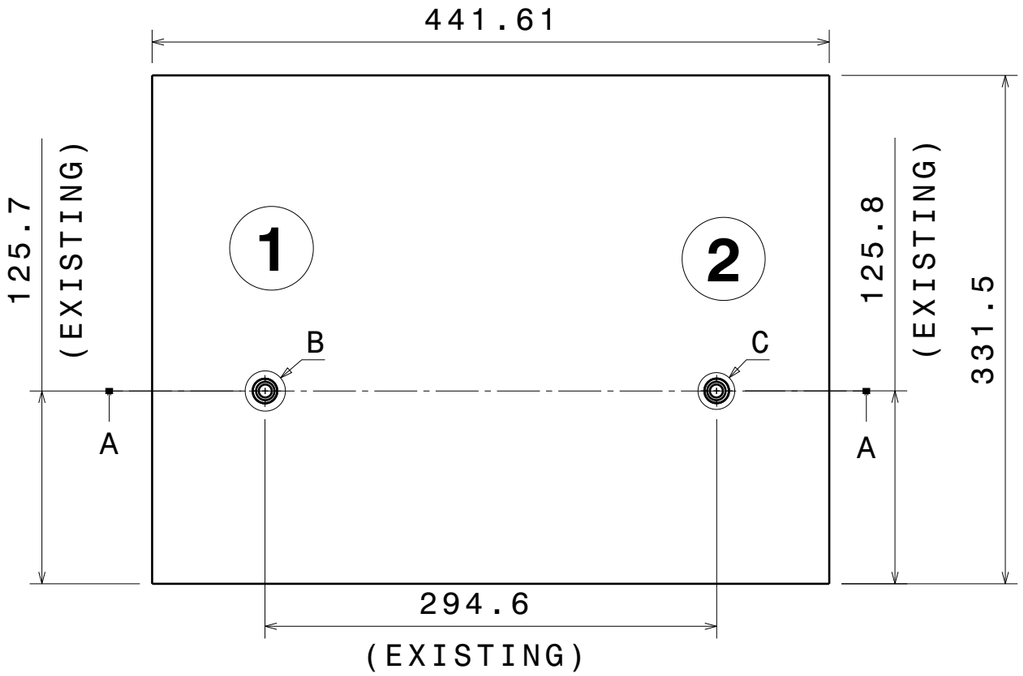
TITLE
LOCAL CNC MACHINING OF FRICTION WELDED SS304L STUB ROD TO OFE COPPER BASE PLATE OF DECELERATION GRID

REF DRG NO:

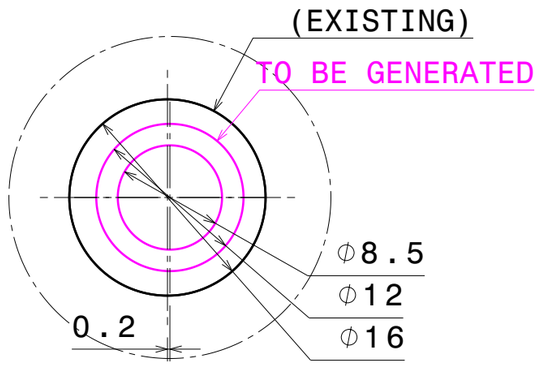
REV 00

DRG.NO 32030004AA

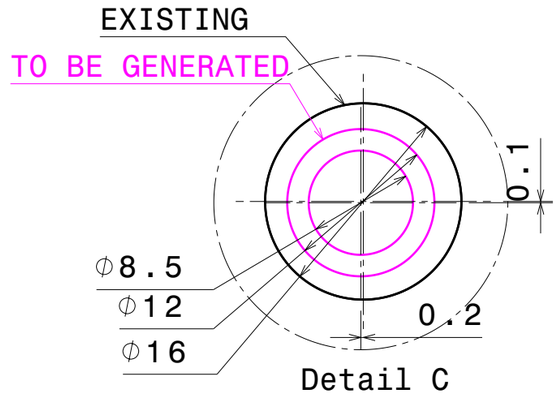
SHEET 2 OF 3



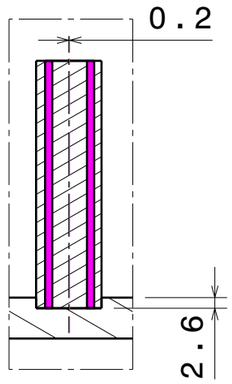
Front view
Scale: 1:4



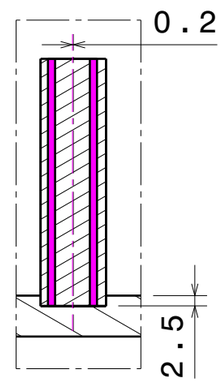
Detail B
Scale: 2:1



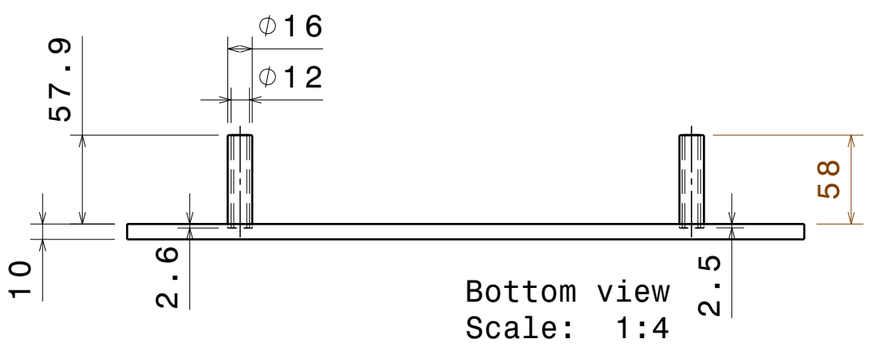
Detail C
Scale: 2:1



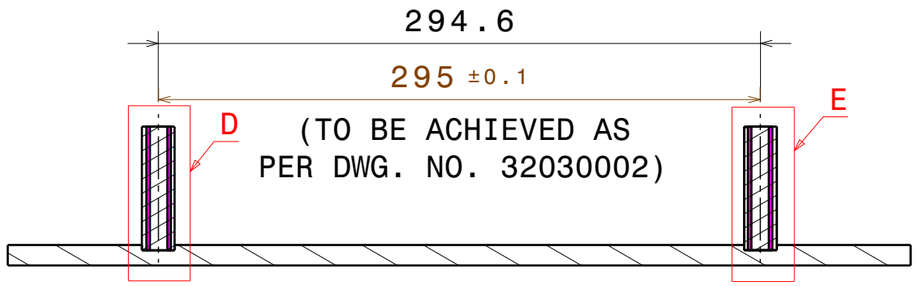
Detail D
Scale: 2:3



Detail E
Scale: 2:3



Bottom view
Scale: 1:4



Section view A-A
Scale: 1:3

DRG.NO	▽ 8-25	▽▽ 1.6-8	▽▽▽ 0.025-1.6	▽▽▽▽ < 0.025
CO-ORDINATED BY				

MACHINING DEVIATIONS FOR NON-TOLERANCED DIMENSIONS

LENGTH IN mm OF SHORTER SIDE OF ANGLES				LENGTH OR DIA	UPTO 6	6-30	30-120	120-315
UPTO 10	10-50	50-120	OVER 120-400					
±1°	±0°-30'	±0°-20'	±0°-10'		±0.1	±0.2	±0.3	±0.5

REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

REVISION COLUMN

ASS'Y GROUP:	SIZE A3	
ALL DIMENSIONS ARE IN `mm' UNLESS OTHERWISE STATED		
SCALE	-	DATE
DRAWN	VRP	.
CHECKED	MR JANA	
APPROVED	MR JANA	

INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR-382 428.

THIRD ANGLE PROJECTION

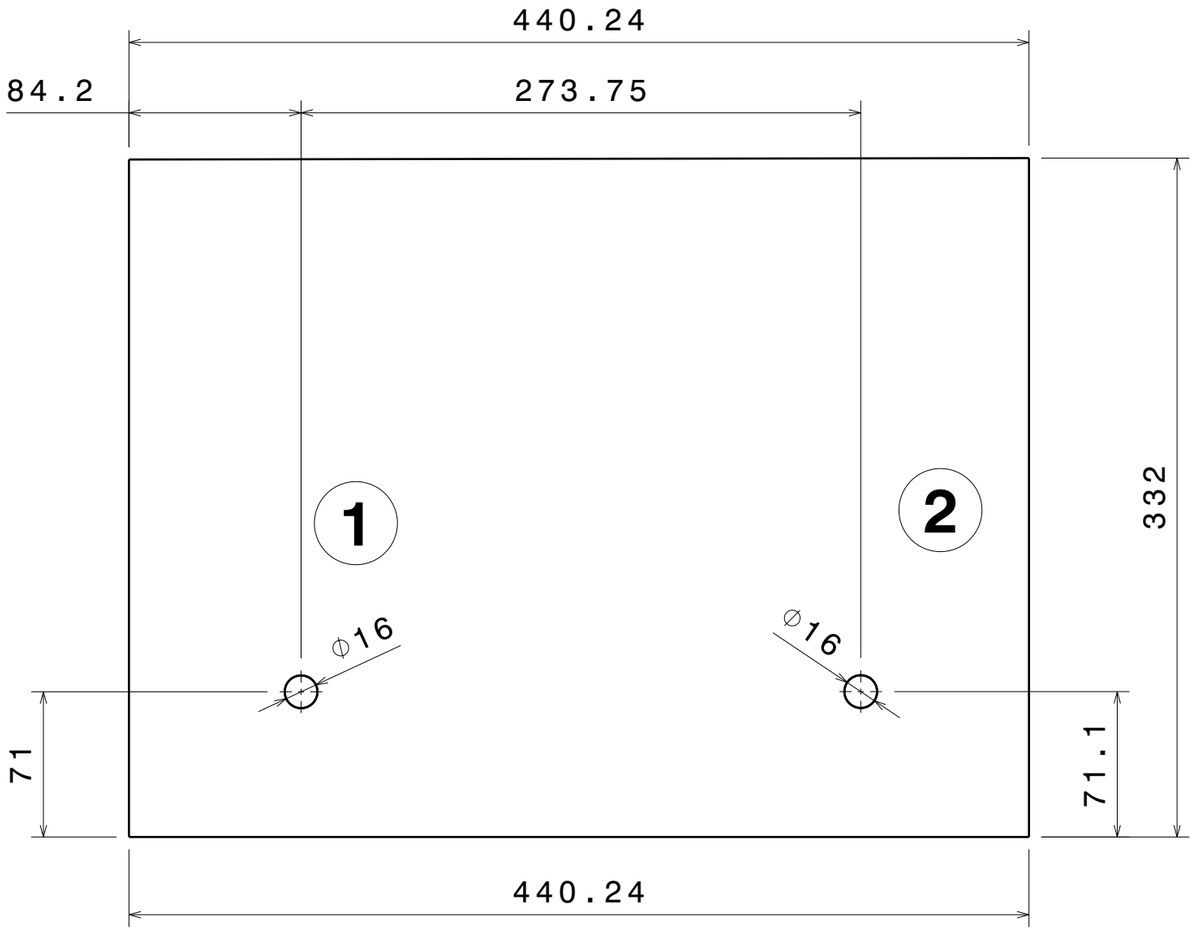
TITLE: LOCAL CNC MACHINING OF FRICTION WELDED SS304L STUB ROD TO OFE COPPER BASE PLATE OF DECELERATION GRID (TO ACHIEVE CENTER TO CENTER DISTANCE BETWEEN STUB PIPES)

REF DRG NO:

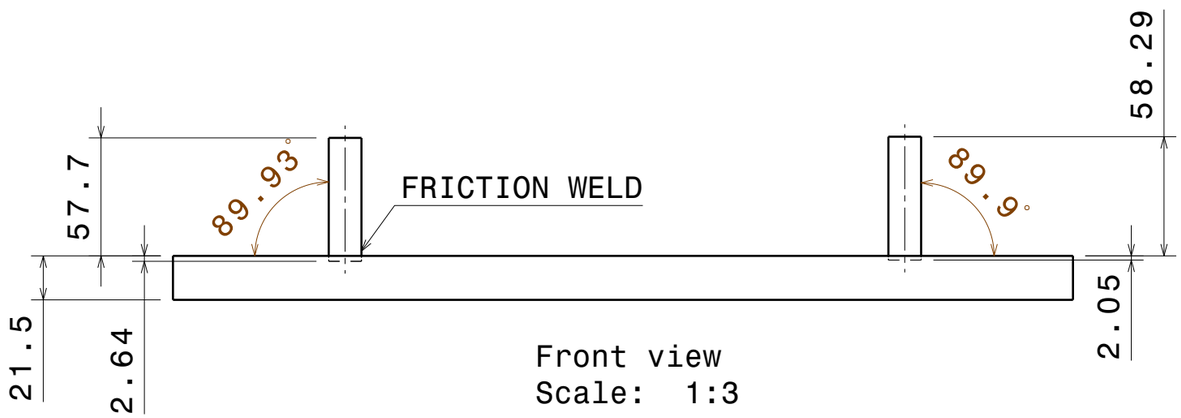
REV 00

DRG.NO 32030004AA

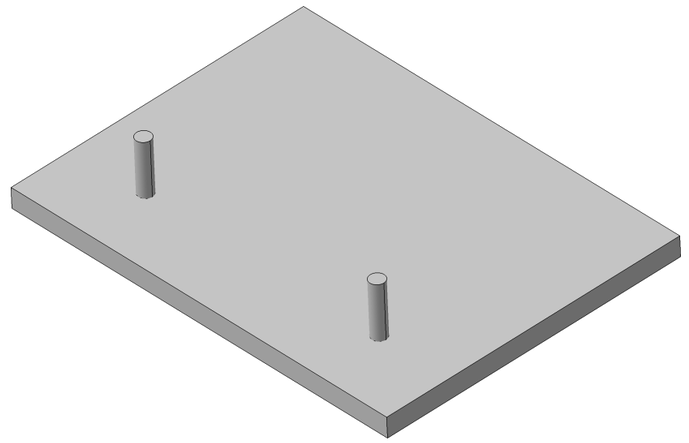
SHEET 3 OF 3



Top view
Scale: 1:3



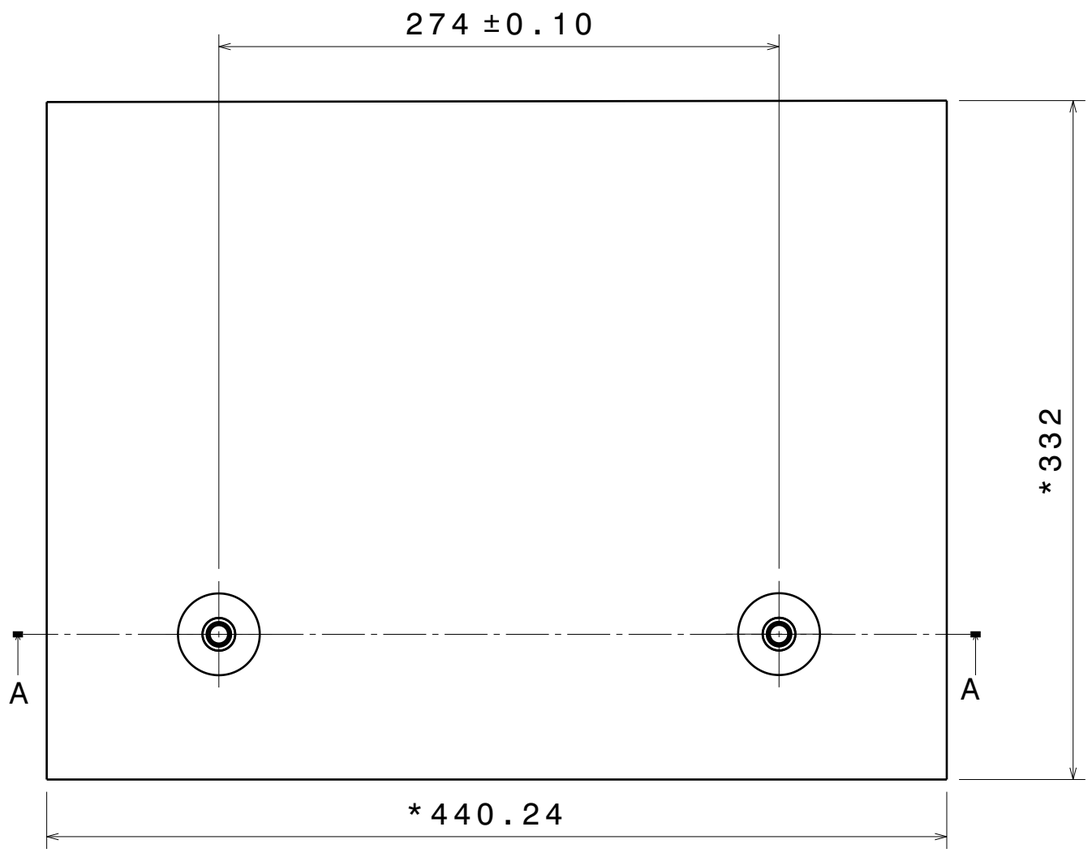
Front view
Scale: 1:3



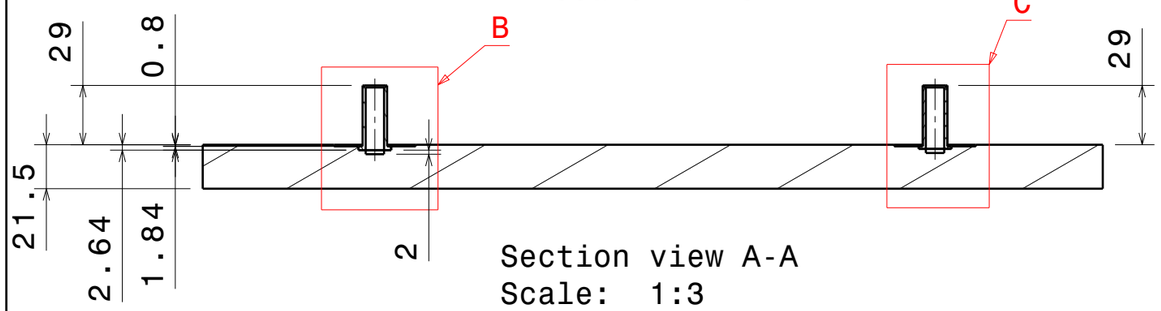
Isometric view
Scale: 1:5

NOTE:
(1) This Drawing is based on one friction welded OFE Copper base plate.
(2) Other OFE copper base plates (IPR will supply) may have small variation in center to center distance of two friction welded SS304L stub rods. The actual required center to center distance may be achived by CNC machining.

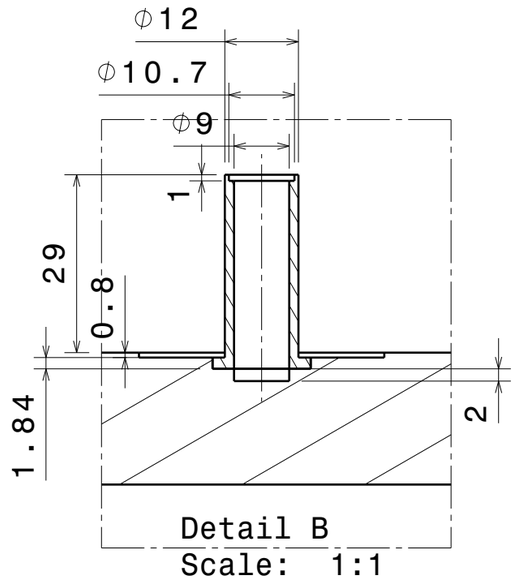
ASS'Y GROUP:		SIZE A3	INSTITUTE FOR PLASMA RESEARCH	
ALL DIMENSIONS ARE IN `mm' UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.	
SCALE	-	DATE	THIRD ANGLE PROJECTION	TITLE: Friction welded SS304L stub rod to OFE copper base plate of Earth grid (BOX NO.21)
DRAWN	KIRIT	11/02/2021		
CHECKED	MR JANA		REF DRG NO:	REV 00
APPROVED	MR JANA		DRG.NO 32040004AA	SHEET 1 OF 3



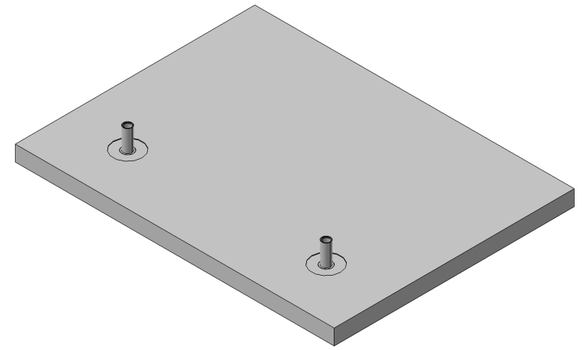
Front view
Scale: 1:3



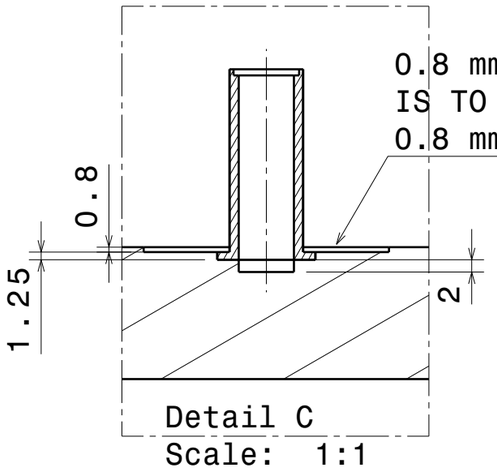
Section view A-A
Scale: 1:3



Detail B
Scale: 1:1



Isometric view
Scale: 1:6



0.8 mm LOCAL MACHINING
IS TO BE DONE IN 40 mm DIAMETER AND
0.8 mm DEPTH REGION MENTION IN DRAWING.

Detail C
Scale: 1:1

NOTES :-

1. THIS DRAWING PROVIDES INFORMATION FOR LEAK TEST WHICH IS REQUIRE TO ENSURE THE FRICTON WELDING BETWEEN SS304L AND OFE COPPER.
2. DIMENSIONS WITH MARK (*) ARE AS PER ACTUAL MEASURMENT AND THESE MAY BE VARIED FOR PLATE TO PLATE.

DRG.NO	▽ 8-25	▽▽ 1.6-8	▽▽▽ 0.025-1.6	▽▽▽▽ < 0.025
CO-ORDINATED BY				

MACHINING DEVIATIONS FOR NON-TOLERANCED DIMENSIONS

LENGTH IN mm OF SHORTER SIDE OF ANGLES				LENGTH OR DIA	UPTO 6	6-30	30-120	120-315
UPTO 10	10-50	50-120	OVER 120-400					
±1°	±0°-30'	±0°-20'	±0°-10'		±0.1	±0.2	±0.3	±0.5

REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

REVISION COLUMN

ASS'Y GROUP:	SIZE A3	
ALL DIMENSIONS ARE IN `mm' UNLESS OTHERWISE STATED		
SCALE	-	DATE
DRAWN	VRP	.
CHECKED	MR JANA	
APPROVED	MR JANA	

INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR-382 428.

THIRD ANGLE PROJECTION

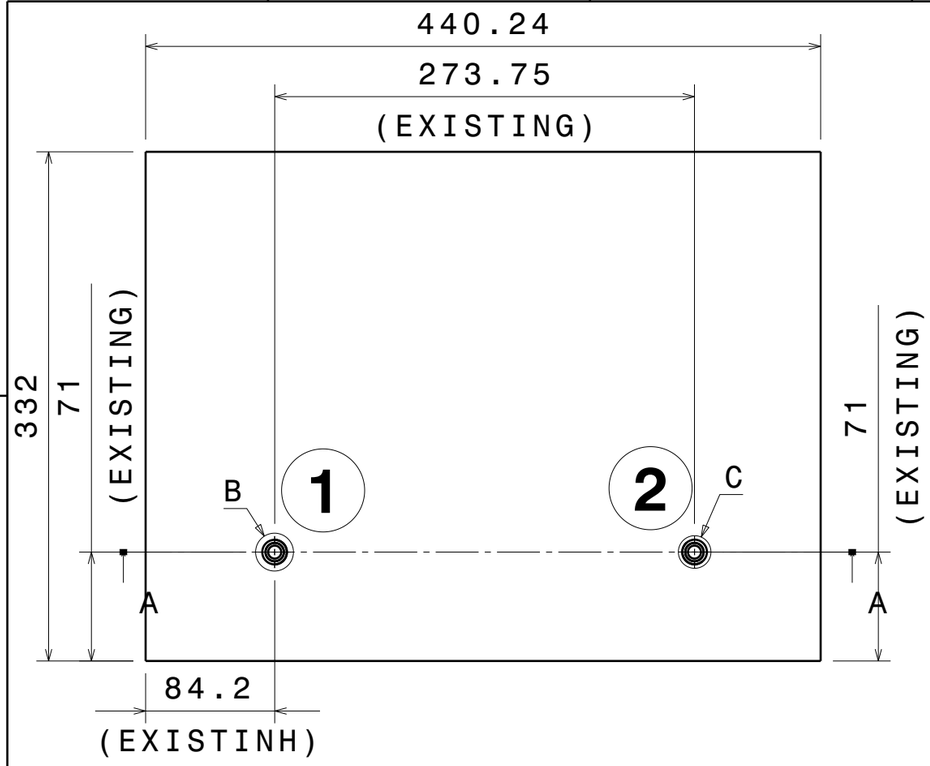
TITLE
LOCAL CNC MACHINING OF FRICTION WELDED SS304L STUB ROD TO OFE COPPER BASE PLATE OF EARTH GRID

REF DRG NO:

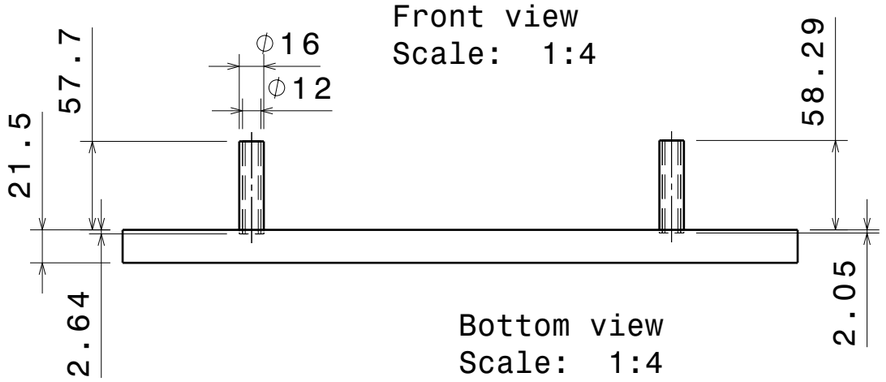
REV 00

DRG.NO 32040004AA

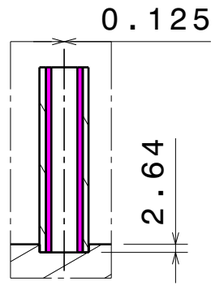
SHEET 2 OF 3



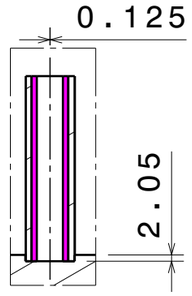
Front view
Scale: 1:4



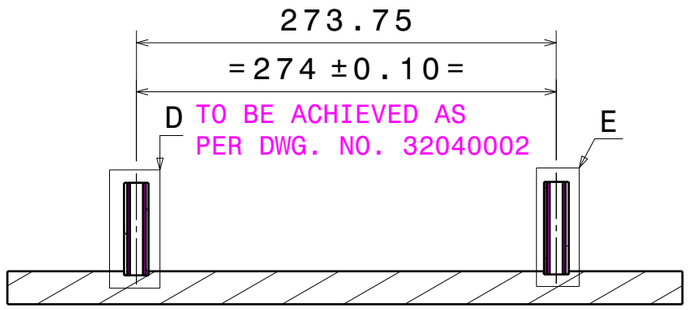
Bottom view
Scale: 1:4



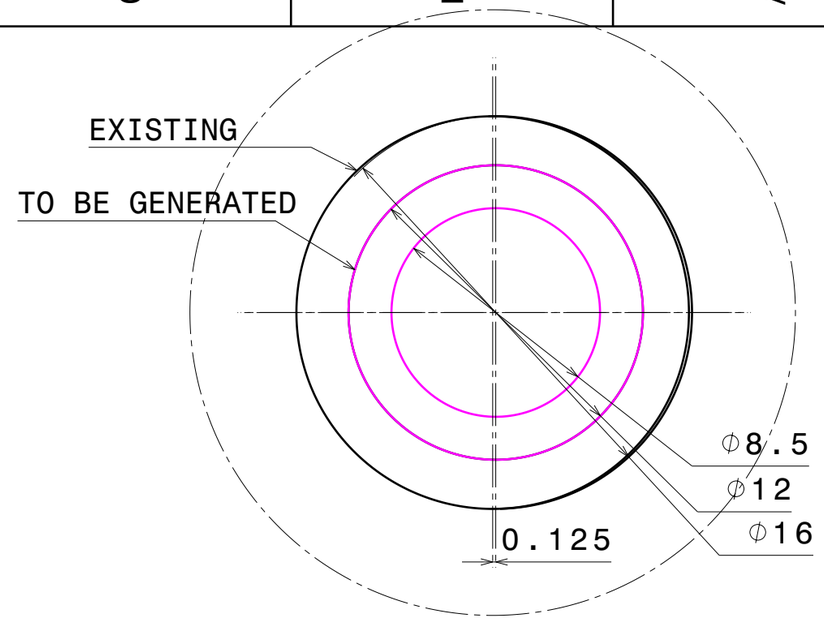
Detail D
Scale: 1:2



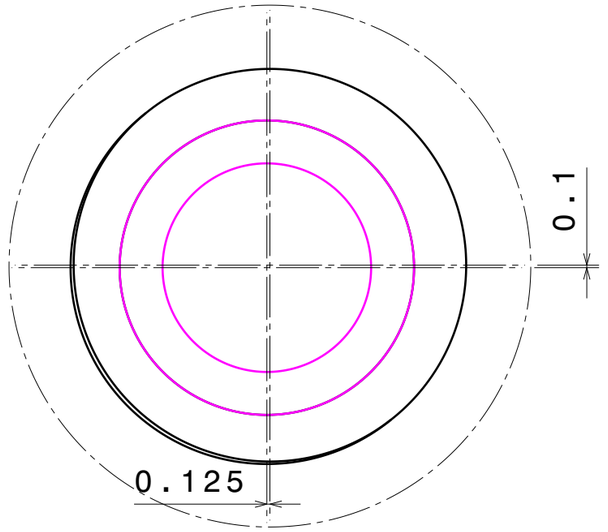
Detail E
Scale: 1:2



Section view A-A Scale 1:4



Detail B
Scale: 4:1



Detail C
Scale: 4:1

DRG.NO	▽ 8-25	▽▽ 1.6-8	▽▽▽ 0.025-1.6	▽▽▽▽ < 0.025
CO-ORDINATED BY				

MACHINING DEVIATIONS FOR NON-TOLERANCED DIMENSIONS

LENGTH IN mm OF SHORTER SIDE OF ANGLES				LENGTH OR DIA	UPTO 6	6-30	30-120	120-315
UPTO 10	10-50	50-120	OVER 120-400					
±1°	±0°-30'	±0°-20'	±0°-10'		±0.1	±0.2	±0.3	±0.5

REVISION COLUMN

REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

ASS'Y GROUP:		SIZE A3
ALL DIMENSIONS ARE IN `mm' UNLESS OTHERWISE STATED		
SCALE	-	DATE
DRAWN	VRP	.
CHECKED	MR JANA	
APPROVED	MR JANA	

INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR-382 428.

THIRD ANGLE PROJECTION

TITLE: LOCAL CNC NACHINING OF FRICTION WELDED SS304L STUB ROD TO OFE COPPER BASE PLATE OF EARTH GRID (TO ACHIEVE CENTER TO CENTER DISTANCE BETWEEN STUB PIPES)

REF DRG NO:

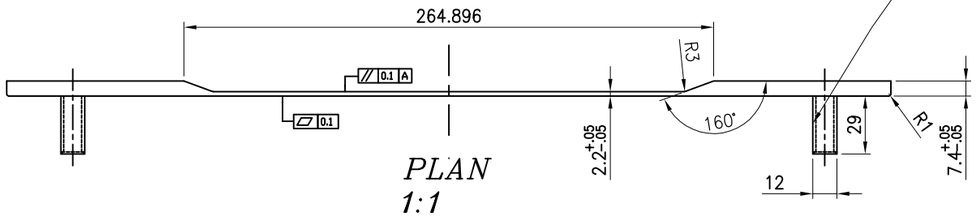
REV 00

DRG.NO 32040004AA

SHEET 3 OF 3

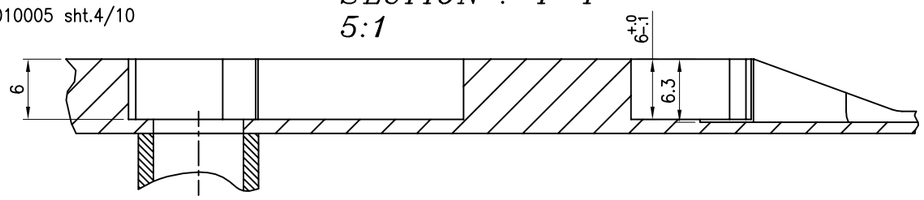
ACAD F.NAME:

ELEVATION
1:1

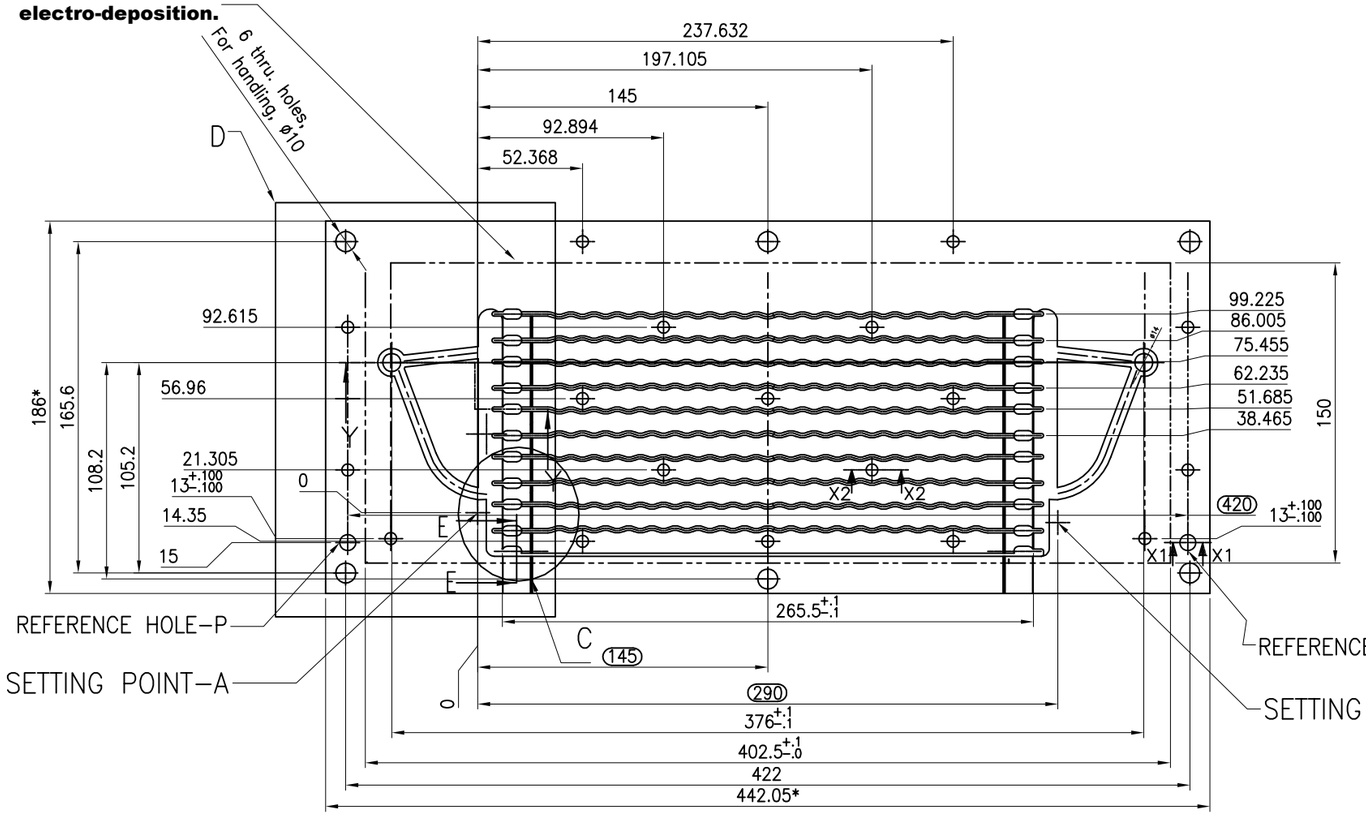


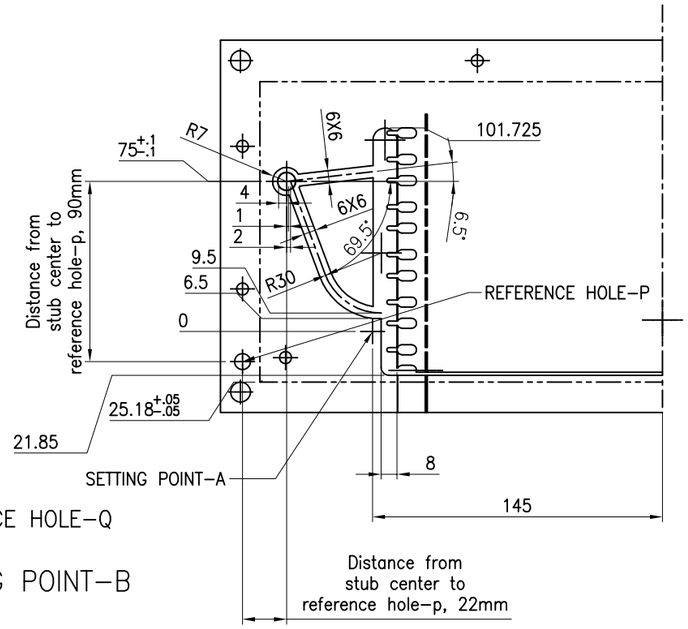
PLAN
1:1

SECTION : Y–Y
5:1

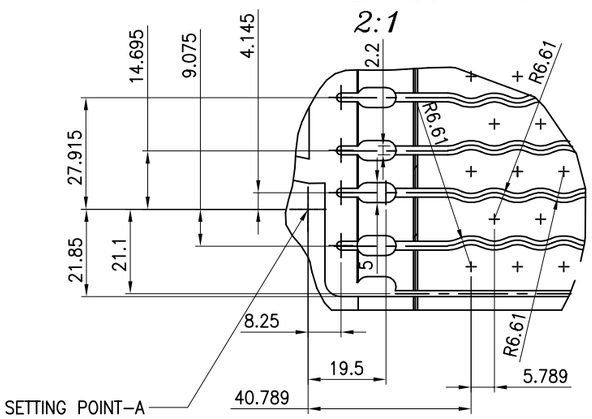


It is to be cut after electro-deposition.



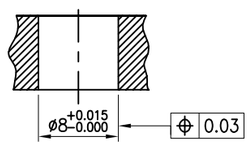


Detail – D
1:1

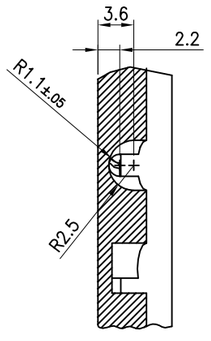


Detail – C
2:1

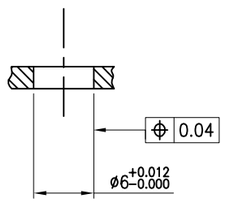
SECTION : X1–X1 (REFERENCE HOLES–P AND Q)



SECTION : E–E
5:1



SECTION : X2–X2 (18 HOLES)



legend

- check dimension= ⬭
- help dimension = ( )
- rough dimension= [ ]
- manual modified= italic font with underlined

NOTES:
1. Do not scale the Drawing.
2. Electro polishing to remove sharp edges.
3. surface finish
   External surface : Rz=2.5 μm
   Miscellaneous = Rz=6.3 μm
4. Pressure test
   Internal pressure = 16 bar Nitrogen
5. Leak –rate
   Integral 10^{-8} mbar*l/s He
6. Material – OFE^{+}Copper
7. * These dimensions may vary for plate to plate.

n

Max. roughness (Ra in μm) of N-Classes							
N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

general tolerance ISO 2768 - m

	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2

	0,2...0,5	>0,5...3	>3...6	>6...30	>30...120	>120...400
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4

	..10	>10...50	>50...120	>120...400	>400
angles	±1,8	±0,9	±0,6	±0,3	±0,15
mm / 100 mm					

metric ISO-threads nut 6H, bolt 6g

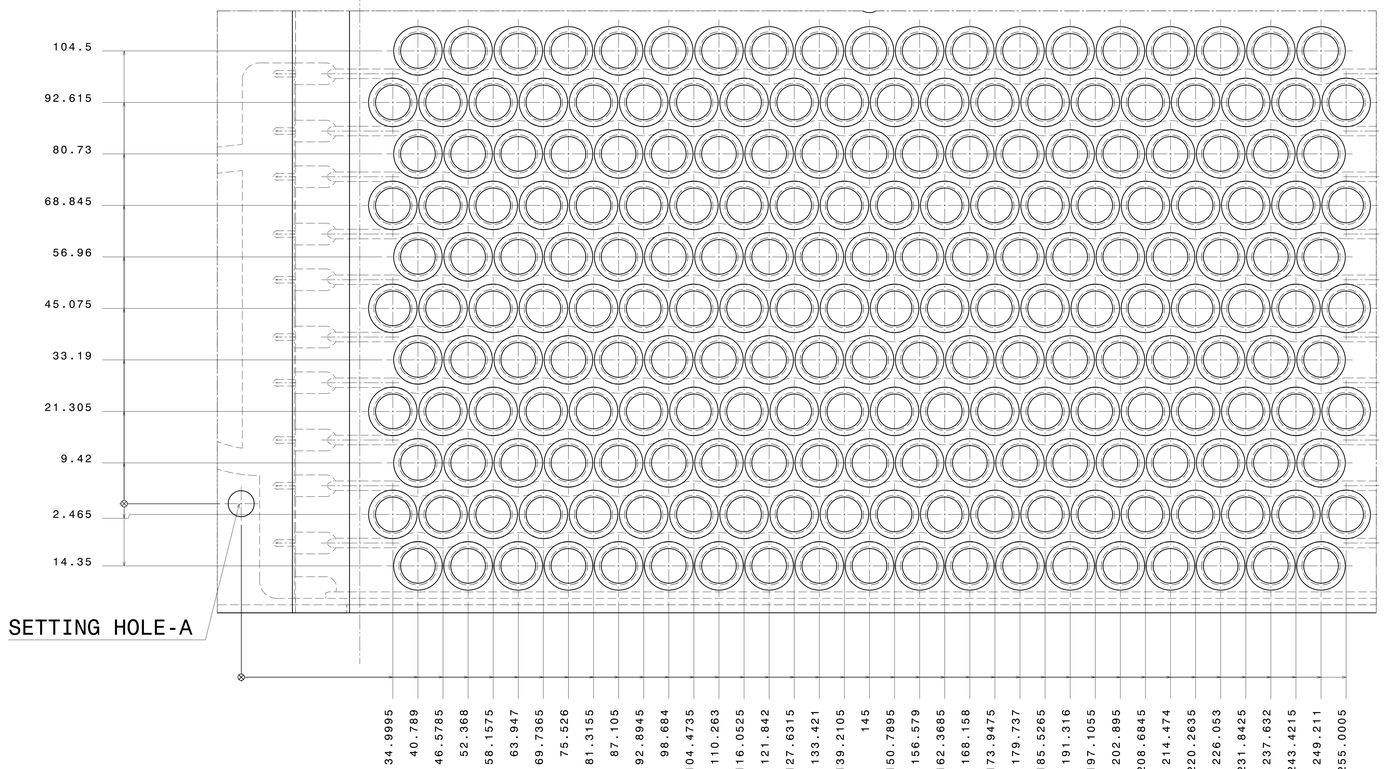
REVISION COLUMN						
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

ASS'Y GROUP:
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED

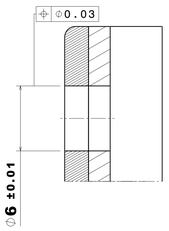
INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR–382 428.

SCALE	NTS	DATE	TITLE: BASEPLATE PROTOTYPE ACCELERATION GRID BEFORE ELECTRO DEPOSITION
DRAWN	KIRIT	07/2020	
CHECKED			REF DRG NO: PH 000 608 REV–1
APPROVED			DRG.NO 32050012 SHEET 01 OF 01

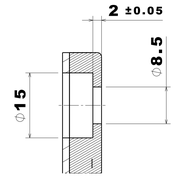
FIRST ANGLE PROJECTION



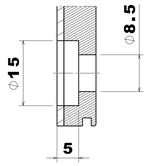
Detail R
Scale: 2:1



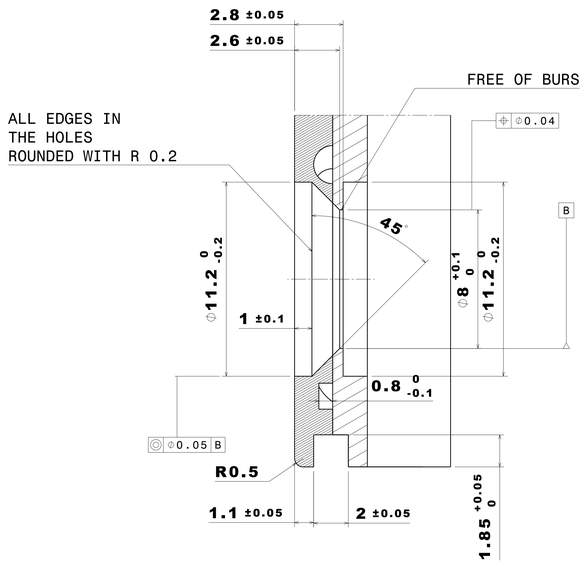
Detail U
Scale: 5:1
SETTING HOLE -A,B & C



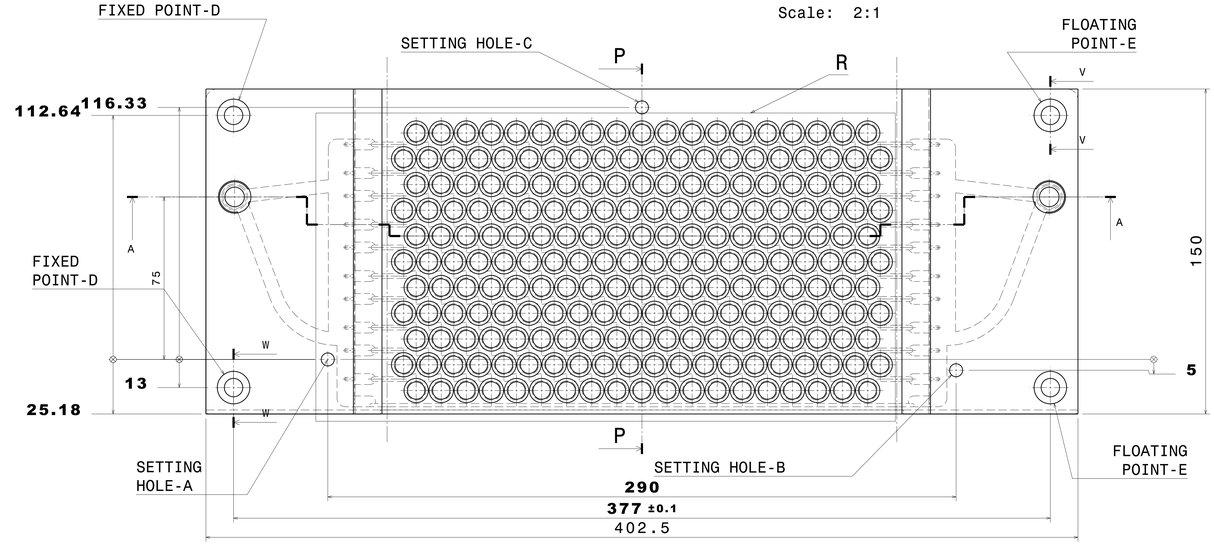
Section view V-V
Scale: 2:1
FLOATING POINT-E

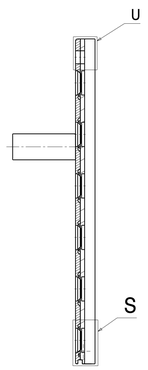


Section view W-W
Scale: 2:1
FIXED POINT-D

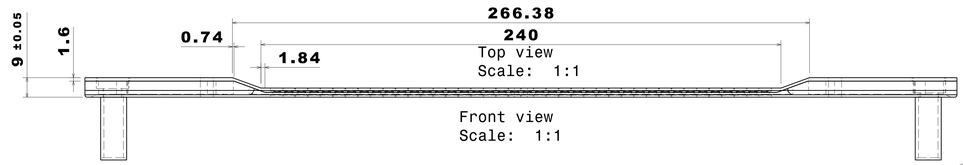


Detail S
Scale: 8:1



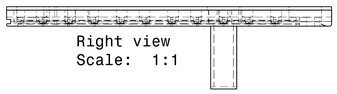


Section view P-P
Scale: 1:1

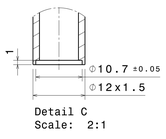


Top view
Scale: 1:1

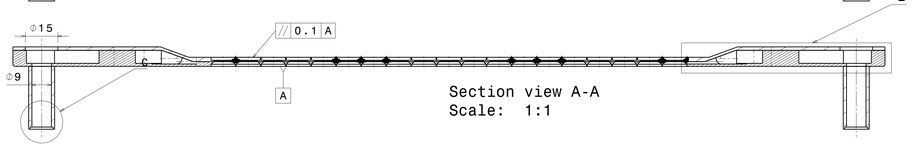
Front view
Scale: 1:1



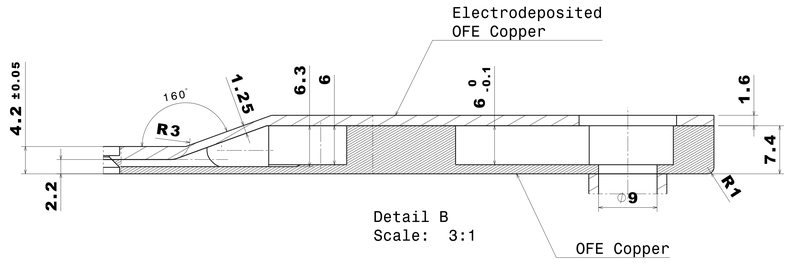
Right view
Scale: 1:1



Detail C
Scale: 2:1



Section view A-A
Scale: 1:1



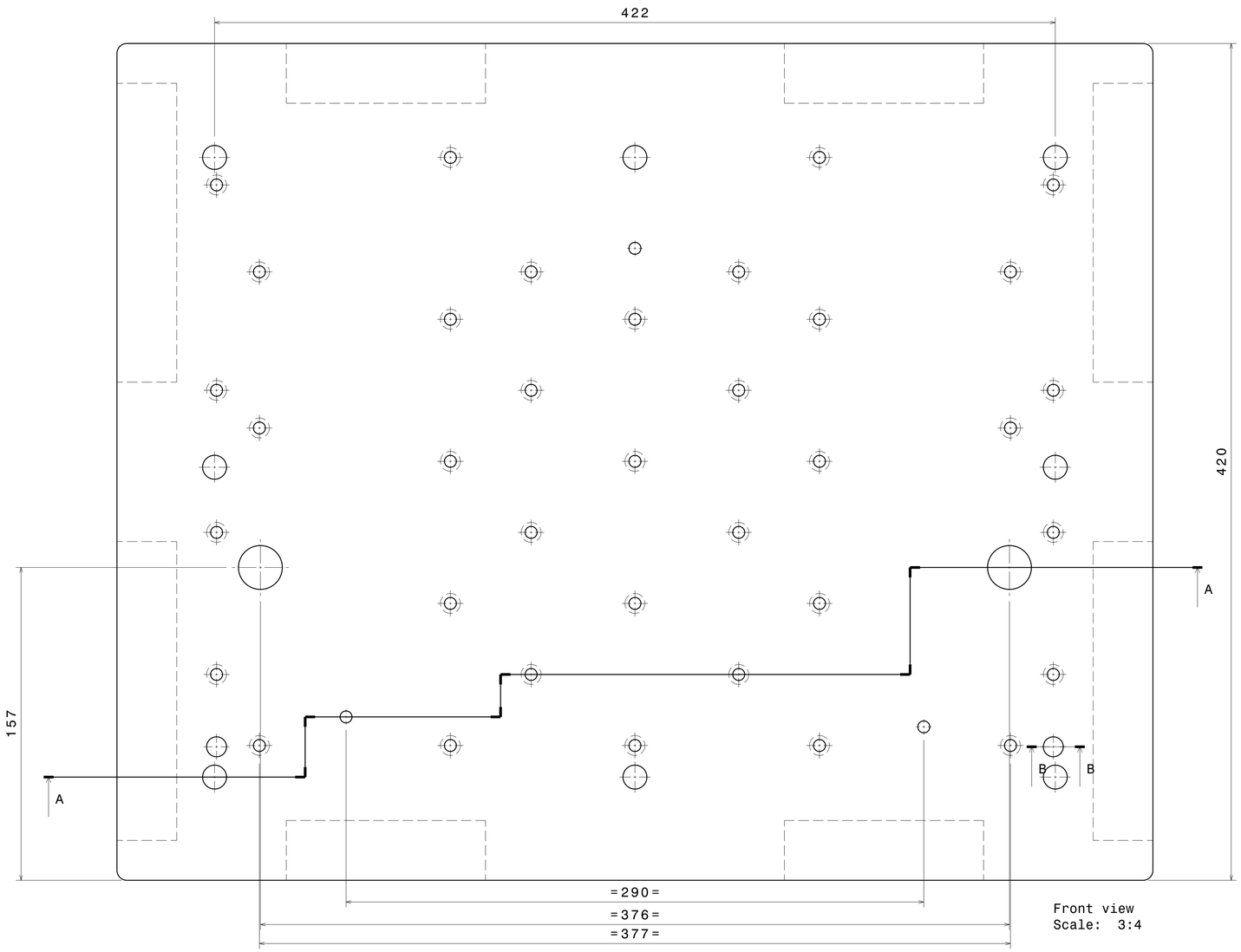
Detail B
Scale: 3:1

NOTE:
(1) Electro-polishing to remove sharp edges.
(2) Finish quality : Extraction surfaces : Rz = 2.5 micron
Miscellaneous : Rz = 6.3 micron
(3) Setting hole A and B are indicative reference point only and meant for dimension measuring.
(4) Dimension accuracy need to be maintained up to 3 decimal while fabrication.
(5) Material - OFE COPPER
(6) Read this Drawing along with Drg. no. 32010002AA.
(7) Surface flatness : 100 micron.
(8) Pressure test (Acceptance test)
Internal Pressure (inside manifold and cooling channels) 16 bar Nitrogen and Helium gas.
(9) Leak test (Acceptance test)
Integral Leak rate : 10 mbar-lit/sec (16 bar He gas)

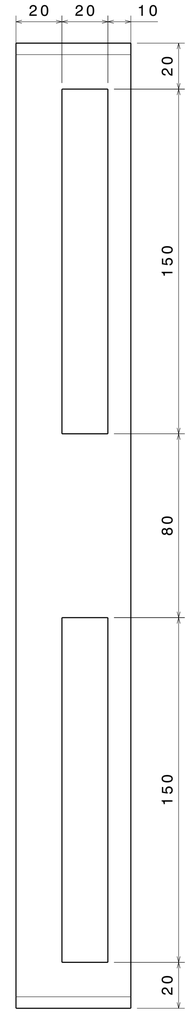
Max. roughness (Ra in µm) of N-Class				general tolerance ISO 2768 - m							
N 12 50 / N 11 20 / N 10 12,5 / N 9 6,3	N 8 3,2 / N 7 1,6 / N 6 0,8 / N 5 0,4	N 4 0,2 / N 3 0,1 / N 2 0,05 / N 1 0,0025	linear dimensions	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	2000...4000	
				±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2	
			radii, chamfers	0,2...0,5	>0,5...3	>3...6	>6...30	>30...120	>120...400		
				±0,1	±0,2	±0,5	±1	±2	±4		
			angles mm / 100 mm	..10	>10...50	>50...120	>120...400	>400			
				±1,8	±0,9	±0,6	±0,3	±0,15			

metric ISO-threads nut 6H, bolt 6g

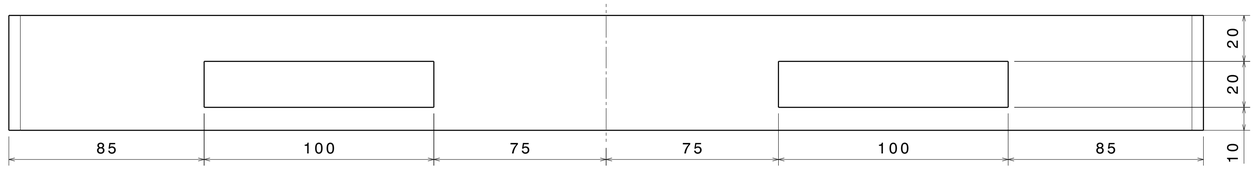
SHEET FORMAT- ISO A0	INSTITUTE FOR PLASMA RESEARCH		
ASS'Y GROUP:	BHAT, GANDHINAGAR-382 428.		
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED			
SCALE		DATE	TITLE: PROTOTYPE ACCELERATION GRID AFTER ELECTRO DEPOSITION
DRAWN	KIRIT	12/02/2021	
REVIEWED	BRD,MKD, RKS		REF DRG NO: — REV 00
APPROVED	M.JANA		DRG.NO 32010001AA — SHEET 01 OF 01



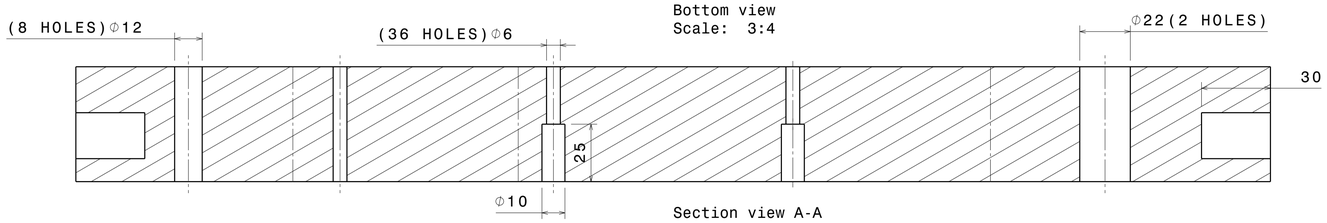
Front view
Scale: 3:4



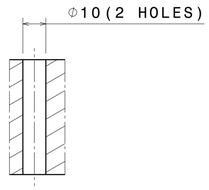
Right view
Scale: 3:4



Bottom view
Scale: 3:4

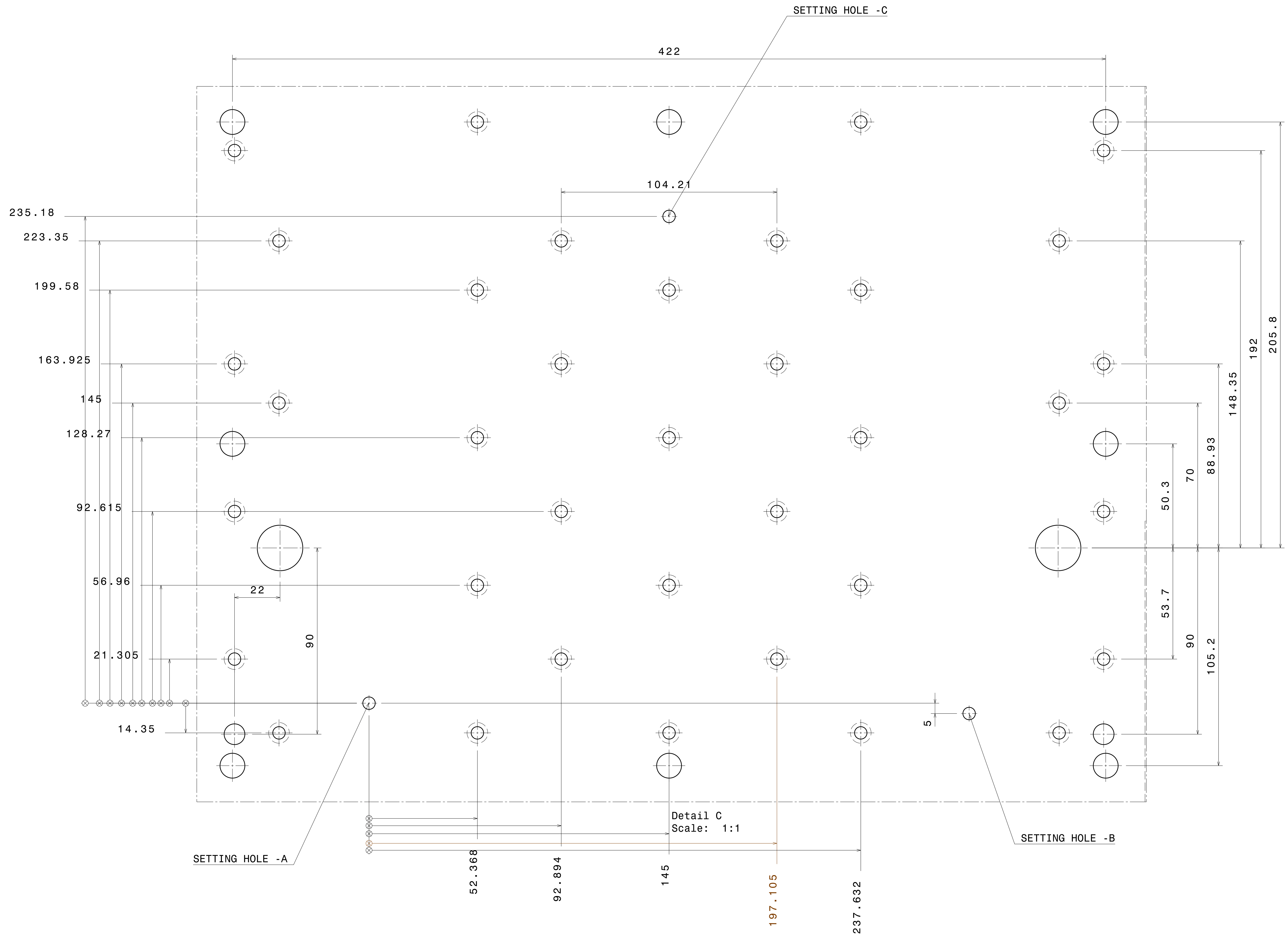


Section view A-A
Scale: 3:4



Section view B-B
Scale: 3:4

DRG.NO	▽ 8-25	▽▽ 1.6-8	▽▽▽ 0.025-1.6	▽▽▽▽ < 0.025	REVISION COLUMN						ASS'Y GROUP:	SIZE A1	INSTITUTE FOR PLASMA RESEARCH				
CO-ORDINATED BY					REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY	ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED		BHAT, GANDHINAGAR-382 428.				
MACHINING DEVIATIONS FOR NON-TOLERANCED DIMENSIONS											SCALE	-	DATE	TITLE	FIXTURE -1 FOR ACCELERATION GRID		
LENGTH IN mm OF SHORTER SIDE OF ANGLES				LENGTH OR DIA	UPTO 6	6-30	30-120	120-315			DRAWN	VRP		THIRD ANGLE PROJECTION			
UPTO 10	10-50	50-120	OVER 120-400		±0.1	±0.2	±0.3	±0.5			DESIGNED	MR JANA		REF DRG NO:			REV R0
±1'	±0'-30'	±0'-20'	±0'-10'								APPROVED	MR JANA		DRG.NO	32010006AA\AGF1		SHEET 01 OF 02

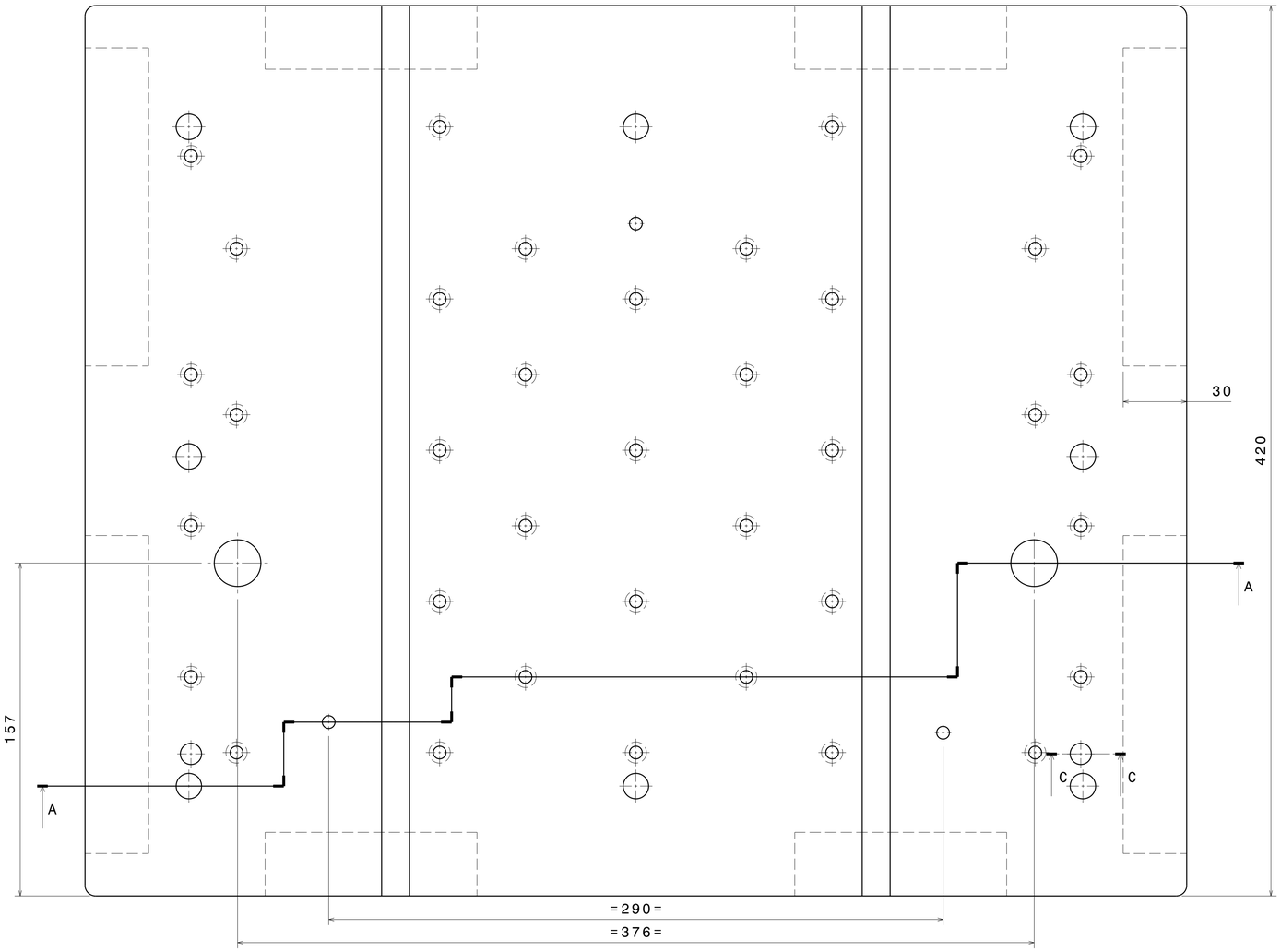


DRG.NO	▽ 8-25	▽▽ 1.6-8	▽▽▽ 0.025-1.6	▽▽▽▽ < 0.025
CO-ORDINATED BY				

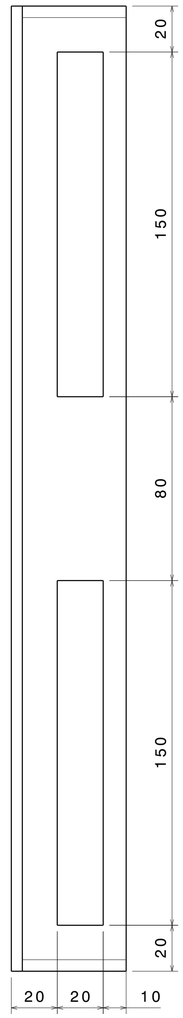
MACHINING DEVIATIONS FOR NON-TOLERANCED DIMENSIONS								
LENGTH IN mm OF SHORTER SIDE OF ANGLES				LENGTH OR DIA	UPTO 6	6-30	30-120	120-315
UPTO 10	10-50	50-120	OVER 120-400		±0.1	±0.2	±0.3	±0.5
±1°	±0°-30'	±0°-20'	±0°-10'					

REVISION COLUMN					
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

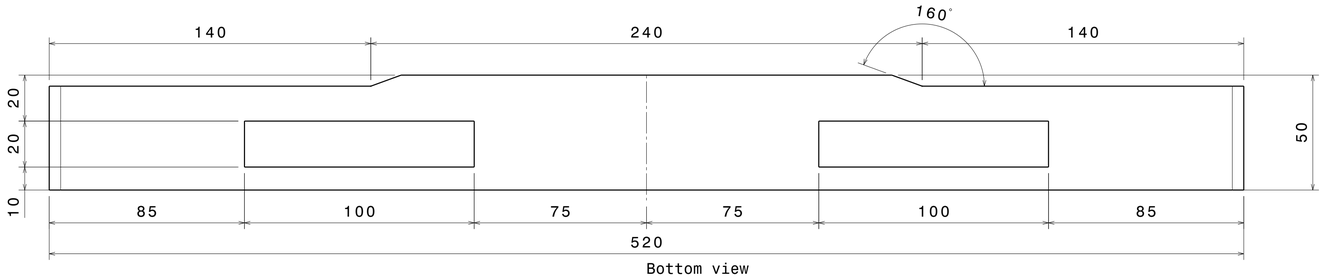
ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH BHAT, GANDHINAGAR-382 428.
ALL DIMENSIONS ARE IN `mm' UNLESS OTHERWISE STATED			
SCALE	-	DATE	THIRD ANGLE PROJECTION — TITLE: FIXTURE -1 FOR ACCELERATION GRID
DRAWN	VRP	-	
DESIGNED	MR JANA		REF DRG NO: — REV R0
APPROVED	MR JANA		DRG.NO 32010006AA\AGF1 — SHEET 02 OF 02



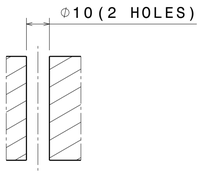
Front view
Scale: 3:4



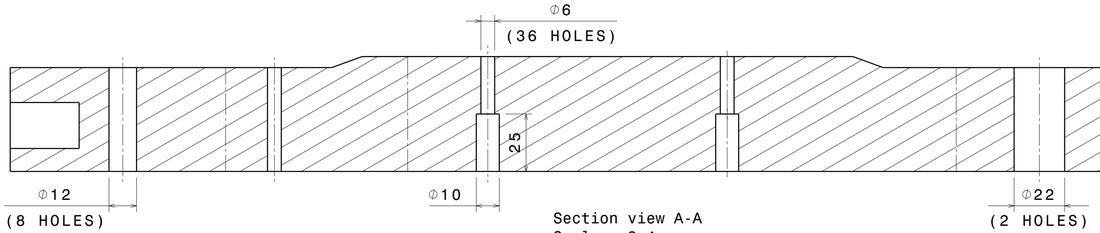
Right view
Scale: 3:4



Bottom view
Scale: 3:4



Section cut C-C
Scale: 3:4



Section view A-A
Scale: 3:4

DRG.NO	▽ 8-25	▽▽ 1.6-8	▽▽▽ 0.025-1.6	▽▽▽▽ < 0.025
CO-ORDINATED BY				

MACHINING DEVIATIONS FOR NON-TOLERANCED DIMENSIONS

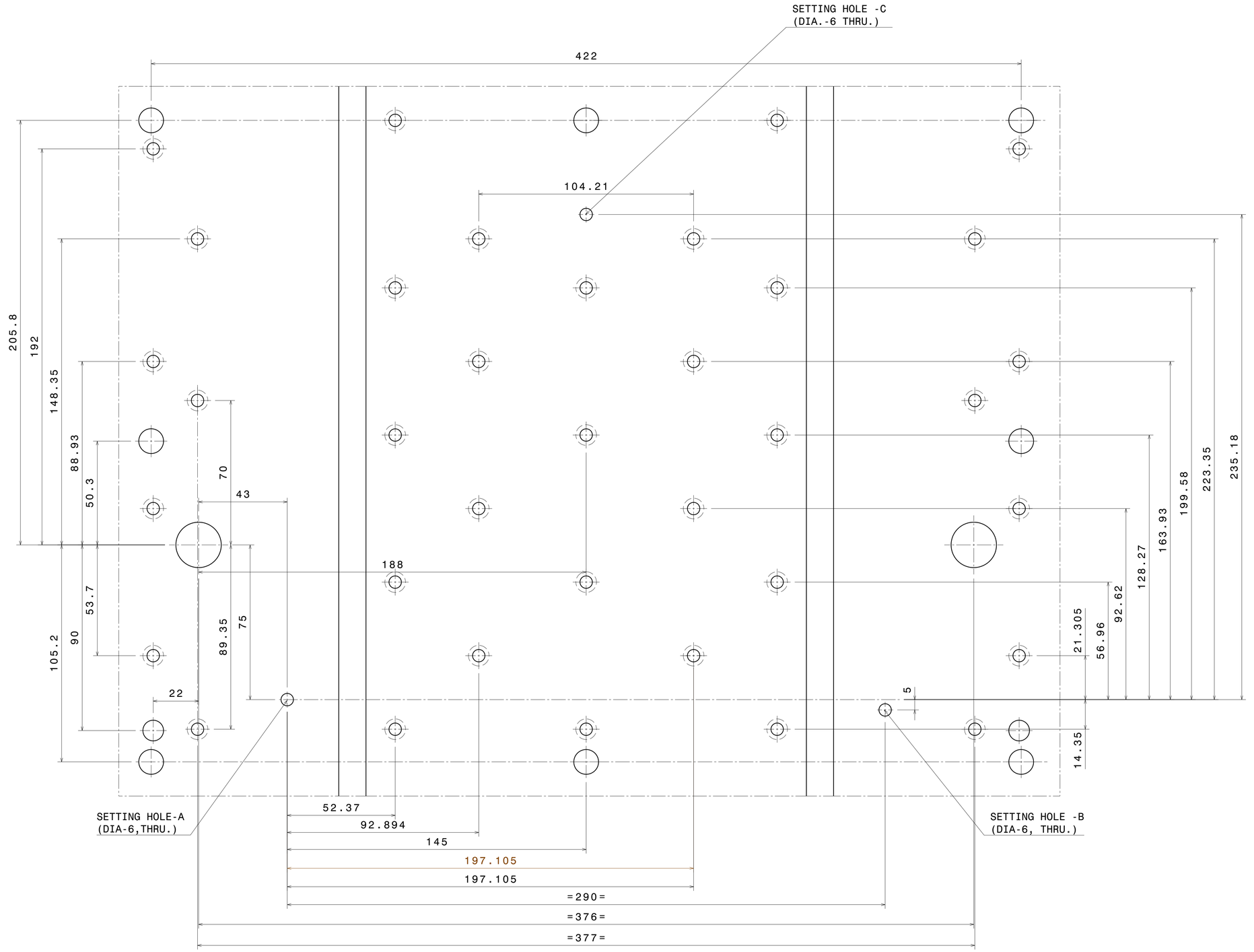
LENGTH IN mm OF SHORTER SIDE OF ANGLES				LENGTH OR DIA	UPTO 6	6-30	30-120	120-315
UPTO 10	10-50	50-120	OVER 120-400					
±1°	±0°-30'	±0°-20'	±0°-10'		±0.1	±0.2	±0.3	±0.5

REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

REVISION COLUMN

ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE	-	DATE	TITLE: FIXTURE -2 ACCELERATION GRID
DRAWN	VRP		
DESIGNED	MR JANA		REF DRG NO: A1 — REV R0
APPROVED	MR JANA		DRG.NO 32010006AA\AGF2 — SHEET 01 OF 02

THIRD ANGLE PROJECTION



Detail B
Scale: 1:1

DRG.NO	▽ 8-25	▽▽ 1.6-8	▽▽▽ 0.025-1.6	▽▽▽▽ < 0.025
CO-ORDINATED BY				

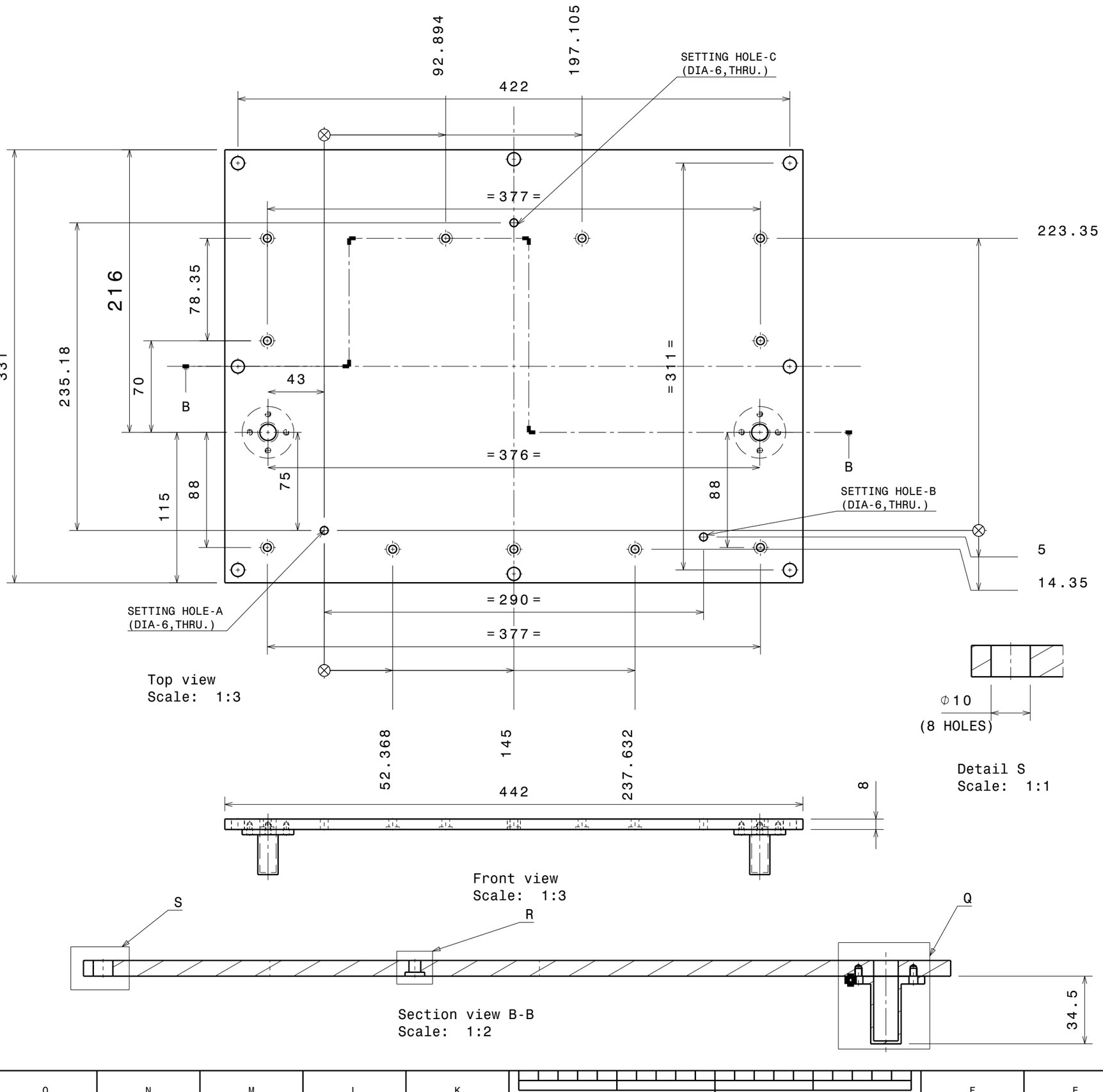
MACHINING DEVIATIONS FOR NON-TOLERANCED DIMENSIONS

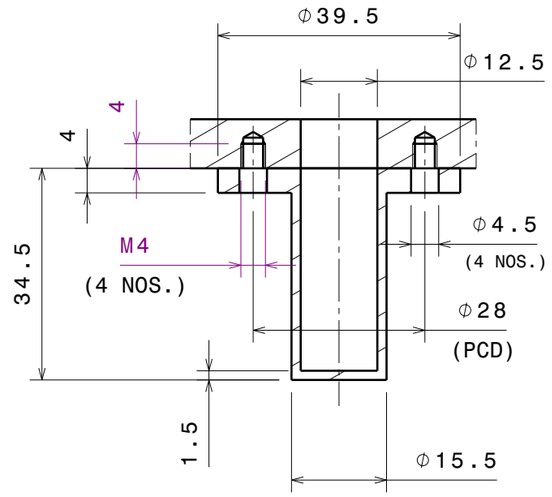
LENGTH IN mm OF SHORTER SIDE OF ANGLES				LENGTH OR DIA	UPTO 6	6-30	30-120	120-315
UPTO 10	10-50	50-120	OVER 120-400					
±1°	±0°-30'	±0°-20'	±0°-10'		±0.1	±0.2	±0.3	±0.5

REVISION COLUMN					
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

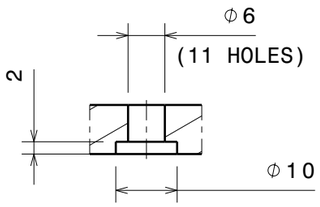
ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE	-	DATE	TITLE: FIXTURE -2 ACCELERATION GRID
DRAWN	VRP		
DESIGNED	MR JANA		REF DRG NO: A1 — REV R0
APPROVED	MR JANA		DRG.NO 32010006AA\AGF2 — SHEET 02 OF 02

THIRD ANGLE PROJECTION





Detail Q
Scale: 1:1

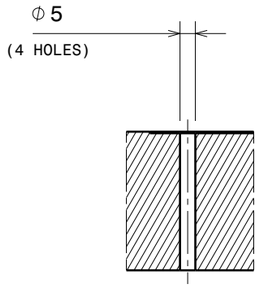


Detail R
Scale: 1:1

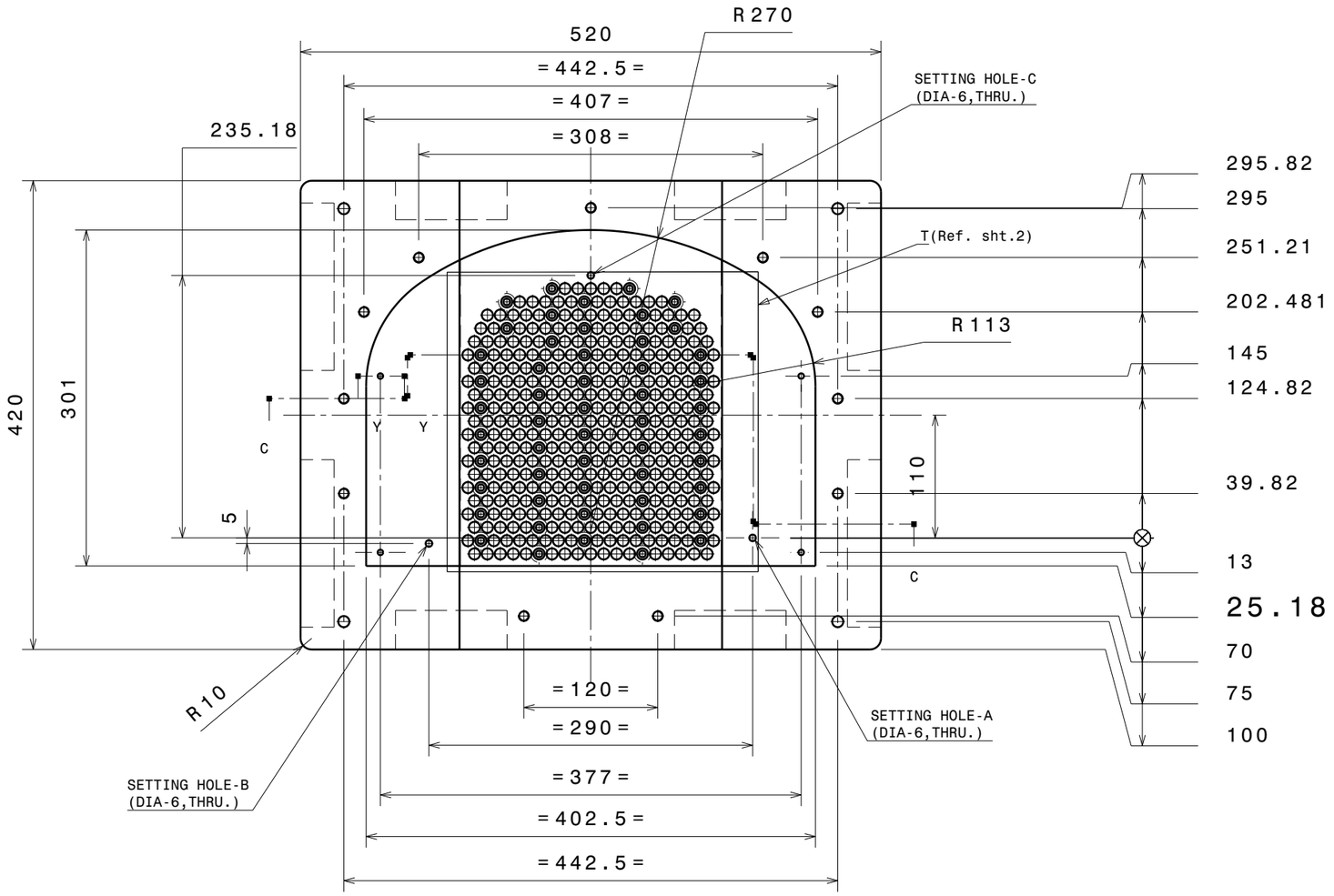
Detail S
Scale: 1:1

NOTES:
1. Fixture drawing is completely conceptual in nature.
2. Type and number of holes are indicative only.
3. Fixture clamping and grid clamping provisions are indicative only.
4. Vendor shall customize the fixture with IPR approvals as per the available facility at the site..
5. Suggested material for fixture (elctro deposition) is G10 / HYLAM.
6. Use of fixtures shall be in a manner to get the final product in the form of grid as per the IPR approved drawing.
7. Use ISO 2768 m Standard for tolerance.
8. Do not scale the drawing. Ask if doubt.

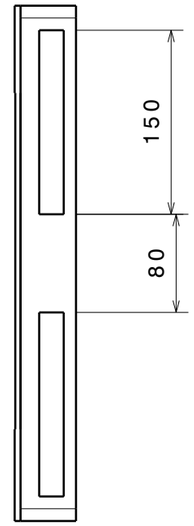
ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE	-	DATE	TITLE FIXTURE-3 ACCELERATION GRID
DRAWN	KIRIT	29/10/2020	THIRD ANGLE PROJECTION
REVIEWED	BRD/MKG/RKS		REF DRG NO: REV 00
APPROVED	M.JANA		DRG.NO 32010006AA\AGF3 SHEET 01OF01



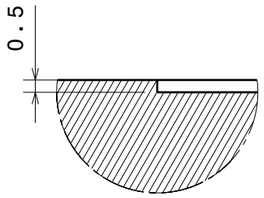
Section view Y-Y
Scale: 1:2



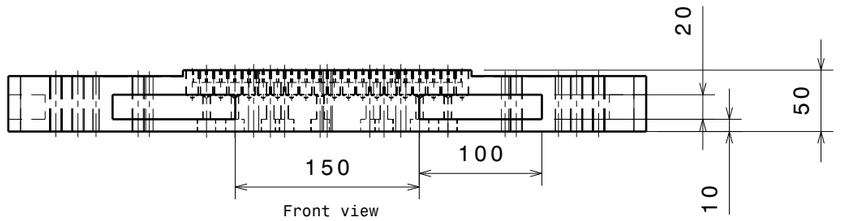
Top view
Scale: 1:5



Auxiliary view U
Scale: 1:5

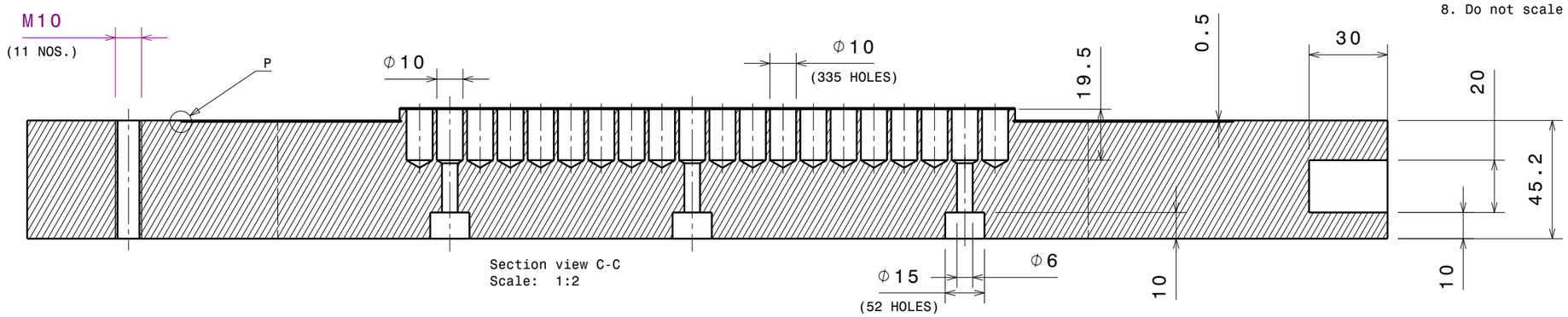


Detail P
Scale: 4:1



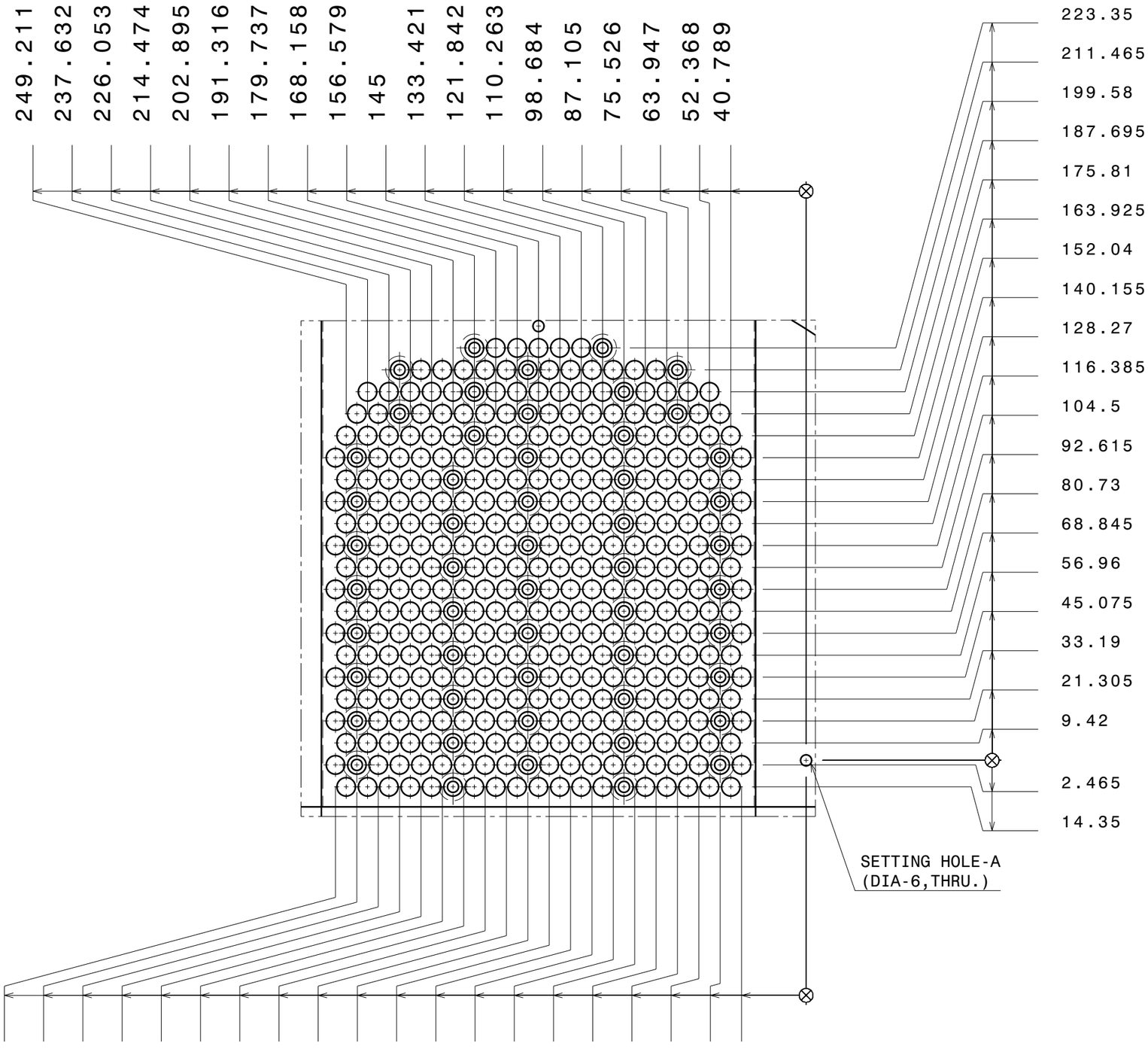
Front view
Scale: 1:5

NOTES:
1. Fixture drawing is completely conceptual in nature.
2. Type and number of holes are indicative only.
3. Fixture clamping and grid clamping provisions are indicative only.
4. Vendor shall customize the fixture with IPR approvals as per the available facility at the site..
5. Fixture material should be non-ferrous and compatible with grid.
6. Use of fixtures shall be in a manner to get the final product in the form of grid as per the IPR approved drawing.
7. Use ISO 2768 m Standard for tolerance.
8. Do not scale the drawing. Ask if doubt.



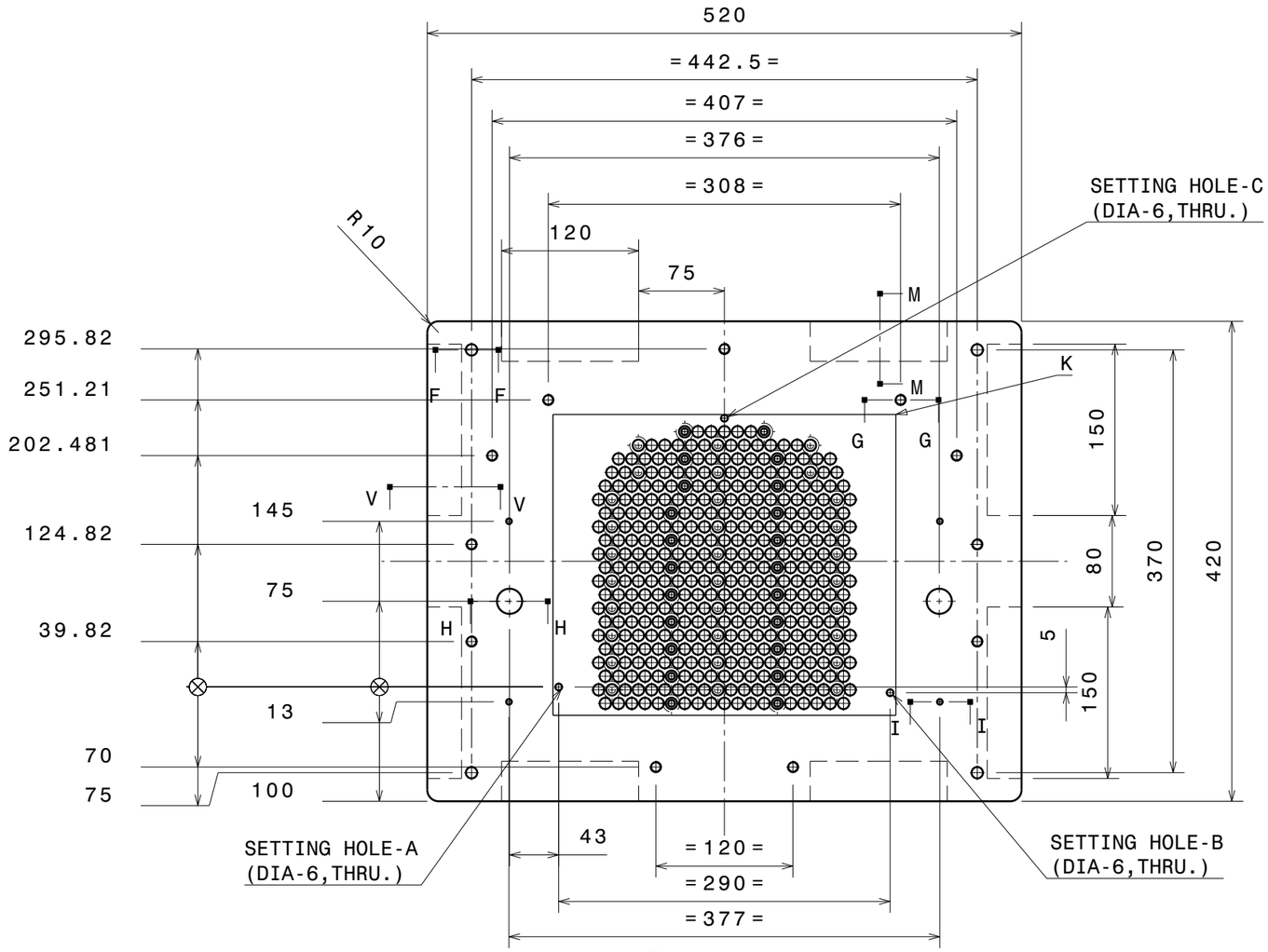
Section view C-C
Scale: 1:2

ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE	-	DATE	TITLE FIXTURE-4 ACCELERATION GRID
DRAWN	KIRIT	29/10/2020	THIRD ANGLE PROJECTION
REVIEWED	BRD/MKG/RKS		REF DRG NO: — REV 00
APPROVED	M.JANA		DRG.NO 32010006AA\AGF4 — SHEET 01 OF 02

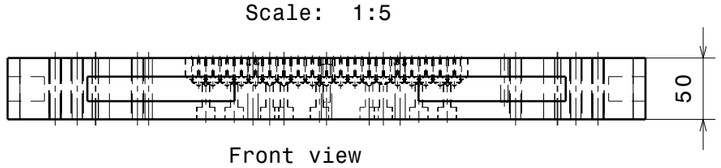


Detail T[2]
Scale: 2:5

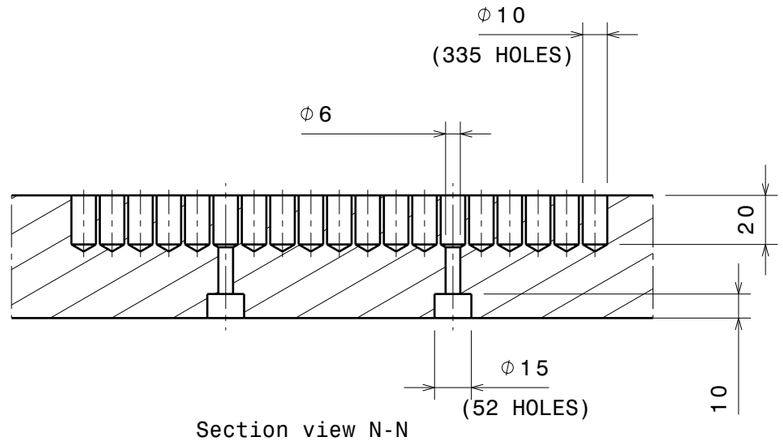
ASS'Y GROUP:	SIZE A1	INSTITUTE FOR PLASMA RESEARCH	
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED		BHAT, GANDHINAGAR-382 428.	
SCALE -	DATE	TITLE FIXTURE-4 ACCELERATION GRID	
DRAWN KIRIT	29/10/2020	THIRD ANGLE PROJECTION	
REVIEWED BRD/MKG/RKS		REF DRG NO:	REV 00
APPROVED M.JANA		DRG.NO 32010006AA\AGF4	SHEET 02OF02



Top view
Scale: 1:5



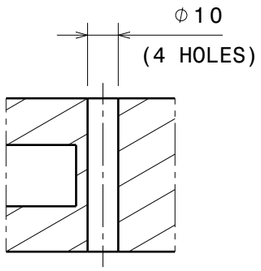
Front view
Scale: 1:5



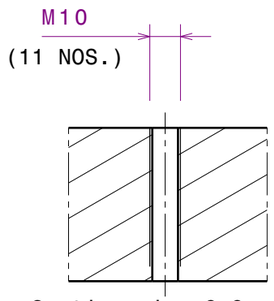
Section view N-N
Scale: 2:5

Section view M-M
Scale: 1:2

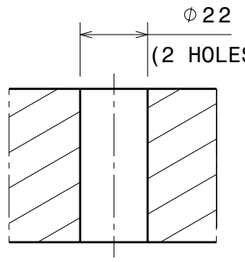
Section view V-V
Scale: 1:5



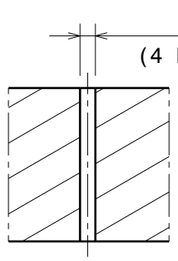
Section view F-F
Scale: 1:2



Section view G-G
Scale: 1:2



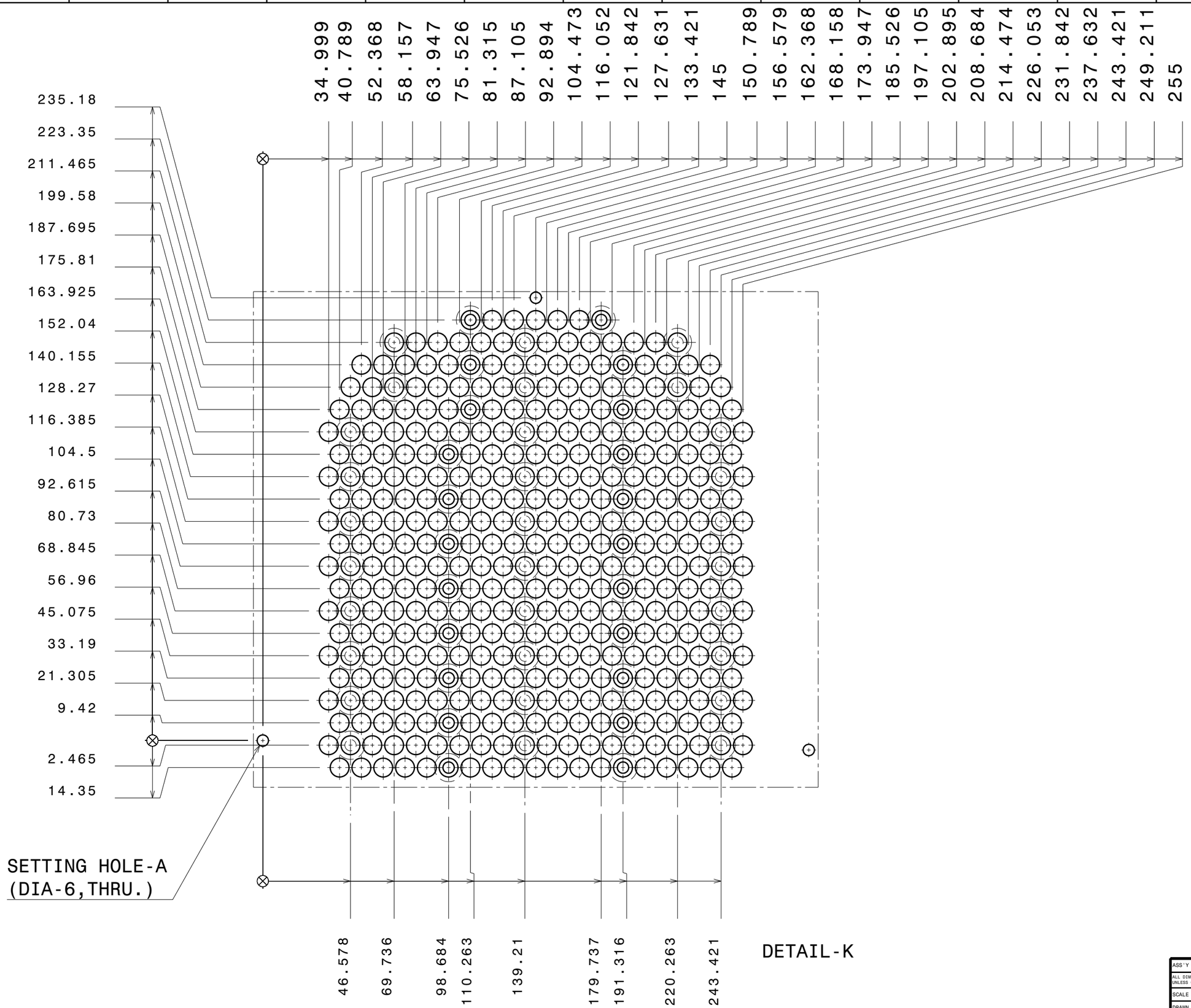
Section view H-H
Scale: 1:2



Section view I-I
Scale: 1:2

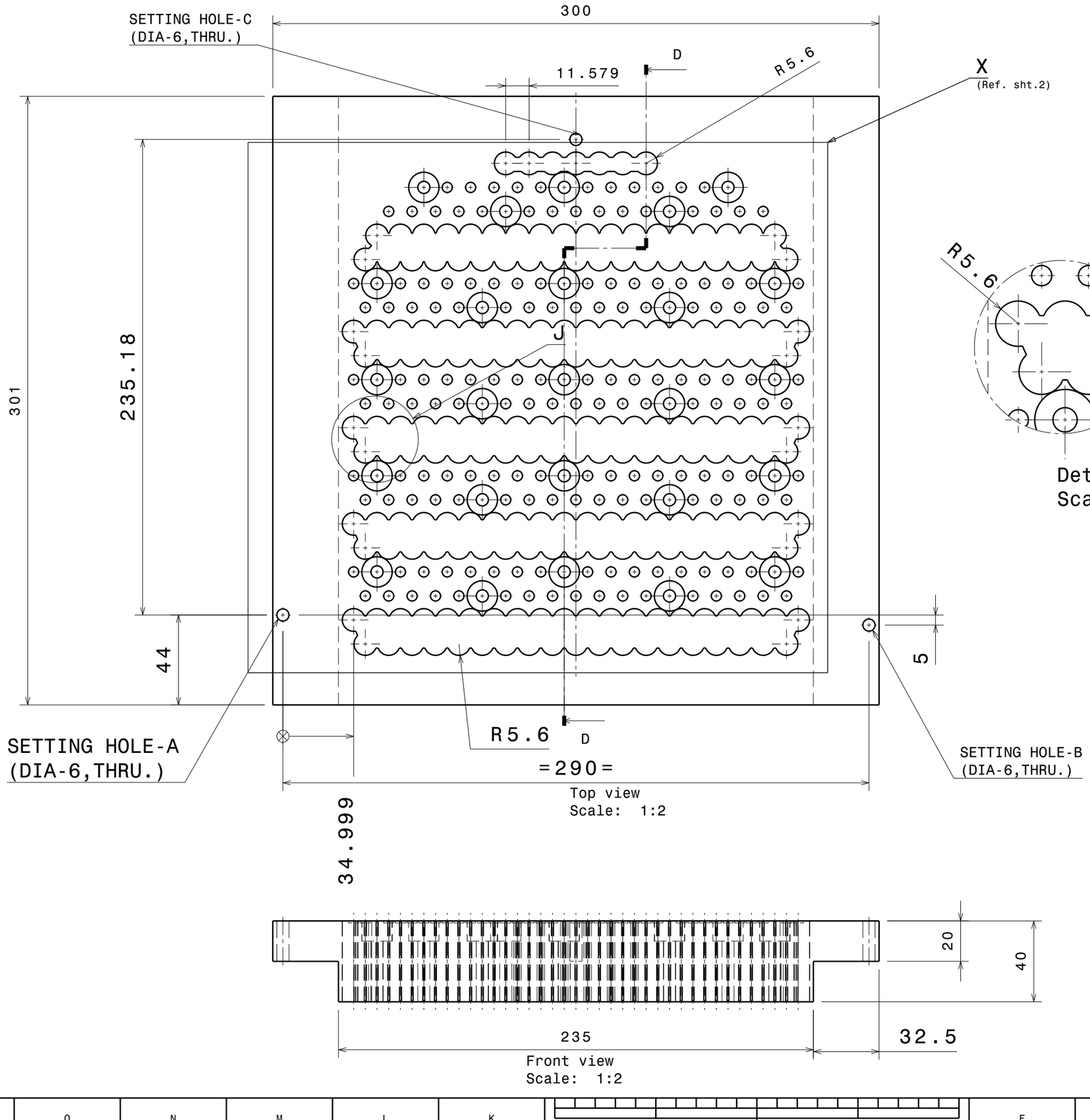
NOTES:
1. Fixture drawing is completely conceptual in nature.
2. Type and number of holes are indicative only.
3. Fixture clamping and grid clamping provisions are indicative only.
4. Vendor shall customize the fixture with IPR approvals as per the available facility at the site..
5. Fixture material should be non-ferrous and compatible with grid.
6. Use of fixtures shall be in a manner to get the final product in the form of grid as per the IPR approved drawing.
7. Use ISO 2768 m Standard for tolerance.
8. Do not scale the drawing. Ask if doubt.

ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE		DATE	TITLE FIXTURE-5 ACCELERATION GRID
DRAWN	KIRIT	29/10/2020	THIRD ANGLE PROJECTION
REVIEWED	BRD/MKG RKS		REF DRG NO: REV 00
APPROVED	M.JANA		DRG.NO 32010006AA\AGF5 SHEET 01 OF 02

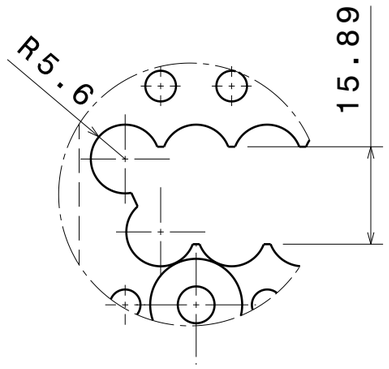


DETAIL-K

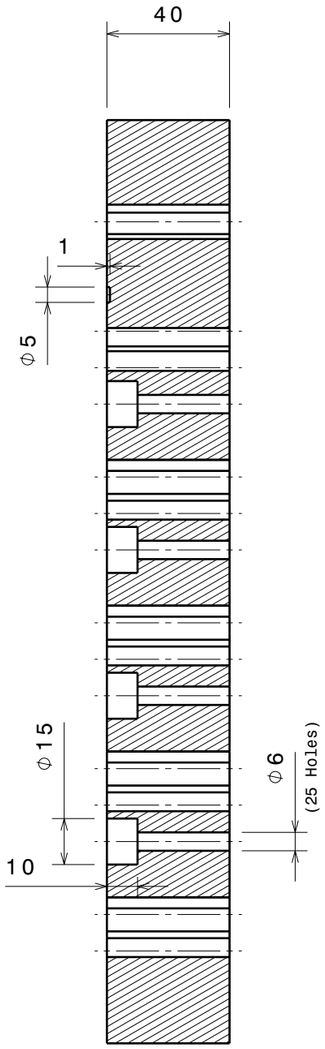
ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH BHAT, GANDHINAGAR-382 428.
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED			
SCALE	-	DATE	TITLE FIXTURE-5 ACCELERATION GRID
DRAWN	KIRIT	29/10/2020	
REVIEWED	BRD/MKG/RKS		REF DRG NO: REV 00
APPROVED	M.JANA		DRG.NO 32010006AA\AGF5 SHEET 02OF02



Top view
Scale: 1:2



Detail J
Scale: 1:1

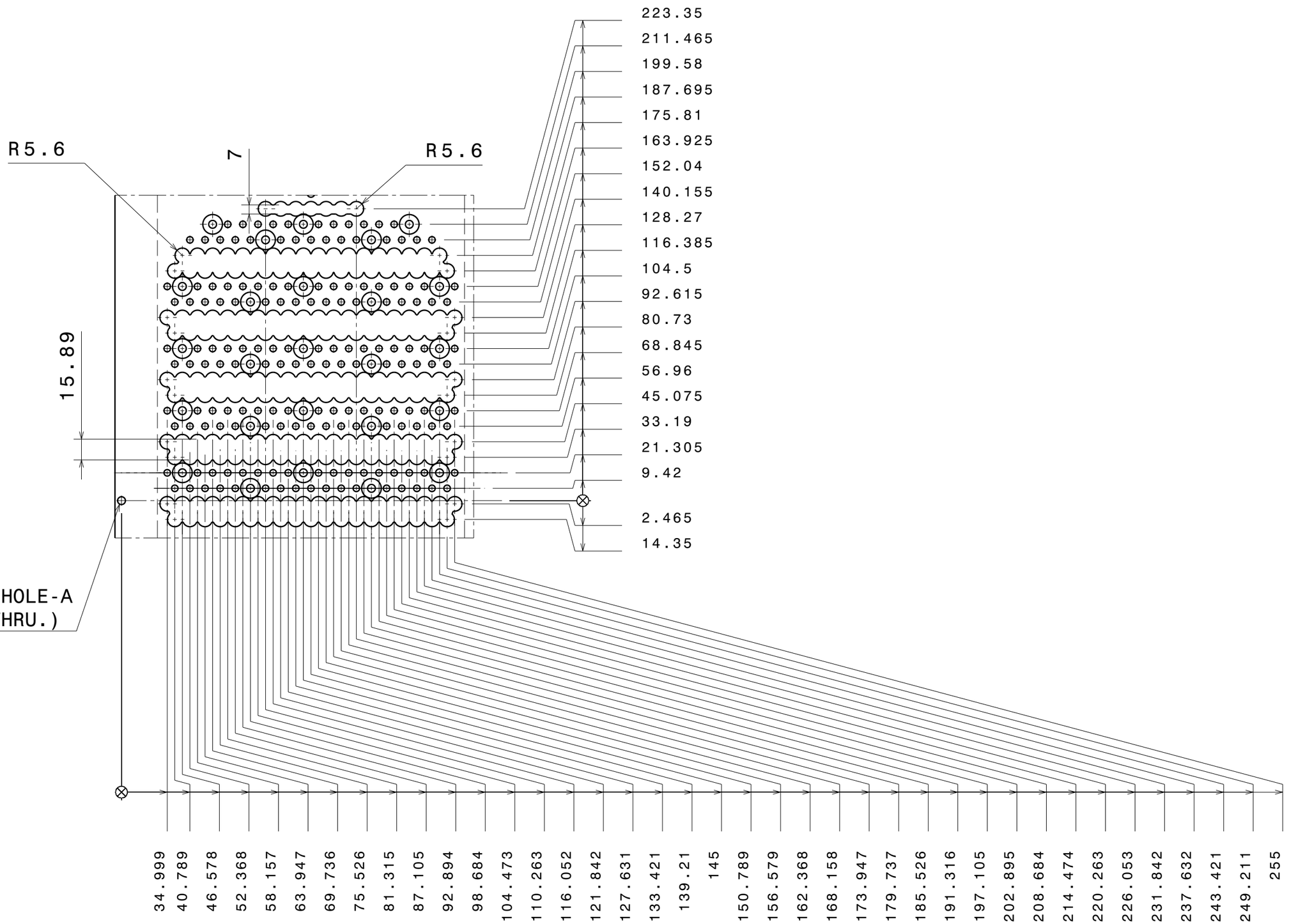


Section view D-D
Scale: 1:2

Front view
Scale: 1:2

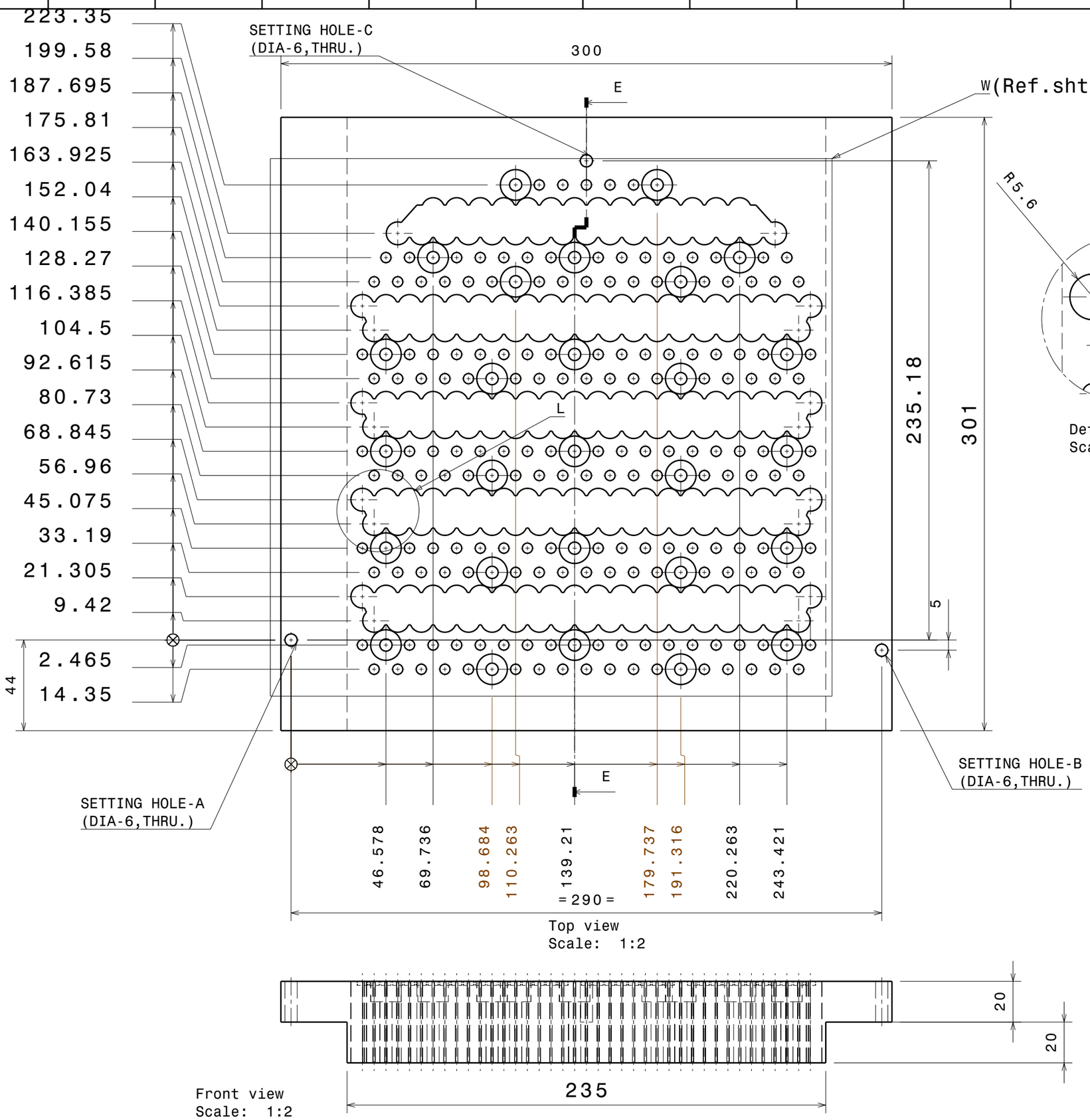
NOTES:
1. Fixture drawing is completely conceptual in nature.
2. Type and number of holes are indicative only.
3. Fixture clamping and grid clamping provisions are indicative only.
4. Vendor shall customize the fixture with IPR approvals as per the available facility at the site..
5. Fixture material should be non-ferrous and compatible with grid.
6. Use of fixtures shall be in a manner to get the final product in the form of grid as per the IPR approved drawing.
7. Use ISO 2768 m Standard for tolerance.
8. Do not scale the drawing. Ask if doubt.

ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE	-	DATE	TITLE FIXTURE-6 ACCELERATION GRID
DRAWN	KIRIT	29/10/2020	THIRD ANGLE PROJECTION
REVIEWED	BRD/MKG/RKS		REF DRG NO: REV 00
APPROVED	M.JANA		DRG.NO 32010006AA\AGF6 SHEET 01of02



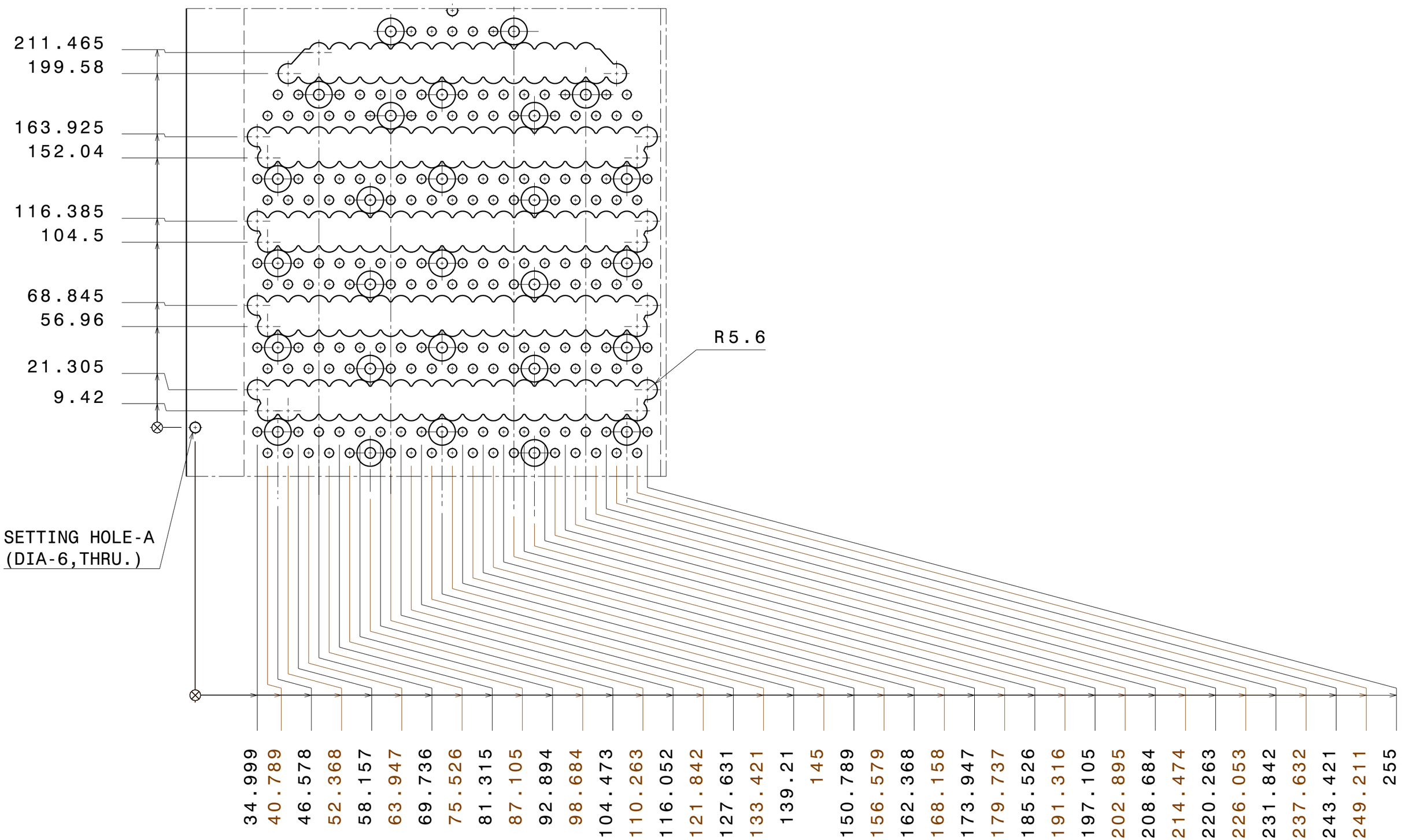
Detail X
Scale: 1:3

ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE	-	DATE	TITLE FIXTURE-6 ACCELERATION GRID
DRAWN	KIRIT	29/10/2020	THIRD ANGLE PROJECTION
REVIEWED	BRD/MKG/RKS		REF DRG NO: REV 00
APPROVED	M.JANA		DRG.NO 32010006AA\AGF6 SHEET 02 OF 02



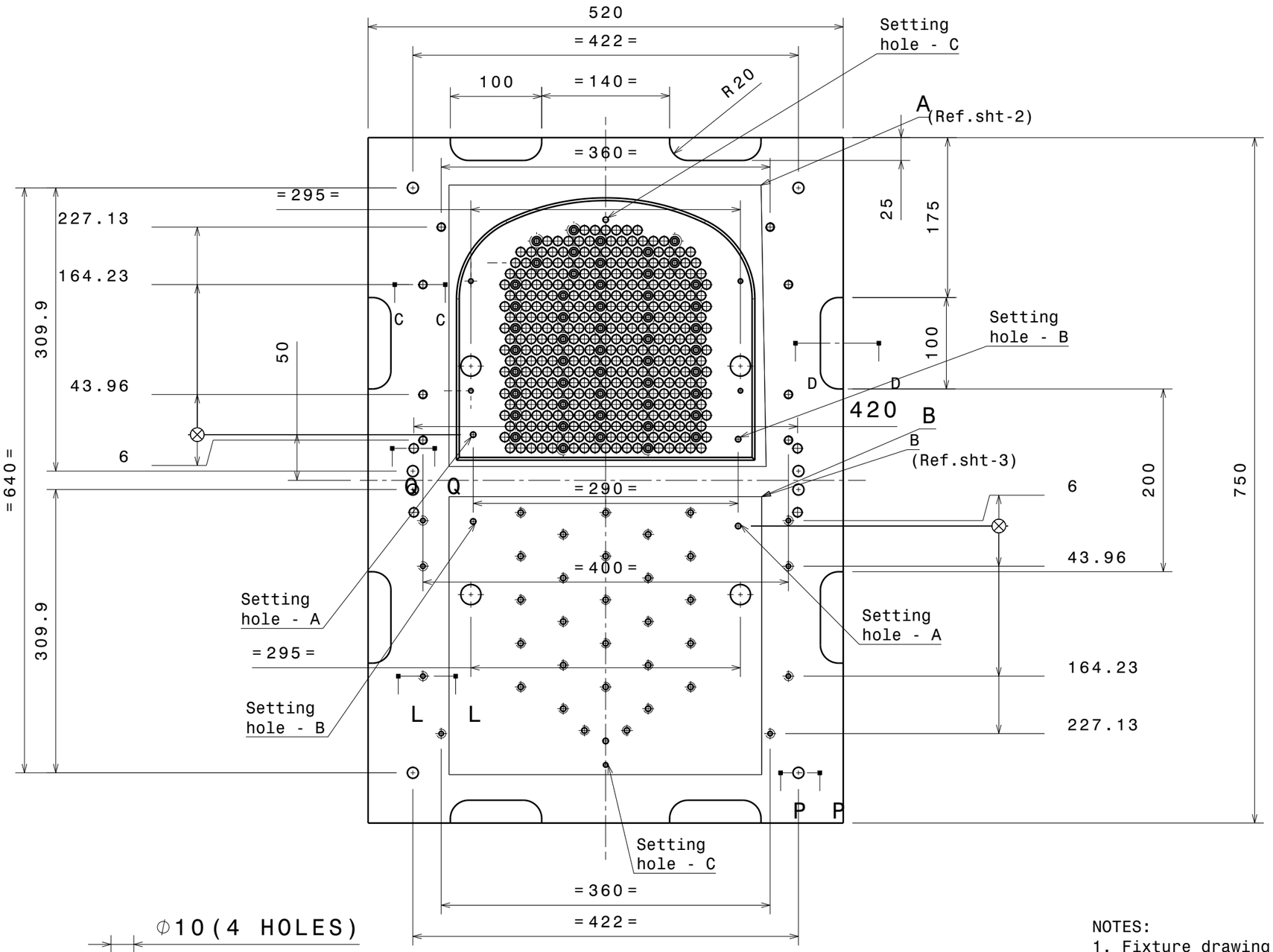
NOTES:
1. Fixture drawing is completely conceptual in nature.
2. Type and number of holes are indicative only.
3. Fixture clamping and grid clamping provisions are indicative only.
4. Vendor shall customize the fixture with IPR approvals as per the available facility at the site..
5. Fixture material should be non-ferrous and compatible with grid.
6. Use of fixtures shall be in a manner to get the final product in the form of grid as per the IPR approved drawing.
7. Use ISO 2768 m Standard for tolerance.
8. Do not scale the drawing. Ask if doubt.

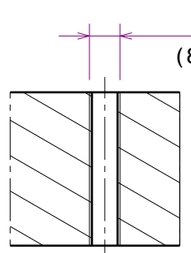
ASS'Y GROUP:	SIZE A1	INSTITUTE FOR PLASMA RESEARCH	
ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED		BHAT, GANDHINAGAR-382 428.	
SCALE :	DATE	THIRD ANGLE PROJECTION	TITLE FIXTURE-7 ACCELERATION GRID
DRAWN KIRIT	29/10/2020		
REVIEWED BRD/MKG/RKS		REF DRG NO:	REV 00
APPROVED M.JANA		DRG.NO 32010006AA\AGF7	SHEET 01 OF 02



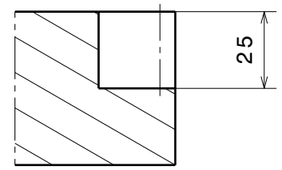
Detail W
Scale: 1:2

ASS'Y GROUP:	SIZE A1	INSTITUTE FOR PLASMA RESEARCH	
ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED		BHAT, GANDHINAGAR-382 428.	
SCALE :	DATE	TITLE FIXTURE-7 ACCELERATION GRID	
DRAWN KIRIT	29/10/2020	THIRD ANGLE PROJECTION	
REVIEWED BRD/MKG/RKS		REF DRG NO:	REV 00
APPROVED M.JANA		DRG.NO 32010006AA\AGF7	SHEET 02OF02

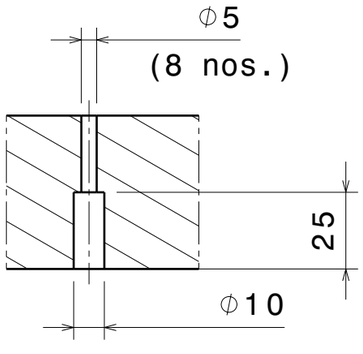




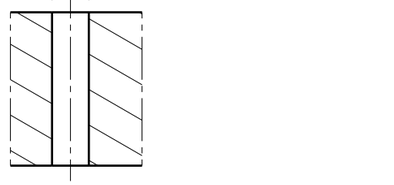
Section view C-C
Scale: 1:2



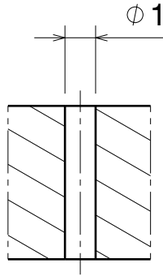
Section view D-D
Scale: 1:2



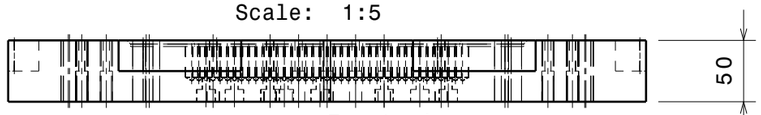
Section view L-L
Scale: 1:2



Section view P-P
Scale: 1:2



Section view Q-Q
Scale: 1:2

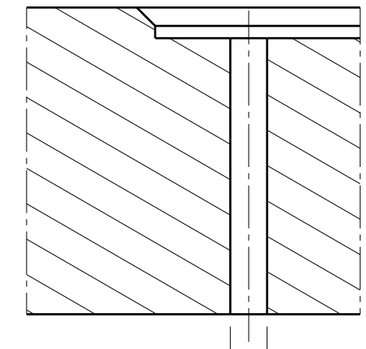


Top view
Scale: 1:5

Front view
Scale: 1:5

NOTES:
1. Fixture drawing is completely conceptual in nature.
2. Type and number of holes are indicative only.
3. Fixture clamping and grid clamping provisions are indicative only.
4. Vendor shall customize the fixture with IPR approvals as per the available facility at the site..
5. Fixture material should be non-ferrous and compatible with grid.
6. Use of fixtures shall be in a manner to get the final product in the form of grid as per the IPR approved drawing.
7. Use ISO 2768 m Standard for tolerance.
8. Do not scale the drawing. Ask if doubt.

ASS'Y GROUP:	SIZE A1	INSTITUTE FOR PLASMA RESEARCH	
ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED		BHAT, GANDHINAGAR-382 428.	
SCALE :	DATE	TITLE	FIXTURE-1 FOR DECELERATION GRID
DRAWN KIRIT	29/10/2020	THIRD ANGLE PROJECTION	
REVIEWED BRD/MKG RKS		REF DRG NO:	REV 00
APPROVED M.JANA		DRG.NO 32030003AA\DGF1	SHEET 01 OF 04



Section view J-J
Scale: 1:1

ϕ6
(3 holes)

34.592
46.214
57.836
69.458
81.08
92.702
104.323
115.945
127.567
139.189
150.811
162.433
174.055
185.677
197.298
208.92
220.542
232.164
243.786
255.408

223.689
211.771
199.852
187.933
176.014
164.095
152.176
140.257
128.338
116.419
104.5
92.581
80.662
68.743
56.824
44.905
32.986
21.067
9.148
2.771
14.689

R92

R250

235.18

168

281

Setting
hole - A

75

48

I

I(ref.sht.-4)

=295=

J

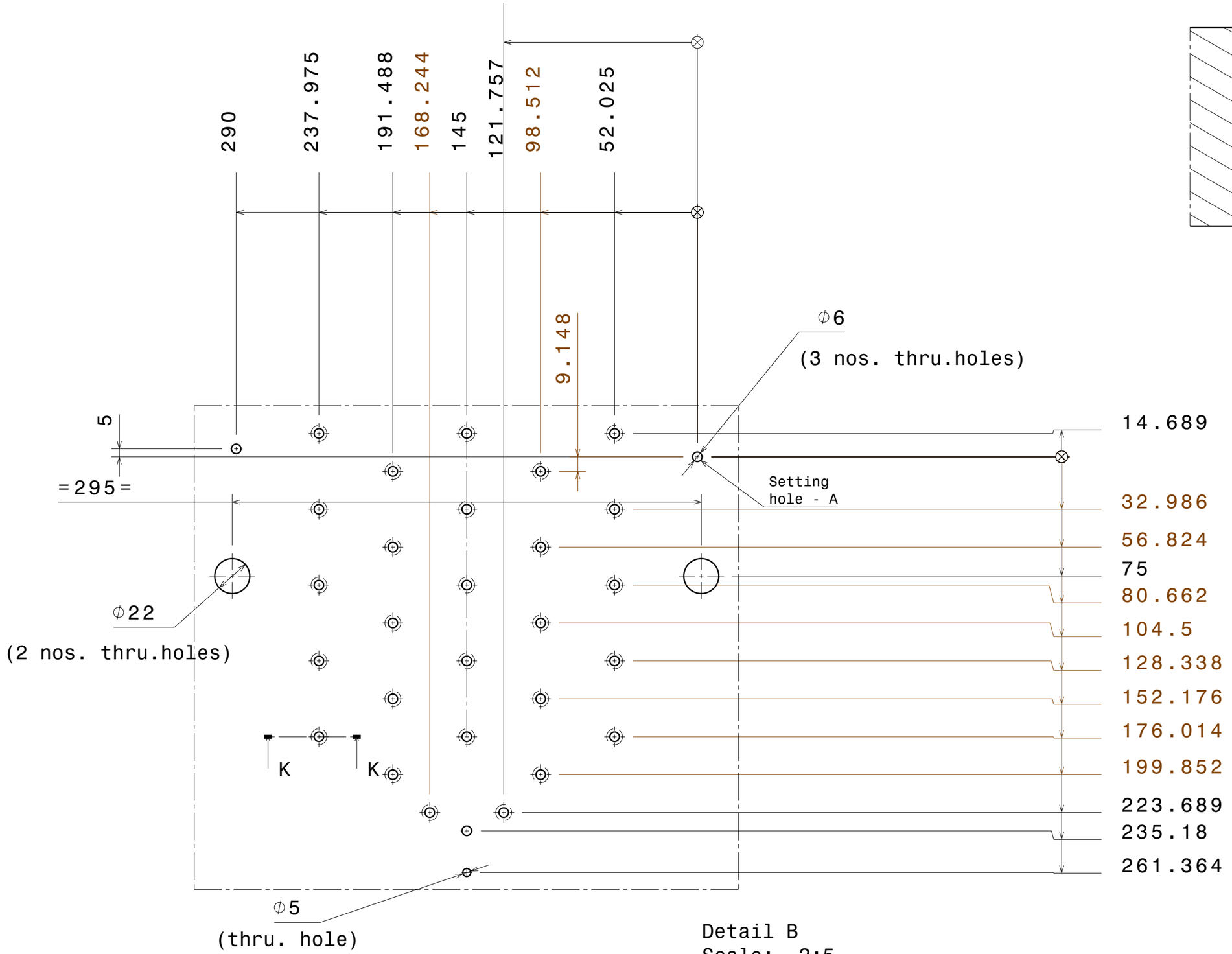
J

=320.5=

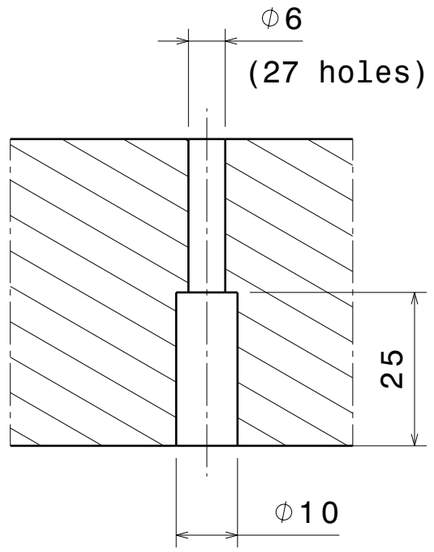
40.403
52.025
63.647
75.269
86.891
98.512
110.134
121.756
133.378
145
156.622
168.244
179.866
191.488
203.109
214.731
226.353
237.975
249.597

Detail A
Scale: 2:5

ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH BHAT, GANDHINAGAR-382 428.
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED			
SCALE	-	DATE	TITLE: FIXTURE-1 FOR DECELERATION GRID
DRAWN	KIRIT	29/10/2020	THIRD ANGLE PROJECTION
REVIEWED	BRD/MKG/RKS		REF DRG NO: — REV 00
APPROVED	M.JANA		DRG.NO 32030003AA\DGF1 — SHEET 02 OF 04

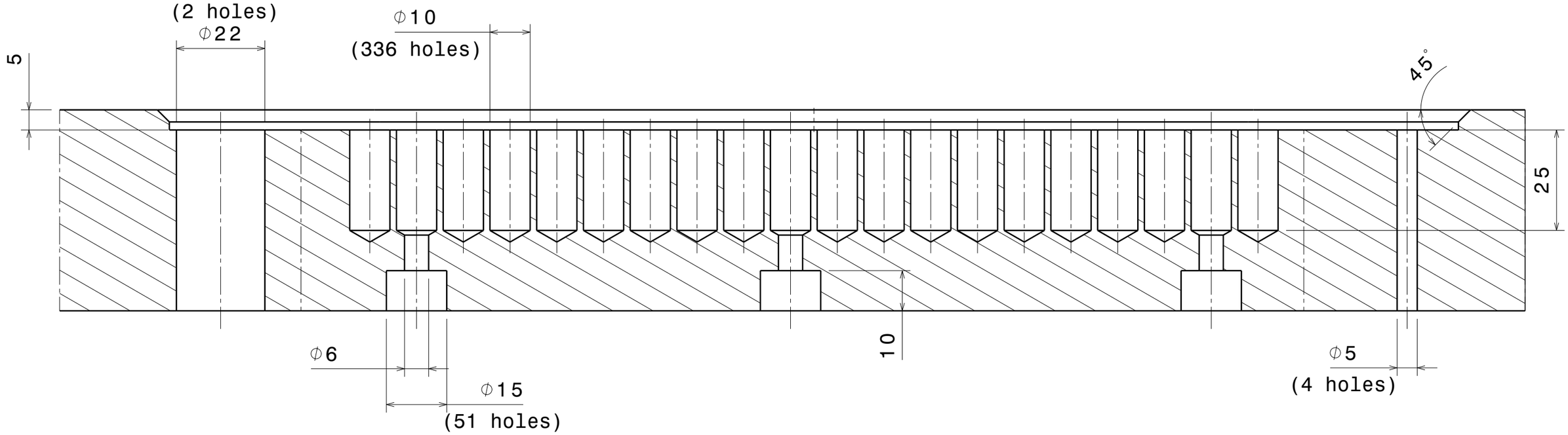


Detail B
Scale: 2:5



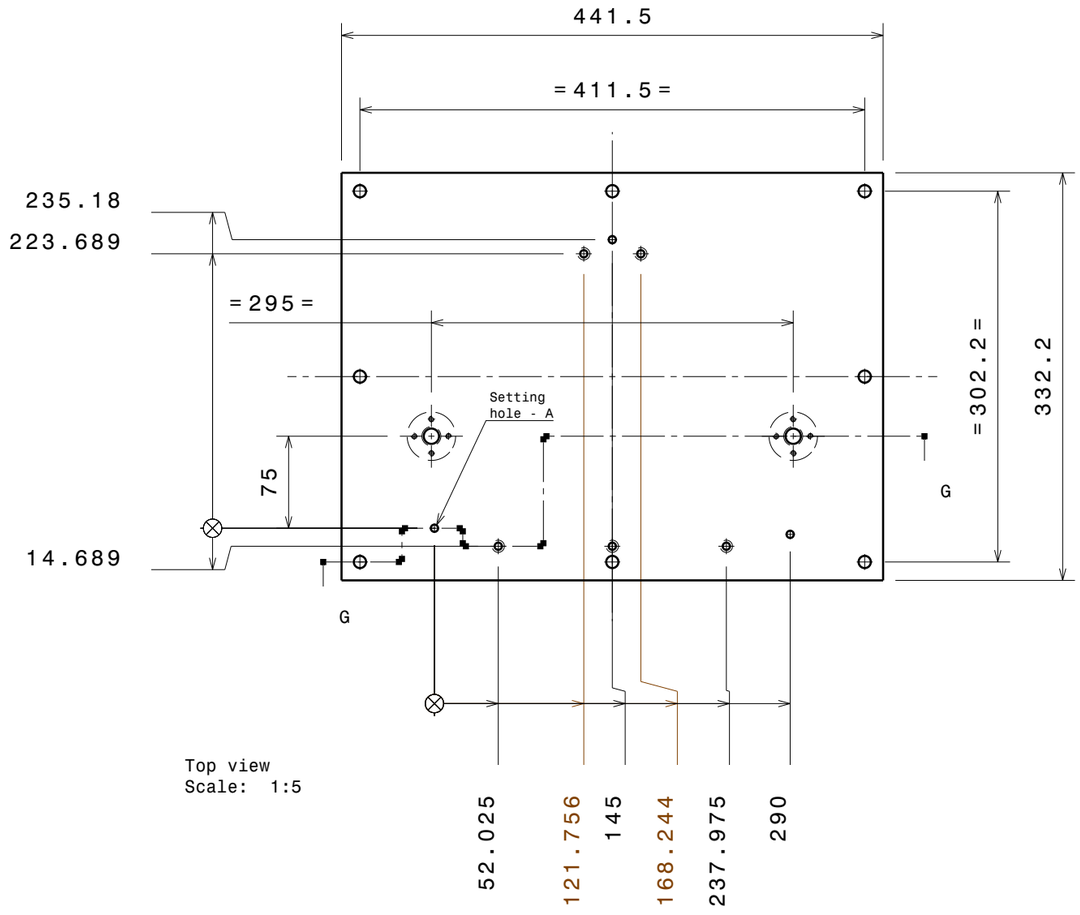
Section view K-K
Scale: 1:1

ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE		DATE	TITLE: FIXTURE-1 FOR DECELERATION GRID
DRAWN	KIRIT	29/10/2020	THIRD ANGLE PROJECTION
REVIEWED	BRD/MKG RKS		REF DRG NO: — REV 00
APPROVED	M.JANA		DRG.NO 32030003AA\DGF1 — SHEET 03 OF 04

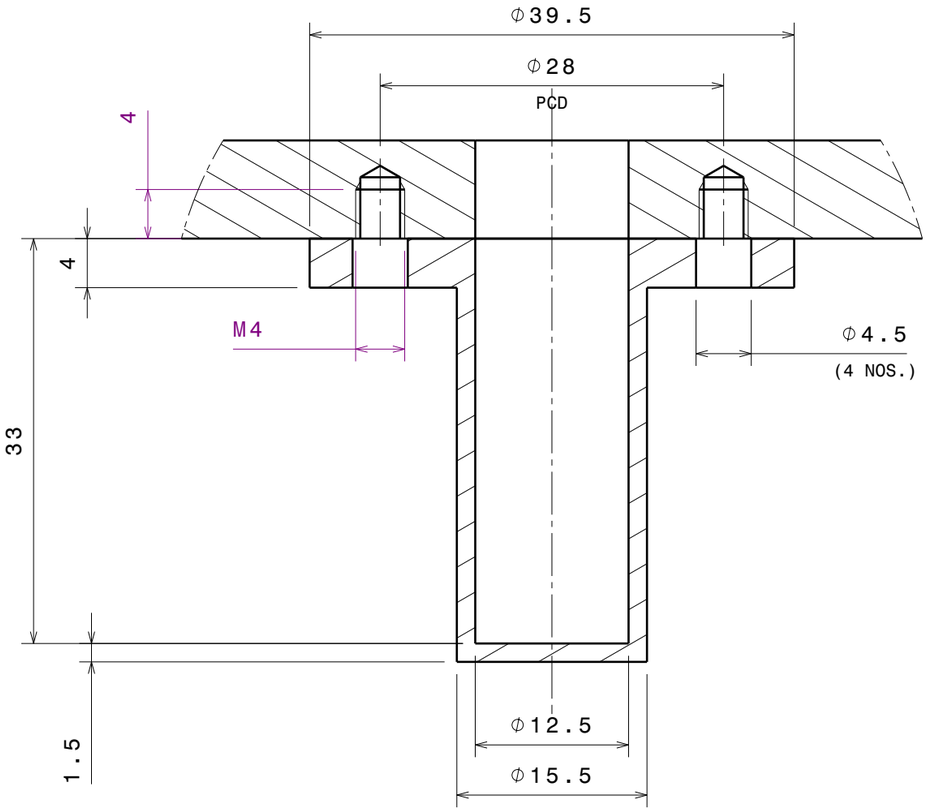


Section view I-I
Scale: 1:1

ASS'Y GROUP:	SIZE A1	INSTITUTE FOR PLASMA RESEARCH	
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED		BHAT, GANDHINAGAR-382 428.	
SCALE -	DATE	THIRD ANGLE PROJECTION	TITLE: FIXTURE-1 FOR DECELERATION GRID
DRAWN KIRIT	29/10/2020		
REVIEWED BRD/MKG/RKS		REF DRG NO:	REV 00
APPROVED M.JANA		DRG.NO 32030003AA\DGF1	SHEET 04 OF 04

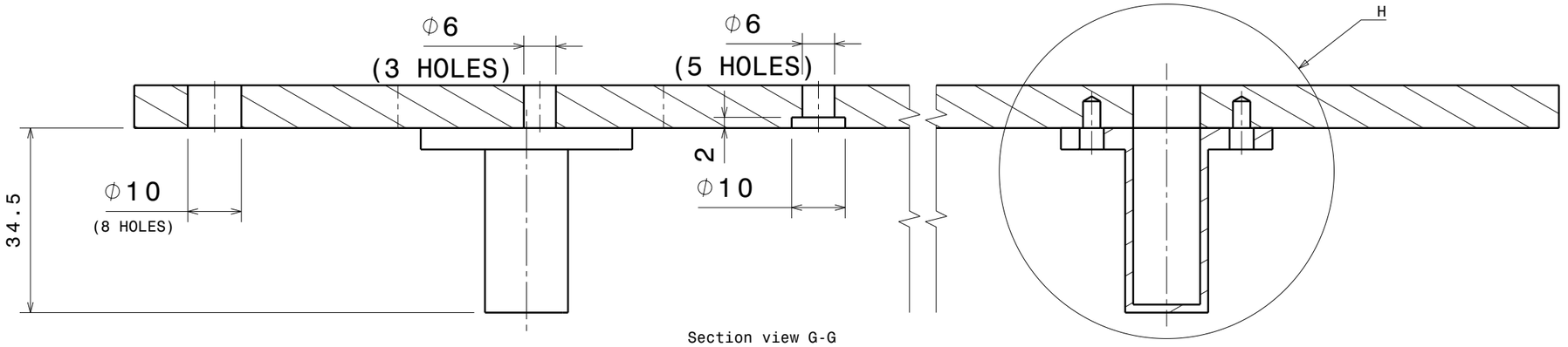


Top view
Scale: 1:5



Detail H
Scale: 2:1

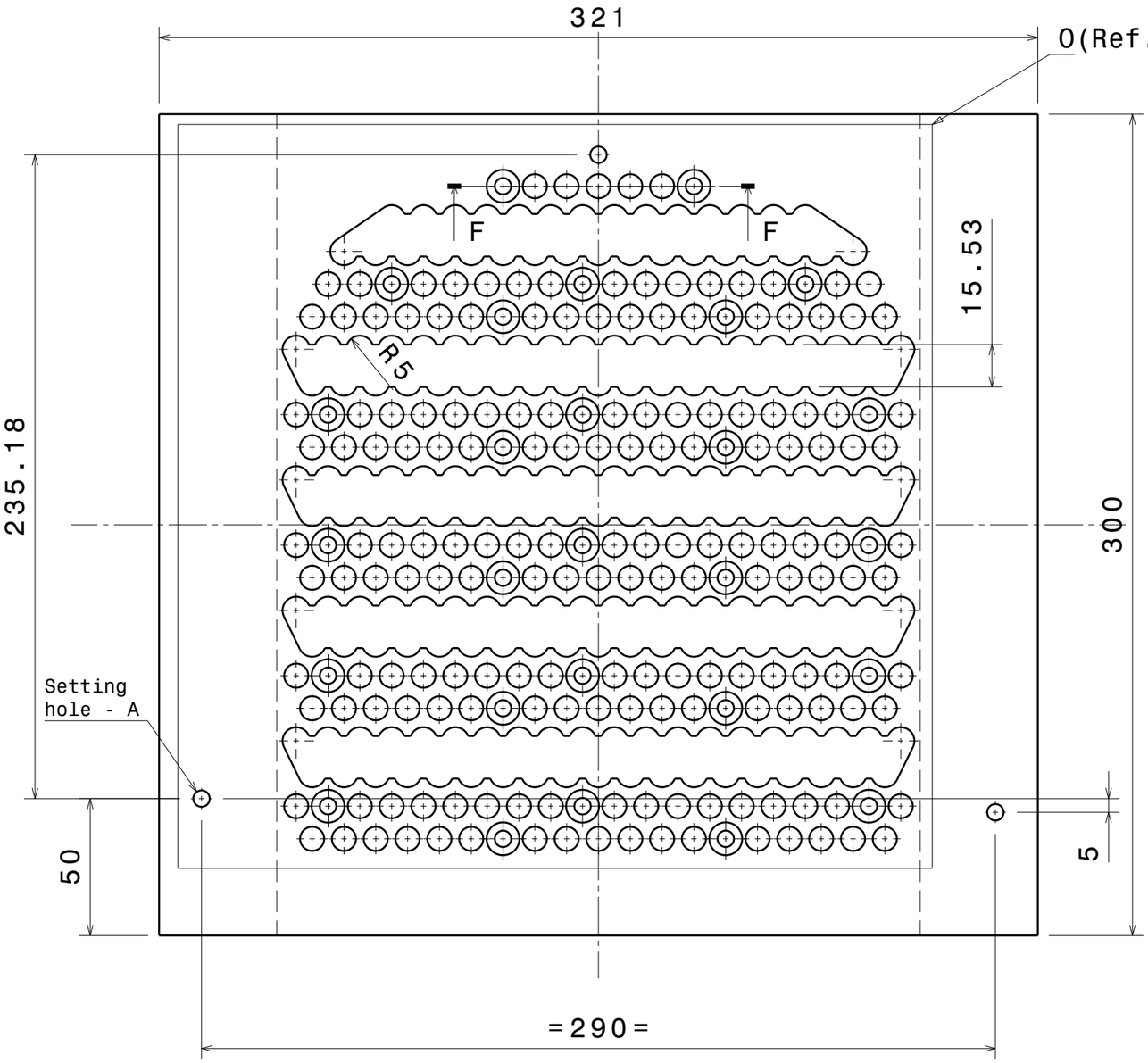
Front view
Scale: 1:5



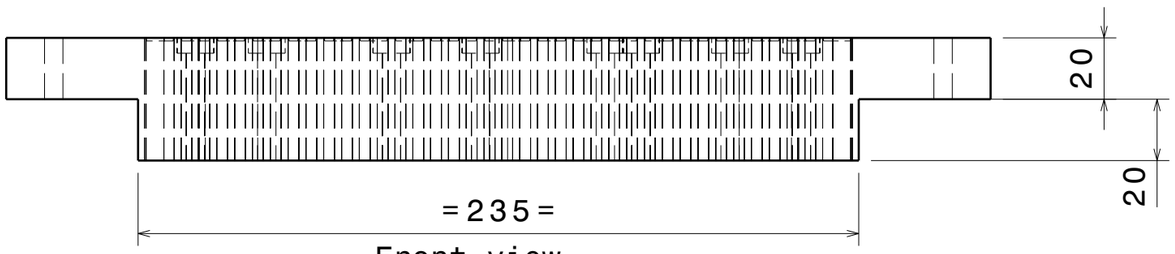
Section view G-G
Scale: 1:1

NOTES:
1. Fixture drawing is completely conceptual in nature.
2. Type and number of holes are indicative only.
3. Fixture clamping and grid clamping provisions are indicative only.
4. Vendor shall customize the fixture with IPR approvals as per the available facility at the site..
5. Suggested material for fixture (elctro deposition) is G10 / HYLAM.
6. Use of fixtures shall be in a manner to get the final product in the form of grid as per the IPR approved drawing.
7. Use ISO 2768 m Standard for tolerance.
8. Do not scale the drawing. Ask if doubt.

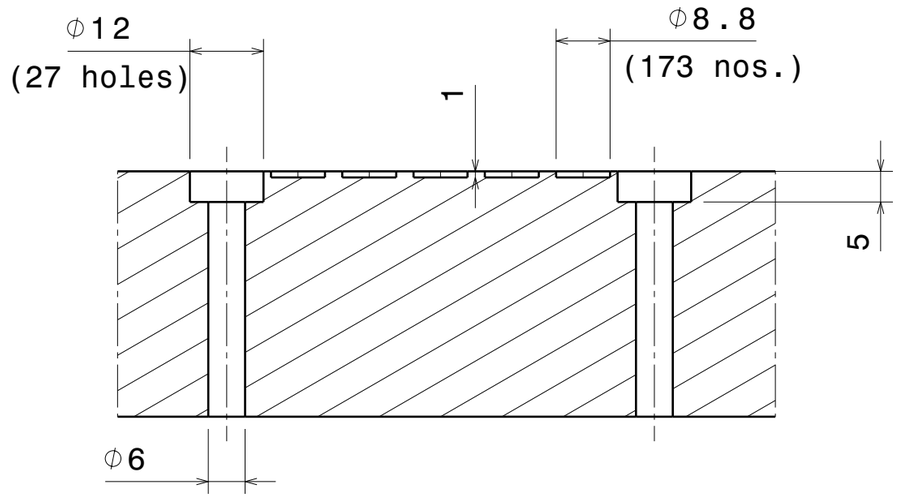
ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE	-	DATE	TITLE: FIXTURE-2 FOR DECELERATION GRID
DRAWN	KIRIT	29/10/2020	THIRD ANGLE PROJECTION
REVIEWED	BRD/MKG RKS		REF DRG NO: — REV 00
APPROVED	M.JANA		DRG.NO 32030003AA\DGF2 — SHEET 01 OF 01



Top view
Scale: 1:2



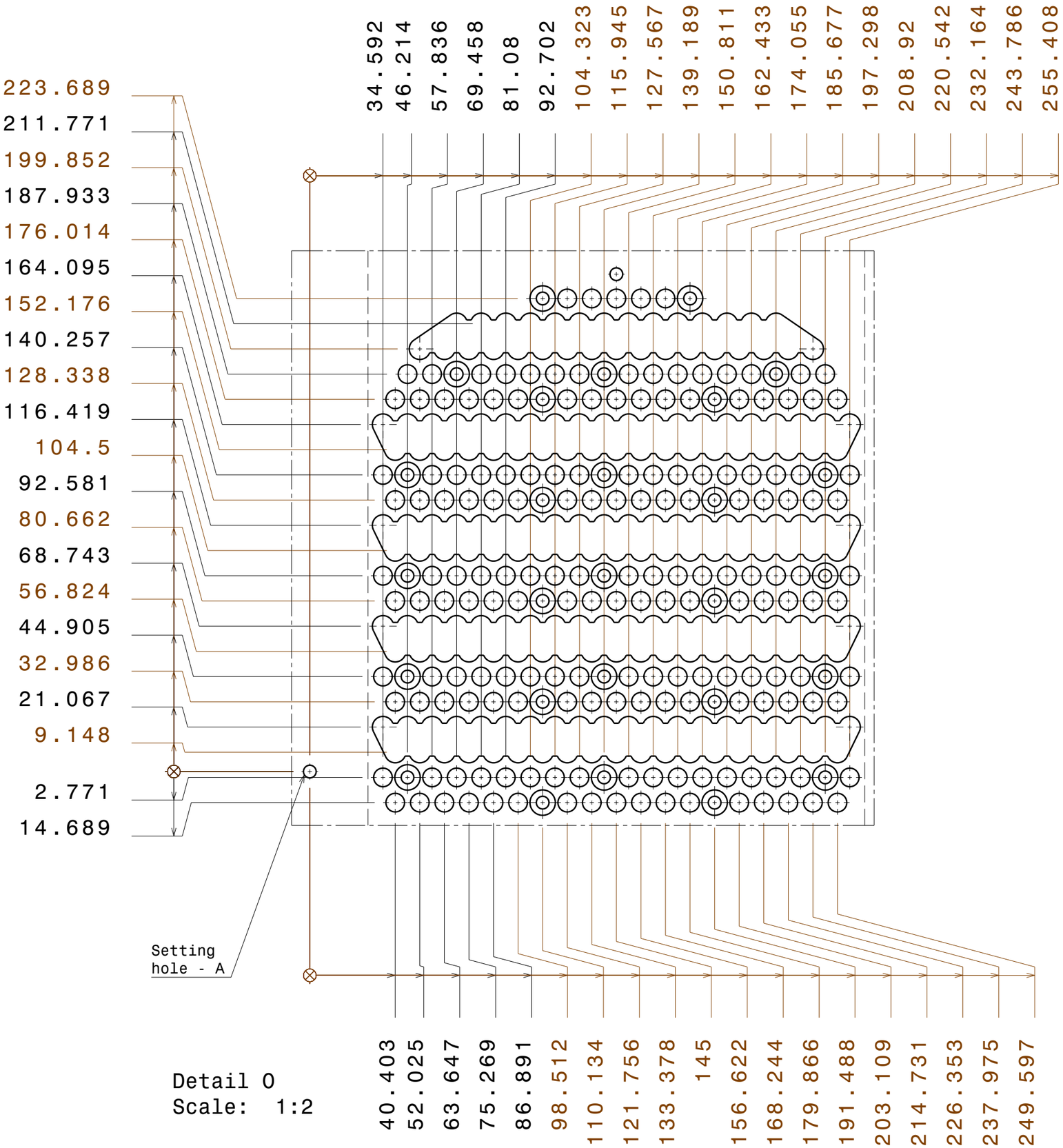
Front view
Scale: 1:2



Section view F-F
Scale: 1:1

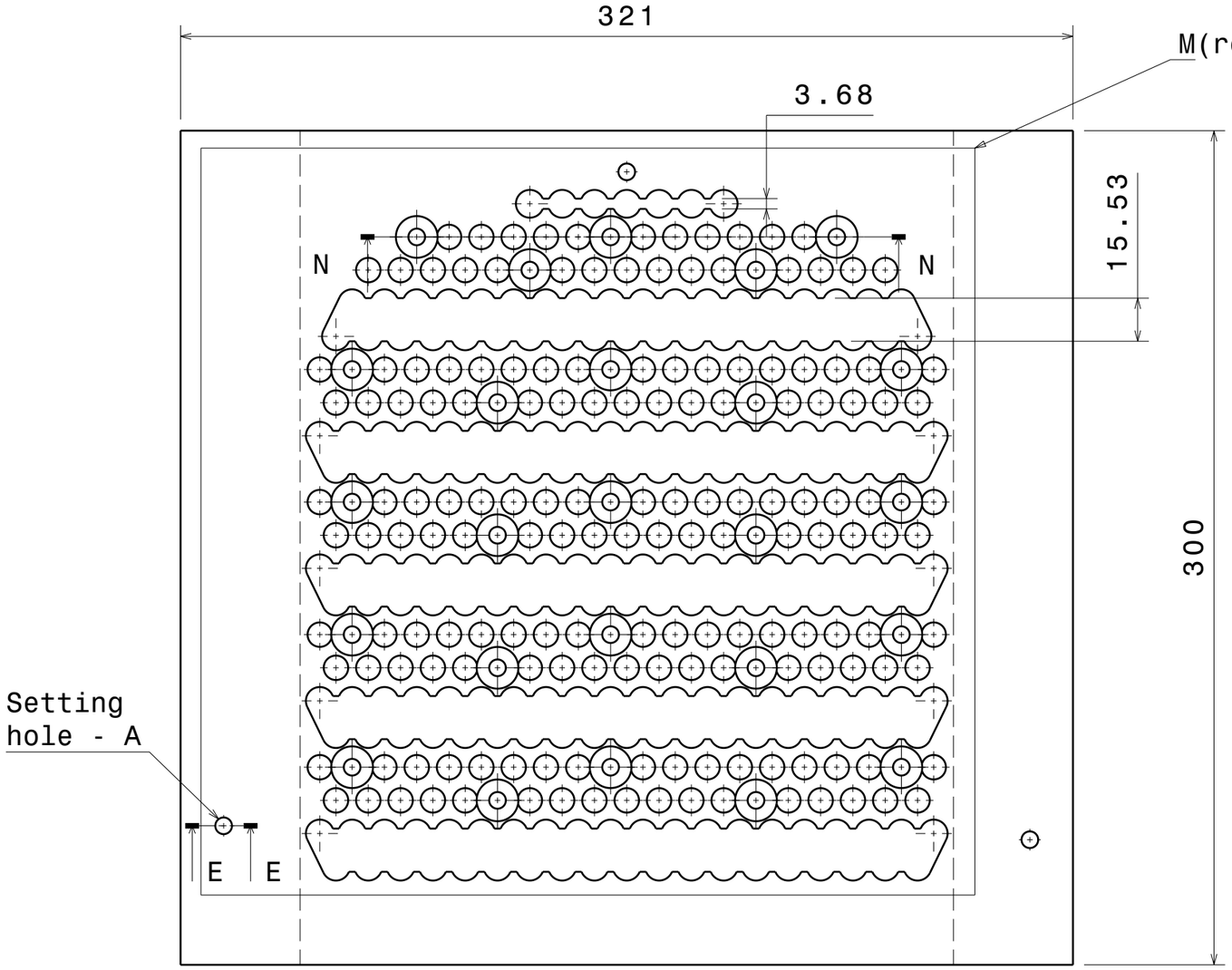
NOTES:
1. Fixture drawing is completely conceptual in nature.
2. Type and number of holes are indicative only.
3. Fixture clamping and grid clamping provisions are indicative only.
4. Vendor shall customize the fixture with IPR approvals as per the available facility at the site..
5. Fixture material should be non-ferrous and compatible with grid.
6. Use of fixtures shall be in a manner to get the final product in the form of grid as per the IPR approved drawing.
7. Use ISO 2768 m Standard for tolerance.
8. Do not scale the drawing. Ask if doubt.

ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE	-	DATE	TITLE: FIXTURE-3 FOR DECELERATION GRID
DRAWN	KIRIT	29/10/2020	THIRD ANGLE PROJECTION
REVIEWED	BRD/MKG/RKS		REF DRG NO: — REV 00
APPROVED	M.JANA		DRG.NO 32030003AA\DGF3 — SHEET 01 OF 02

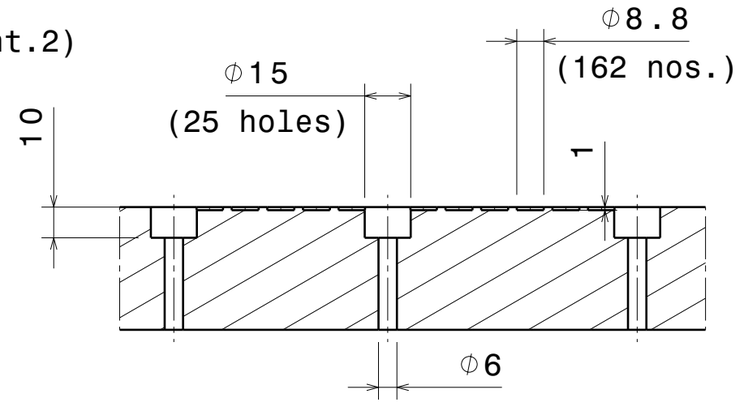


Detail O
Scale: 1:2

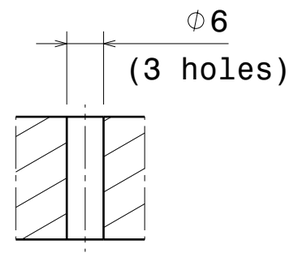
ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH		
ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.		
SCALE	-	DATE	THIRD ANGLE PROJECTION	TITLE	FIXTURE-3 FOR DECELERATION GRID
DRAWN	KIRIT	29/10/2020			
REVIEWED	BRD/MKG RKS		REF DRG NO:		REV 00
APPROVED	M.JANA		DRG.NO	32030003AA\DGF3	SHEET 02 OF 02



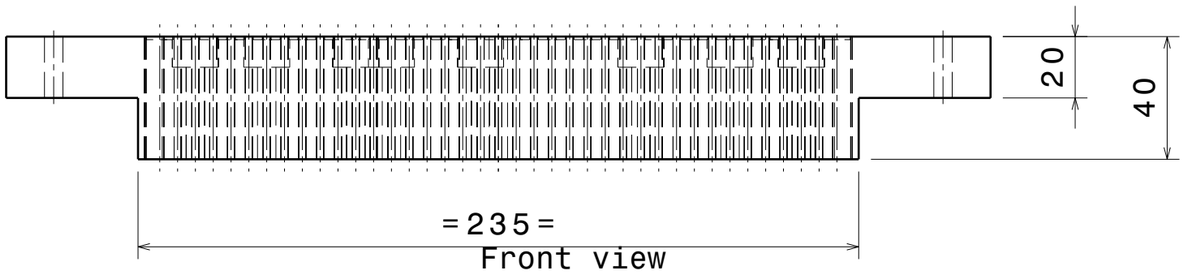
Top view
Scale: 1:2



Section view N-N
Scale: 1:2



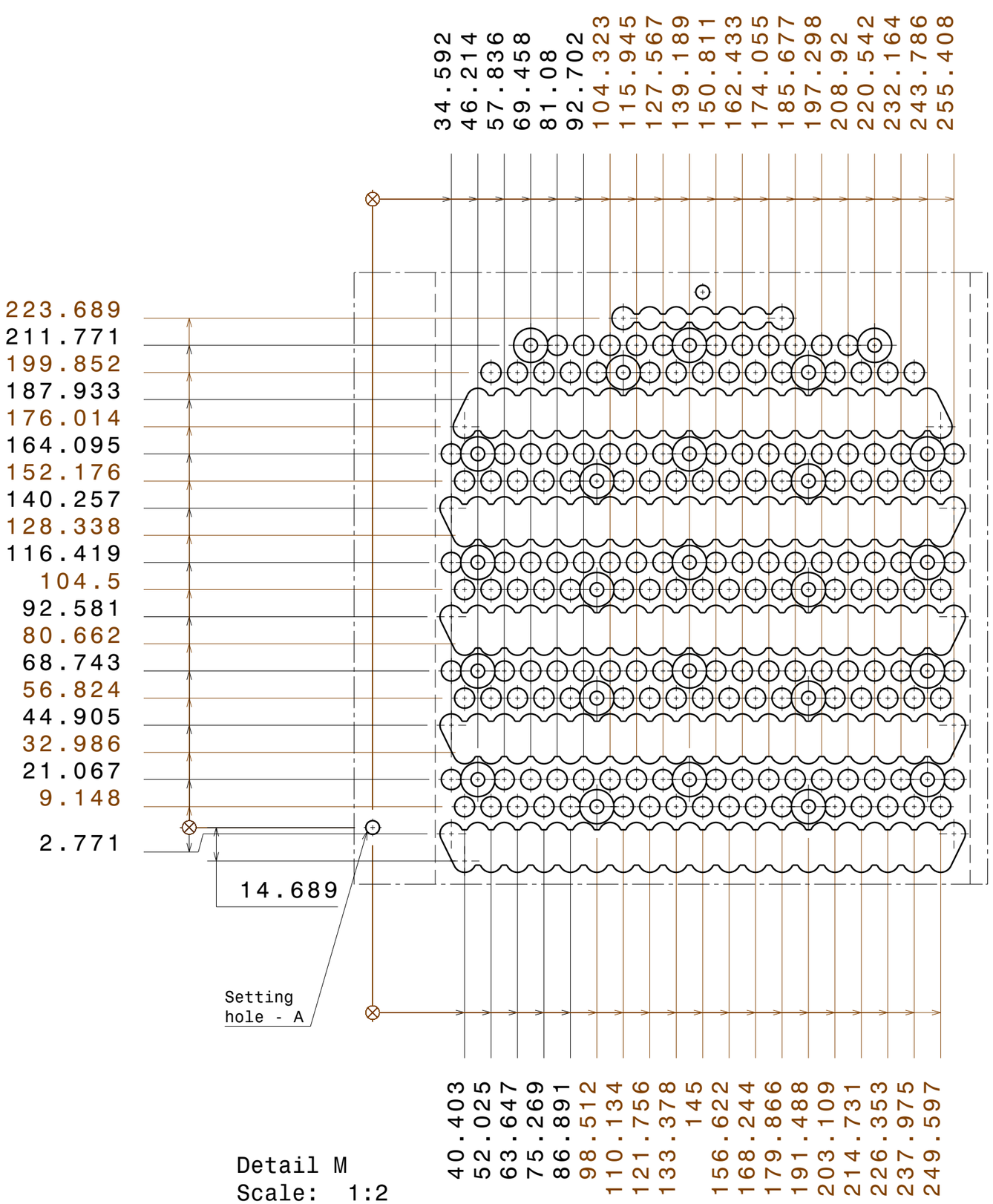
Section view E-E
Scale: 1:1



Front view
Scale: 1:2

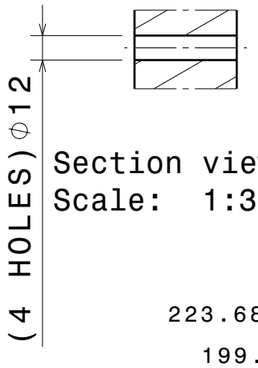
NOTES:
1. Fixture drawing is completely conceptual in nature.
2. Type and number of holes are indicative only.
3. Fixture clamping and grid clamping provisions are indicative only.
4. Vendor shall customize the fixture with IPR approvals as per the available facility at the site..
5. Fixture material should be non-ferrous and compatible with grid.
6. Use of fixtures shall be in a manner to get the final product in the form of grid as per the IPR approved drawing.
7. Use ISO 2768 m Standard for tolerance.
8. Do not scale the drawing. Ask if doubt.

ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE	-	DATE	TITLE: FIXTURE-4 FOR DECELERATION GRID
DRAWN	KIRIT	29/10/2020	THIRD ANGLE PROJECTION
REVIEWED	BRD/MKG/RKS		REF DRG NO: — REV 00
APPROVED	M.JANA		DRG.NO 32030003AA\DGF4 — SHEET 01 OF 02

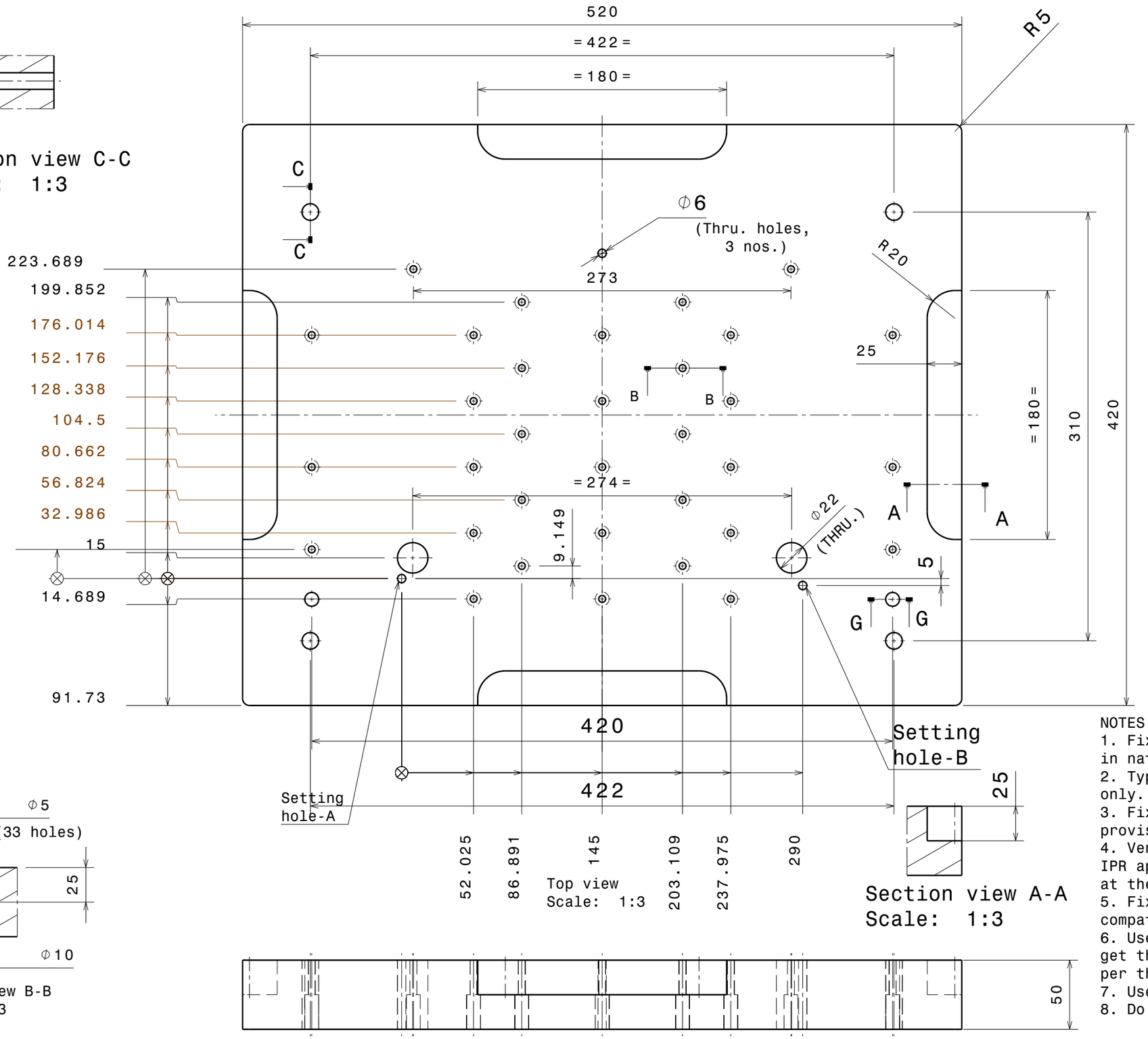


Detail M
Scale: 1:2

ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE	-	DATE	TITLE: FIXTURE-4 FOR DECELERATION GRID
DRAWN	KIRIT	29/10/2020	THIRD ANGLE PROJECTION
REVIEWED	BRD/MKG/RKS		REF DRG NO: — REV 00
APPROVED	M.JANA		DRG.NO 32030003AA\DGF4 — SHEET 02 OF 02

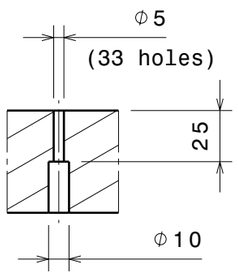


Section view C-C
Scale: 1:3



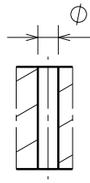
Top view
Scale: 1:3

Section view A-A
Scale: 1:3



Section view B-B
Scale: 1:3

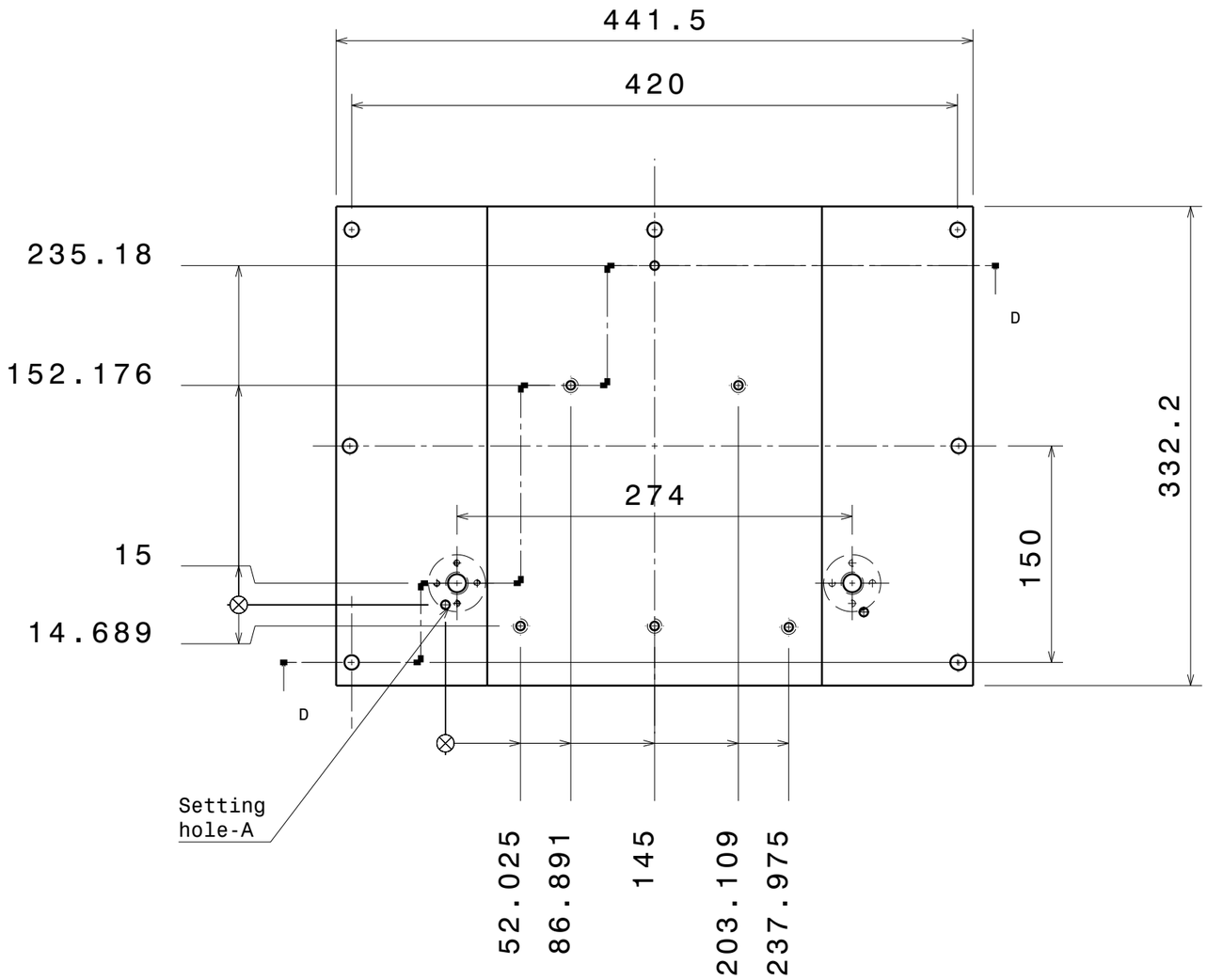
Front view
Scale: 1:3



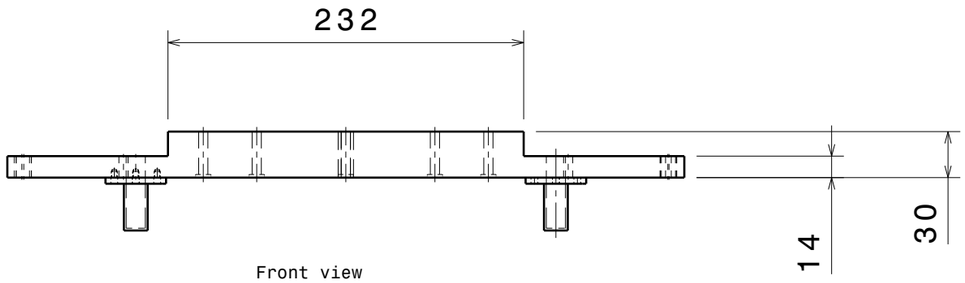
Section view G-G
Scale: 1:3

NOTES:
1. Fixture drawing is completely conceptual in nature.
2. Type and number of holes are indicative only.
3. Fixture clamping and grid clamping provisions are indicative only.
4. Vendor shall customize the fixture with IPR approvals as per the available facility at the site..
5. Fixture material should be non-ferrous and compatible with grid.
6. Use of fixtures shall be in a manner to get the final product in the form of grid as per the IPR approved drawing.
7. Use ISO 2768 m Standard for tolerance.
8. Do not scale the drawing. Ask if doubt.

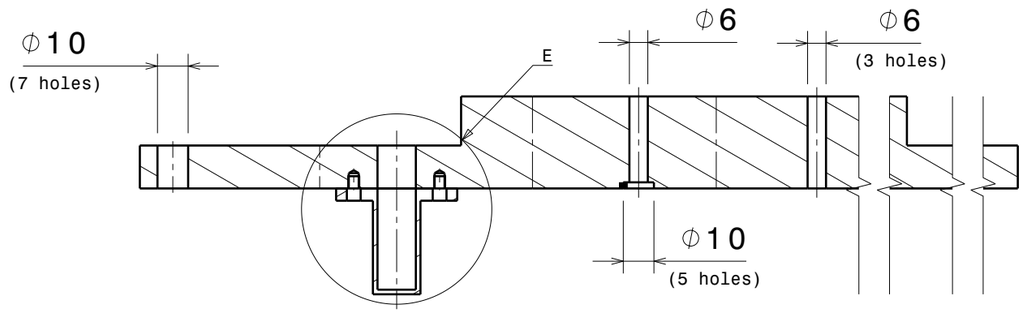
ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE	-	DATE	TITLE: FIXTURE-1 FOR EARTH GRID
DRAWN	KIRIT	29/10/2020	THIRD ANGLE PROJECTION
REVIEWED	BRD/MKG/RKS		REF DRG NO: — REV 00
APPROVED	M.JANA		DRG.NO 32040003AA\EGF1 — SHEET 01of01



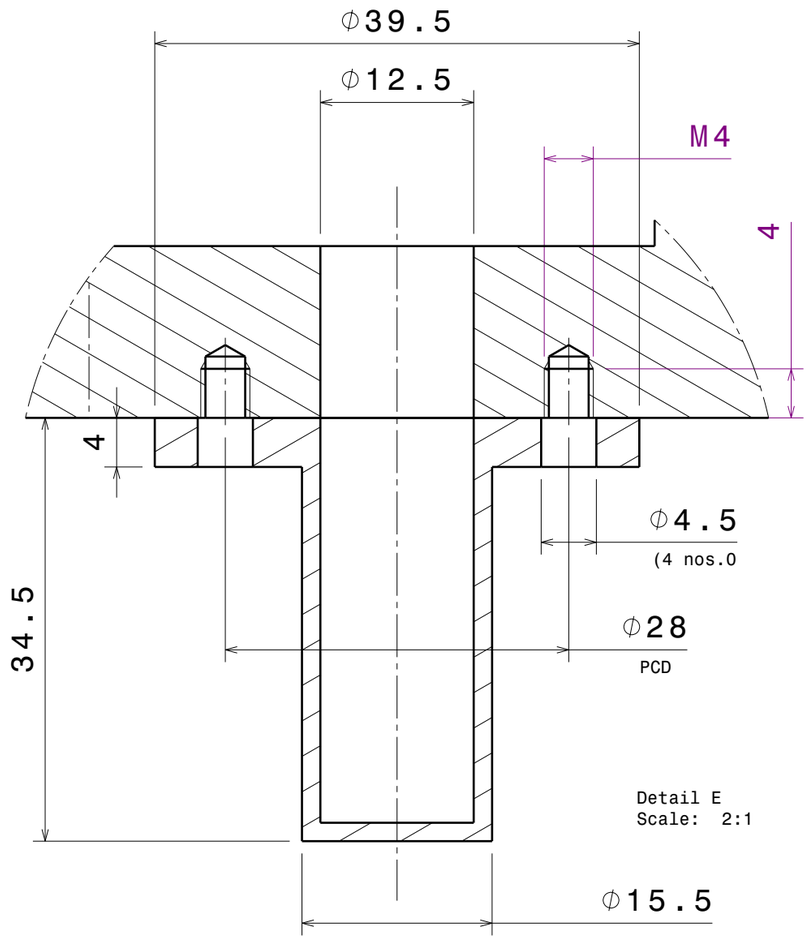
Top view
Scale: 1:4



Front view
Scale: 1:4



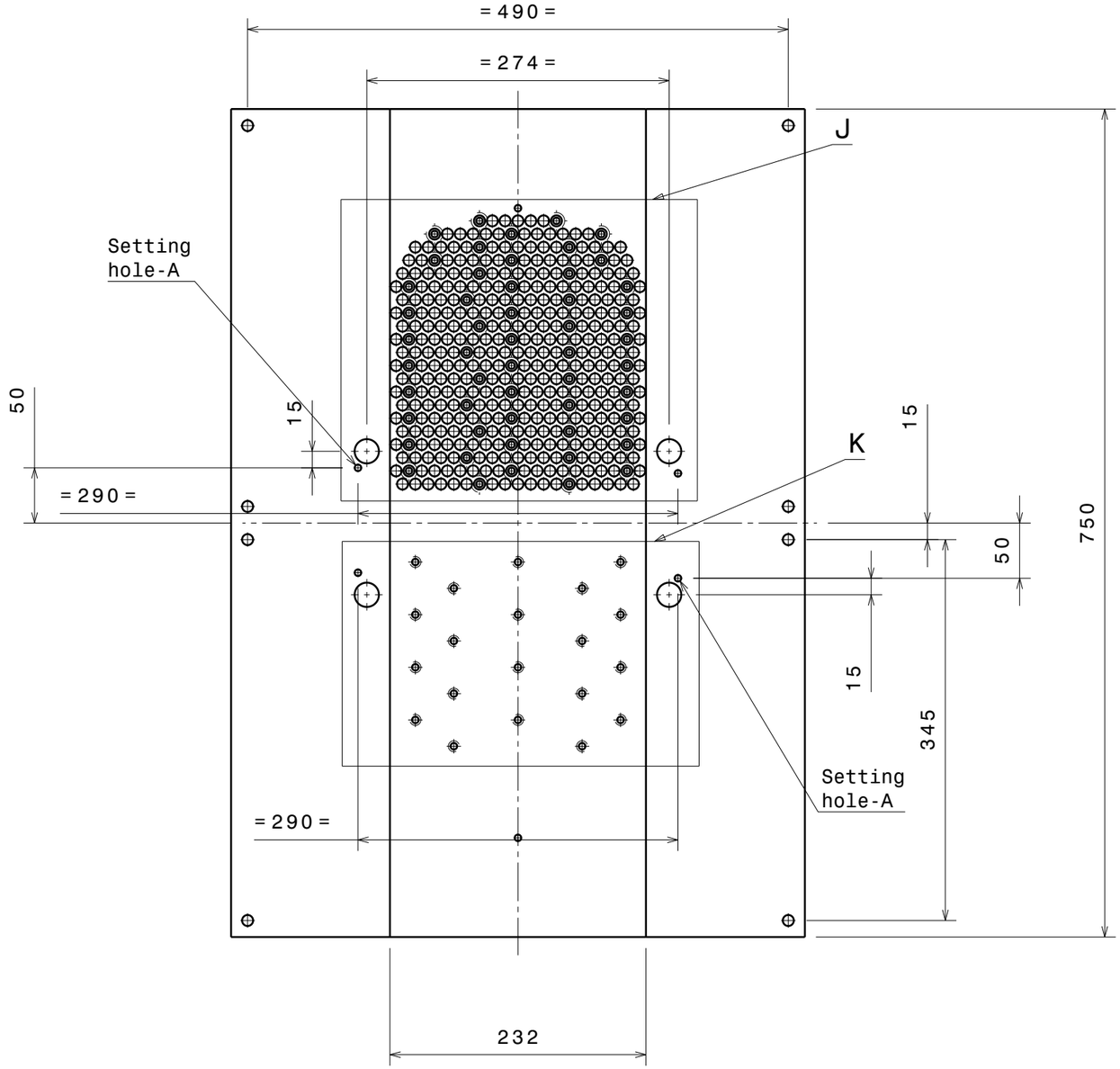
Section view D-D
Scale: 1:2



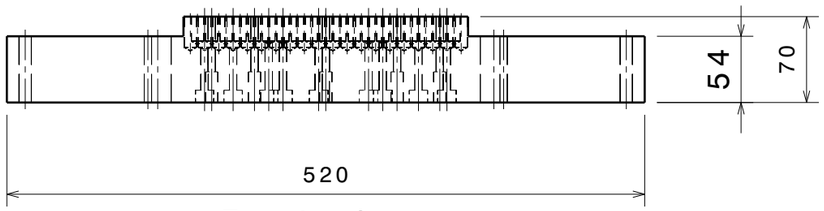
Detail E
Scale: 2:1

NOTES:
1. Fixture drawing is completely conceptual in nature.
2. Type and number of holes are indicative only.
3. Fixture clamping and grid clamping provisions are indicative only.
4. Vendor shall customize the fixture with IPR approvals as per the available facility at the site..
5. Suggested material for fixture (elctro deposition) is G10 / HYLAM.
6. Use of fixtures shall be in a manner to get the final product in the form of grid as per the IPR approved drawing.
7. Use ISO 2768 m Standard for tolerance.
8. Do not scale the drawing. Ask if doubt.

ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE	-	DATE	TITLE: FIXTURE-2 FOR EARTH GRID
DRAWN	KIRIT	29/10/2020	THIRD ANGLE PROJECTION
REVIEWED	BRD/MKG RKS		REF DRG NO: — REV 00
APPROVED	M.JANA		DRG.NO 32040003AA\EGF2 — SHEET 01OF01



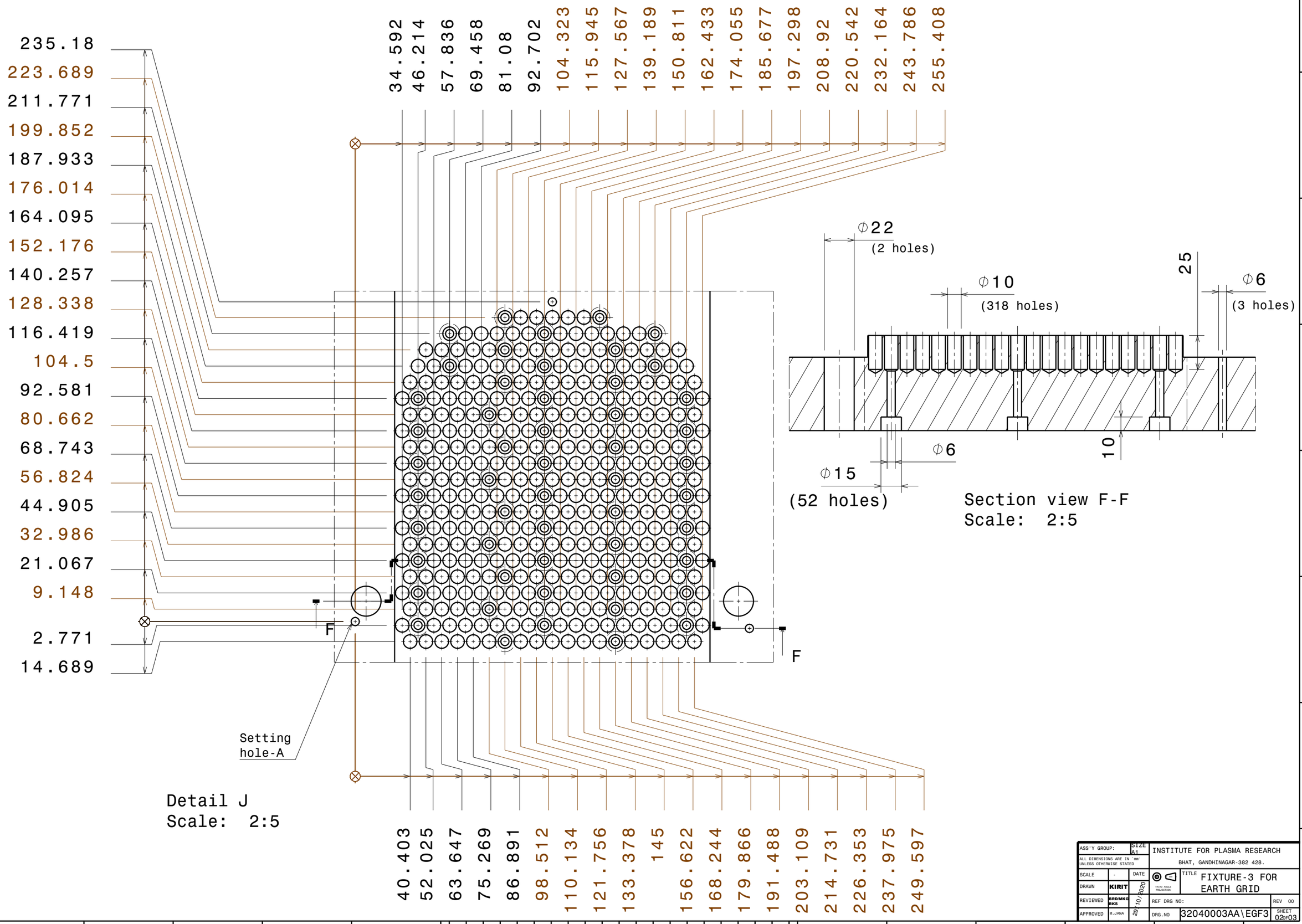
Top view
Scale: 1:5



Front view
Scale: 1:5

NOTES:
1. Fixture drawing is completely conceptual in nature.
2. Type and number of holes are indicative only.
3. Fixture clamping and grid clamping provisions are indicative only.
4. Vendor shall customize the fixture with IPR approvals as per the available facility at the site..
5. Fixture material should be non-ferrous and compatible with grid.
6. Use of fixtures shall be in a manner to get the final product in the form of grid as per the IPR approved drawing.
7. Use ISO 2768 m Standard for tolerance.
8. Do not scale the drawing. Ask if doubt.

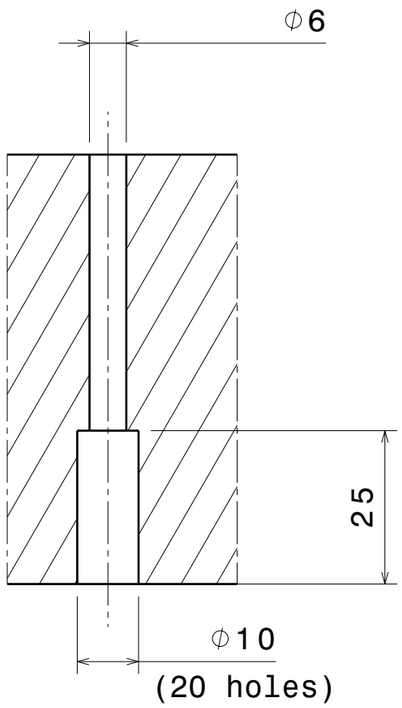
ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE	-	DATE	TITLE: FIXTURE-3 FOR EARTH GRID
DRAWN	KIRIT	29/10/2020	THIRD ANGLE PROJECTION
REVIEWED	BRD/MKG/RKS		REF DRG NO: — REV 00
APPROVED	M.JANA		DRG.NO 32040003AA\EGF3 — SHEET 01OF03



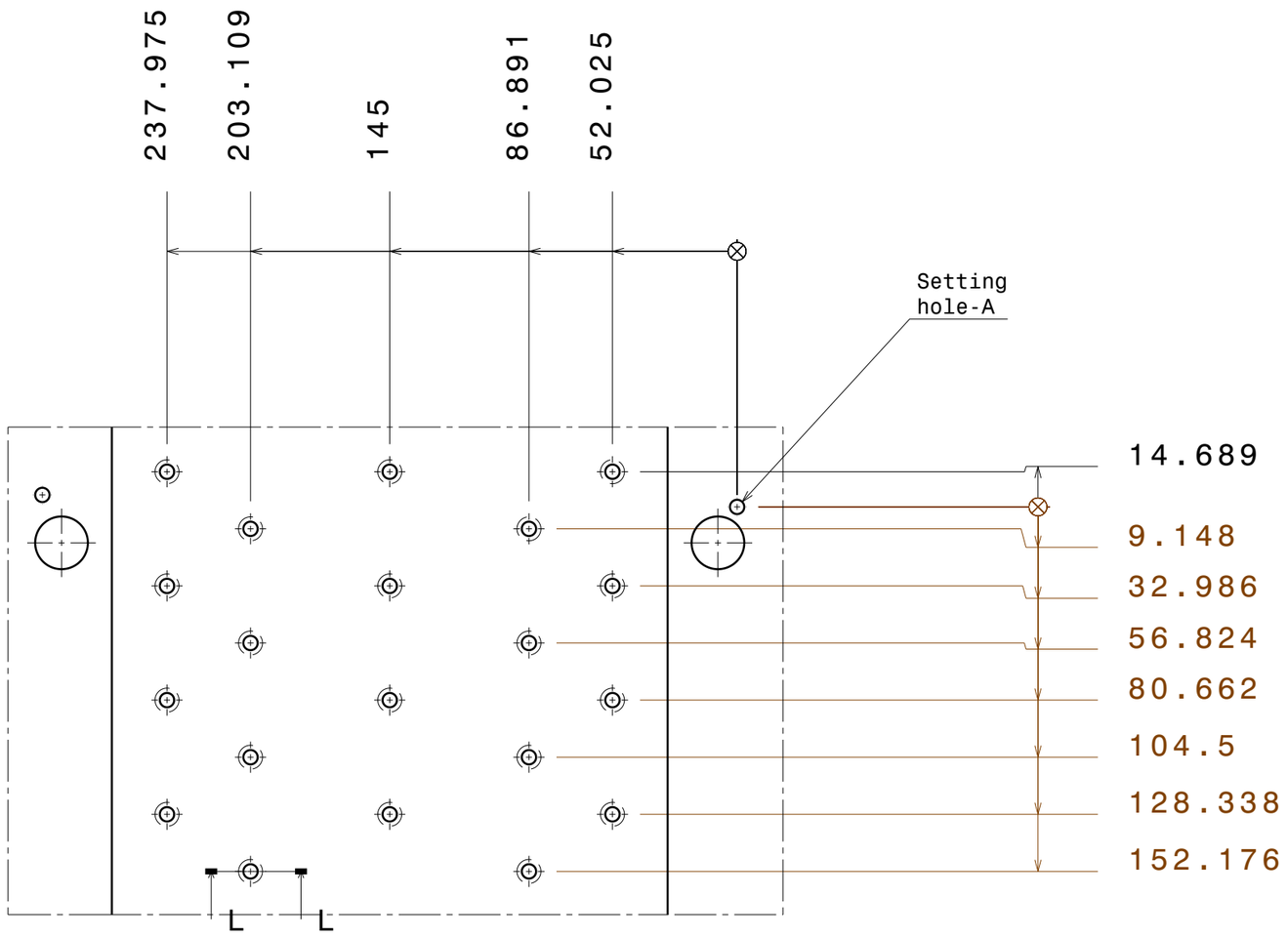
Detail J
Scale: 2:5

Section view F-F
Scale: 2:5

ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH BHAT, GANDHINAGAR-382 428.
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED			
SCALE	-	DATE	TITLE: FIXTURE-3 FOR EARTH GRID
DRAWN	KIRIT	29/10/2020	THIRD ANGLE PROJECTION
REVIEWED	BRD/MKG/RKS		REF DRG NO: — REV 00
APPROVED	M.JANA		DRG.NO 32040003AA\EGF3 — SHEET 02 of 03

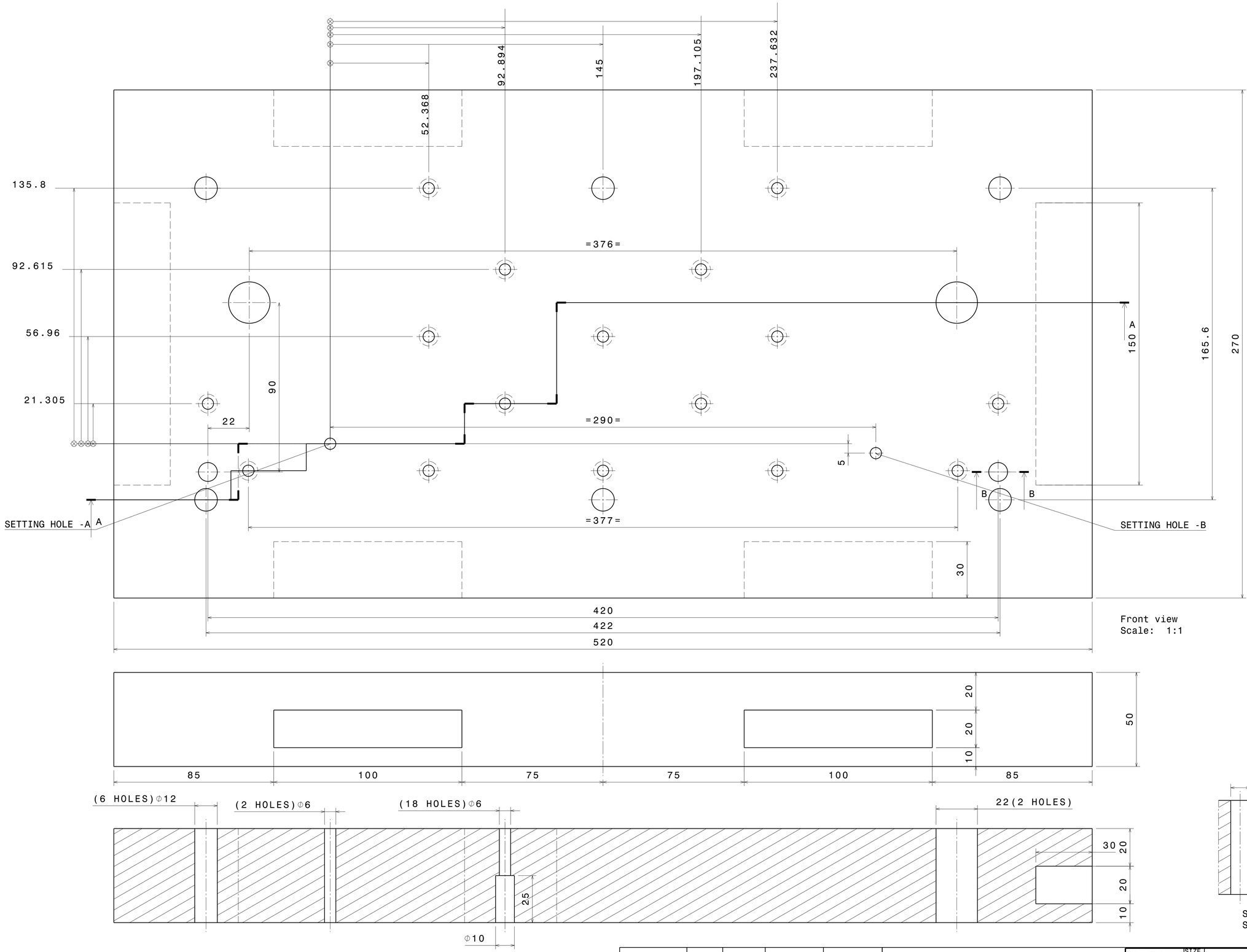


Section view L-L
Scale: 1:1



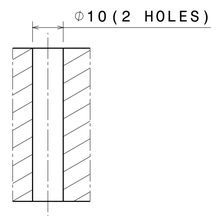
Detail K
Scale: 2:5

ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH		
ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.		
SCALE	-	DATE	TITLE	FIXTURE-3 FOR EARTH GRID	
DRAWN	KIRIT	29/10/2020	THIRD ANGLE PROJECTION		
REVIEWED	BRD/MKG RKS		REF DRG NO:		REV 00
APPROVED	M.JANA		DRG.NO	32040003AA\EGF3	SHEET 03 OF 03



Front view
Scale: 1:1

Section view A-A
Scale: 1:1



Section view B-B
Scale: 1:1

DRG.NO	▽ 8-25	▽▽ 1.6-8	▽▽▽ 0.025-1.6	▽▽▽▽ < 0.025
CO-ORDINATED BY				

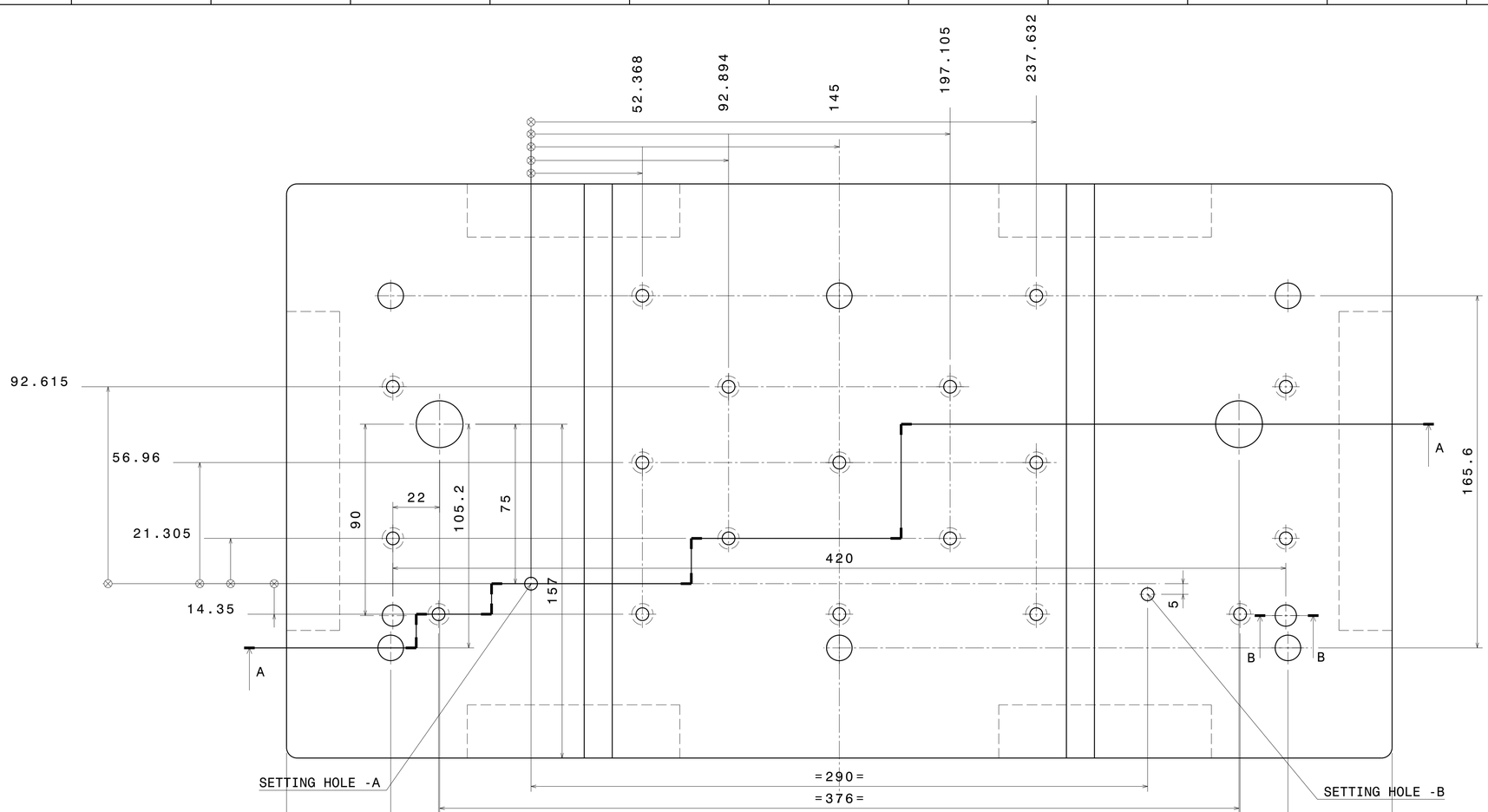
MACHINING DEVIATIONS FOR NON-TOLERANCED DIMENSIONS

LENGTH IN mm OF SHORTER SIDE OF ANGLES				LENGTH OR DIA	UPTO 6	6-30	30-120	120-315
UPTO 10	10-50	50-120	OVER 120-400					
±1°	±0°-30'	±0°-20'	±0°-10'		±0.1	±0.2	±0.3	±0.5

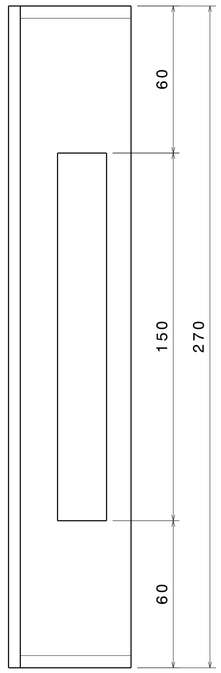
REVISION COLUMN					
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE	-	DATE	
DRAWN	VRP		TITLE: FIXTURE -1 FOR PROTO TYPE ACCELERATION GRID
DESIGNED	MR JANA		REF DRG NO: A1 — REV R0
APPROVED	MR JANA		DRG.NO 32010007AA\PGF1 — SHEET 01 OF 01

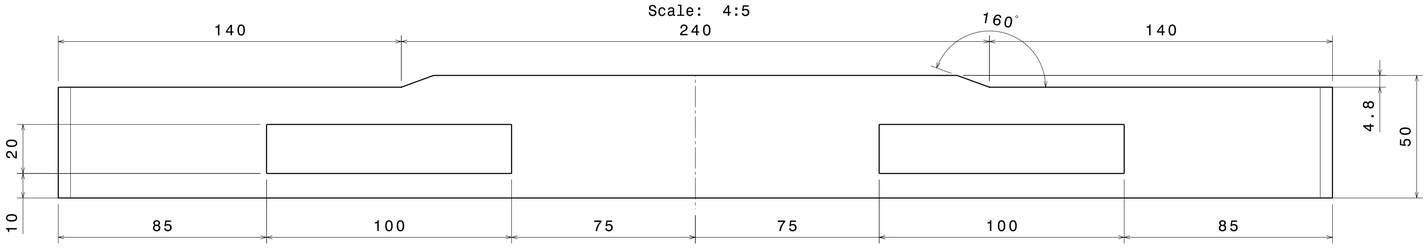
THIRD ANGLE PROJECTION



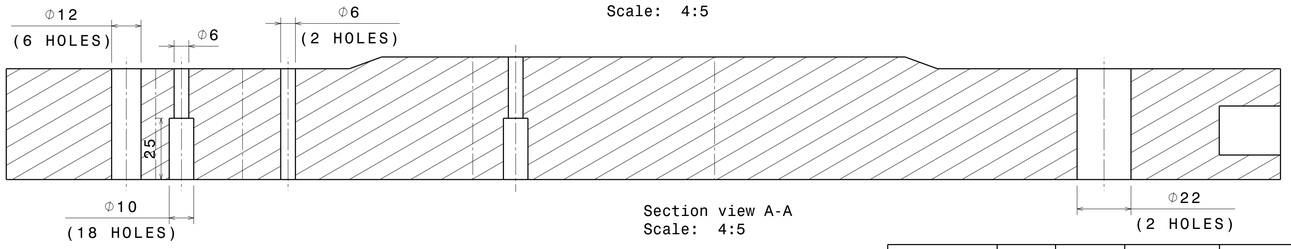
Front view
Scale: 4:5



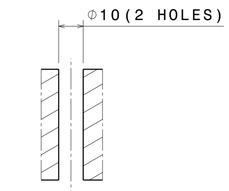
Right view
Scale: 4:5



Bottom view
Scale: 4:5

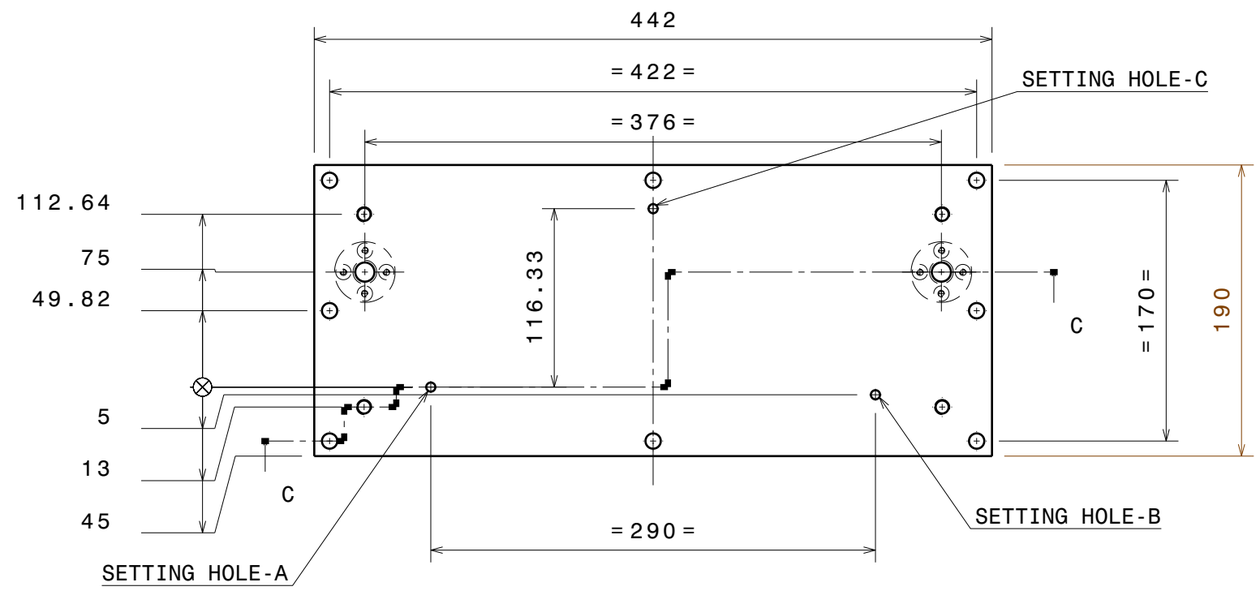


Section view A-A
Scale: 4:5

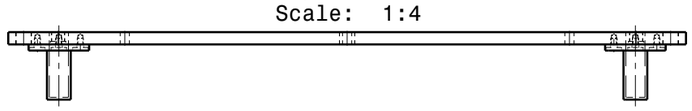


Section cut B-B
Scale: 4:5

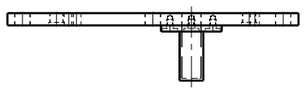
DRG.NO	▽ 8-25	▽▽ 1.6-8	▽▽▽ 0.025-1.6	▽▽▽▽ < 0.025	REVISION COLUMN						ASS'Y GROUP:	SIZE A1	INSTITUTE FOR PLASMA RESEARCH						
CO-ORDINATED BY					REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY	ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED		BHAT, GANDHINAGAR-382 428.						
MACHINING DEVIATIONS FOR NON-TOLERANCED DIMENSIONS											SCALE -	DATE	TITLE	FIXTURE-2 PROTOTYPE GRID					
LENGTH IN mm OF SHORTER SIDE OF ANGLES				LENGTH OR DIA	UPTO 6	6-30	30-120	120-315			DRAWN VRP	-	THIRD ANGLE PROJECTION						
UPTO 10	10-50	50-120	OVER 120-400		±0.1	±0.2	±0.3	±0.5			DESIGNED MR JANA								
±1°	±0°-30'	±0°-20'	±0°-10'								APPROVED MR JANA		REF DRG NO: A1					REV R0	
													DRG.NO	32010007AA\PGF2				SHEET 01 OF 01	



Top view
Scale: 1:4

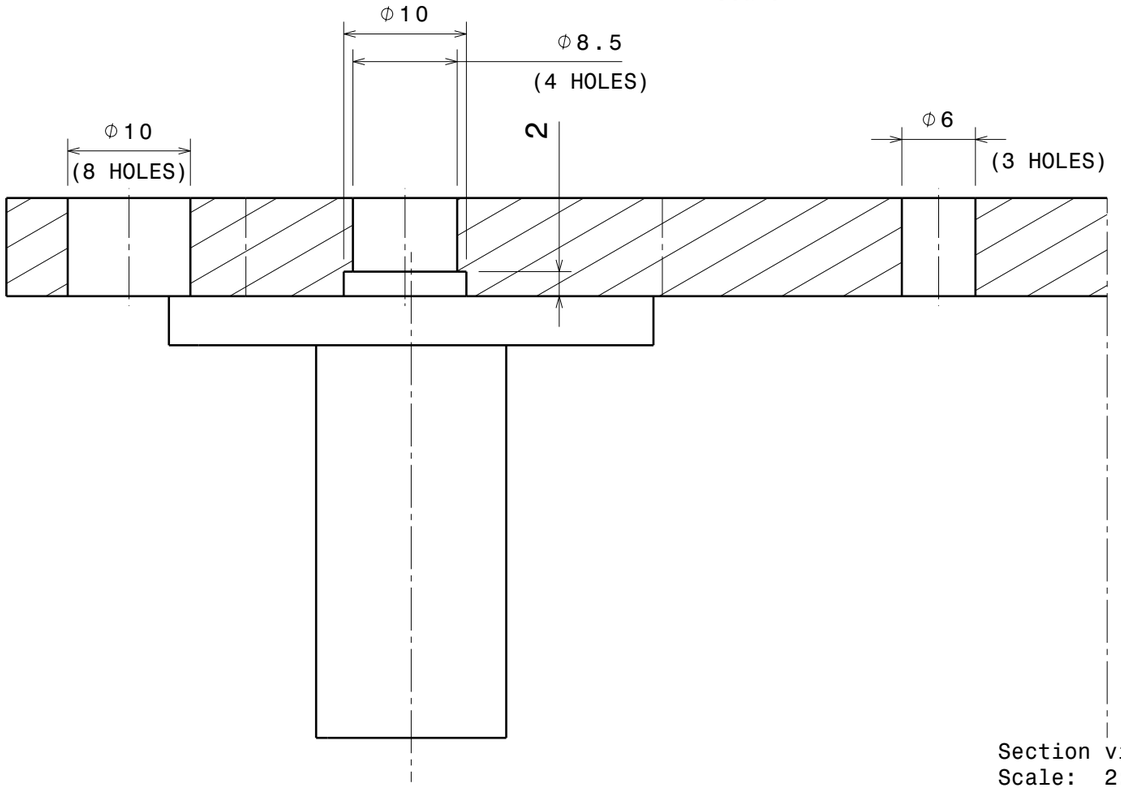


Front view
Scale: 1:4

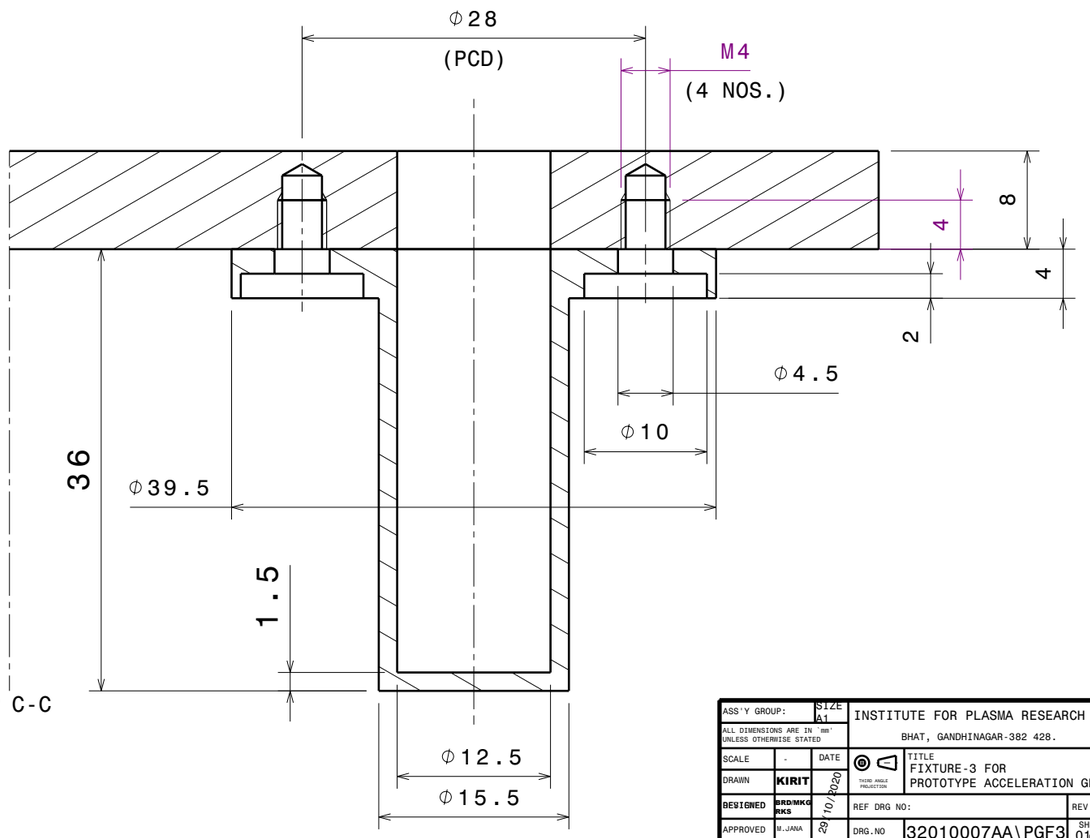


Right view
Scale: 1:4

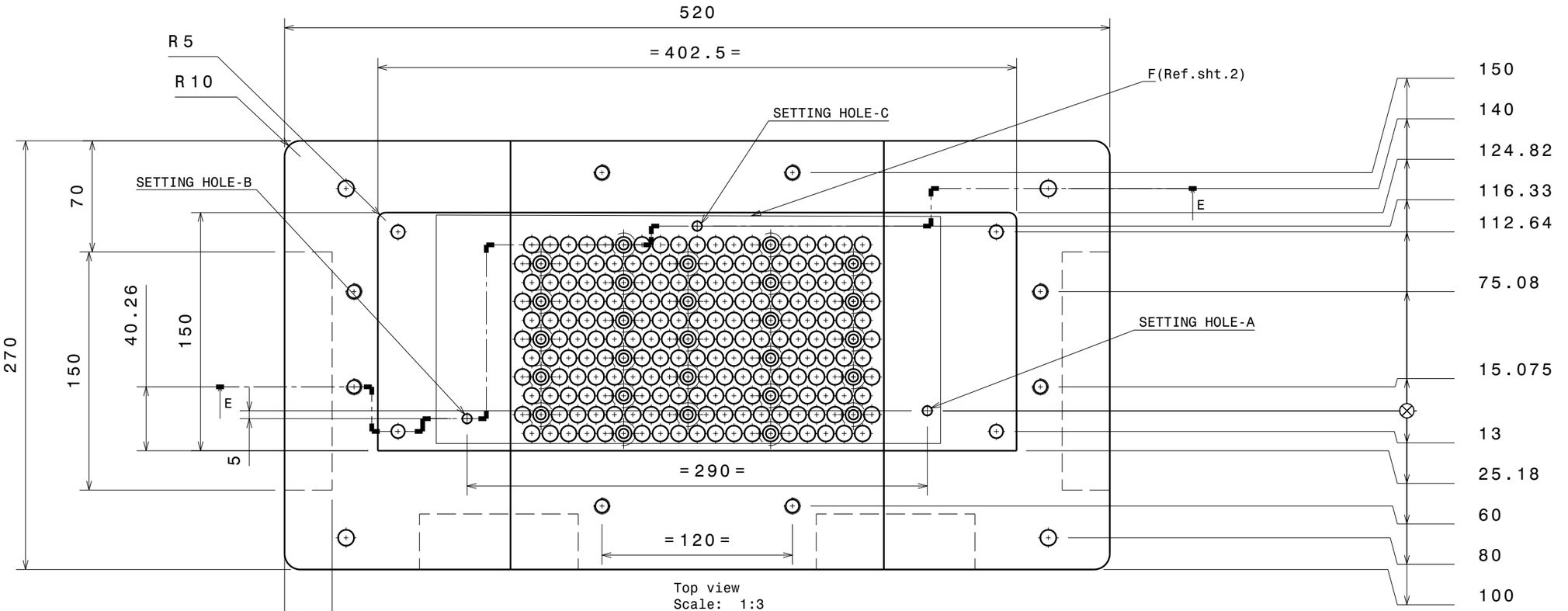
NOTES:
1. Fixture drawing is completely conceptual in nature.
2. Type and number of holes are indicative only.
3. Fixture clamping and grid clamping provisions are indicative only.
4. Vendor shall customize the fixture with IPR approvals as per the available facility at the site..
5. Suggested material for fixture (elctro deposition) is G10 / HYLAM.
6. Use of fixtures shall be in a manner to get the final product in the form of grid as per the IPR approved drawing.
7. Use ISO 2768 m Standard for tolerance.
8. Do not scale the drawing. Ask if doubt.



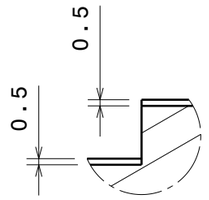
Section view C-C
Scale: 2:1



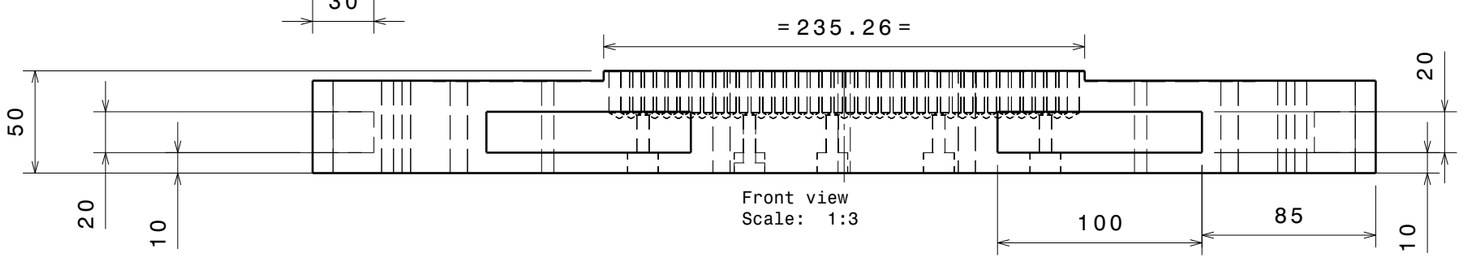
ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE	-	DATE	TITLE: FIXTURE-3 FOR PROTOTYPE ACCELERATION GRID
DRAWN	KIRIT	29/10/2020	THIRD ANGLE PROJECTION
DESIGNED	BRD/MKG/RKS		REF DRG NO: — REV 00
APPROVED	M.JANA		DRG.NO 32010007AA\PGF3 — SHEET 01OF01



Top view
Scale: 1:3

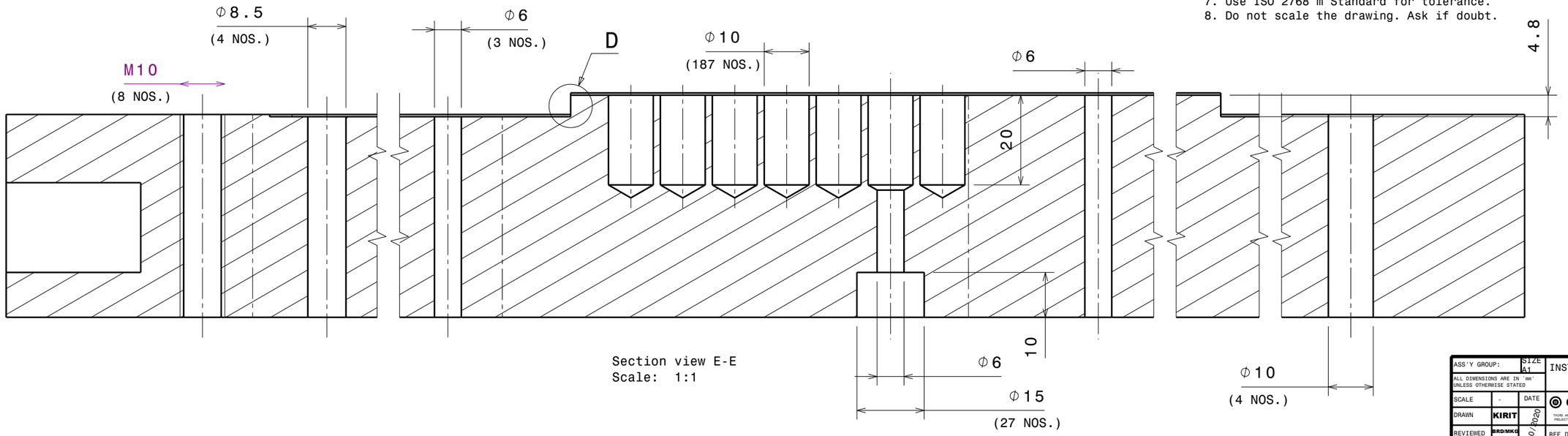


Detail D
Scale: 2:1



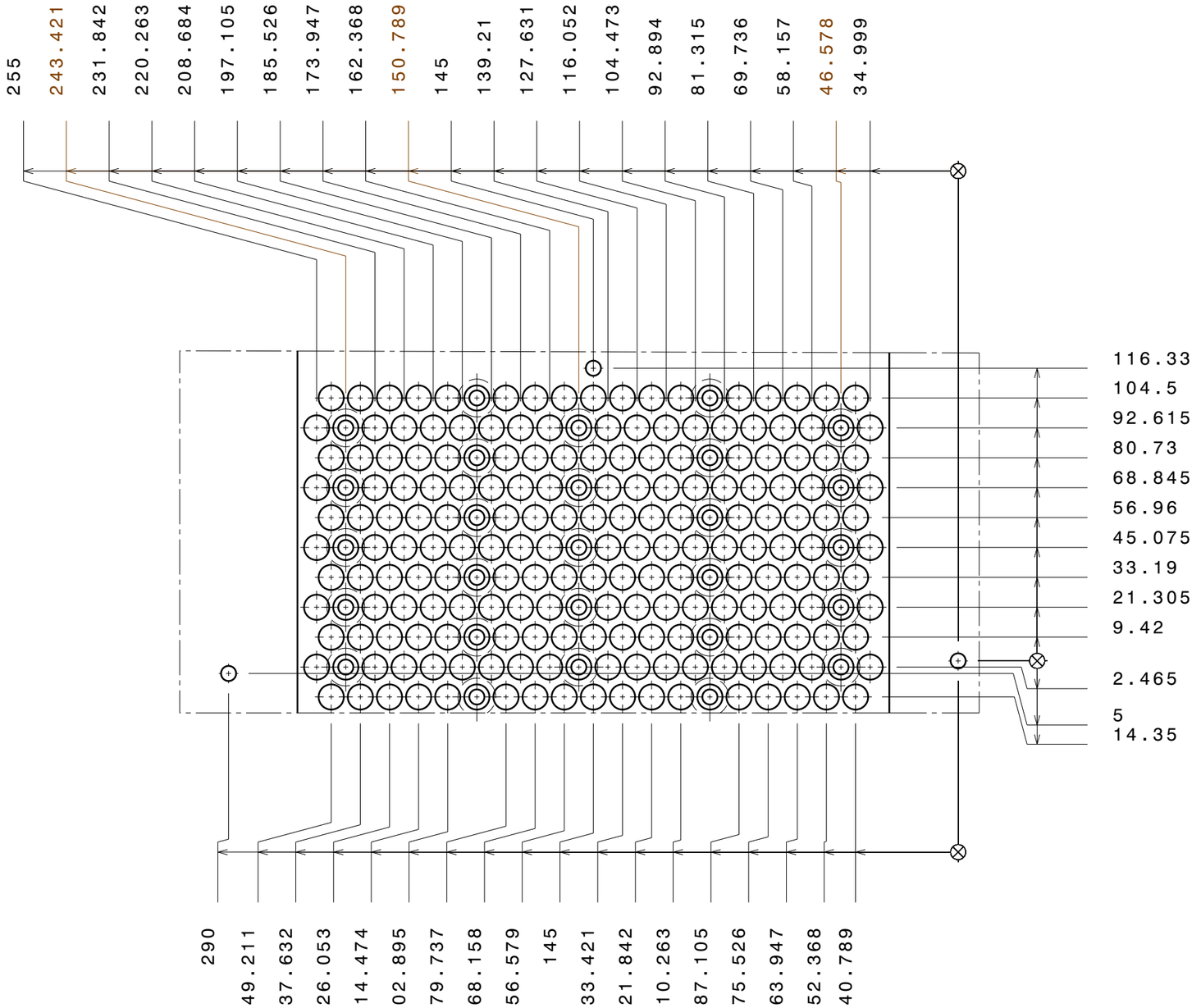
Front view
Scale: 1:3

NOTES:
1. Fixture drawing is completely conceptual in nature.
2. Type and number of holes are indicative only.
3. Fixture clamping and grid clamping provisions are indicative only.
4. Vendor shall customize the fixture with IPR approvals as per the available facility at the site..
5. Fixture material should be non-ferrous and compatible with grid.
6. Use of fixtures shall be in a manner to get the final product in the form of grid as per the IPR approved drawing.
7. Use ISO 2768 m Standard for tolerance.
8. Do not scale the drawing. Ask if doubt.



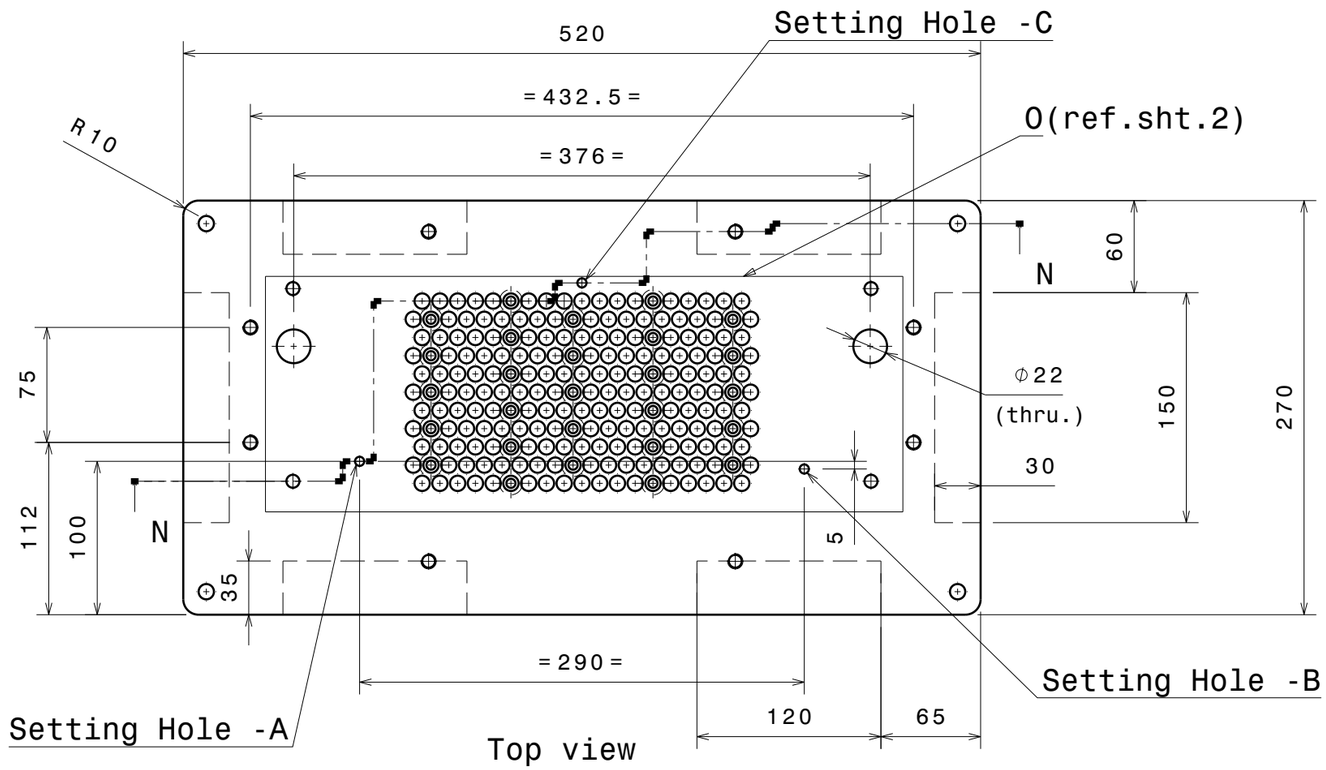
Section view E-E
Scale: 1:1

ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE	1:3	DATE	TITLE: FIXTURE-4 FOR PROTOTYPE ACCELERATION GRID
DRAWN	KIRIT	29/10/2020	THIRD ANGLE PROJECTION
REVIEWED	BRD/MKG/RKS		REF DRG NO: — REV 00
APPROVED	M.JANA		DRG.NO 32010007AA\PGF4 — SHEET 01 OF 02

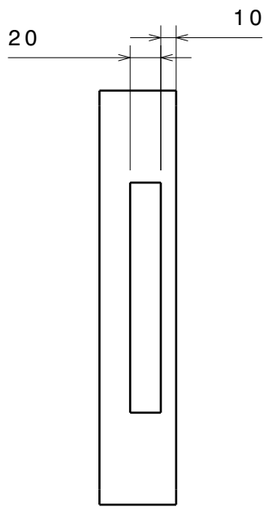


Detail F
Scale: 1:2

ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE	-	DATE	TITLE: FIXTURE-4 FOR PROTOTYPE ACCELERATION GRID
DRAWN	KIRIT	29/10/2020	THIRD ANGLE PROJECTION
REVIEWED	BRD/MKG/RKS		REF DRG NO: — REV 00
APPROVED	M.JANA		DRG.NO 32010007AA\PGF4 — SHEET 02OF02

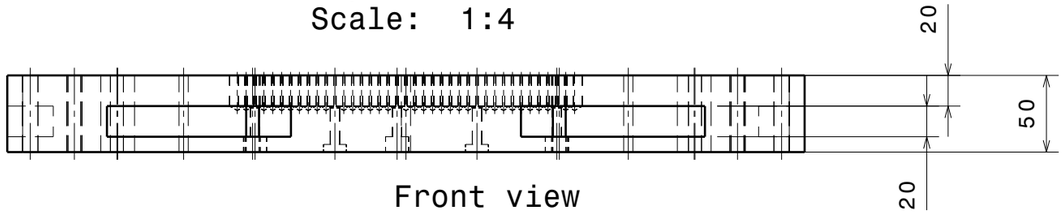


Top view
Scale: 1:4

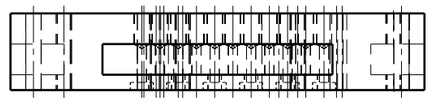


Auxiliary view P
Scale: 1:4

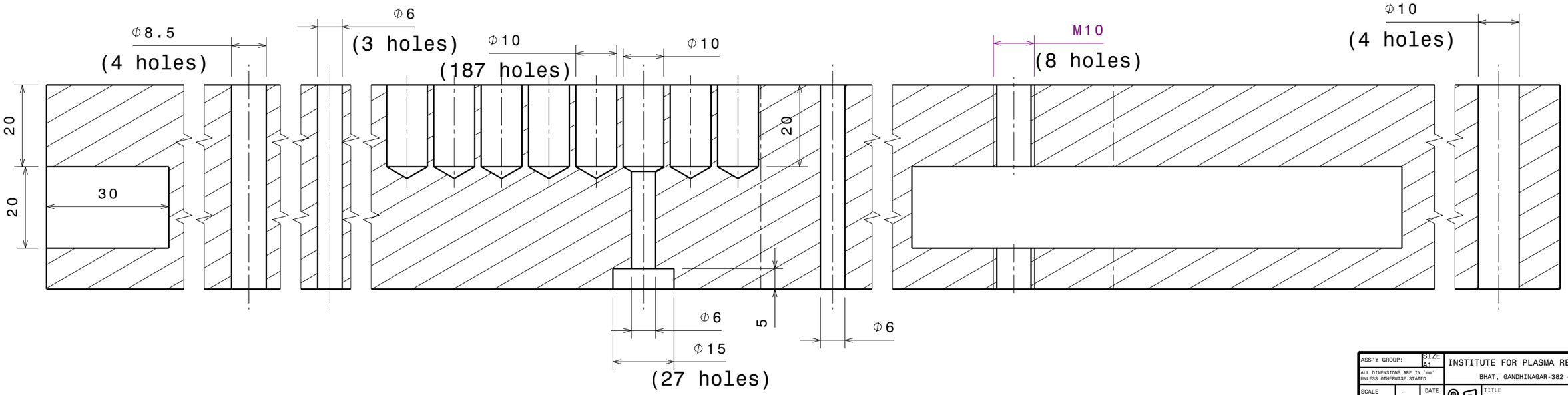
NOTES:
1. Fixture drawing is completely conceptual in nature.
2. Type and number of holes are indicative only.
3. Fixture clamping and grid clamping provisions are indicative only.
4. Vendor shall customize the fixture with IPR approvals as per the available facility at the site..
5. Fixture material should be non-ferrous and compatible with grid.
6. Use of fixtures shall be in a manner to get the final product in the form of grid as per the IPR approved drawing.
7. Use ISO 2768 m Standard for tolerance.
8. Do not scale the drawing. Ask if doubt.



Front view
Scale: 1:4

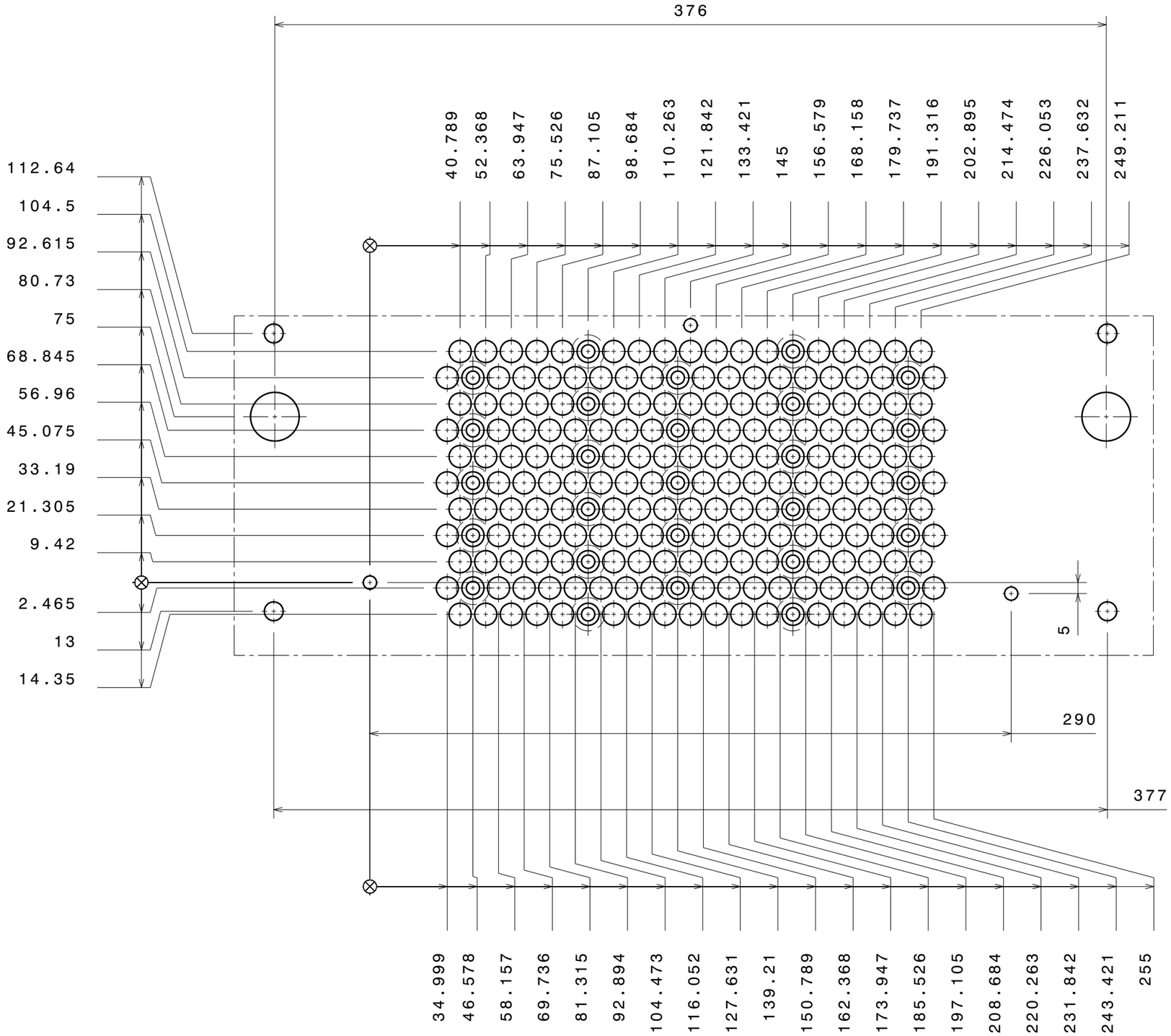


Right view
Scale: 1:4



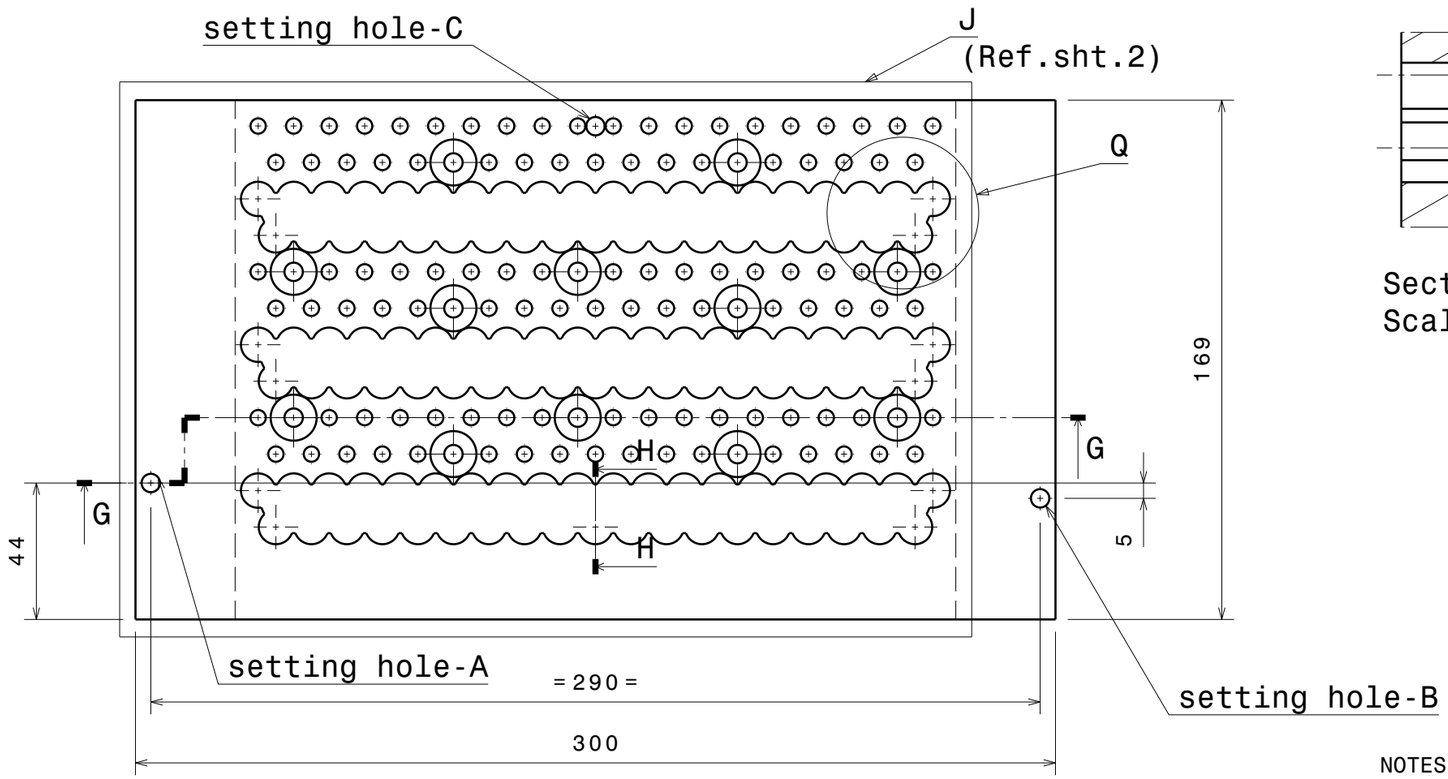
Section view N-N
Scale: 1:1

ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE		DATE	TITLE: FIXTURE-5 FOR PROTOTYPE ACCELERATION GRID
DRAWN	KIRIT	29/10/2020	THIRD ANGLE PROJECTION
REVIEWED	BRD/MKG RKS		REF DRG NO: — REV 00
APPROVED	M.JANA		DRG.NO 32010007AA\PGF5 — SHEET 01 OF 02

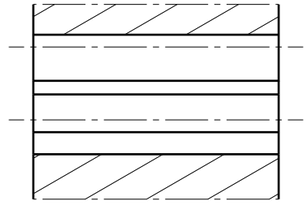


Detail O
Scale: 1:2

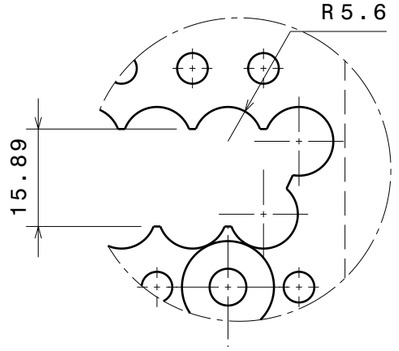
ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE	-	DATE	TITLE: FIXTURE-5 FOR PROTOTYPE ACCELERATION GRID
DRAWN	KIRIT	29/10/2020	THIRD ANGLE PROJECTION
REVIEWED	BRD/MKG/RKS		REF DRG NO: — REV 00
APPROVED	M.JANA		DRG.NO 32010007AA\PGF5 — SHEET 02OF02



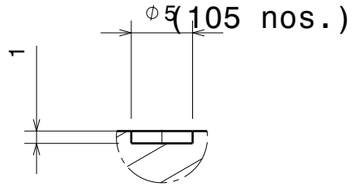
Top view
Scale: 1:2



Section view H-H
Scale: 1:1

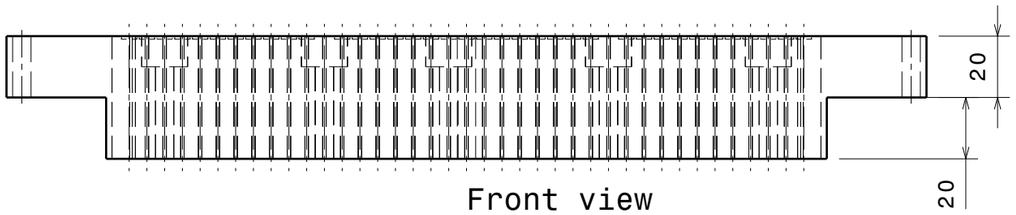


Detail Q
Scale: 1:1

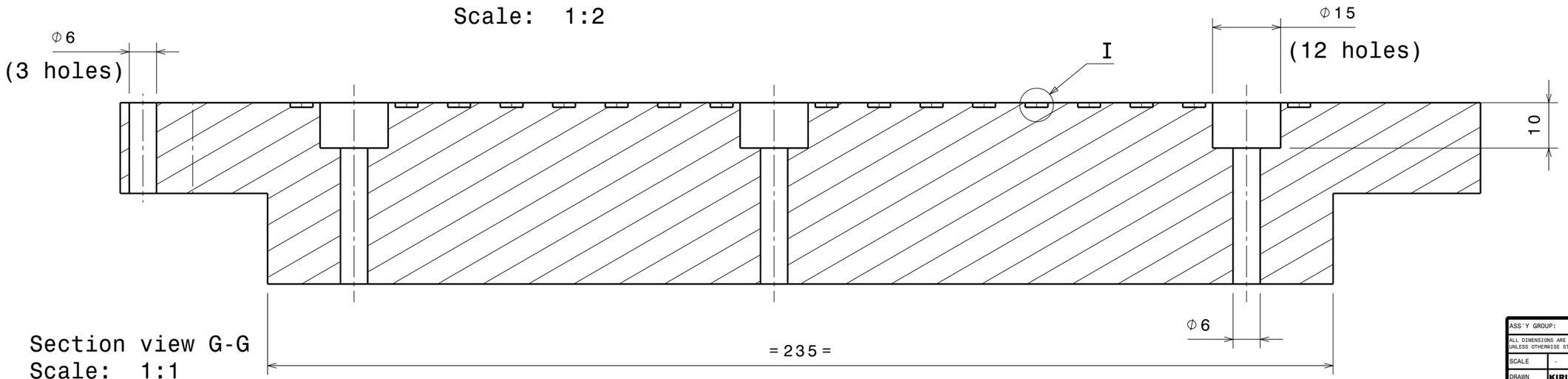


Detail I
Scale: 2:1

NOTES:
1. Fixture drawing is completely conceptual in nature.
2. Type and number of holes are indicative only.
3. Fixture clamping and grid clamping provisions are indicative only.
4. Vendor shall customize the fixture with IPR approvals as per the available facility at the site..
5. Fixture material should be non-ferrous and compatible with grid.
6. Use of fixtures shall be in a manner to get the final product in the form of grid as per the IPR approved drawing.
7. Use ISO 2768 m Standard for tolerance.
8. Do not scale the drawing. Ask if doubt.



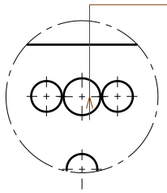
Front view
Scale: 1:2



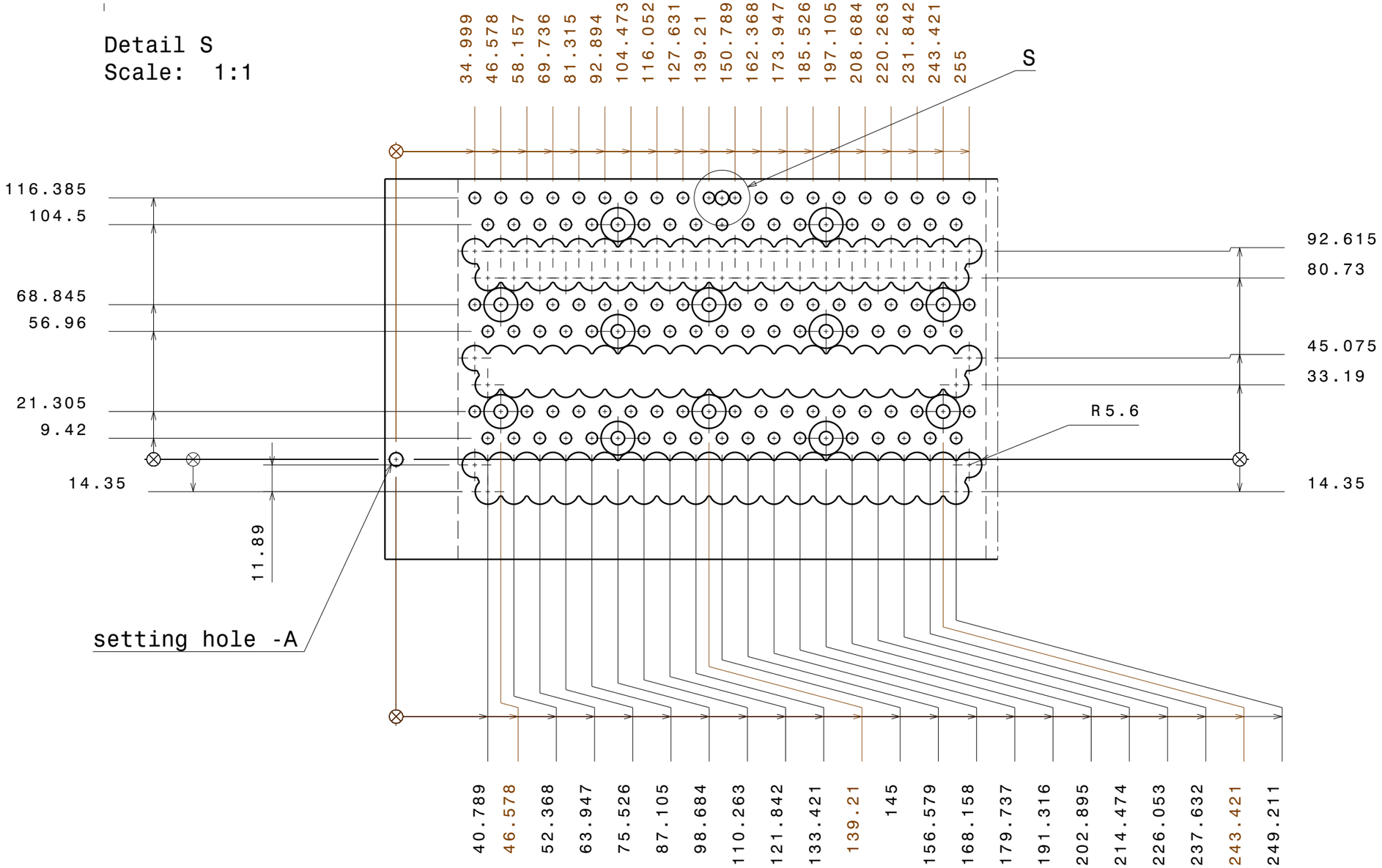
Section view G-G
Scale: 1:1

ASS'Y GROUP:	SIZE A1	INSTITUTE FOR PLASMA RESEARCH	
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED		BHAT, GANDHINAGAR-382 428.	
SCALE -	DATE	TITLE	
DRAWN KIRIT	29/10/2020	FIXTURE-6 FOR PROTOTYPE ACCELERATION GRID	
REVIEWED BRD/MKG RKS		REF DRG NO:	REV 00
APPROVED M.JANA		DRG.NO 32010007AA\PGF6	SHEET 01or02

116.33 FROM SETTING HOLE-A

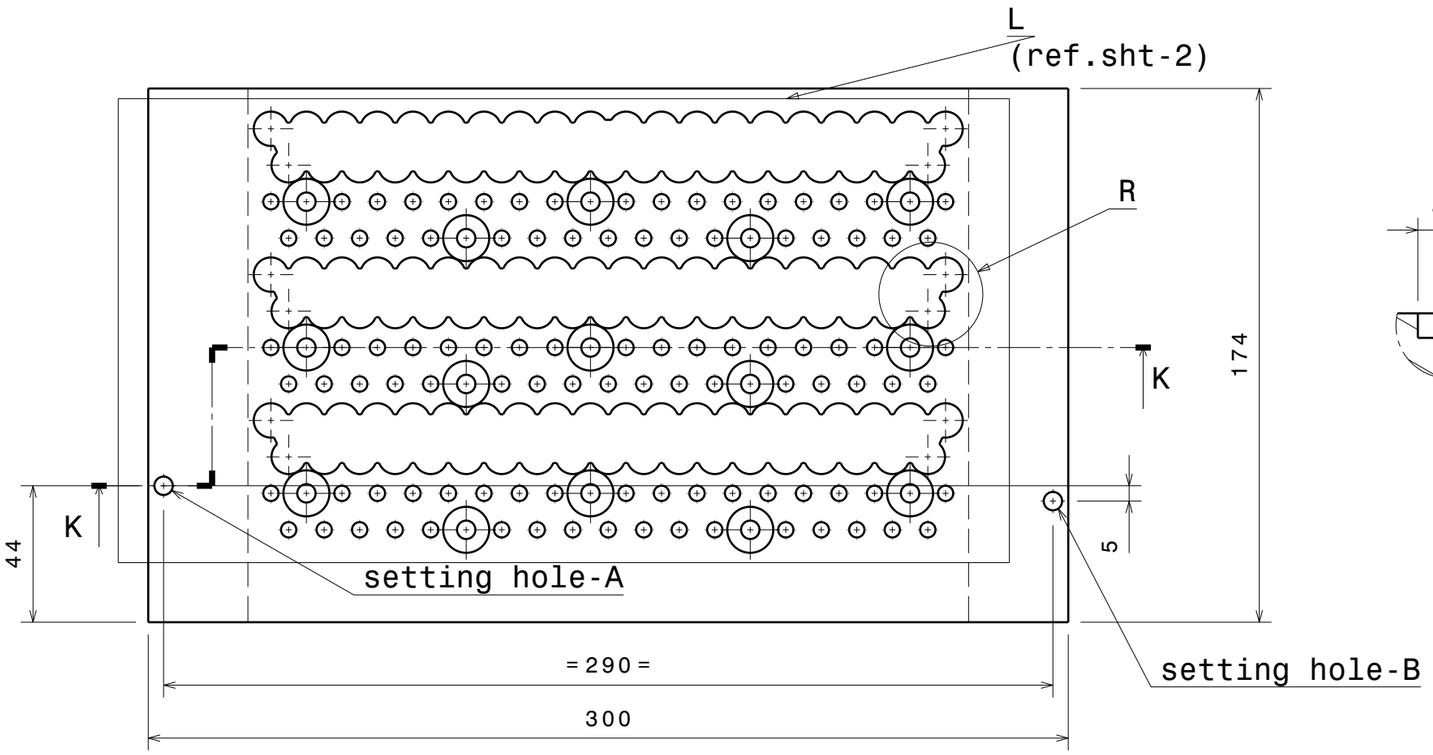


Detail S
Scale: 1:1

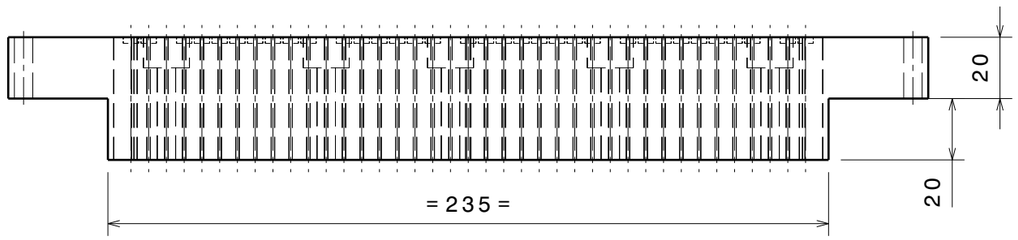


Detail J
Scale: 1:2

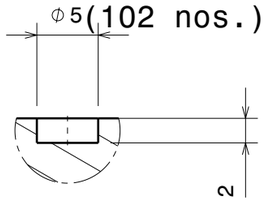
ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH		
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.		
SCALE	-	DATE	THIRD ANGLE PROJECTION	TITLE	FIXTURE-6 FOR PROTOTYPE ACCELERATION GRID
DRAWN	KIRIT	29/10/2020			
REVIEWED	BRD/MKG/RKS		REF DRG NO:		REV 00
APPROVED	M.JANA		DRG.NO	32010007AA\PGF6	SHEET 02OF02



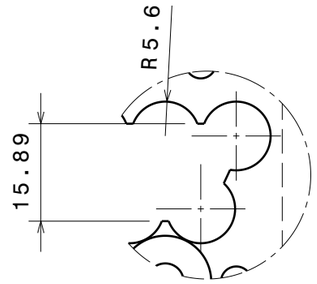
Top view
Scale: 1:2



Front view
Scale: 1:2

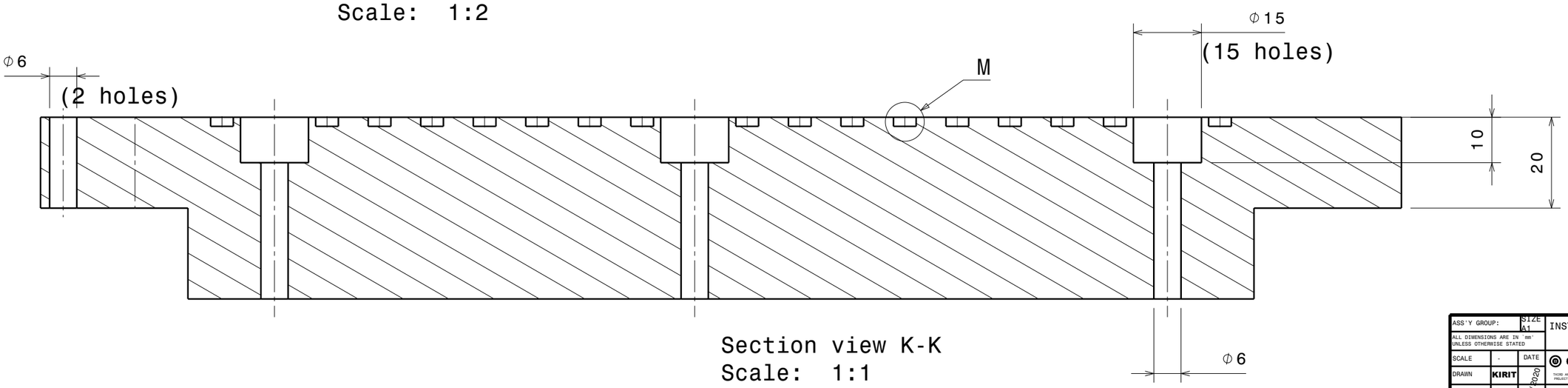


Detail M
Scale: 2:1



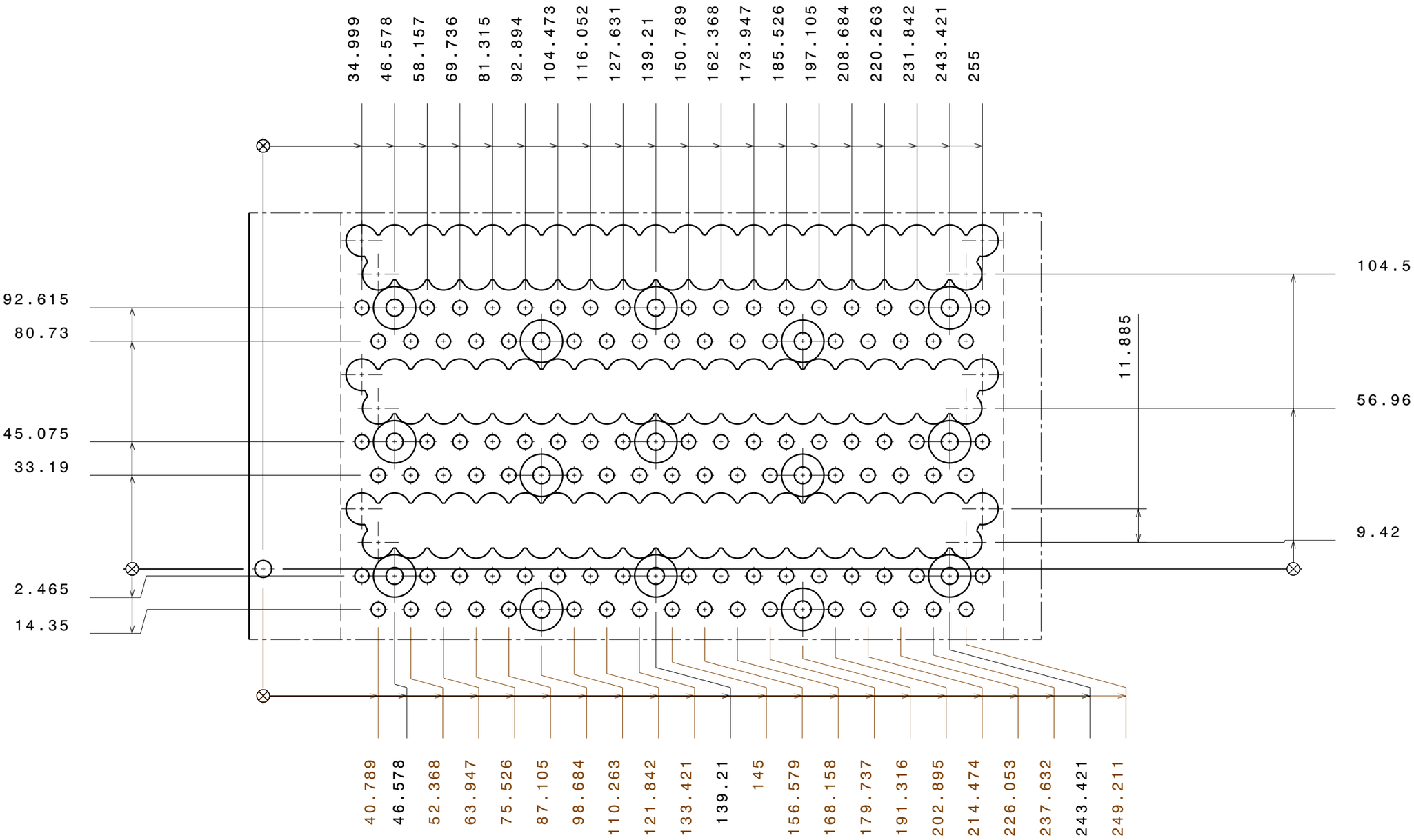
Detail R
Scale: 1:1

NOTES:
1. Fixture drawing is completely conceptual in nature.
2. Type and number of holes are indicative only.
3. Fixture clamping and grid clamping provisions are indicative only.
4. Vendor shall customize the fixture with IPR approvals as per the available facility at the site..
5. Fixture material should be non-ferrous and compatible with grid.
6. Use of fixtures shall be in a manner to get the final product in the form of grid as per the IPR approved drawing.
7. Use ISO 2768 m Standard for tolerance.
8. Do not scale the drawing. Ask if doubt.



Section view K-K
Scale: 1:1

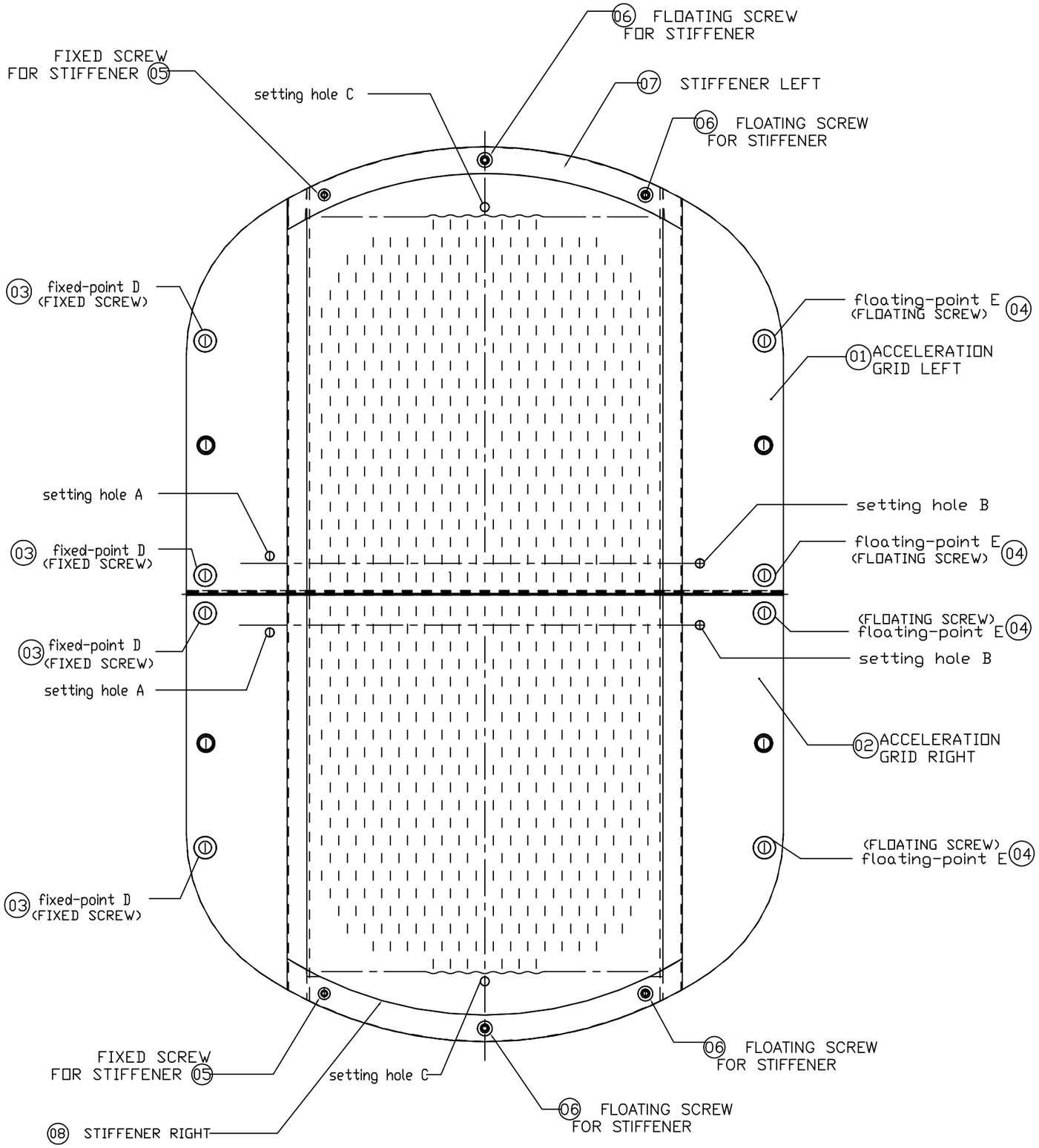
ASS'Y GROUP:	SIZE A1	INSTITUTE FOR PLASMA RESEARCH	
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED		BHAT, GANDHINAGAR-382 428.	
SCALE -	DATE	TITLE	
DRAWN KIRIT	29/10/2020	FIXTURE-7 FOR PROTOTYPE ACCELERATION GRID	
REVIEWED BRD/MKG/RKS		REF DRG NO:	REV 00
APPROVED M.JANA		DRG.NO 32010007AA\PGF7	SHEET 01of02

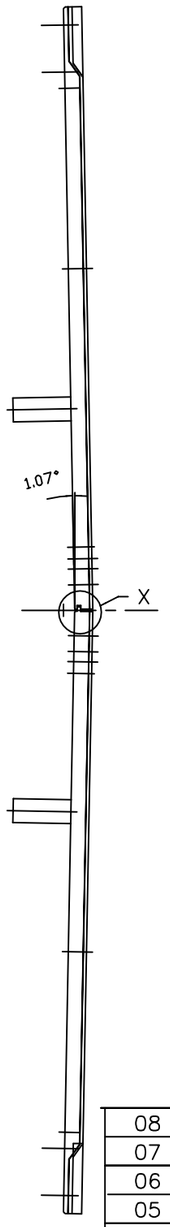


Detail L
Scale: 2:3

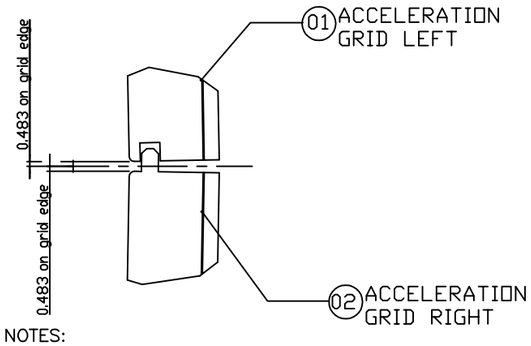
ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE	-	DATE	TITLE: FIXTURE-7 FOR PROTOTYPE ACCELERATION GRID
DRAWN	KIRIT	29/10/2020	
REVIEWED	BRD/MKG/RKS		REF DRG NO: — REV 00
APPROVED	M.JANA		DRG.NO 32010007AA\PGF7 — SHEET 02 OF 02

ACAD F.NAME:





VIEWX



NOTES:

1. Do not scale the Drawing. Ask if doubt.
2. Electro polishing to remove sharp edges.
3. Assembly of two grid hales shown here is not the scope of vendor. Here it is shown for the shake of understanding of assembly of two grid halves which will be done at IPR.
5. surface finish
   Extraction surface : Rz=2.5 µm
   Miscellaneous surface = Rz=6.3 µm
6. Surface flatness : 100 µm
7. Pressure Test (Acceptance Test)
   Internal pressure (inside manifold and cooling channels) 16 bar Nitrogen and Helium gas.
8. Leak Test (Acceptance Test)
   Integral Leak rate : 10^{-8} mbar–lit/sec (16 bar He gas)

SR.NO.	PART NO.	DESCRIPTION	REF.DRG.NO.	QTY.
08	08	STIFFENER RIGHT	SHEET 06 OF 10	01
07	07	STIFFENER LEFT	SHEET 06 OF 10	01
06	06	FLOATING SCREW FOR ACCELERATION GRID STIFFENER	SHEET 09 OF 10	04
05	05	FIXED SCREW FOR ACCELERATION GRID STIFFENER	SHEET 10 OF 10	02
04	04	FLOATING SCREW FOR ACCELERATION GRID (M5 X 12)	SHEET 07 OF 10	04
03	03	FIXED SCREW FOR ACCELERATION GRID (M5 X 25)	SHEET 08 OF 10	04
02	02	ACCELERATION GRID RIGHT (VERSION WITHOUT HOLES)	SHEET 04 OF 10	01
01	01	ACCELERATION GRID LEFT (VERSION WITHOUT HOLES)	SHEET 02 OF 10	01

Max. roughness (Ra in µm) of N-Classes

N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

general tolerance ISO 2768 - m

	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2

	0,2...0,5	>0,5...3	>3...6	>6...30	>30...120	>120...400
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4

	..10	>10...50	>50...120	>120...400	>400
angles mm / 100 mm	±1,8	±0,9	±0,6	±0,3	±0,15

metric ISO-threads nut 6H, bolt 6g

REVISION COLUMN

REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

ASS'Y GROUP:

ALL DIMENSIONS ARE IN "mm" UNLESS OTHERWISE STATED

SCALE | DATE

REFURBISHED BY KIRIT 8/2020

REVIEWED BRD,MKG RKS

APPROVED M.JANA

INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR–382 428.

TITLE: ACCELERATION GRID ASSEMBLY VERSION WHITOUT HOLES

REF DRG NO: PH 000 604 -U REV – 1

DRG.NO 32010005 SHEET 01 OF 10

ACAD F.NAME:

+0.05
-0.05
9

SECTION B-B

setting hole - C

FIXED SCREW

FLOATING SCREW

STIFFENER LEFT

A

B

B

18

R261.0000

Ø332

Ø24.50

Ø24.50

Ø66.379

01

SECTION A-A

Ø12 X 1.5
Ø10.7 +0.05 0

Ø9

1

Detail - X

Friction welded

WATER STUB PIPE

02

G3/8x1.5
Ø10.7 +0.05 0

1

29

X

setting hole -A

setting hole -B

A

legend

help dimension = ( )

SR.NO.	PART NO.	DESCRIPTION	REF.DRG.NO.	QTY.	MATERIAL	REMARKS
02	02	WATER STUB PIPE	-	02	SS304L	-
01	01	BASEPLATE ACCELERATION GRID LEFT	SHEET 03	01	OFE COPPER	-

Max. roughness (Ra in µm) of N-Classes									
N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

general tolerance ISO 2768 - m							
	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
	0,2...0,5	>0,5...3	>3...6	>6...30	>30..120	>120...400	
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4	
angles	..10	>10...50	>50...120	>120...400	>400		
mm / 100 mm	±1,8	±0,9	±0,6	±0,3	±0,15		

metric ISO-threads nut 6H, bolt 6g

REVISION COLUMN					
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

ASS'Y GROUP:

ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED

SCALE NTS DATE

REFURBISHED BY KRMT 18/2020

REVIEWED BRD,MKG RKS

APPROVED M.JANA

INSTITUTE FOR PLASMA RESEARCH

BHAT, GANDHINAGAR-382 428.

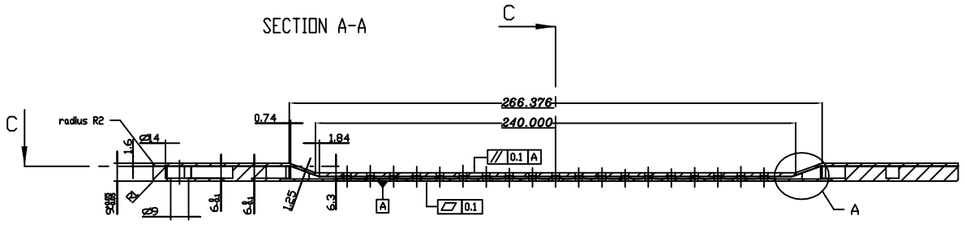
TITLE
ACCELERATION GRID LEFT
(VERSION WITHOUT HOLES)

REF DRG NO: PH 000 607 -X REV 1

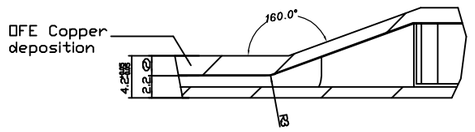
DRG.NO 32010005 SHEET 02 OF 10

ACAD F.NAME:

SECTION A-A

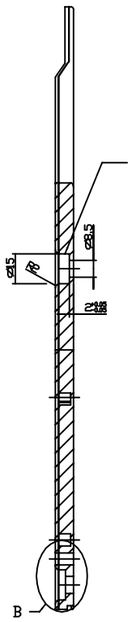


Detail - A

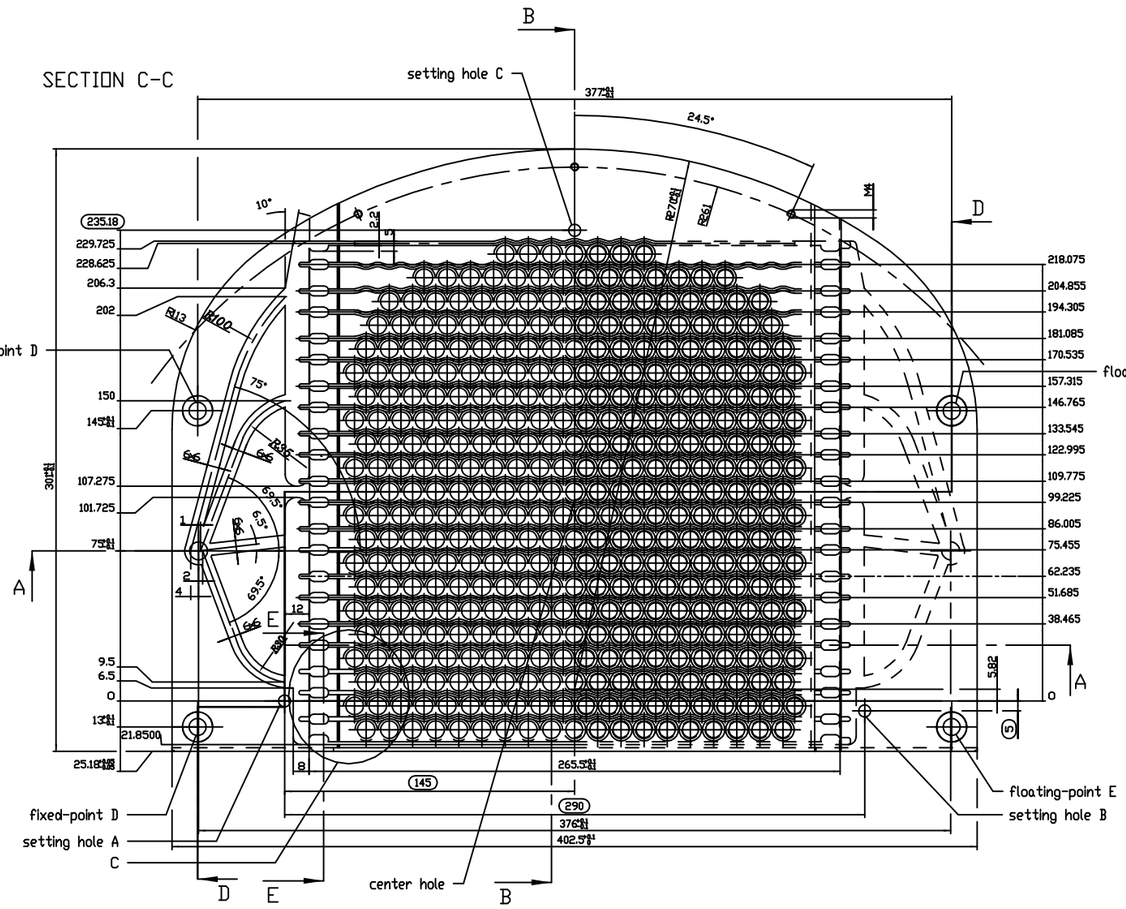


Position of water cooling channel must be accurate up to two decimal.

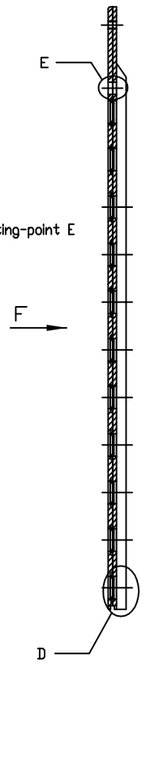
SECTION D-D



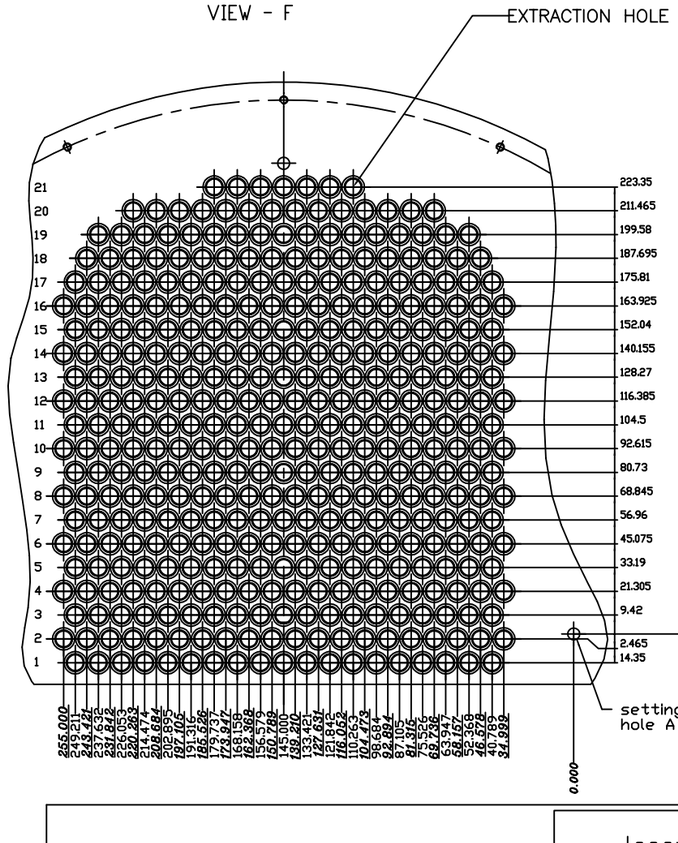
SECTION C-C



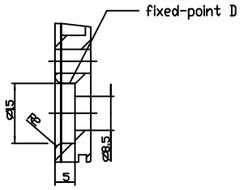
SECTION B-B



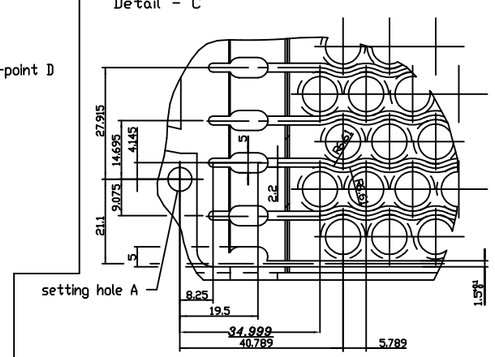
VIEW - F



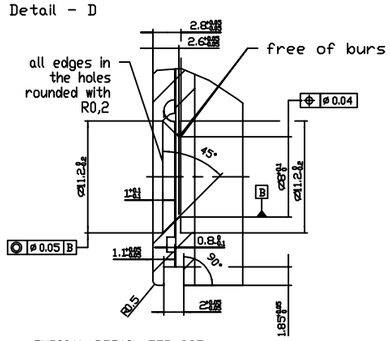
Detail - B



Detail - C

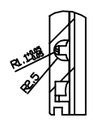


Detail - D



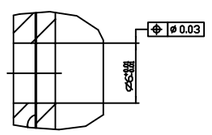
TYPICAL DETAIL FOR 387 EXTRACTION HOLES

SECTION E-E



Detail - E

setting holes A, B, C



legend

check dimension= ⬭

help dimension = ( )

manual modified= Italic font with underlined

NOTES:
1. Do not scale the Drawing. Ask if any doubt.
2. Italic font with underlined Dimensions are manual modified.
3. Number of holes : 387 (Ref. Detail –D)
4. Electro polishing to remove sharp edges.
5. surface finish
   Extraction surface : Rz=2.5 μm
   Miscellaneous surface = Rz=6.3 μm
6. Material – OFE Copper
7. Pressure Test (Acceptance Test)
   Internal pressure (inside manifold and cooling channels) 16 bar Nitrogen and Helium gas.
8. Leak Test (Acceptance Test)
   Integral Leak rate : 10^{-8} mbar–lit/sec (16 bar He gas)
9. Position of water cooling channel must be accurate up to two decimal.
10. Positional tolerance of aperture is with respect to setting hole A.

n	Max. roughness (Ra in μm) of N-Classes					
N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

general tolerance ISO 2768 - m							
	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
	0,2...0,5	>0,5...3	>3...6	>6...30	>30...120	>120...400	
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4	
angles	..10	>10...50	>50...120	>120...400	>400		
mm / 100 mm	±1,8	±0,9	±0,6	±0,3	±0,15		

metric ISO-threads nut 6H, bolt 6g

REVISION COLUMN					
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

ASS'Y GROUP:		INSTITUTE FOR PLASMA RESEARCH	
ALL DIMENSIONS ARE IN "mm" UNLESS OTHERWISE STATED		BHAT, GANDHINAGAR–382 428.	
SCALE	NTS	DATE	TITLE: BASEPLATE ACCELERATION GRID LEFT
REFURBISHED BY	KRIT	15/2020	
REVIEWED	BRD,MKG RKS		REF DRG NO: PH 000 608 REV–1
APPROVED	N.JANA		DRG.NO 32010005 SHEET 03 OF 10

ACAD F.NAME:

SECTION A-A

FLOATING-SCREW

STIFFENER RIGHT

01

FRICTION WELDED

X

Ø10.7 +0.05

Ø21.5

1

29

02

setting hole - B

A

setting hole C

B

B

R261.0000

R232

24.55

24.55

Ø66.379

FIXED-SCREW

9 +0.05 -0.05

SECTION B-B

setting hole A

A

1

Ø10.7 +0.05

Ø12 X 1.5

Detail - X

legend

help dimension = ( )

NOTES:
1. Do not scale the Drawing. Ask if any doubt.
2. Electro polishing to remove sharp edge.

SR.NO.	PART NO.	DESCRIPTION	REF.DRG.NO.	QTY.	MATERIAL	REMARKS
02	02	WATER STUB PIPE	-	02	SS304L	-
01	01	BASEPLATE ACCELERATION GRID RIGHT	SHEET 05	01	OFE COPPER	-

Max. roughness (Ra in µm) of N-Classes											
N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

general tolerance ISO 2768 - m							
	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
	0,2...0,5	>0,5...3	>3...6	>6...30	>30..120	>120...400	
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4	
angles	..10	>10...50	>50...120	>120...400	>400		
mm / 100 mm	±1,8	±0,9	±0,6	±0,3	±0,15		

metric ISO-threads nut 6H, bolt 6g

REVISION COLUMN					
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

ASS'Y GROUP:

ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED

INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR-382 428.

SCALE: NTS | DATE:

REFURBISHED BY: KANT | 15/2020

REVIEWED: BRD,MKG RKS

APPROVED: M.JANA

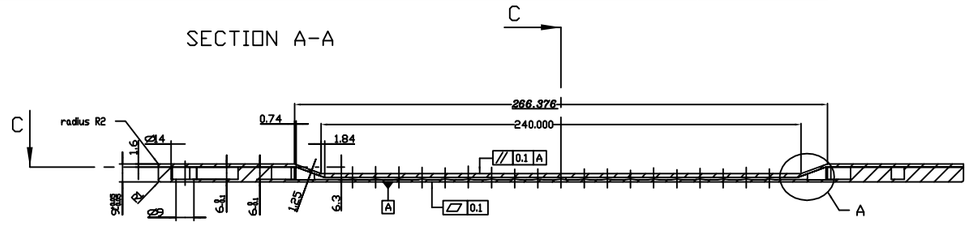
TITLE: ACCELERATION GRID RIGHT (VERSION WHITOUT HOLES)

REF DRG NO: PH 000 609 -X | REV 1

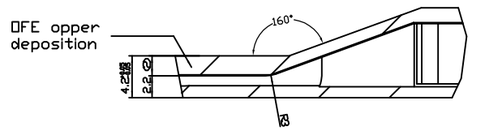
DRG.NO: 32010005 | SHEET 04 OF 10

ACAD F.NAME:

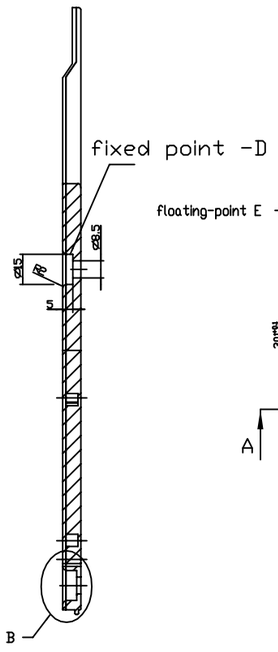
SECTION A-A



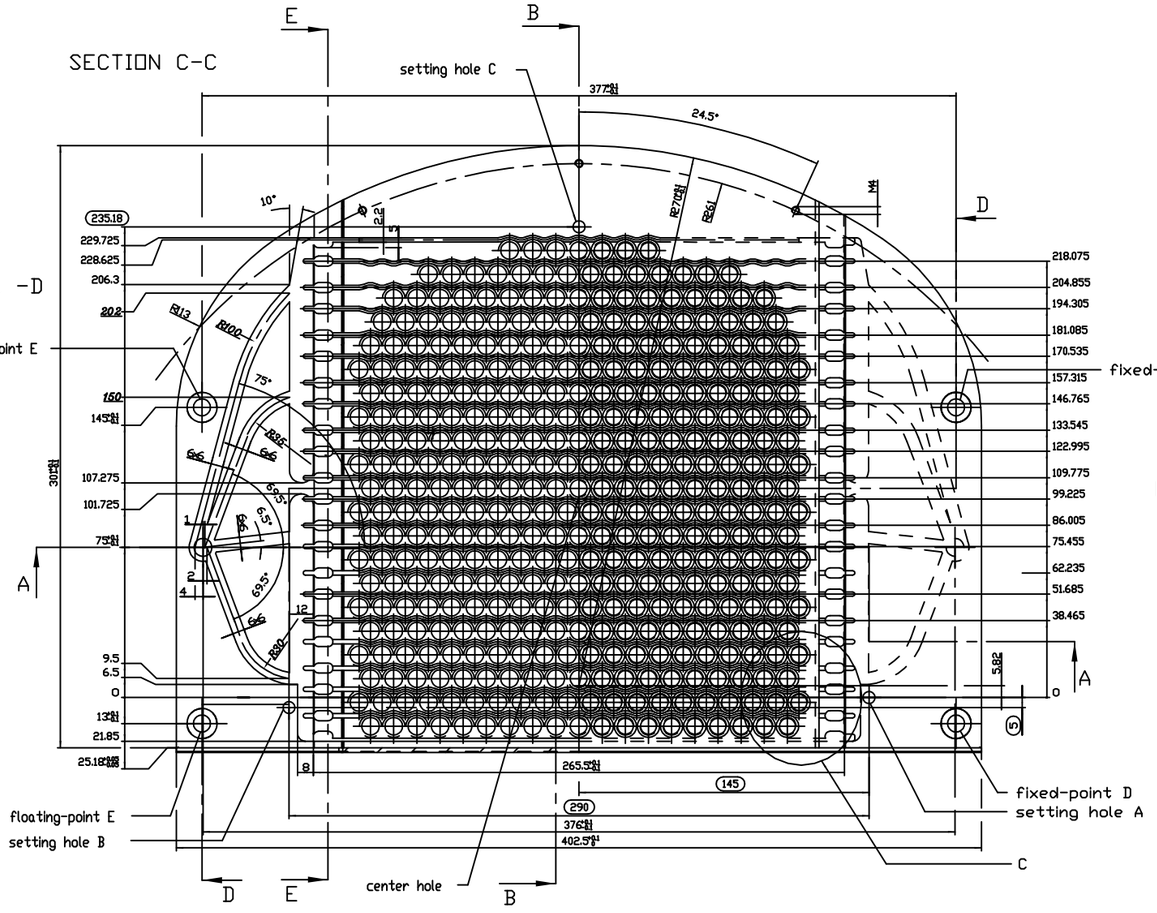
Detail -A



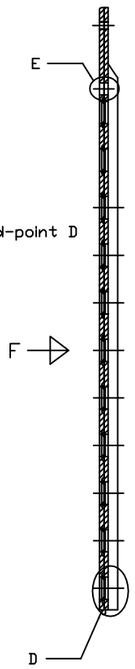
SECTION D-D



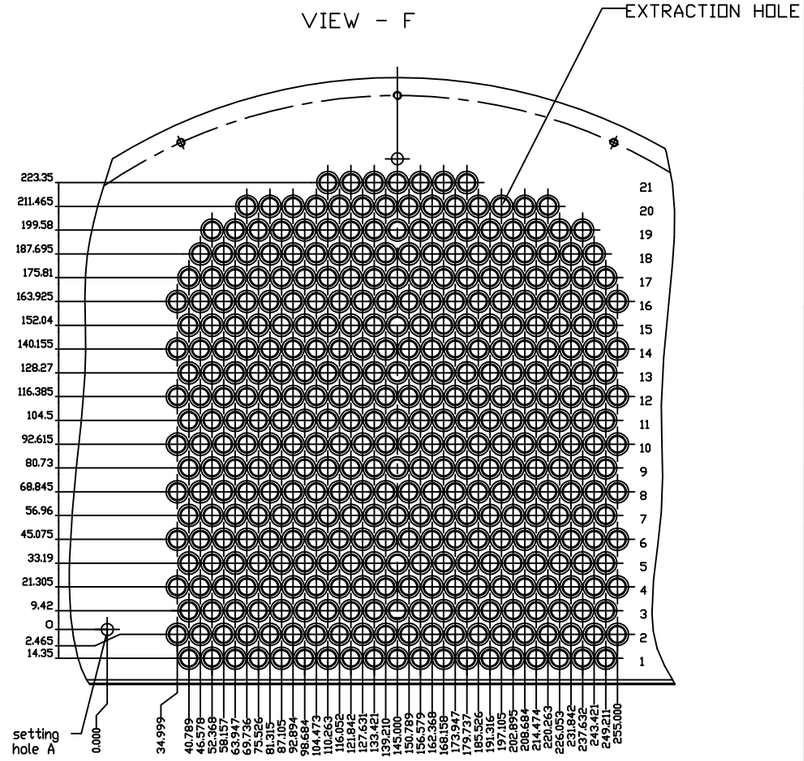
SECTION C-C



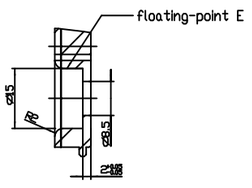
SECTION B-B



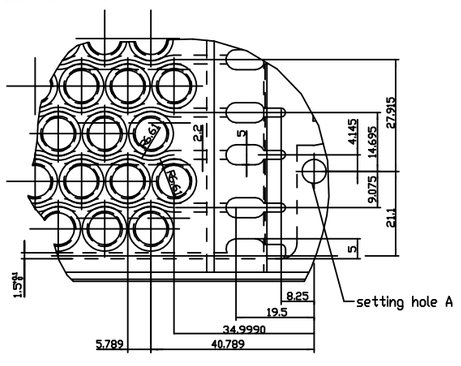
VIEW - F



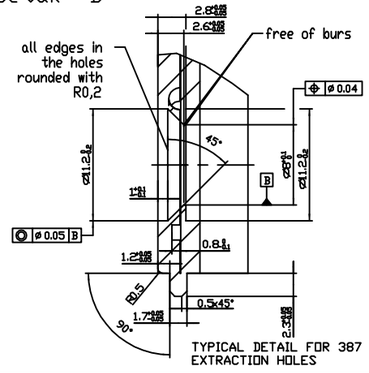
Detail -B



Detail -C

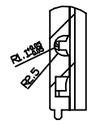


Detail -D



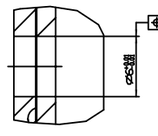
TYPICAL DETAIL FOR 387 EXTRACTION HOLES

SECTION E-E



Detail -E

setting holes A, B, C



legend

check dimension= ⬭

help dimension = ( )

manual modified= italic font with underlined

NOTES:

1. Do not scale the Drawing. Ask if any doubt.
2. Italic font with underlined Dimensions are manual modified.
3. Number of holes : 387 (Ref. Detail –D)
4. Electro polishing to remove sharp edges.
5. surface finish
   External surface : Rz=2.5 µm
   Miscellaneous = Rz=6.3 µm
6. Material – OFE Copper
7. Pressure Test (Acceptance Test)
   Internal pressure (inside manifold and cooling channels) 16 bar Nitrogen and Helium gas.
8. Leak Test (Acceptance Test)
   Integral Leak rate : 10^{-8} mbar–lit/sec (16 bar He gas)

Max. roughness (Ra in µm) of N-Classes					
N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

general tolerance ISO 2768 - m

	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2

	0,2...0,5	>0,5...3	>3...6	>6...30	>30...120	>120...400
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4

	..10	>10...50	>50...120	>120...400	>400
angles					
mm / 100 mm	±1,8	±0,9	±0,6	±0,3	±0,15

metric ISO-threads nut 6H, bolt 6g

REVISION COLUMN					
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

ASS'Y GROUP:

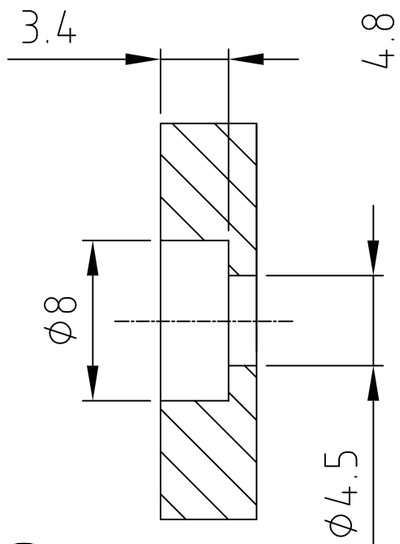
ALL DIMENSIONS ARE IN "mm" UNLESS OTHERWISE STATED

INSTITUTE FOR PLASMA RESEARCH

BHAT, GANDHINAGAR–382 428.

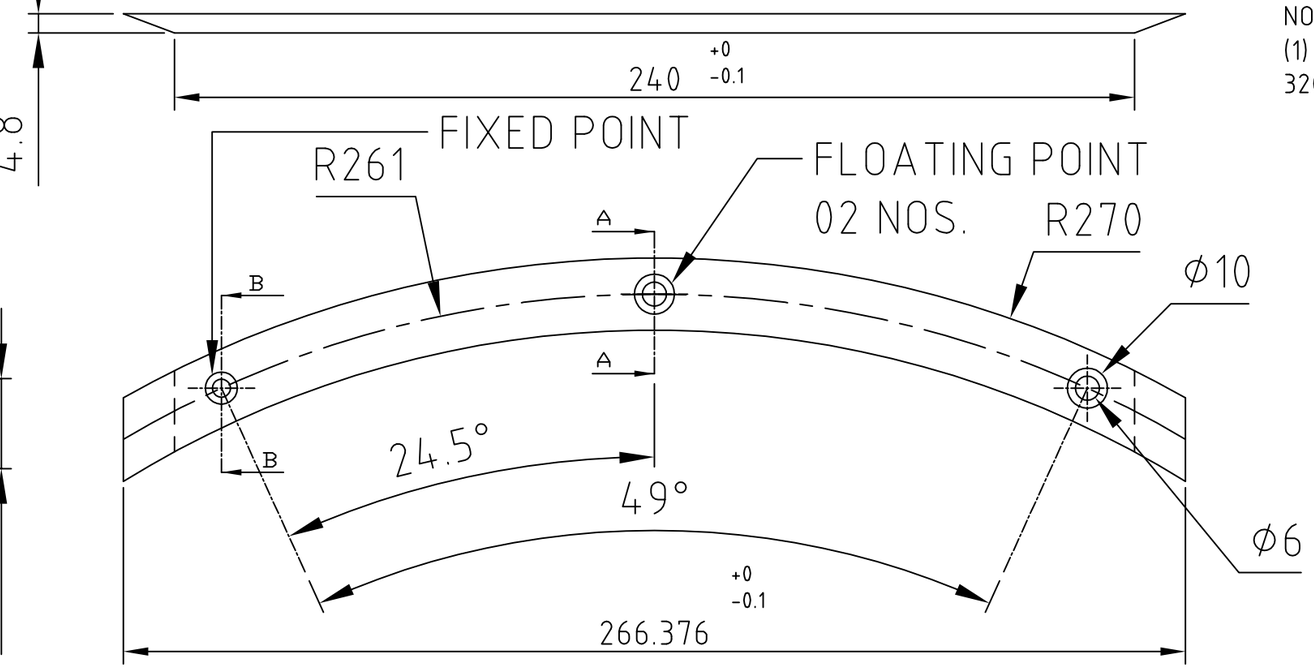
SCALE	NTS	DATE	TITLE: BASEPLATE ACCELERATION GRID RIGHT
REFURBISHED BY	KRRT	15/2020	FIRST ANGLE PROJECTION
REVIEWED	BRD,MKG RKS		REF DRG NO: PH 000 614 — REV – 1
APPROVED	N.JANA		DRG.NO 32010005 — SHEET 05 OF 10

NOTES :
(1) This stiffener needs to be assembled as per Drawing No. 32010005, Sheet No. 01.

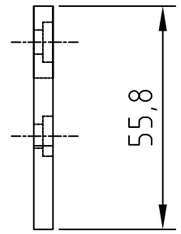


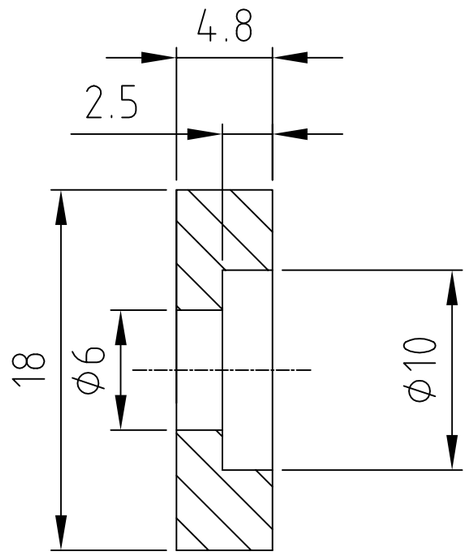
02

SECTION
B-B

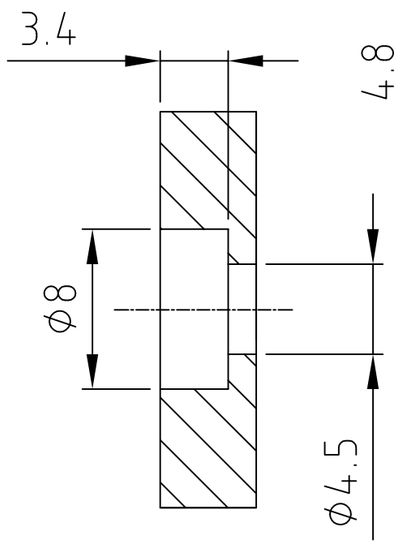


SCALE 2:1

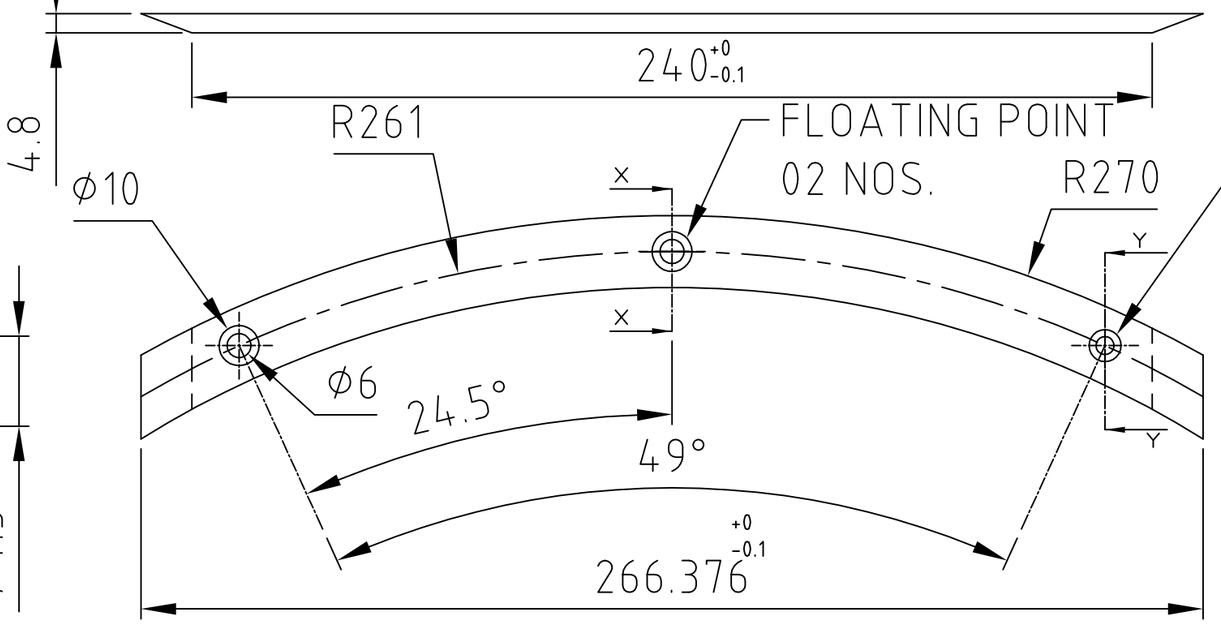


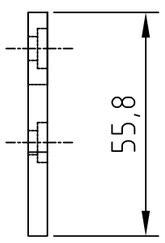


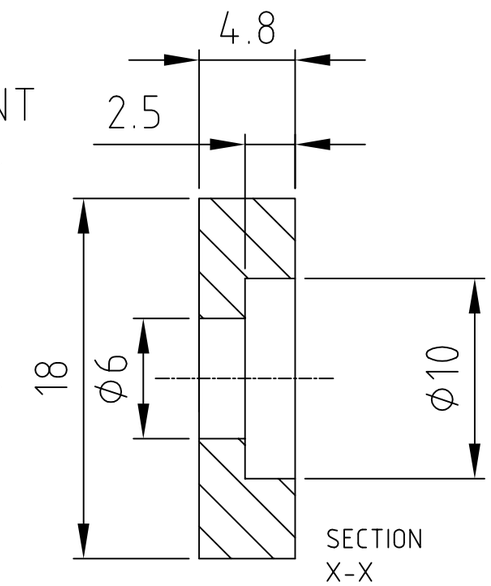
SECTION
A-A



SECTION
Y-Y







SECTION
X-X

NOTES :
(1) This stiffener needs to be assembled as per Drawing No. 32010005, Sheet No. 01.

02	STIFFENER FOR ACCELERATION GRID LEFT	OFE COPPER	01
01	STIFFENER FOR ACCELERATION GRID RIGHT	OFE COPPER	01
PART NO	DESCRIPTION	MATL	QTY

01

Max. roughness (Ra in μm) of N-Classes												
N 12	50	N 8	3,2	N 4	0,2							
N 11	20	N 7	1,6	N 3	0,1							
N 10	12,5	N 6	0,8	N 2	0,05							
N 9	6,3	N 5	0,4	N 1	0,0025							

general tolerance ISO 2768 - m								
	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
	0,2...0,5	>0,5...3	>3...6	>6...30	>30..120	>120...400	
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4	
angles	..10	>10...50	>50...120	>120...400	>400		
mm / 100 mm	±1,8	±0,9	±0,6	±0,3	±0,15		

metric ISO-threads nut 6H, bolt 6g

REVISION COLUMN						
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

ASS'Y GROUP:
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED

INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR–382 428.

SCALE	NTS	DATE	
REFURBISHED BY	KIRIT	19/2020	
REVIEWED	BRD,MKG RKS		
APPROVED	PLJANA		

FIRST ANGLE PROJECTION

TITLE: STIFFENER FOR ACCELERATION GRID LEFT AND RIGHT

REF DRG NO: REV – 0

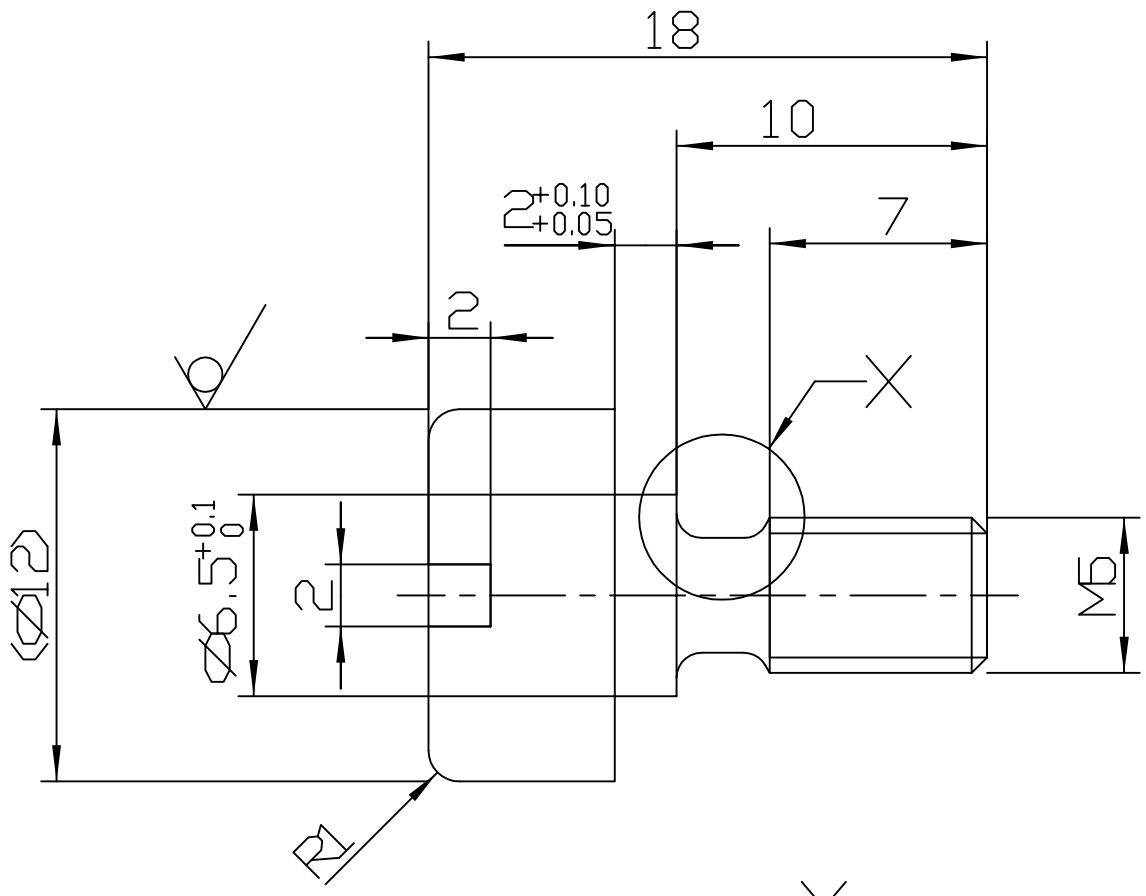
DRG.NO 32010005 SHEET 06 OF 10

Max. roughness (Ra in μm) of N-Classes					
N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

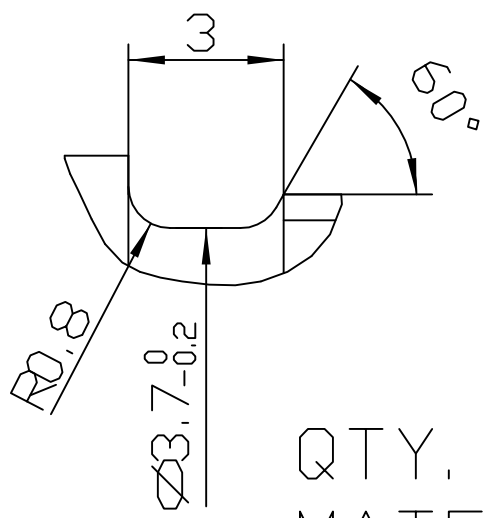
General tolerances from DIN 6871 m							
Linear dimensions	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2

Radii, chamfers	0,2...0,5	>0,5...3	>3...6	>6...30	>30...120	>120...400	Metric ISO-threads nut 6H, bolt 6g
	±0,1	±0,2	±0,5	±1	±2	±4	

mm / 100 mm	...10	>10...50	>50...120	>120...400	>400
	±1,8	±0,9	±0,6		



Detail X
5:1



N8

NOTES :
(1) Assembly of this component shall be done as shown in Sheet No. 01 of Drawing No. 32010005

QTY. - 04 NOS.
MATERIAL - SS304L

S.NO	PART NO	DESCRIPTION	MATL	QTY	SIZE/SPECIFICATIONS	WEIGHT	REMARKS
		FLOATING SCREW FOR ACCELERATION GRID	SS304L	04	M5 X 12		

REV	REMARKS

ASS'Y GROUP:

SIGNATURE: DATE

REVISED BY

REFURBISHED BY KIRIT

REVIEWED BRD,MKG RKS 22/10/2020

APPROVED BY M.JANA

INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR-382 428.

TITLE
FLOATING SCREW FOR ACCELERATION GRID (M5 x 12)

REF DRG NO: PH 403 500 REV

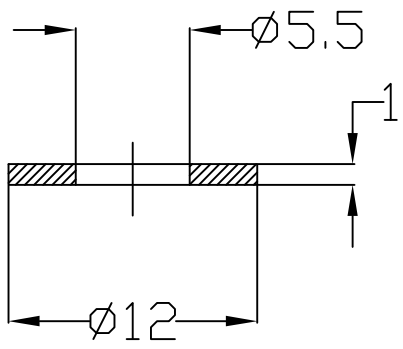
DRG.NO 32010005 SHEET 07 OF 10

Max. roughness (Ra in μm) of N-Classes					
N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

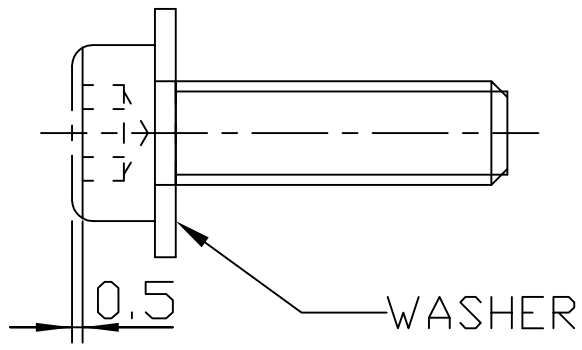
General tolerances from DIN 6871 m							
Linear dimensions	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2

Radii, chamfers	0,2...0,5	>0,5...3	>3...6	>6...30	>30...120	>120...400	Metric ISO-threads nut 6H, bolt 6g
	±0,1	±0,2	±0,5	±1	±2	±4	

mm / 100 mm	...10	>10...50	>50...120	>120...400	>400
	±1,8	±0,9	±0,6		



WASHER



FIXED SCREW WITH WASHER

NOTES :
(1) Assembly of this component shall be done as shown in Sheet No. 01 of Drawing No. 32010005

N8

QTY. - 04 NOS.
MATERIAL - SS304L

S.NO	PART NO	DESCRIPTION	MATL	QTY	SIZE/SPECIFICATIONS	WEIGHT	REMARKS

REV	REMARKS

ASS'Y GROUP:		
SIGNATURE:		DATE
REVISED BY		
REFURBISHED BY	KIRIT	
REVIEWED	BRD,MKG RKS	22/10/2020
APPROVED BY	M.JANA	

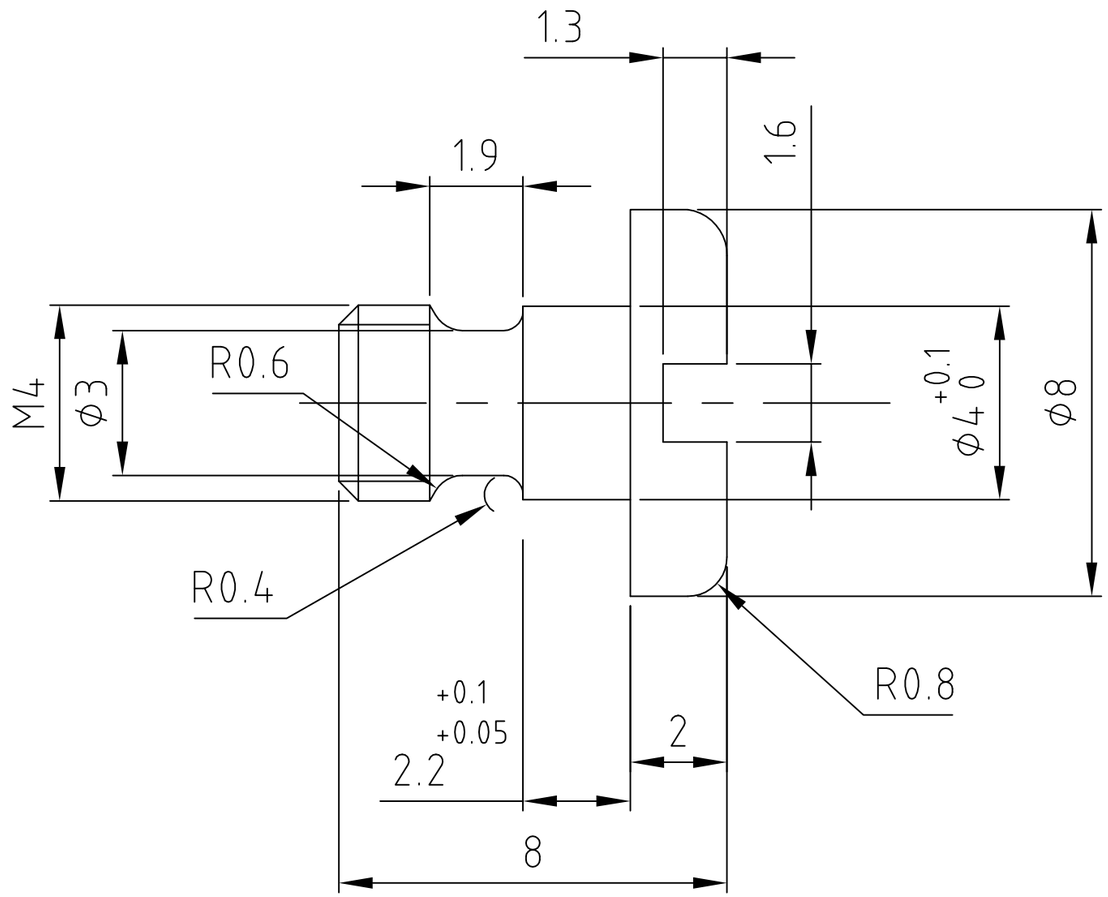
INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR-382 428.

TITLE
FIXED SCREW FOR ACCELERATION GRID (M5 x 25)

REF DRG NO: PH 403 502 — REV

DRG.NO 32010005 — SHEET 08 OF 10

ACAD F.NAME: FILENAME



NOTES :

(1) Assembly of this component shall be done as shown in Sheet No. 01 of Drawing No. 32010005

FLOATING SCREW	SS304L	04	
DESCRIPTION	MATERIAL	QTY.	REMARKS

DRG.NO	▽ 8–25	▽▽ 1.6–8	▽▽▽ 0.025–1.6	▽▽▽▽ < 0.025
CO–ORDINATED BY				

MACHINING DEVIATIONS FOR NON–TOLERANCED DIMENSIONS

LENGTH IN mm OF SHORTER SIDE OF ANGLES				LENGTH OR DIA	UPTO 6	6–30	30–120	120–315
UPTO 10	10–50	50–120	OVER 120–400					
±1°	±0°–30'	±0°–20'	±0°–10'		±0.1	±0.2	±0.3	±0.5

REVISION COLUMN					
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

ASS'Y GROUP:

ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED

SCALE	NTS	DATE
REFURBISHED BY	KIRIT	
REVIEWED	BRD,MKG RKS	
APPROVED	M.JANA	

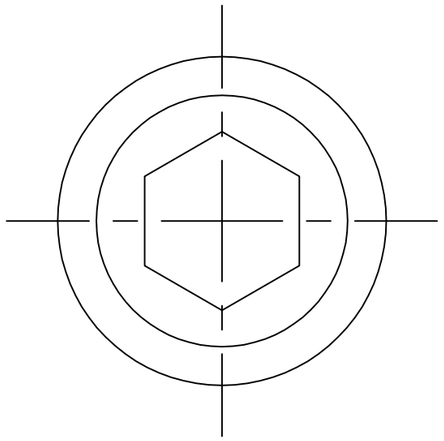
INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR–382 428.

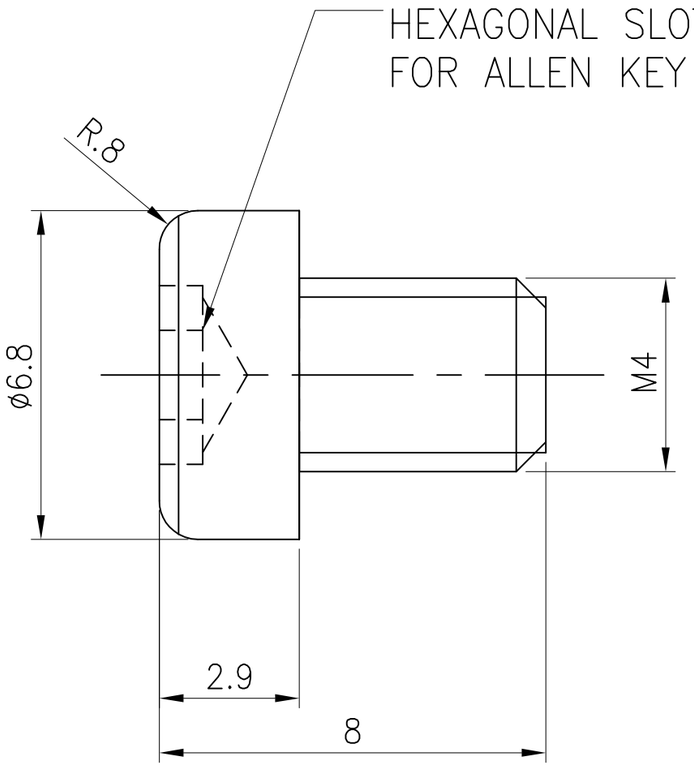
TITLE FLOATING SCREW FOR ACCELERATION GRID STIFFENER

REF DRG NO: | REV

DRG.NO 32010005 | SHEET 09 OF 10

ACAD F.NAME: FILENAME





NOTES :

(1) Assembly of this component shall be done as shown in Sheet No. 01 of Drawing No. 32010005

DESCRIPTION	MATERIAL	QTY.	REMARKS
FIXED SCREW	SS304L	02	

DRG.NO	▽ 8–25	▽▽ 1.6–8	▽▽▽ 0.025–1.6	▽▽▽▽ < 0.025
CO–ORDINATED BY				

MACHINING DEVIATIONS FOR NON–TOLERANCED DIMENSIONS

LENGTH IN mm OF SHORTER SIDE OF ANGLES				LENGTH OR DIA	UPTO 6	6–30	30–120	120–315
UPTO 10	10–50	50–120	OVER 120–400					
±1°	±0°–30'	±0°–20'	±0°–10'		±0.1	±0.2	±0.3	±0.5

REVISION COLUMN

REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

ASS'Y GROUP:		
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED		
SCALE	NTS	DATE
REFURBISHED	BY	KIRIT
REVIEWED	BRD,MKG RKS	
APPROVED	M.JANA	18/2/2020

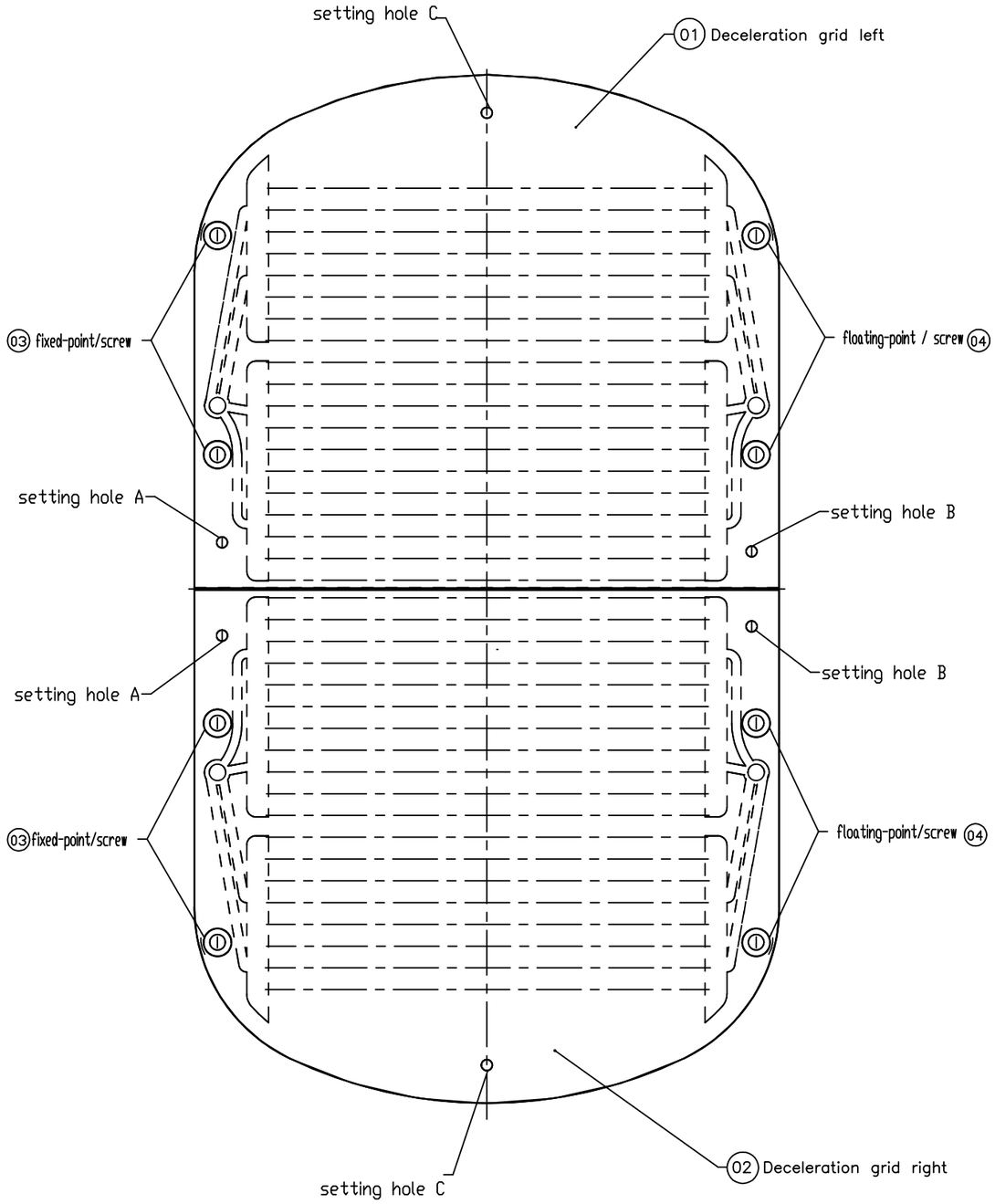
INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR–382 428.

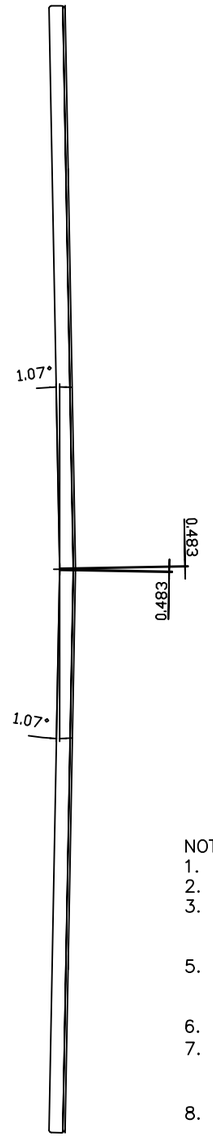
TITLE FIXED SCREW FOR ACCELERATION GRID STIFFENER

REF DRG NO: REV–00

DRG.NO 32010005 SHEET 10 OF 10

ACAD F.NAME:





NOTES:
1. Do not scale the Drawing. Ask if doubt.
2. Electro polishing to remove sharp edges.
3. Assembly of two grid hales shown here is not the scope of vendor. Here it is shown for the shake of understanding of assembly of two grid halves which will be done at IPR.
5. surface finish
   Extraction surface : Rz=2.5 μm
   Miscellaneous surface = Rz=6.3 μm
6. Surface flatness : 100 μm
7. Pressure Test (Acceptance Test)
   Internal pressure (inside manifold and cooling channels) 16 bar Nitrogen and Helium gas.
8. Leak Test (Acceptance Test)
   Integral Leak rate : 10^{-8} mbar–lit/sec (16 bar He gas)

04	04	Floating point / screw M5 X 12	Sheet 9 of 9	04	SS304L	
03	03	Fixed point / screw M5 X 25	Sheet 8 of 9	04	SS304L	
02	02	Deceleration grid right	Sheet 5 of 9	01		
01	01	Deceleration grid left	Sheet 2 of 9	01		
SR.NO.	PART NO.	DESCRIPTION	REF.DRG.NO.	QTY.	MATERIAL	REMARKS

Max. roughness (Ra in μm) of N-Classes												
N 12	50	N 8	3,2	N 4	0,2							
N 11	20	N 7	1,6	N 3	0,1							
N 10	12,5	N 6	0,8	N 2	0,05							
N 9	6,3	N 5	0,4	N 1	0,0025							

general tolerance ISO 2768 - m							
	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
	0,2...0,5	>0,5...3	>3...6	>6...30	>30...120	>120...400	
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4	
angles	..10	>10...50	>50...120	>120...400	>400		
mm / 100 mm	±1,8	±0,9	±0,6	±0,3	±0,15		

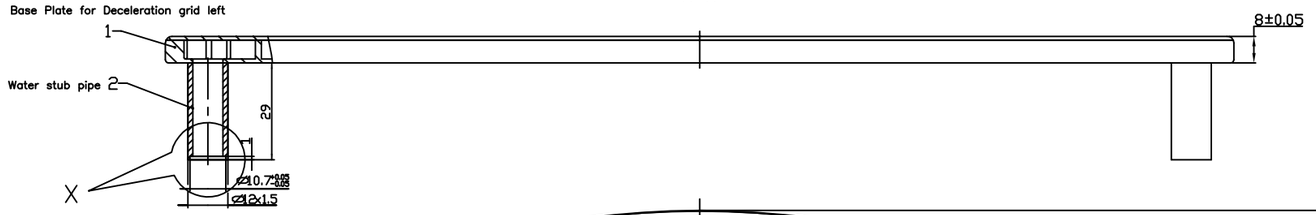
metric ISO-threads nut 6H, bolt 6g

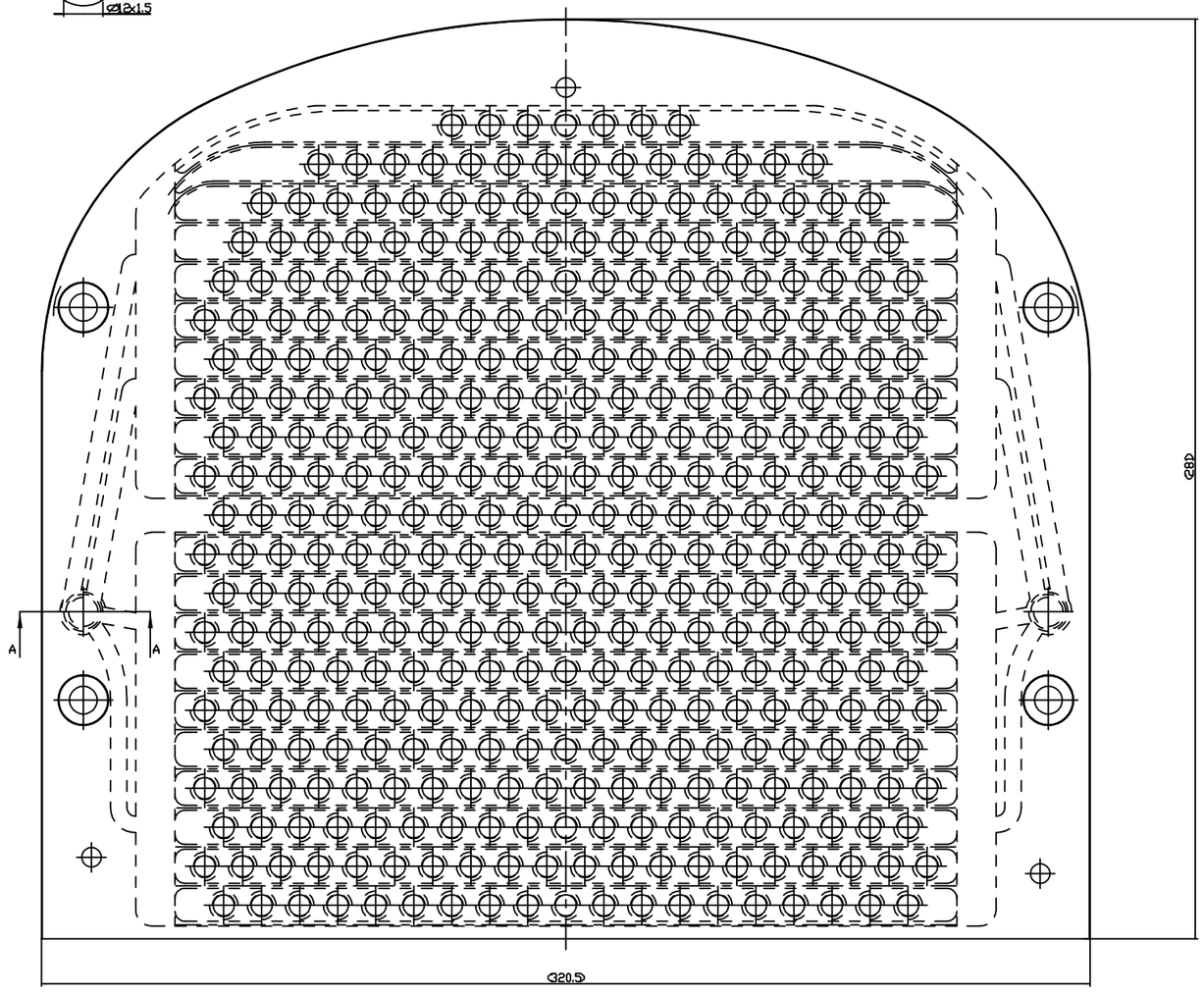
REVISION COLUMN					
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

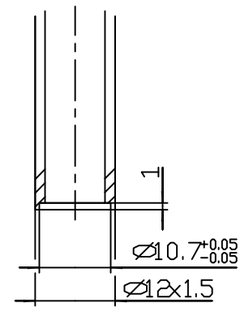
ASS'Y GROUP:		INSTITUTE FOR PLASMA RESEARCH	
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED		BHAT, GANDHINAGAR–382 428.	
SCALE	NTS	DATE	TITLE: DECELERATION GRID ASSEMBLY VERSION WHITOUT HOLES
REFURBISHED BY	KRRT	15/2020	
REVIEWED	BRD,MKG RKS	REF DRG NO: PH 000 615 -U	REV – 00
APPROVED	M.JANA	DRG.NO 32030002	SHEET 01 OF 09

ACAD F.NAME:

A-A







DETAIL - X

legend

help dimension = ( )

02	02	Water stub pipe		02	SS304L
01	01	Base Plate for Deceleration grid left	Sheet 3 of 9	01	OFE COPPER
SR.NO.	PART NO.	DESCRIPTION	REF.DRG.NO.	QTY.	MATERIAL

Max. roughness (Ra in µm) of N-Classes

N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

general tolerance ISO 2768 - m

	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2

	0,2...0,5	>0,5...3	>3...6	>6...30	>30...120	>120...400
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4

	..10	>10...50	>50...120	>120...400	>400
angles					
mm / 100 mm	±1,8	±0,9	±0,6	±0,3	±0,15

metric ISO-threads nut 6H, bolt 6g

REVISION COLUMN

REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

ASS'Y GROUP:

ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED

SCALE | DATE

REVIEWED	BRD,MKG RKS M.JANA	
APPROVED		

INSTITUTE FOR PLASMA RESEARCH

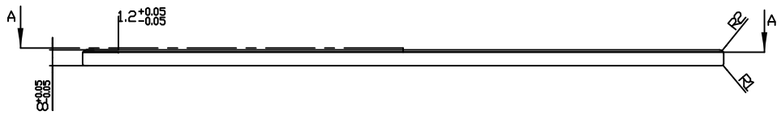
BHAT, GANDHINAGAR-382 428.

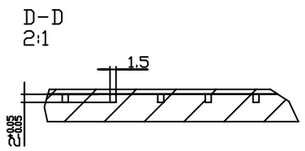
TITLE: Deceleration grid left

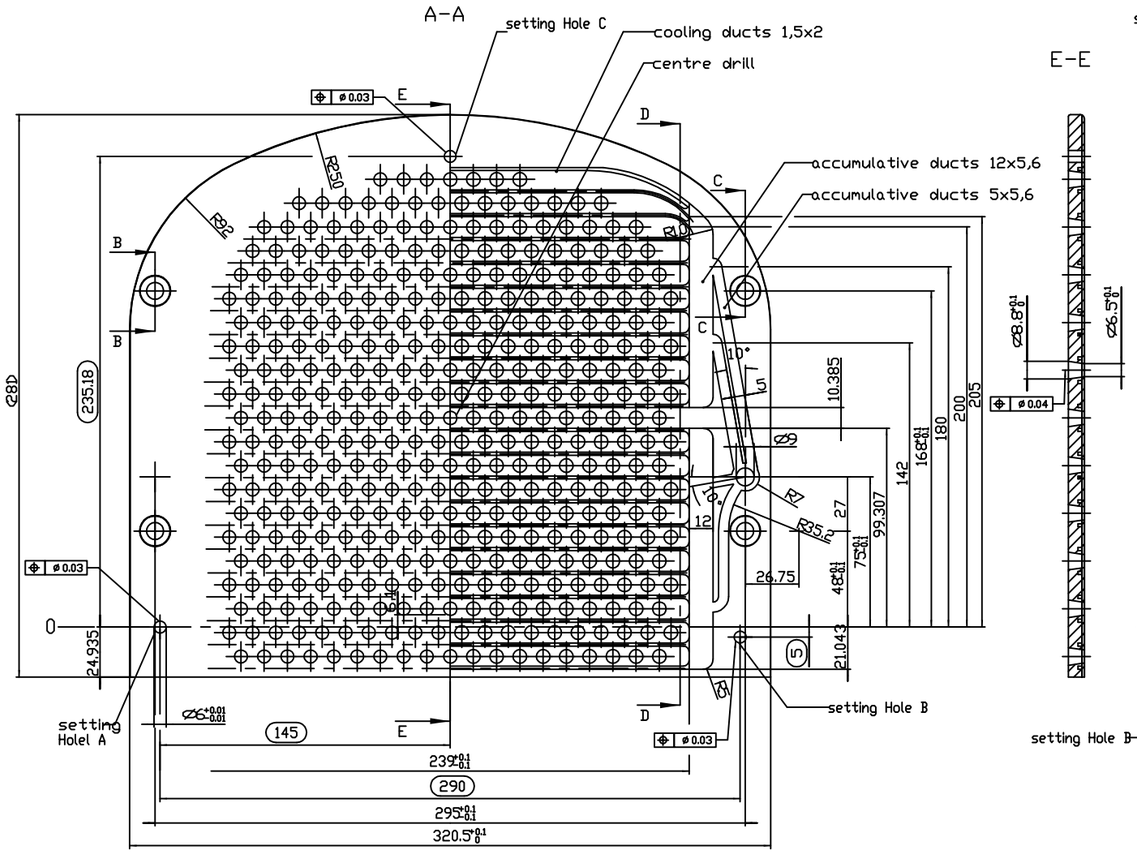
REF DRG NO: PH 000 612-X 1 OF 1 | REV - 00

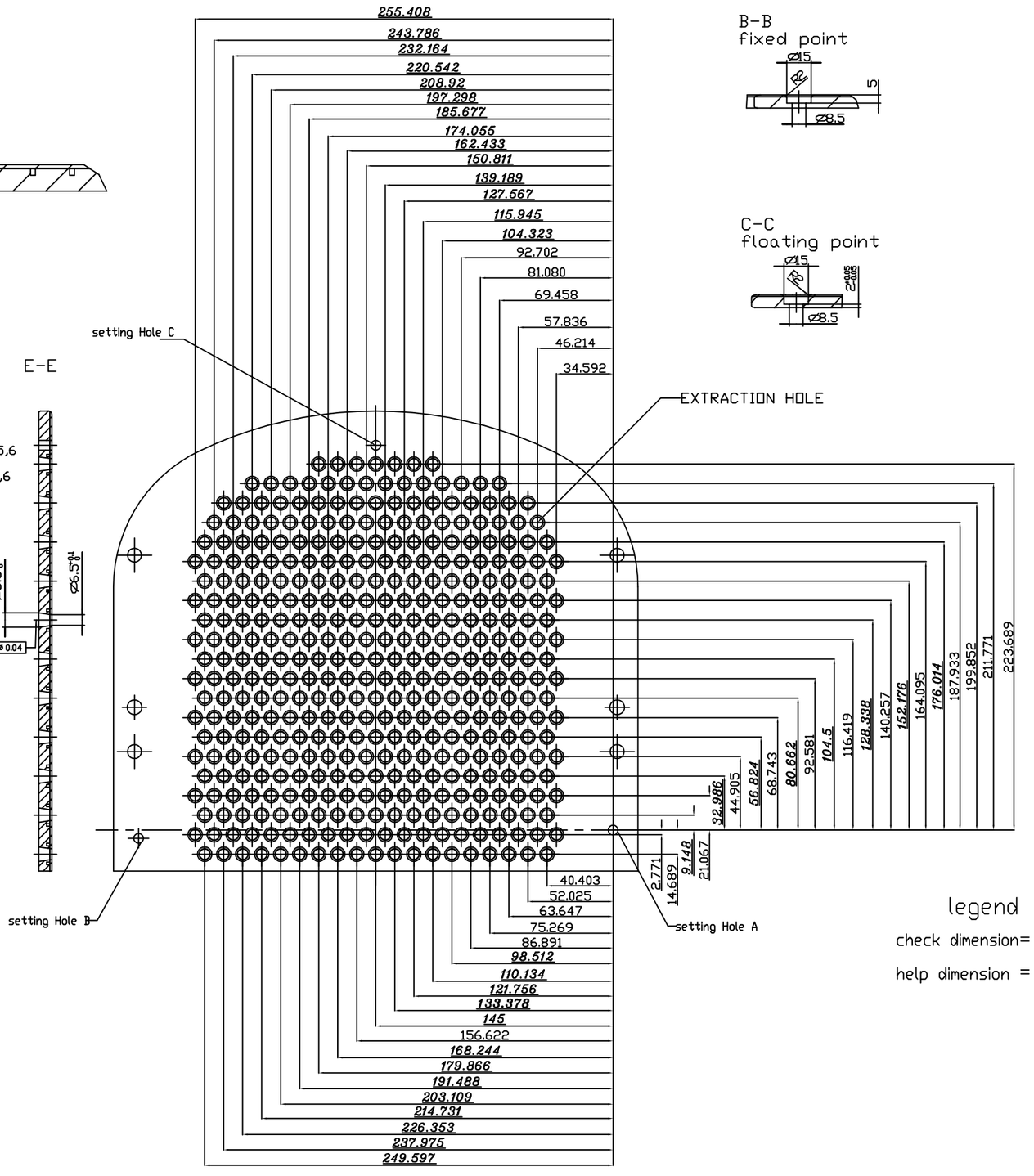
DRG.NO 32030002 | SHEET 02 OF 09

ACAD F.NAME:









legend

check dimension= ⬭

help dimension = ( )

NOTES:
1. Do not scale the Drawing. Ask if any doubt.
2. Italic font with underlined Dimensions are manual modified.
3. Number of holes : 387 (Extraction holes)
4. Electro polishing to remove sharp edges.
5. surface finish
   Extraction surface : Rz=2.5 μm
   Miscellaneous surface = Rz=6.3 μm
6. Material – OFE Copper
7. Pressure Test (Acceptance Test)
   Internal pressure (inside manifold and cooling channels) 16 bar Nitrogen and Helium gas.
8. Leak Test (Acceptance Test)
   Integral Leak rate : 10^{-9} mbar–lit/sec (16 bar He gas)
9. This drg. needs to be refereed with sheet no. 04 of 09.

Max. roughness (Ra in μm) of N-Classes						
N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

general tolerance ISO 2768 - m							
	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
	0,2...0,5	>0,5...3	>3...6	>6...30	>30...120	>120...400	
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4	
angles	..10	>10...50	>50...120	>120...400	>400		
mm / 100 mm	±1,8	±0,9	±0,6	±0,3	±0,15		

metric ISO-threads nut 6H, bolt 6g

REVISION COLUMN					
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

ASS'Y GROUP:

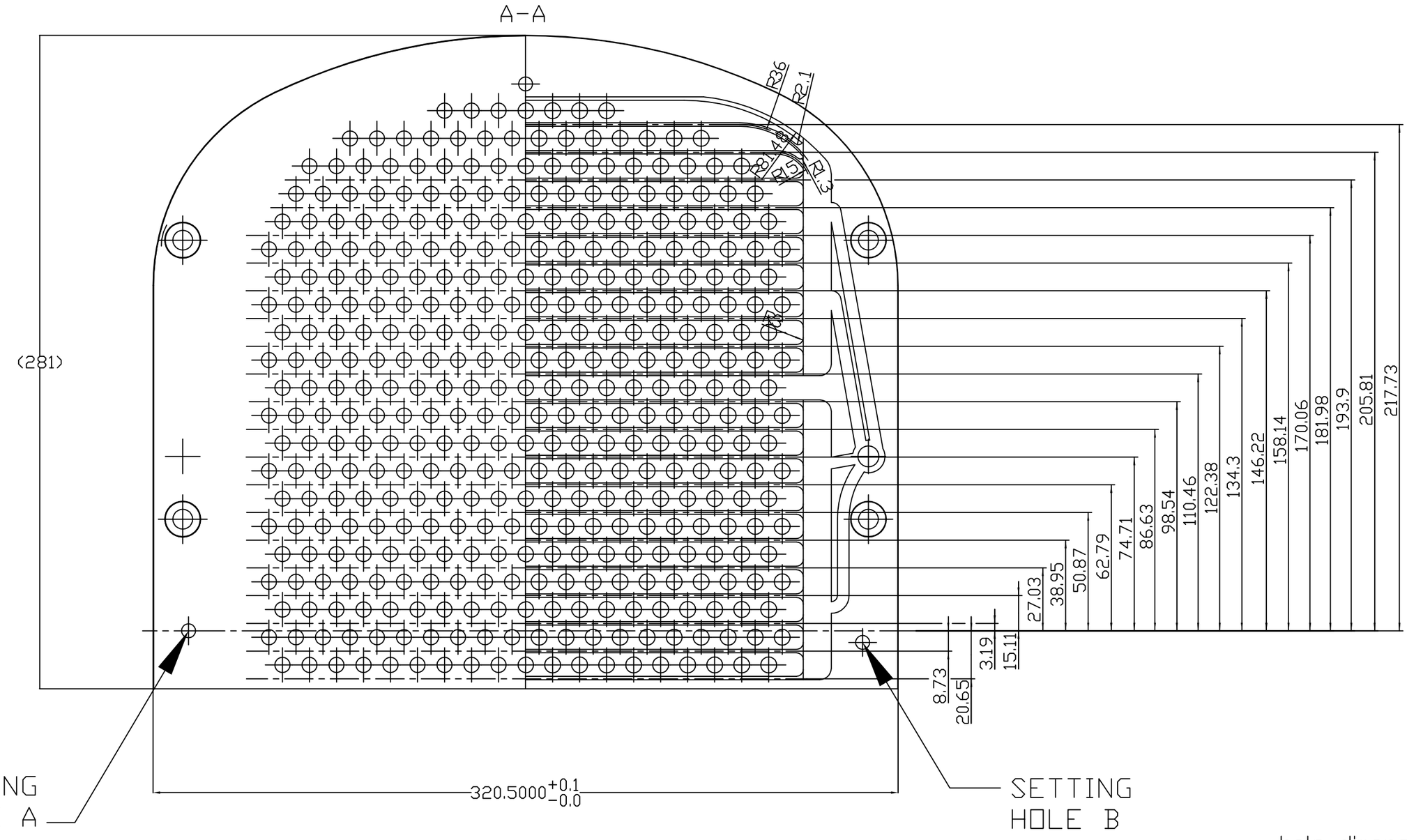
ALL DIMENSIONS ARE IN "mm" UNLESS OTHERWISE STATED

INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR–382 428.

SCALE		DATE	TITLE: *Baseplate for Deceleration grid left*
REFURBISHED BY	KIRIT	9/2020	
REVIEWED	BRD,MKG RKS		REF DRG NO: PH 000 610 1of2 REV – 00
APPROVED	M.JANA		DRG.NO 32030002 SHEET 03 OF 09

ACAD F.NAME:

A–A



help dimension = ( )

Max. roughness (Ra in µm) of N-Classes										
N 12	50	N 8	3,2	N 4	0,2					
N 11	20	N 7	1,6	N 3	0,1					
N 10	12,5	N 6	0,8	N 2	0,05					
N 9	6,3	N 5	0,4	N 1	0,0025					

general tolerance ISO 2768 - m								
	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
	0,2...0,5	>0,5...3	>3...6	>6...30	>30..120	>120...400	
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4	
angles	..10	>10...50	>50...120	>120...400	>400		
mm / 100 mm	±1,8	±0,9	±0,6	±0,3	±0,15		

metric ISO-threads
nut 6H, bolt 6g

REVISION COLUMN						
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

ASS'Y GROUP:

ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED

SCALE | DATE

REFURBISHED IN | KNT | 2020

REVIEWED BRD,MKG RKS KJANA

APPROVED

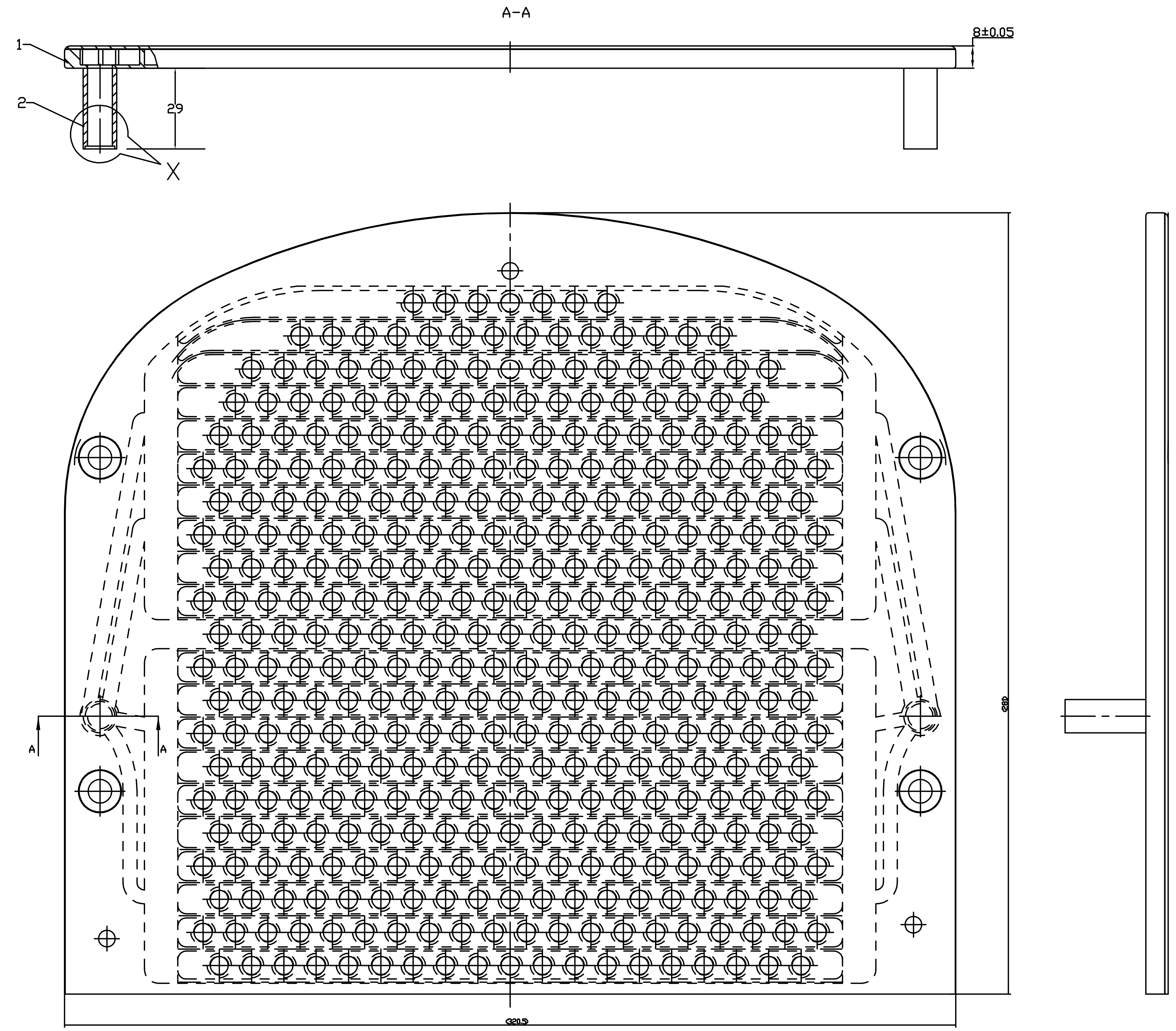
INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR–382 428.

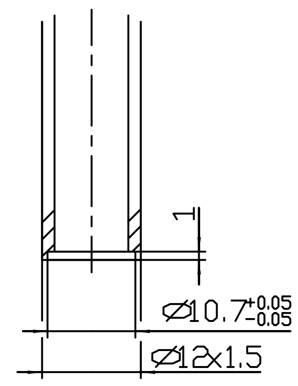
TITLE
Baseplate for Deceleration grid left

REF DRG NO: PH 000 610 2of2 | REV – 00

DRG.NO 32030002 | SHEET 04 OF 09

ACAD F.NAME:





DETAIL - X

legend

help dimension = ( )

02	02	Water stub pipe		02	SS304L
01	01	Base Plate for Deceleration grid right	Sheet 6 of 9	01	OFE COPPER
SR.NO.	PART NO.	DESCRIPTION	REF.DRG.NO.	QTY.	MATERIAL

Max. roughness (Ra in µm) of N-Classes

N 12	50	N 8	3,2	N 4	0,2		
N 11	20	N 7	1,6	N 3	0,1		
N 10	12,5	N 6	0,8	N 2	0,05		
N 9	6,3	N 5	0,4	N 1	0,0025		

general tolerance ISO 2768 - m

linear dimensions	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2

radii, chamfers	0,2...0,5	>0,5...3	>3...6	>6...30	>30..120	>120...400
	±0,1	±0,2	±0,5	±1	±2	±4

angles mm / 100 mm	..10	>10...50	>50...120	>120...400	>400
	±1,8	±0,9	±0,6	±0,3	±0,15

metric ISO-threads
nut 6H, bolt 6g

REVISION COLUMN

REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

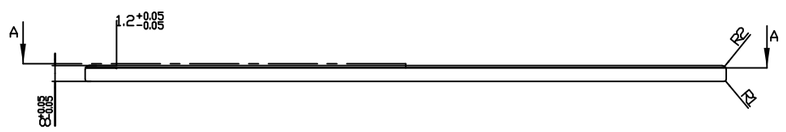
ASS'Y GROUP:		
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED		
SCALE		DATE
REFURBISHED BY	KIRIT	5/2020
REVIEWED	BRD,MKG RKS	
APPROVED	M.JANA	

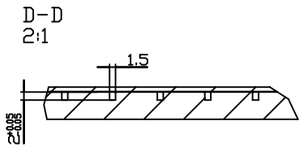
INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR-382 428.

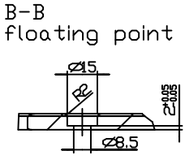
TITLE Deceleration grid right

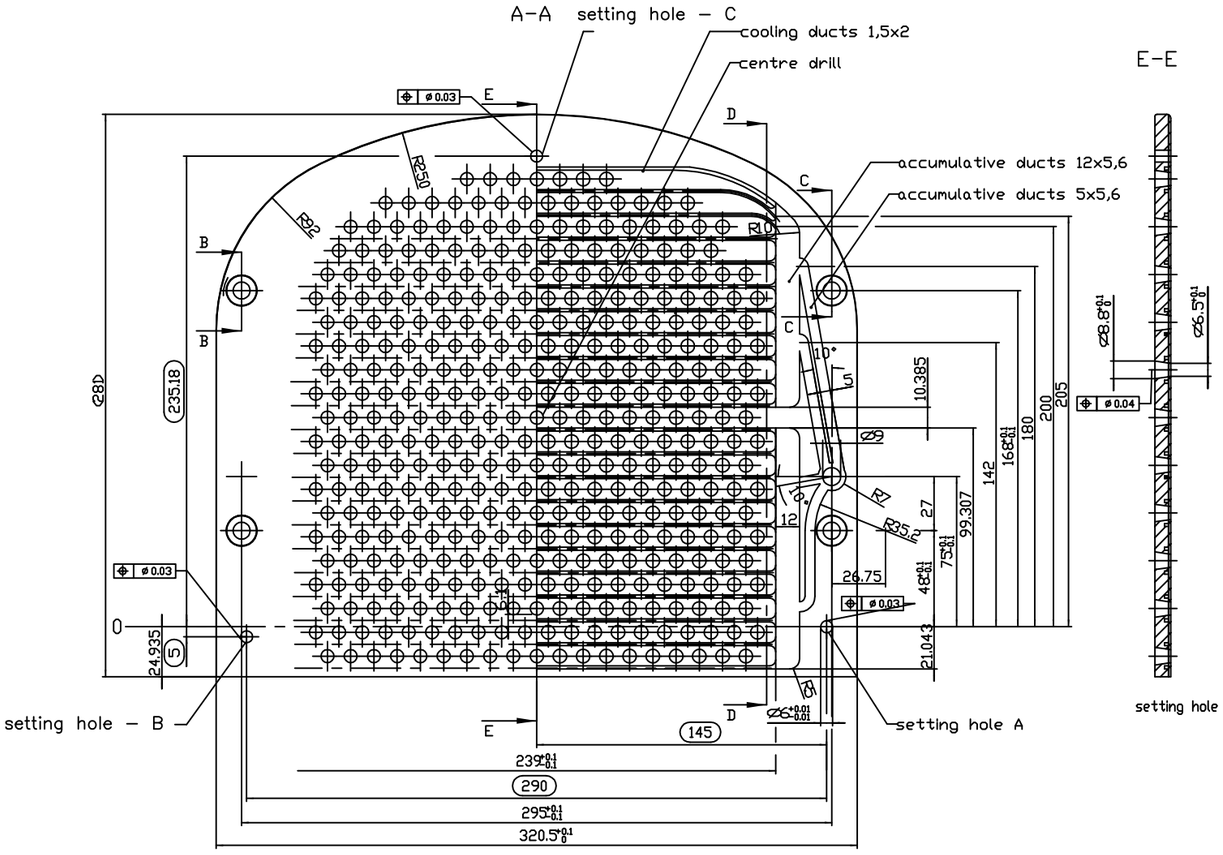
REF DRG NO: PH 000 613-X 1 OF 1 | REV - 00

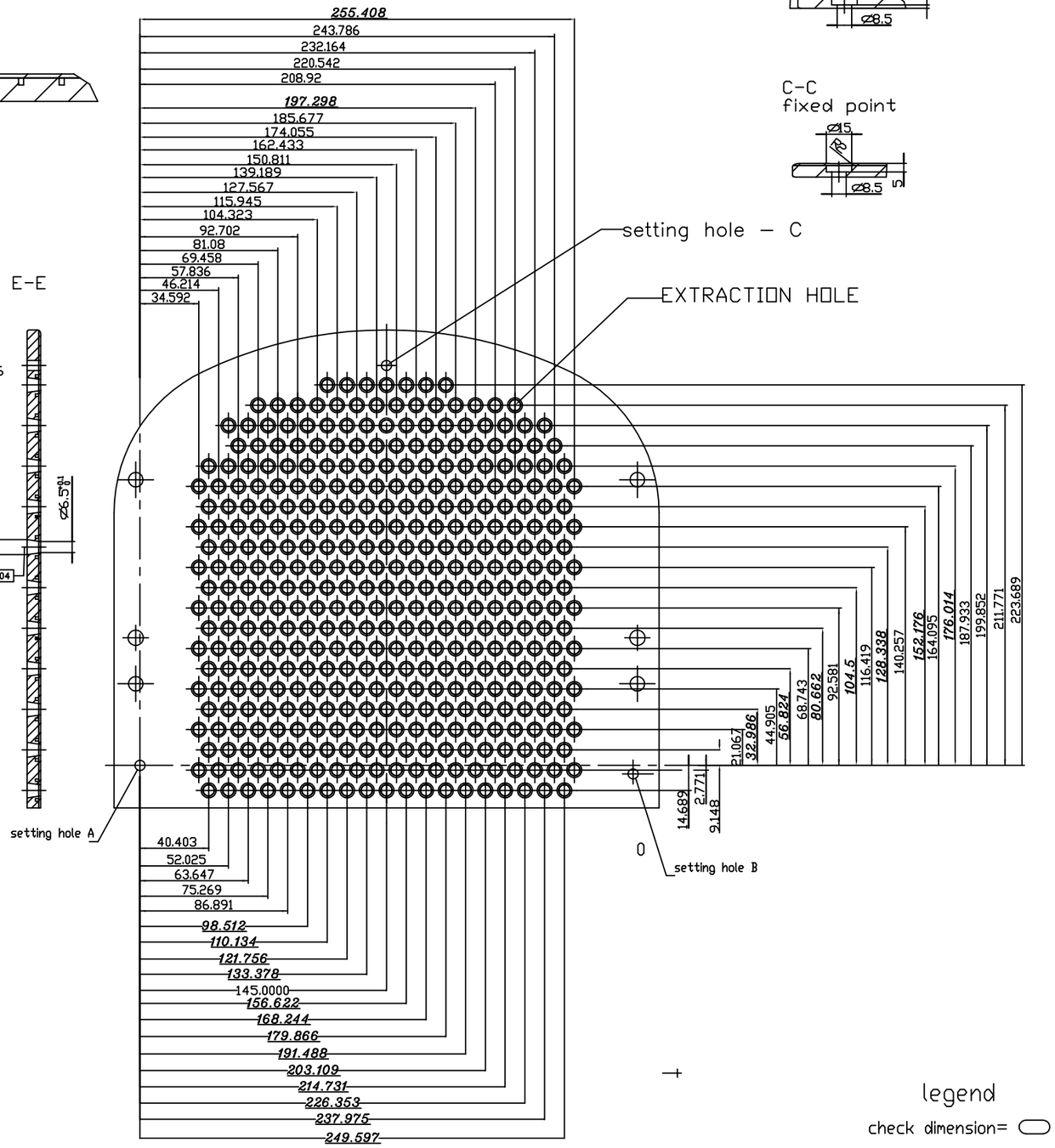
DRG.NO 32030002 | SHEET 05 OF 09











NOTES:
1. Do not scale the Drawing. Ask if any doubt.
2. Italic font with underlined Dimensions are manual modified.
3. Number of holes : 387 (Extraction holes)
4. Electro polishing to remove sharp edges.
5. surface finish
   Extraction surface : Rz=2.5 µm
   Miscellaneous surface = Rz=6.3 µm
6. Material – OFE Copper
7. Pressure Test (Acceptance Test)
   Internal pressure (inside manifold and cooling channels) 16 bar Nitrogen and Helium gas.
8. Leak Test (Acceptance Test)
   Integral Leak rate : 10^{-8} mbar–lit/sec (16 bar He gas)
9. This drg. needs to be refereed with sheet no. 07 of 09.

Max. roughness (Ra in µm) of N-Classes									
N 12	50	N 8	3,2	N 4	0,2				
N 11	20	N 7	1,6	N 3	0,1				
N 10	12,5	N 6	0,8	N 2	0,05				
N 9	6,3	N 5	0,4	N 1	0,0025				

general tolerance ISO 2768 - m								
	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
	0,2...0,5	>0,5...3	>3...6	>6...30	>30..120	>120...400	
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4	
angles	..10	>10...50	>50...120	>120...400	>400		
mm / 100 mm	±1,8	±0,9	±0,6	±0,3	±0,15		

metric ISO-threads nut 6H, bolt 6g

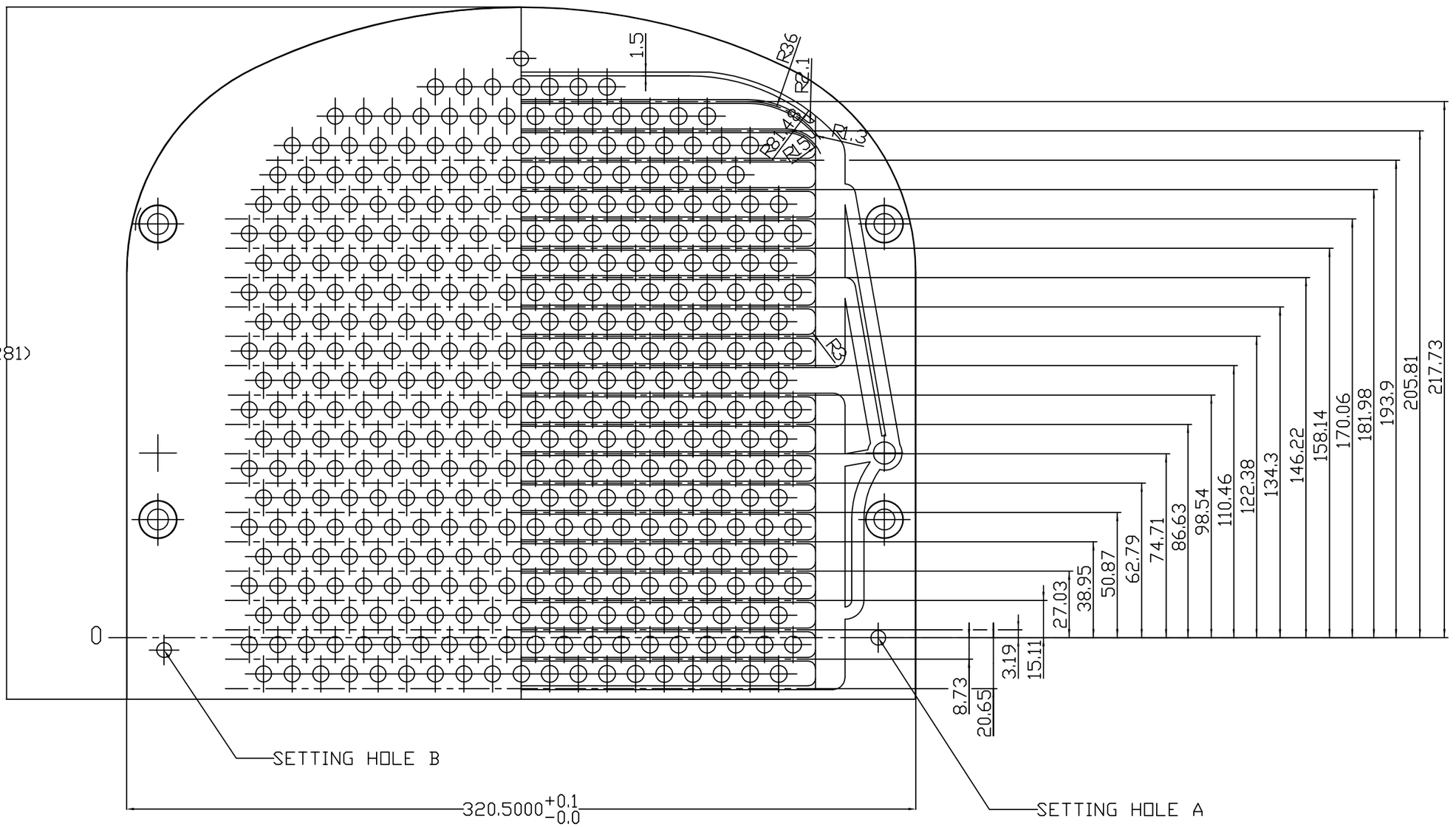
REVISION COLUMN					
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

legend
check dimension= ⬭
help dimension = ( )

ASS'Y GROUP:		INSTITUTE FOR PLASMA RESEARCH	
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED		BHAT, GANDHINAGAR–382 428.	
SCALE	DATE	TITLE: *Baseplate for Deceleration grid right*	
REFURBISHED BY: KIRIT	12/2020		
REVIEWED: BRD,MKG RKS		REF DRG NO: PH 000 611 1of2	REV – 00
APPROVED: N.JANA		DRG.NO: 32030002	SHEET 06 OF 09

ACAD F.NAME:

A–A



Max. roughness (Ra in µm) of N-Classes						
N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

general tolerance ISO 2768 - m								
	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
	0,2...0,5	>0,5...3	>3...6	>6...30	>30...120	>120...400	
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4	
angles	..10	>10...50	>50...120	>120...400	>400		
mm / 100 mm	±1,8	±0,9	±0,6	±0,3	±0,15		

metric ISO-threads
nut 6H, bolt 6g

REVISION COLUMN						
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

ASS'Y GROUP:

ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED

INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR–382 428.

SCALE | DATE

TITLE: Baseplate for Deceleration grid right

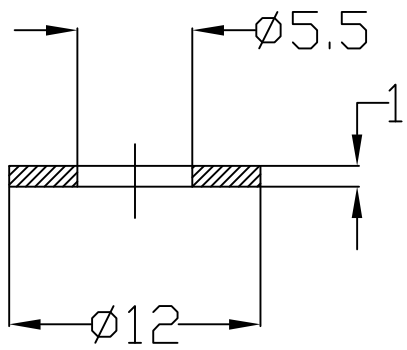
REFERENCED BY	KANT	15/10/09
REVIEWED	BRD,MKG RKS	
APPROVED	H.JANA	

REF DRG NO: PH 000 611 2of2 | REV – 00

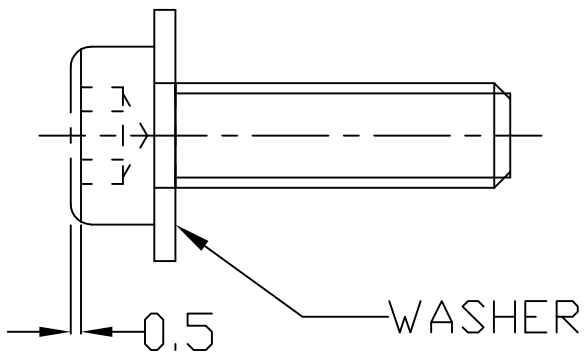
DRG.NO 32030002 | SHEET 07 OF 09

Max. roughness (Ra in µm) of N-Classes					
N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

General tolerances from DIN 6871 m							
Linear dimensions	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
Radii, chamfers	0,2...0,5	>0,5...3	>3...6	>6...30	>30...120	>120...400	Metric ISO-threads nut 6H, bolt 6g
	±0,1	±0,2	±0,5	±1	±2	±4	
mm / 100 mm	...10	>10...50	>50...120	>120...400	>400		
	±1,8	±0,9	±0,6				



WASHER



FIXED SCREW
WITH WASHER

QTY. - 04 NOS.
MATERIAL - SS304L

N8

S.NO	PART NO	DESCRIPTION	MATL	QTY	SIZE/SPECIFICATIONS	WEIGHT	REMARKS

REV	REMARKS

ASS'Y GROUP:

SIGNATURE: DATE

REVISED BY

REFURBISHED BY KIRIT

REVIEWED BRD,MKG RKS 22/10/2020

APPROVED BY M.JANA

INSTITUTE FOR PLASMA RESEARCH

BHAT, GANDHINAGAR-382 428.

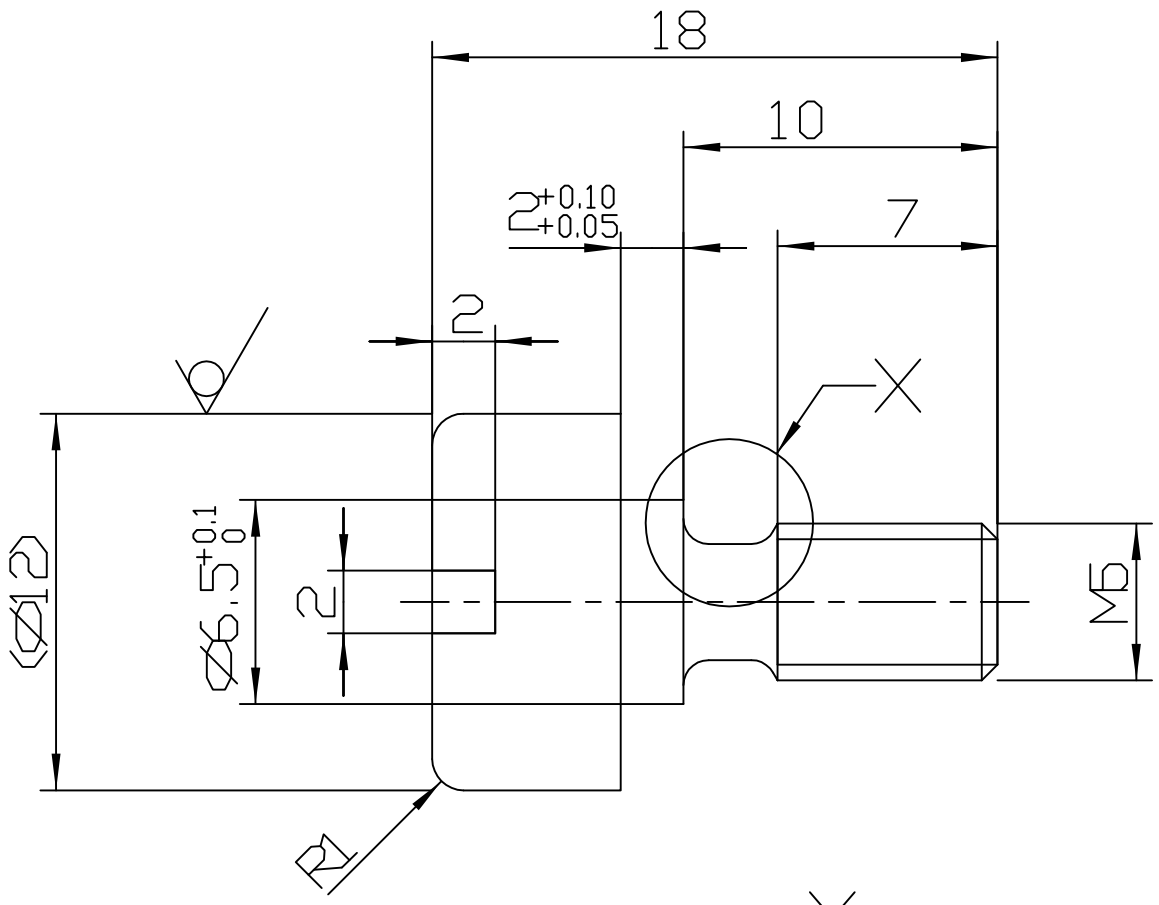
TITLE: Fixed point/Screw M5 x 25

REF DRG NO: PH 403 502 REV-0

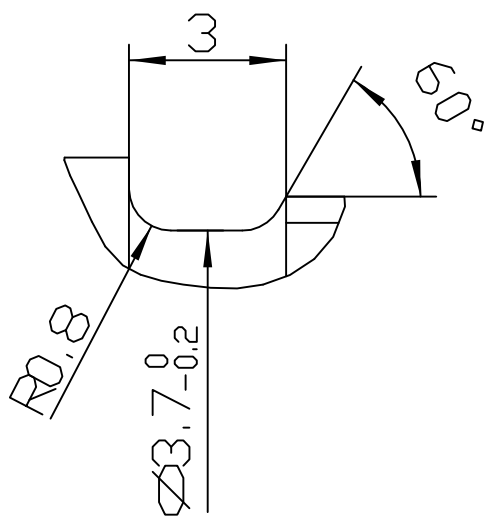
DRG.NO 32030002 SHEET 8 OF 9

Max. roughness (Ra in µm) of N-Classes					
N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

General tolerances from DIN 6871 m							
Linear dimensions	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
Radii, chamfers	0,2...0,5	>0,5...3	>3...6	>6...30	>30...120	>120...400	Metric ISO-threads nut 6H, bolt 6g
	±0,1	±0,2	±0,5	±1	±2	±4	
mm / 100 mm	...10	>10...50	>50...120	>120...400	>400		
	±1,8	±0,9	±0,6				



Detail X
5:1



legend

help dimension = ( )

N8 (▽)

QTY. - 04 NOS.

MATERIAL - SS304L

S.NO	PART NO	DESCRIPTION	MATL	QTY	SIZE/SPECIFICATIONS	WEIGHT	REMARKS

REV	REMARKS

ASS'Y GROUP:		
SIGNATURE:		DATE
REVISED BY		
REFURBISHED BY	KIRIT	
REVIEWED	BRD,MKG RKS	29/10/2020
APPROVED BY	M.JANA	

INSTITUTE FOR PLASMA RESEARCH

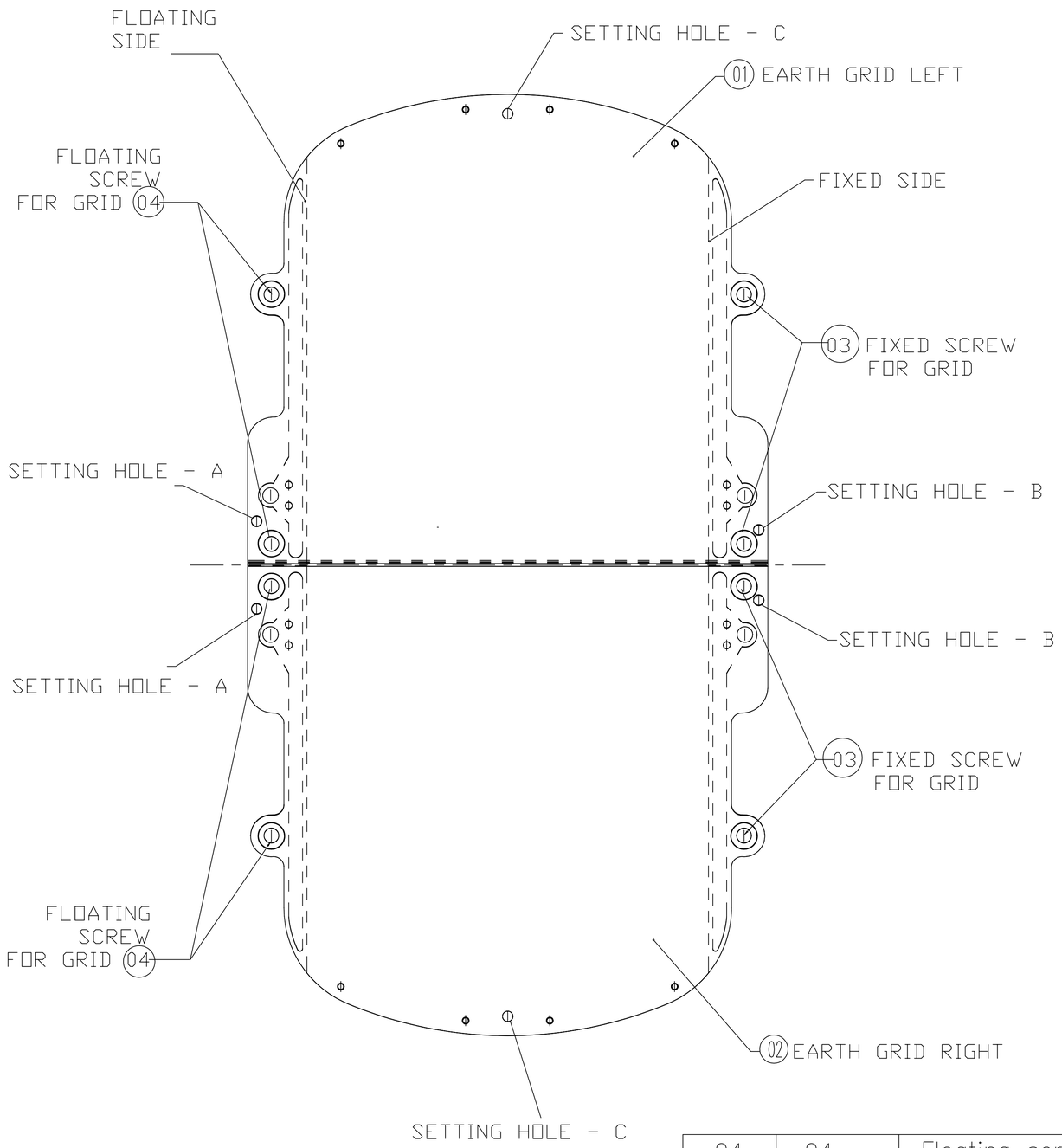
BHAT, GANDHINAGAR-382 428.

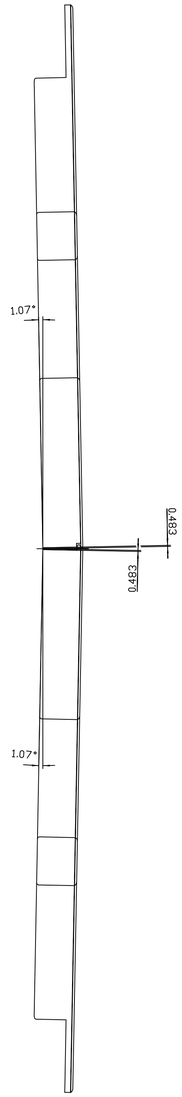
TITLE: Floating point/Screw M5 x 12

REF DRG NO: PH 403 500 — REV-0

DRG.NO: 32030002 — SHEET 9 OF 9

ACAD F.NAME:





NOTES:

1. Do not scale the Drawing. Ask if doubt.
2. Electro polishing to remove sharp edges.
3. Assembly of two grid hales shown here is not the scope of vendor. Here it is shown for the shake of understanding of assembly of two grid halves which will be done at IPR.
4. surface finish
   Extraction surface : Rz=2.5 μm
   Miscellaneous surface = Rz=6.3 μm
5. Surface flatness : 100 μm
6. Pressure Test (Acceptance Test)
   Internal pressure (inside manifold and cooling channels) 16 bar Nitrogen and Helium gas.
7. Leak Test (Acceptance Test)
   Integral Leak rate : 10^{-8} mbar–lit/sec (16 bar He gas)

SR.NO.	PART NO.	DESCRIPTION	REF.DRG.NO.	QTY.	REMARKS
04	04	Floating screw for grid (M5 X 23)	Sheet 8 OF 15	04	
03	03	Fixed screw for grid (M5 X 25)	Sheet 9 OF 15	04	
02	02	Earth grid right	Sheet 5 OF 15	01	
01	01	Earth grid left	Sheet 2 OF 15	01	

Max. roughness (Ra in μm) of N-Classes												
N 12	50	N 8	3,2	N 4	0,2							
N 11	20	N 7	1,6	N 3	0,1							
N 10	12,5	N 6	0,8	N 2	0,05							
N 9	6,3	N 5	0,4	N 1	0,0025							

general tolerance ISO 2768 - m								
	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000	
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2	
	0,2...0,5	>0,5...3	>3...6	>6...30	>30...120	>120...400		
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4		
angles	..10	>10...50	>50...120	>120...400	>400			metric ISO-threads nut 6H, bolt 6g
mm / 100 mm	±1,8	±0,9	±0,6	±0,3	±0,15			

REVISION COLUMN					
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

ASS'Y GROUP:
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED

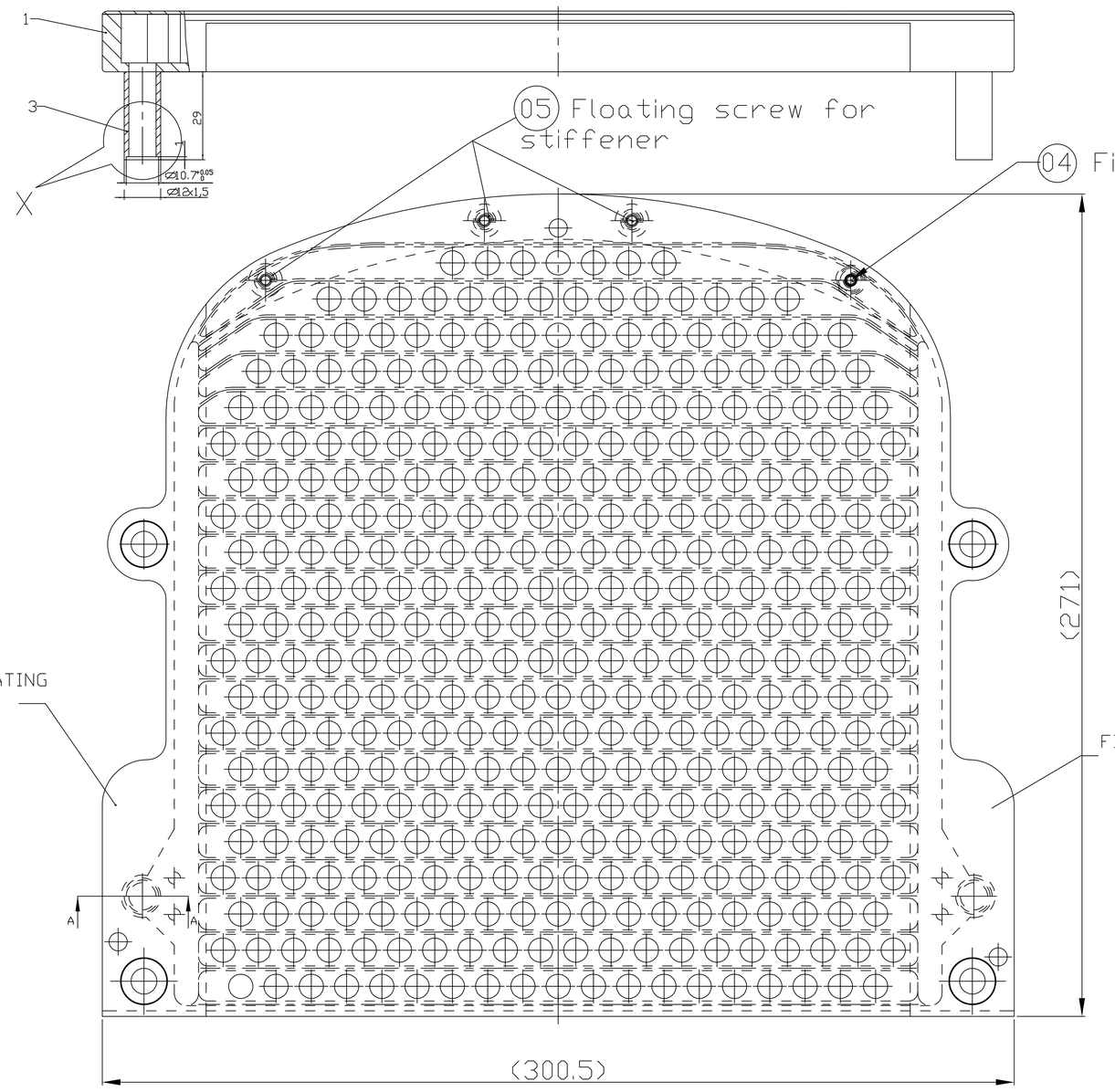
INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR–382 428.

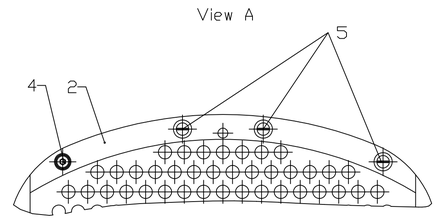
SCALE | DATE
REFURBISHED BY KIRIT 9/2020
REVIEWED BRD,MKG RKS
APPROVED M.JANA

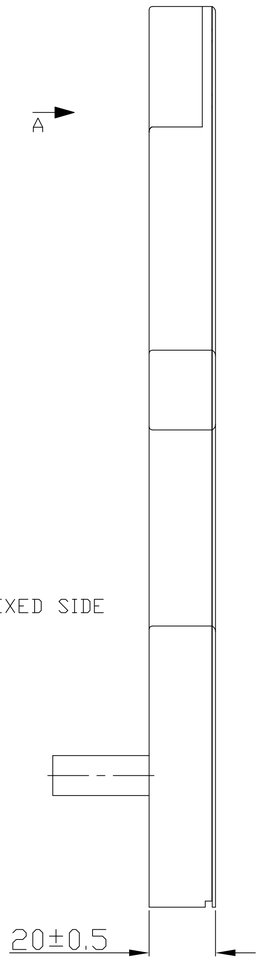
TITLE: EARTH GRID ASSEMBLY

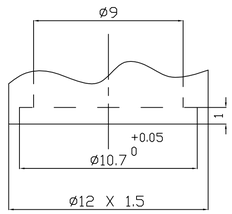
REF DRG NO: PH 000 616 -U | REV – 00
DRG.NO 32040002 | SHEET 01 OF 15

ACAD F.NAME:









DETAIL - X

NOTES:
1. Do not scale the Drawing. Ask if doubt.
2. Electro polishing to remove sharp edges.
3. surface finish
   Extraction surface : Rz=2.5 μm
   Miscellaneous surface = Rz=6.3 μm
4. Surface flatness : 100 μm
5. Pressure Test (Acceptance Test)
   Internal pressure (inside manifold and cooling channels) 16 bar Nitrogen and Helium gas.
6. Leak Test (Acceptance Test)
   Integral Leak rate : 10^{-8} mbar-lit/sec (16 bar He gas)

legend

help dimension = ( )

SR.NO.	PART NO.	DESCRIPTION	REF.DRG.NO.	QTY.	MATERIAL
05	05	Floating screw for stiffener- Earth Grid	Sheet 12	03	SS304L
04	04	Fixed screw for stiffener - Earth Grid	Sheet 13	01	SS304L
03	03	Water stub pipe		02	SS304L
02	02	Stiffener, Fixed and Floating Screw for Earth Grid Left	Sheet 10	01	OFE COPPER
01	01	Base Plate for Earth grid left	Sheet 3	01	OFE COPPER

Max. roughness (Ra in μm) of N-Classes									
N 12	50	N 8	3,2	N 4	0,2				
N 11	20	N 7	1,6	N 3	0,1				
N 10	12,5	N 6	0,8	N 2	0,05				
N 9	6,3	N 5	0,4	N 1	0,0025				

general tolerance ISO 2768 - m							
	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
	0,2...0,5	>0,5...3	>3...6	>6...30	>30..120	>120...400	
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4	
angles	..10	>10...50	>50...120	>120...400	>400		
mm / 100 mm	±1,8	±0,9	±0,6	±0,3	±0,15		

metric ISO-threads nut 6H, bolt 6g

REVISION COLUMN						
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

ASS'Y GROUP:

ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED

INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR-382 428.

SCALE | DATE

REFURBISHED BY KIRIT 8/2020

REVIEWED BRD,MKG RKS

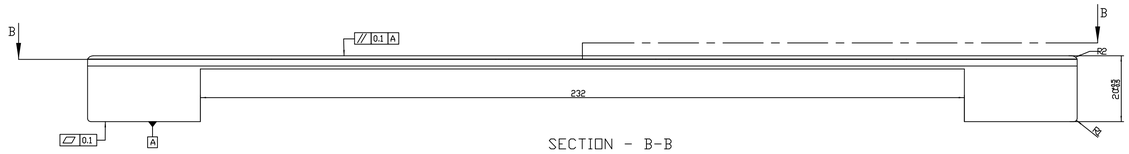
APPROVED M.JANA

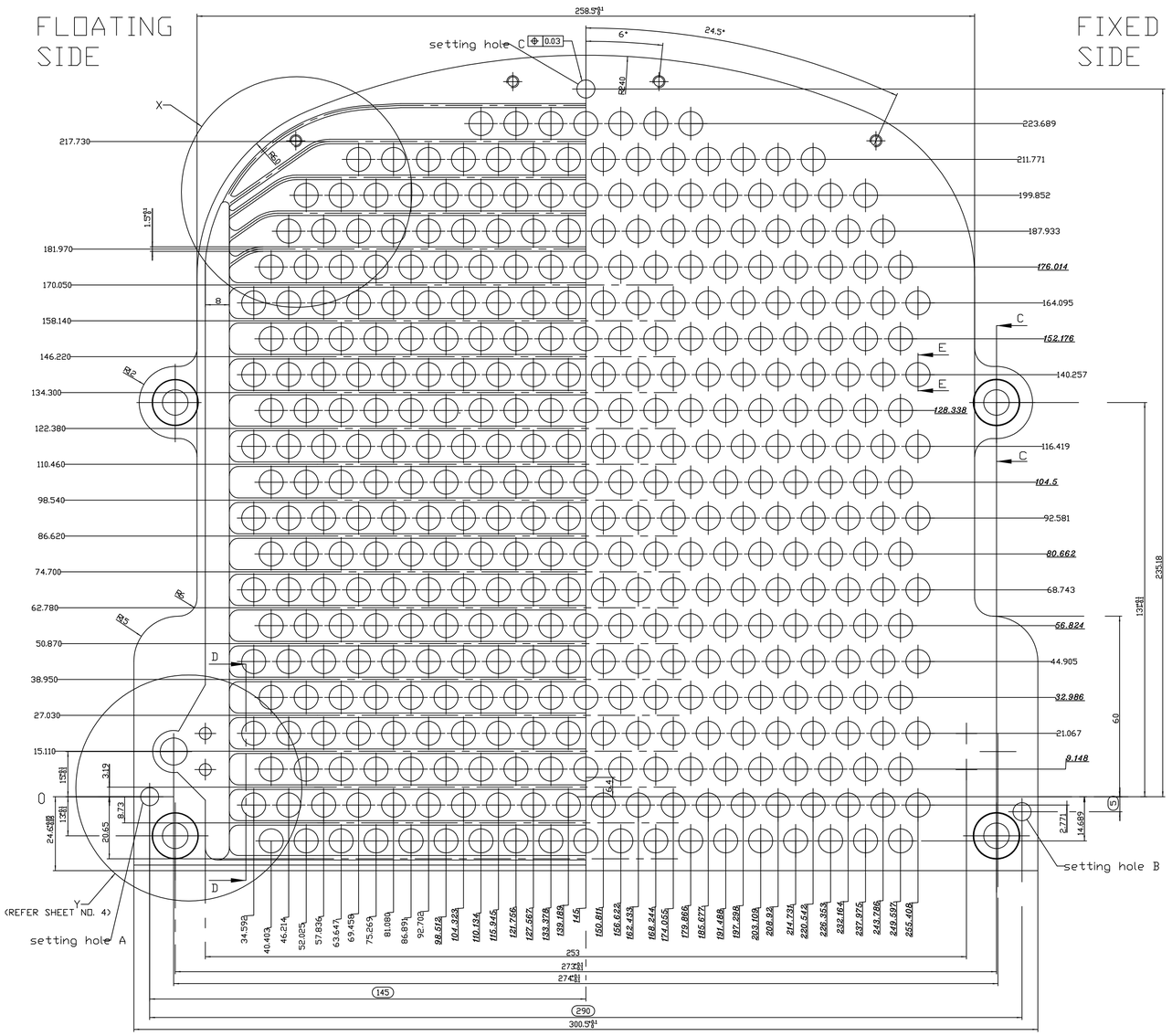
TITLE: Earth grid left

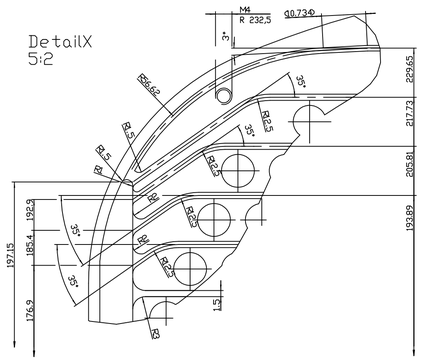
REF DRG NO: PH 000 602-X 1 OF 1 | REV - 00

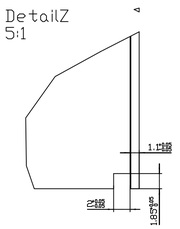
DRG.NO 32040002 | SHEET 02 OF 15

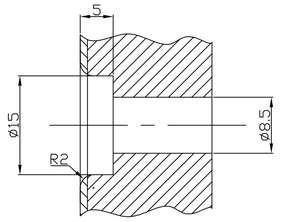
ACAD F.NAME:



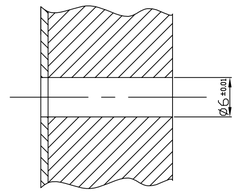




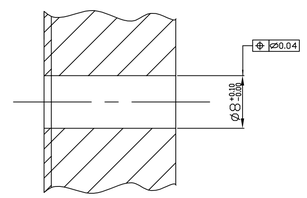




SECTION C-C
HOLE FOR FIXED SCREW (Two locations)



SETTING HOLE A, B AND C



SECTION E-E

NOTES:
1. Do not scale the Drawing. Ask if doubt.
2. Electro polishing to remove sharp edges.
3. surface finish
   Extraction surface : Rz=2.5 μm
   Miscellaneous surface = Rz=6.3 μm
4. Surface flatness : 100 μm
5. Pressure Test (Acceptance Test)
   Internal pressure (inside manifold and cooling channels) 16 bar
   Nitrogen and Helium gas.
6. Leak Test (Acceptance Test)
   Integral Leak rate : 10^{-8} mbar-lit/sec (16 bar He gas)

REFER SHEET NO. 4 FOR SECTION D-D AND DETAIL-Y

Max. roughness (Ra in μm) of N-Classes								
N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

general tolerance ISO 2768 - m								
	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
	0,2...0,5	>0,5...3	>3...6	>6...30	>30...120	>120...400	
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4	
angles	..10	>10...50	>50...120	>120...400	>400		
mm / 100 mm	±1,8	±0,9	±0,6	±0,3	±0,15		

metric ISO-threads nut 6H, bolt 6g

REVISION COLUMN					
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

ASS'Y GROUP:
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED

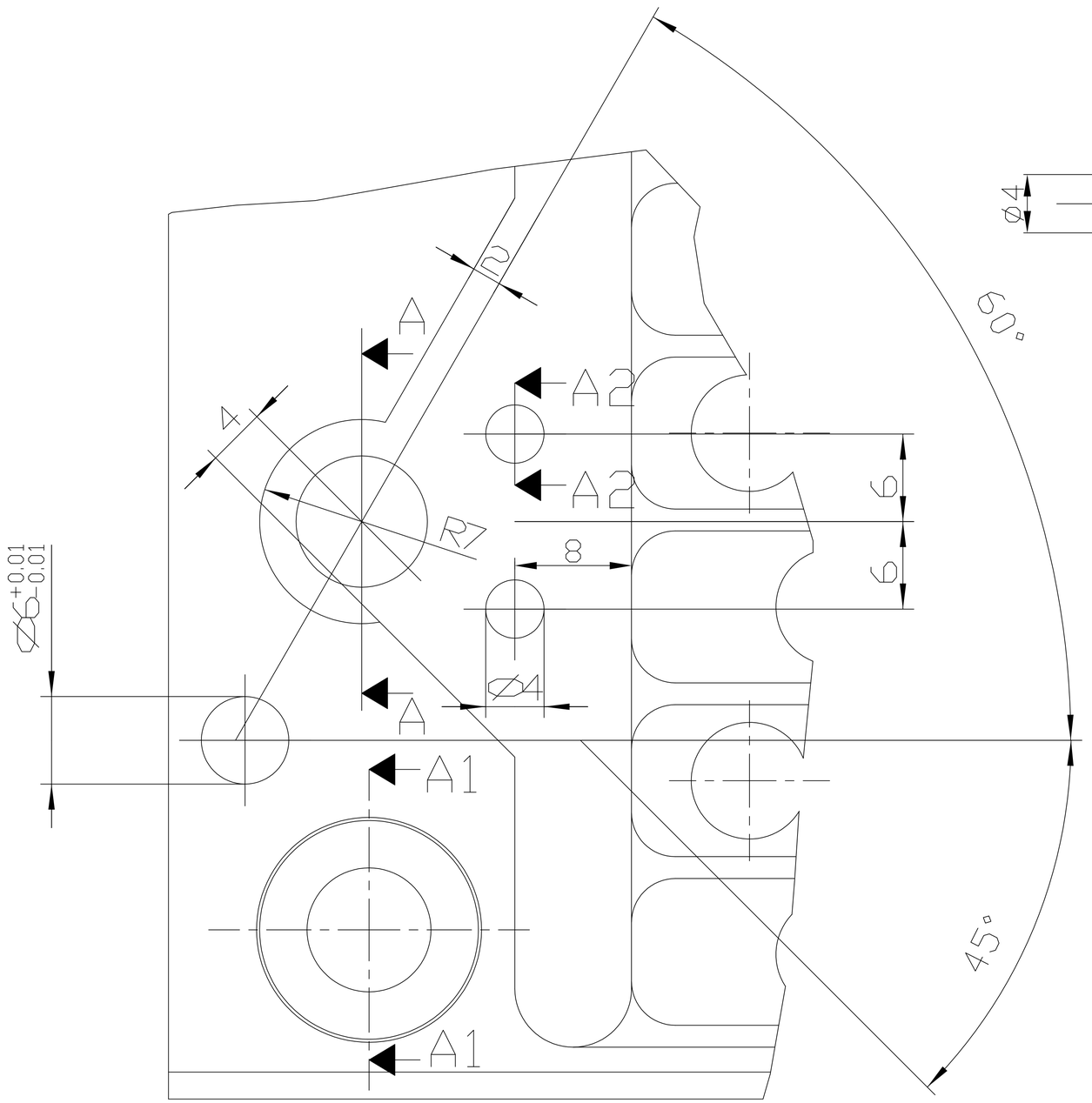
INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR-382 428.

SCALE | DATE
REFURBISHED BY KIRIT 8/2020
REVIEWED BRD,MKG RKS
APPROVED M.JANA

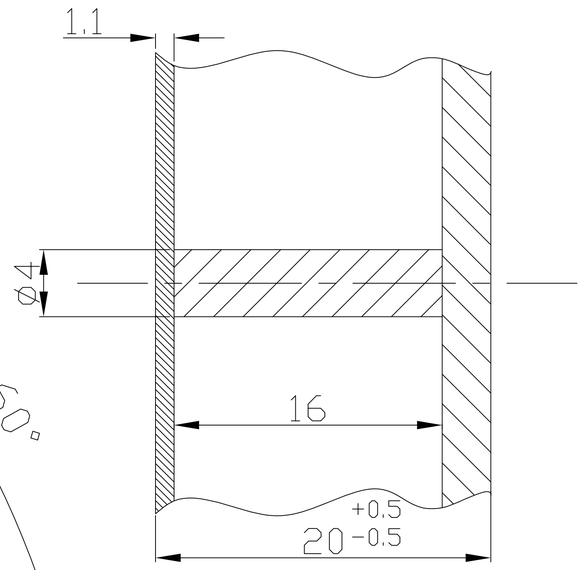
TITLE: Base plate for Earth grid left

REF DRG NO: PH 000 605 1 OF 2 | REV - 00
DRG.NO 32040002 | SHEET 03 OF 15

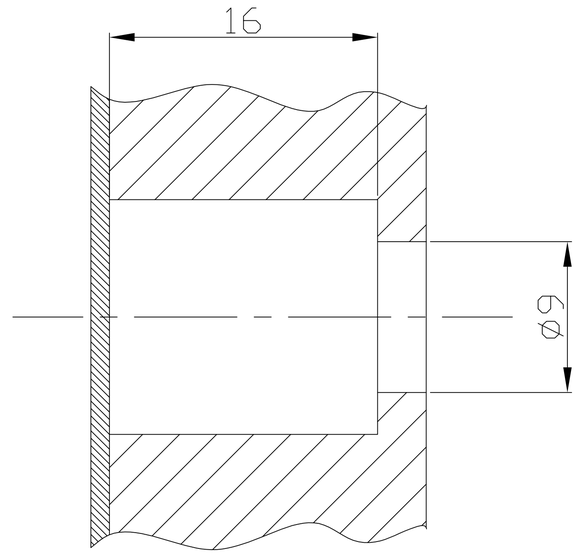
ACAD F.NAME:



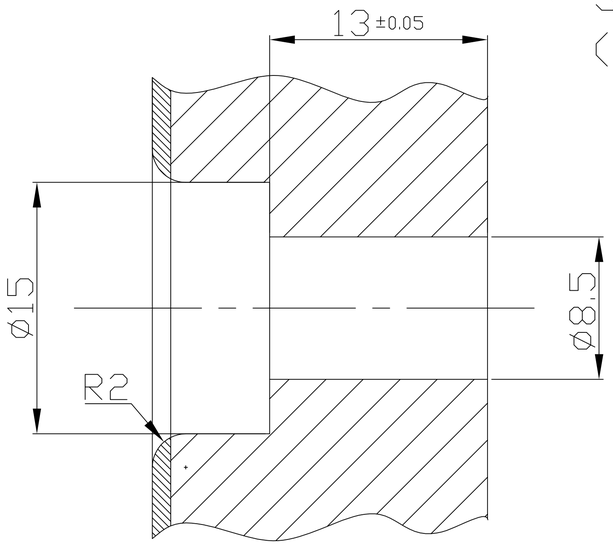
DETAIL - Y



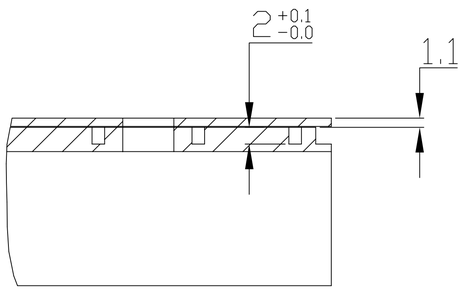
SECTION A2-A2
(Four locations)



SECTION A-A
STUB LOCATION
(Two locations)



SECTION A1-A1
HOLE FOR
FLOATING SCREW
(Two locations)



SECTION D-D

Ø6 +0.01 -0.01

Max. roughness (Ra in µm) of N-Classes						
N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

general tolerance ISO 2768 - m								
	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
	0,2...0,5	>0,5...3	>3...6	>6...30	>30..120	>120...400	
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4	
angles	..10	>10...50	>50...120	>120...400	>400		
mm / 100 mm	±1,8	±0,9	±0,6	±0,3	±0,15		

metric ISO-threads
nut 6H, bolt 6g

REVISION COLUMN						
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

ASS'Y GROUP:

ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED

SCALE | DATE

REFURBISHED BY KIRIT 9/2020

REVIEWED BRD,MKG RKS

APPROVED M.JANA

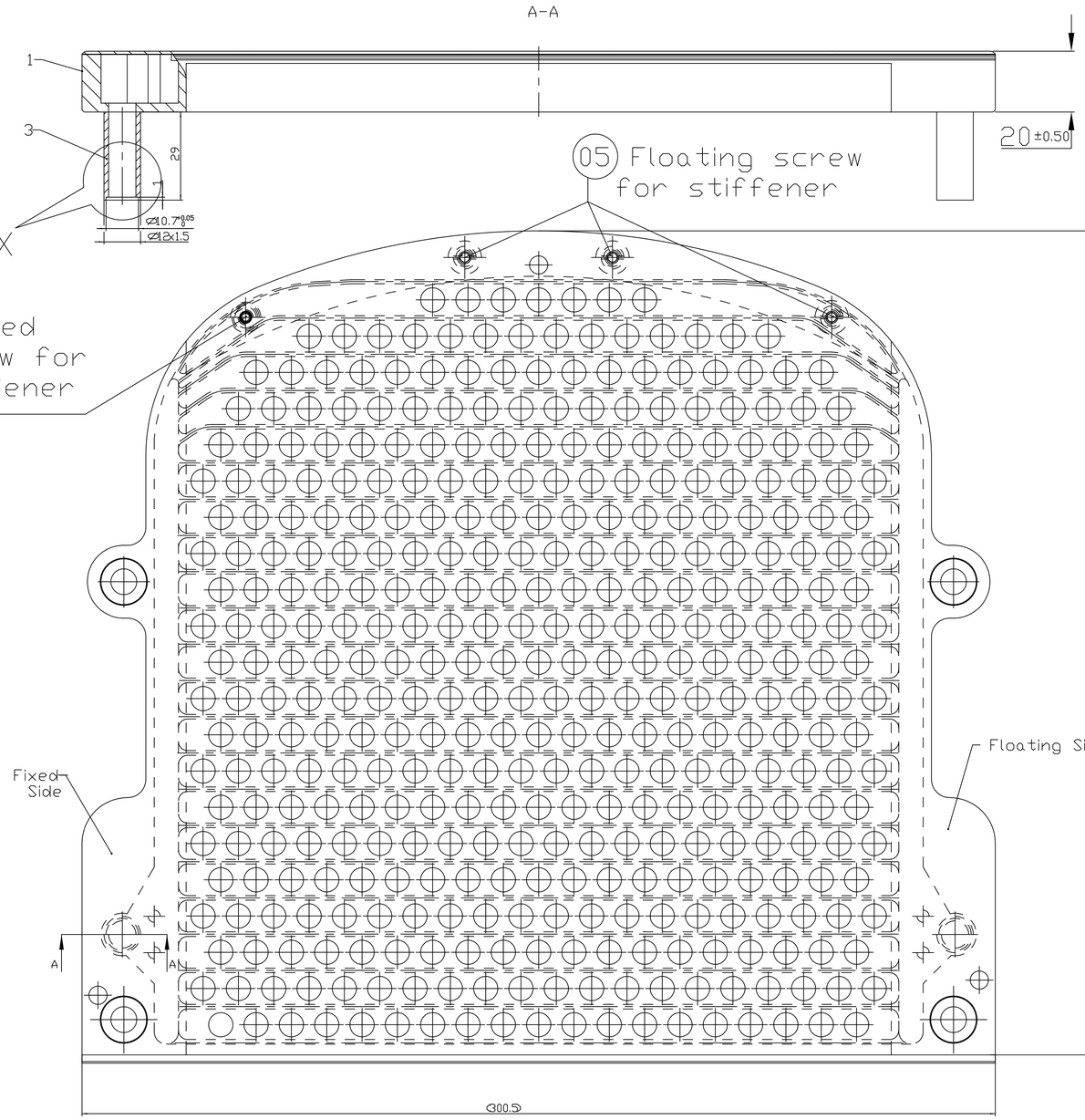
INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR-382 428.

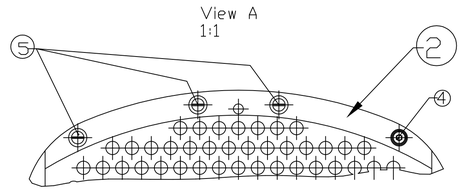
TITLE: Base plate for Earth grid left

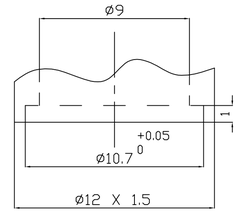
REF DRG NO: PH 000 605 2 OF 2 | REV - 00

DRG.NO 32040002 | SHEET 04 OF 15

ACAD F.NAME:







DETAIL - X

NOTES:
1. Do not scale the Drawing. Ask if doubt.
2. Electro polishing to remove sharp edges.
3. surface finish
   Extraction surface : Rz=2.5 μm
   Miscellaneous surface = Rz=6.3 μm
4. Surface flatness : 100 μm
5. Pressure Test (Acceptance Test)
   Internal pressure (inside manifold and cooling channels) 16 bar
   Nitrogen and Helium gas.
6. Leak Test (Acceptance Test)
   Integral Leak rate : 10^{-8} mbar-lit/sec (16 bar He gas)

legend

help dimension = ( )

SR.NO.	PART NO.	DESCRIPTION	REF.DRG.NO.	QTY.	MATERIAL
05	05	Floating screw for stiffener -Earth Grid	Sheet 12	03	SS304L
04	04	Fixed screw for stiffener - Earth Grid	Sheet 13	01	SS304L
03	03	Water stub pipe		02	SS304L
02	02	Stiffener, Fixed and Floating Screw for Earth Grid Right	Sheet 14	01	OFE COPPER
01	01	Base Plate for Earth grid right	Sheet 6	01	OFE COPPER

Max. roughness (Ra in μm) of N-Classes

N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

general tolerance ISO 2768 - m

linear dimensions	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000	
	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2	
radii, chamfers	0,2...0,5	>0,5...3	>3...6	>6...30	>30..120	>120...400		
	±0,1	±0,2	±0,5	±1	±2	±4		
angles	..10	>10...50	>50...120	>120...400	>400			metric ISO-threads nut 6H, bolt 6g
mm / 100 mm	±1,8	±0,9	±0,6	±0,3	±0,15			

REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

ASS'Y GROUP:
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED

INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR-382 428.

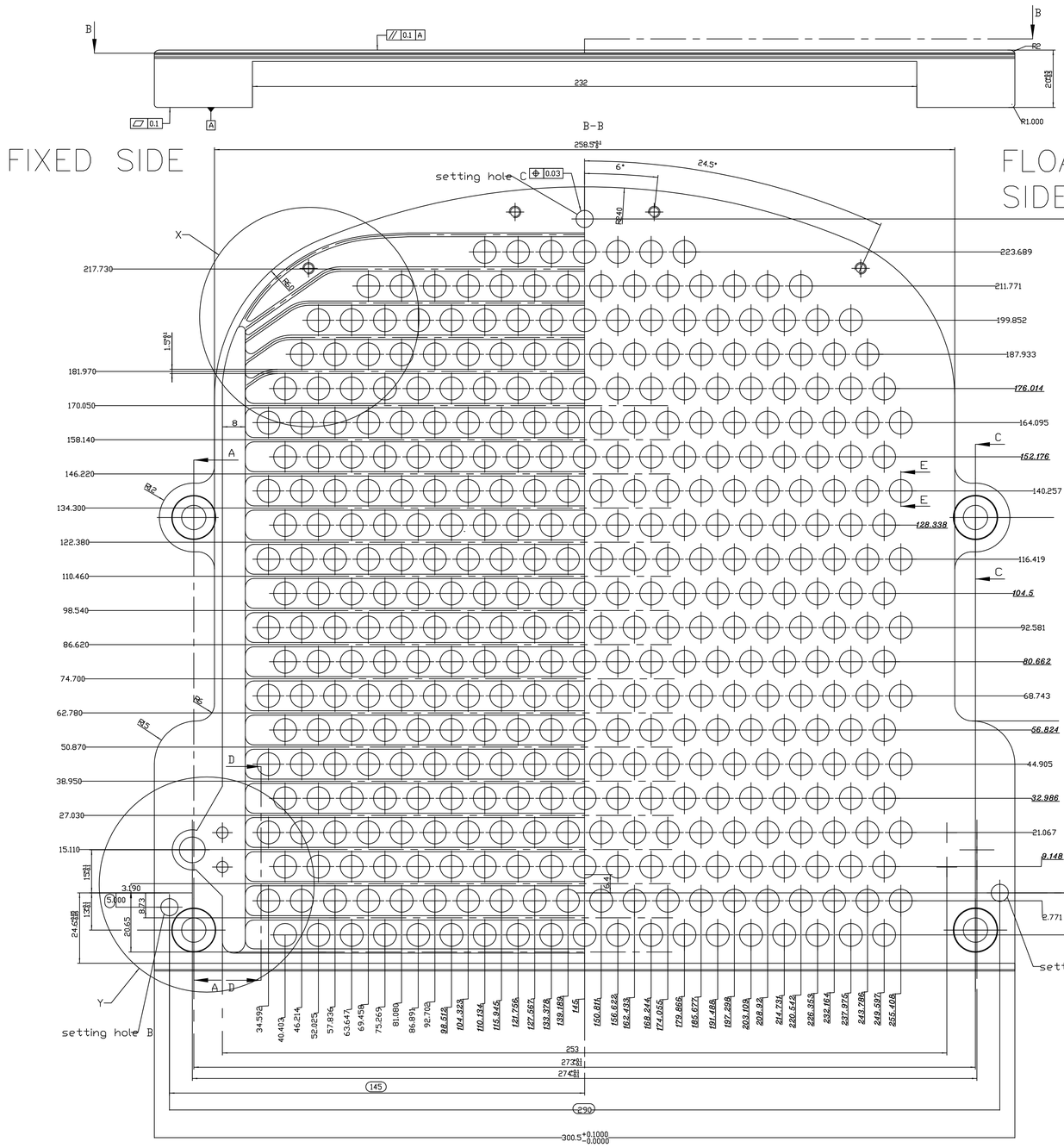
SCALE | DATE

TITLE: Earth grid right

REFURBISHED BY KIRIT 6/2020
REVIEWED BRD,MKG RKS M.JANA
APPROVED

REF DRG NO: PH 000 603-X 1 OF 1 | REV - 00

DRG.NO 32040002 | SHEET 05 OF 15



REFER SHEET NO. 7 FOR SECTION D-D AND DETAIL-Y

legend

check dimension= ⬭

help dimension = ( )

rough dimension= [ ]

NOTES:

1. Do not scale the Drawing. Ask if doubt.
2. Electro polishing to remove sharp edges.
3. surface finish
   Extraction surface : Rz=2.5 μm
   Miscellaneous surface = Rz=6.3 μm
4. Surface flatness : 100 μm
5. Pressure Test (Acceptance Test)
   Internal pressure (inside manifold and cooling channels) 16 bar Nitrogen and Helium gas.
6. Leak Test (Acceptance Test)
   Integral Leak rate : 10^{-8} mbar–lit/sec (16 bar He gas)

Max. roughness (Ra in μm) of N-Classes							
N 12	50	N 8	3,2	N 4	0,2		
N 11	20	N 7	1,6	N 3	0,1		
N 10	12,5	N 6	0,8	N 2	0,05		
N 9	6,3	N 5	0,4	N 1	0,0025		

general tolerance ISO 2768 - m							
	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
	0,2...0,5	>0,5...3	>3...6	>6...30	>30..120	>120...400	
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4	
angles	..10	>10...50	>50...120	>120...400	>400		
mm / 100 mm	±1,8	±0,9	±0,6	±0,3	±0,15		

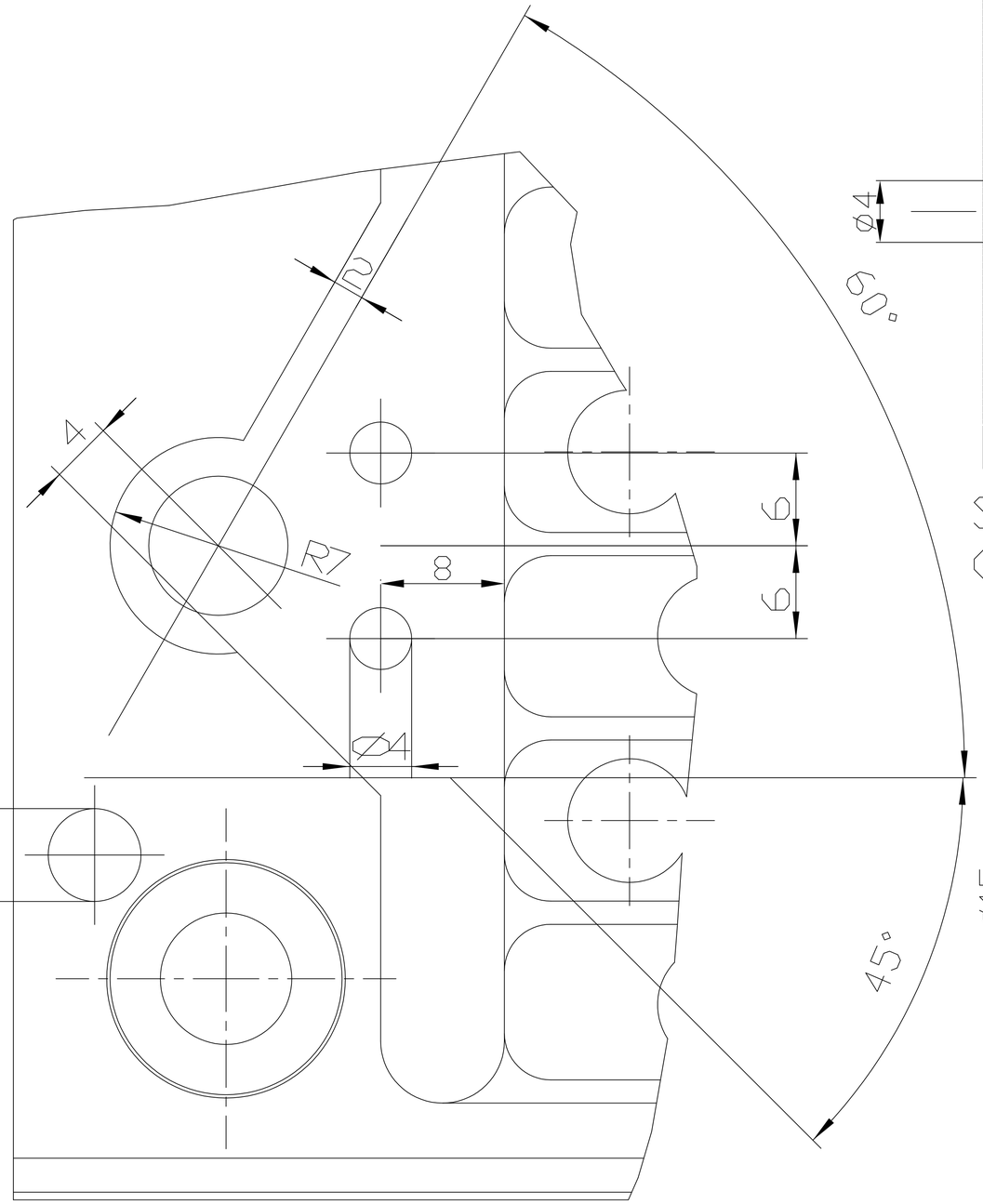
metric ISO-threads nut 6H, bolt 6g

REVISION COLUMN					
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

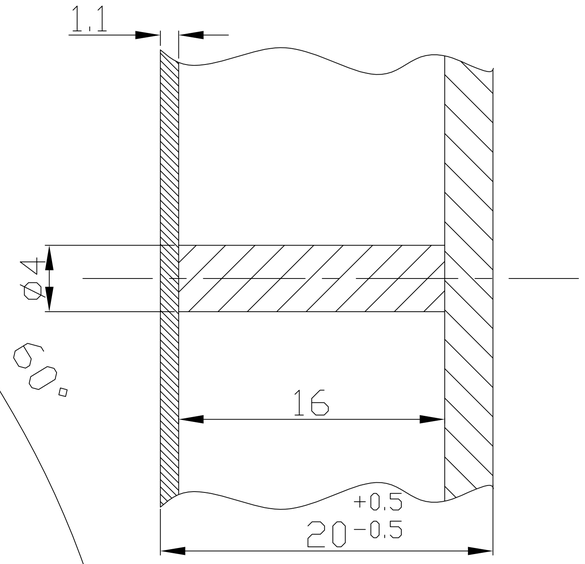
ASS'Y GROUP:		INSTITUTE FOR PLASMA RESEARCH	
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED		BHAT, GANDHINAGAR–382 428.	
SCALE	DATE	TITLE: Base plate for Earth grid right	
REFURBISHED BY	KIRIT 8/2020		
REVIEWED	BRD,MKG RKS	REF DRG NO: PH 000 606 1 OF2	REV – 00
APPROVED	M.JANA	DRG.NO 32040002	SHEET 06 OF 15

ACAD F.NAME:

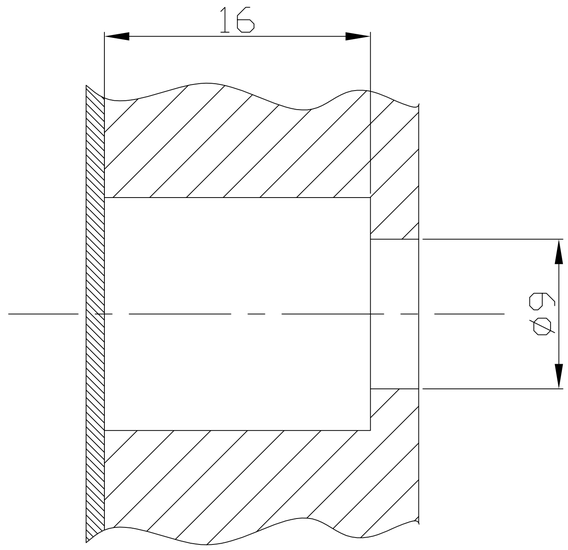
ACAD F.NAME:



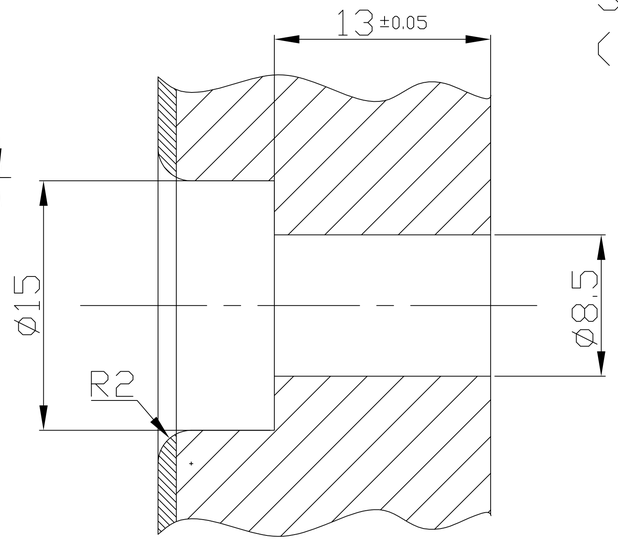
DETAIL - Y



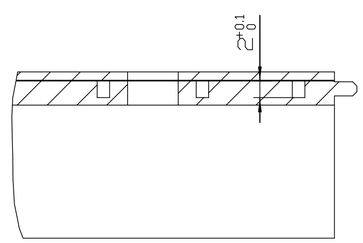
SECTION A2-A2
(Four locations)



SECTION A-A
STUB LOCATION
(Two locations)



SECTION A1-A1
HOLE FOR
FLOATING SCREW
(Two locations)



Max. roughness (Ra in µm) of N-Classes							
N 12	50	N 8	3,2	N 4	0,2		
N 11	20	N 7	1,6	N 3	0,1		
N 10	12,5	N 6	0,8	N 2	0,05		
N 9	6,3	N 5	0,4	N 1	0,0025		

general tolerance ISO 2768 - m							
	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
	0,2...0,5	>0,5...3	>3...6	>6...30	>30...120	>120...400	
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4	
angles	..10	>10...50	>50...120	>120...400	>400		
mm / 100 mm	±1,8	±0,9	±0,6	±0,3	±0,15		

metric ISO-threads
nut 6H, bolt 6g

REVISION COLUMN					
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

ASS'Y GROUP:		INSTITUTE FOR PLASMA RESEARCH	
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED		BHAT, GANDHINAGAR-382 428.	
SCALE	DATE	TITLE: Base plate for Earth grid right	
REFURBISHED BY	KIRIT 17/2020		
REVIEWED	BRD,MKG RKS	REF DRG NO: PH 000 606 2 OF 2	REV - 00
APPROVED	M.JANA	DRG.NO 32040002	SHEET 07 OF 15

Max. Rauheit (Ra in µm) der N-Klassen Max. roughness (Ra in µm) of N-Classes					
N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

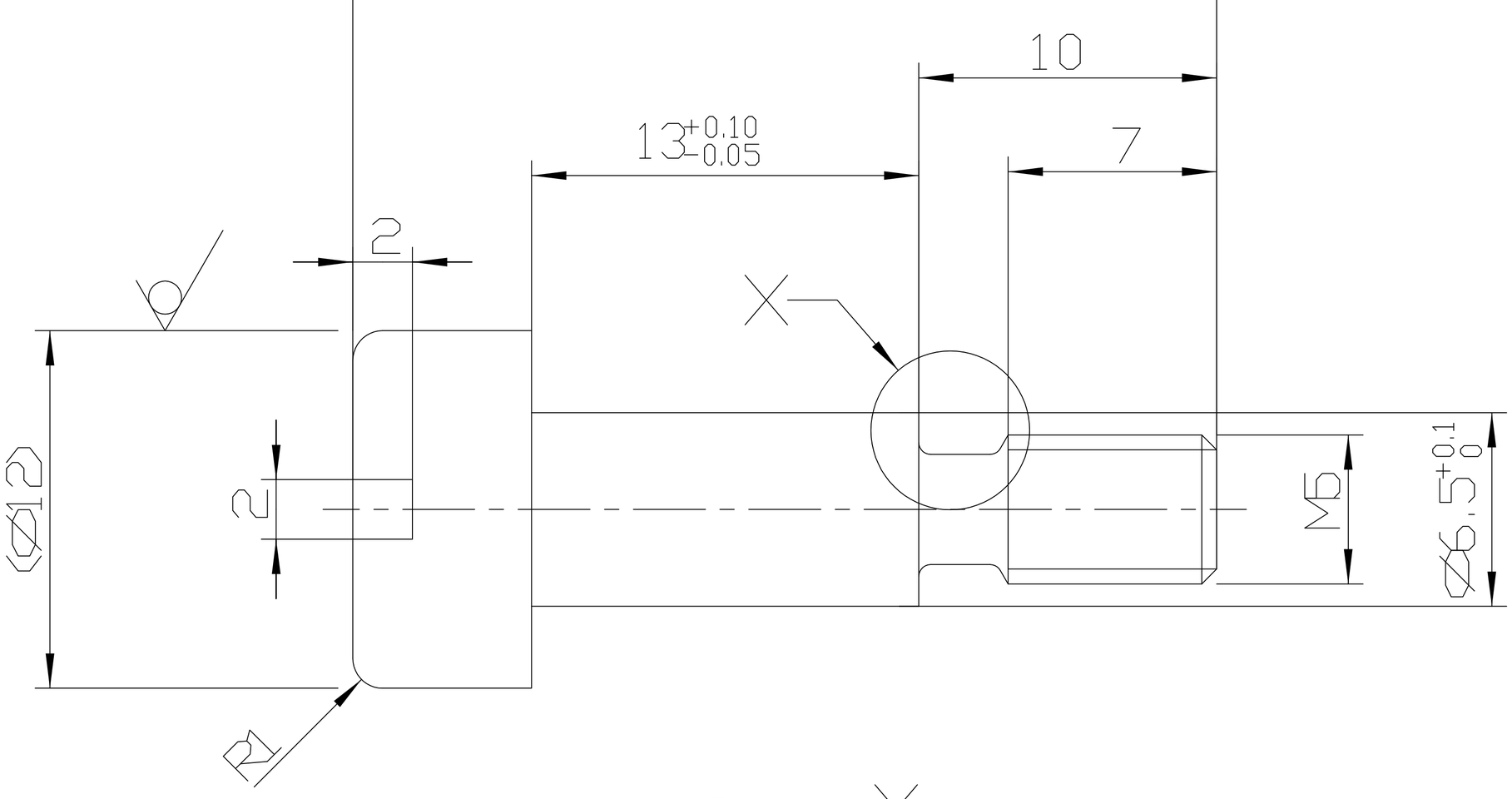
Allgemeintoleranzen nach DIN 7168 mittel / General tolerances from DIN 6871 m							
Längenmaße Linear dimensions	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2

Radien, Fasen Radii, chamfers	0,2...0,5	>0,5...3	>3...6	>6...30	>30...120	>120...400
	±0,1	±0,2	±0,5	±1	±2	±4

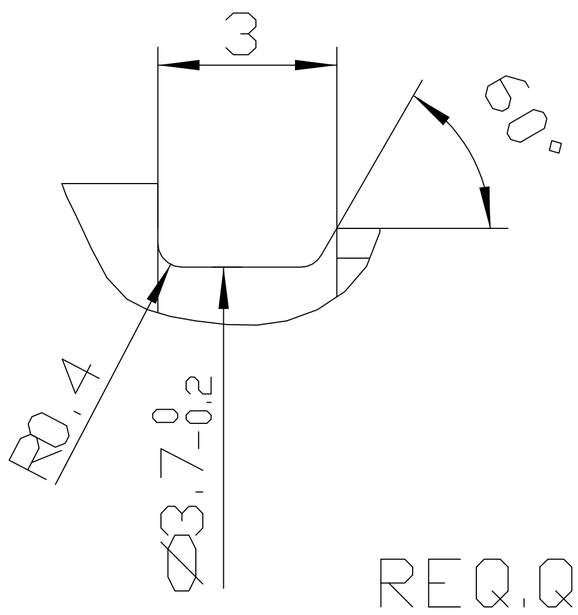
Winkel, Angles	...10	>10...50	>50...120	>120...400	>400
mm / 100 mm	±1,8	±0,9	±0,6		

Metrisches ISO-Gewinde
Mutter 6H, Bolzen 6g

Metric ISO-threads
nut 6H, bolt 6g



Detail X
5:1



REQ.QTY. - 04 NOS.
MATERIAL - SS304L

S.NO	PART NO	DESCRIPTION	MATL	QTY	SIZE/SPECIFICATIONS	WEIGHT	REMARKS

REV	REMARKS

ASS'Y GROUP:		
SIGNATURE:		DATE
REVISED BY		
REFURBISHED BY	KIRIT	
REVIEWED	BRD,MKG RKS	29/10/2020
APPROVED BY	M.JANA	

INSTITUTE FOR PLASMA RESEARCH

BHAT, GANDHINAGAR-382 428.

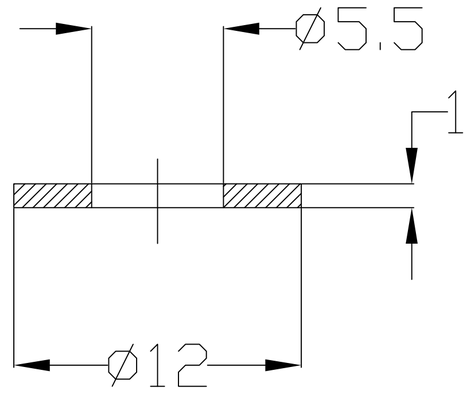
TITLE
Floating screw for grid
(M5 X23)

REF DRG NO: PH 403 501 — REV

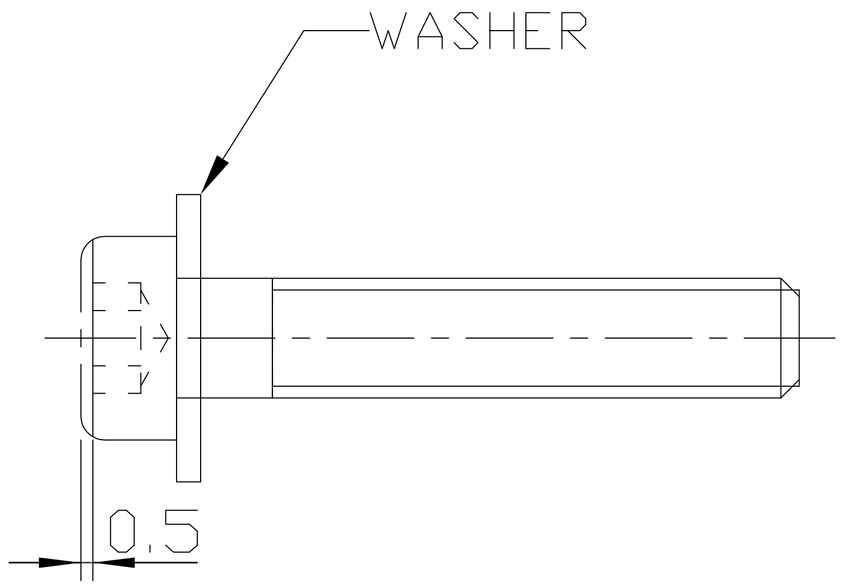
DRG.NO 32040002 — SHEET 08 OF 15

Max. Rauheit (Ra in µm) der N-Klassen Max. roughness (Ra in µm) of N-Classes					
N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

Allgemeintoleranzen nach DIN 7168 mittel / General tolerances from DIN 6871 m							
Längenmaße Linear dimensions	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
Radien, Fasen Radii, chamfers	0,2...0,5	>0,5...3	>3...6	>6...30	>30...120	>120...400	Metrisches ISO-Gewinde Mutter 6H, Bolzen 6g Metric ISO-threads nut 6H, bolt 6g
	±0,1	±0,2	±0,5	±1	±2	±4	
Winkel, Angles	...10	>10...50	>50...120	>120...400	>400		
mm / 100 mm	±1,8	±0,9	±0,6				



WASHER



REQ.QTY. - 04 NOS.
MATERIAL - SS304L

S.NO	PART NO	DESCRIPTION	MATL	QTY	SIZE/SPECIFICATIONS	WEIGHT	REMARKS

REV	REMARKS

ASS'Y GROUP:		
SIGNATURE:		DATE
REVISED BY		
REFURBISHED BY	KIRIT	29/10/2020
REVIEWED	BRD,MKG RKS	
APPROVED BY	M.JANA	

INSTITUTE FOR PLASMA RESEARCH

BHAT, GANDHINAGAR-382 428.

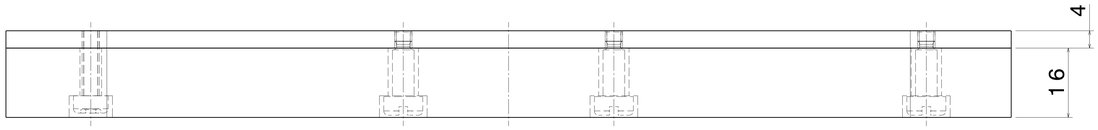
TITLE
Fixed screw for grid
(M5 X 25)

REF DRG NO: PH 403 503

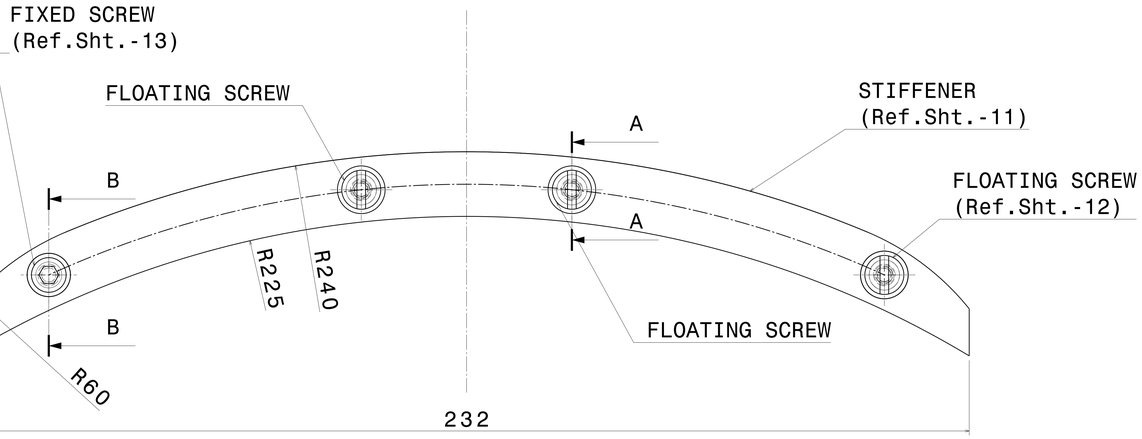
REV-0

DRG.NO 32040002

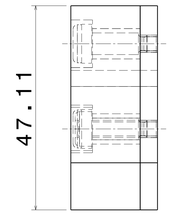
SHEET
09 OF 15



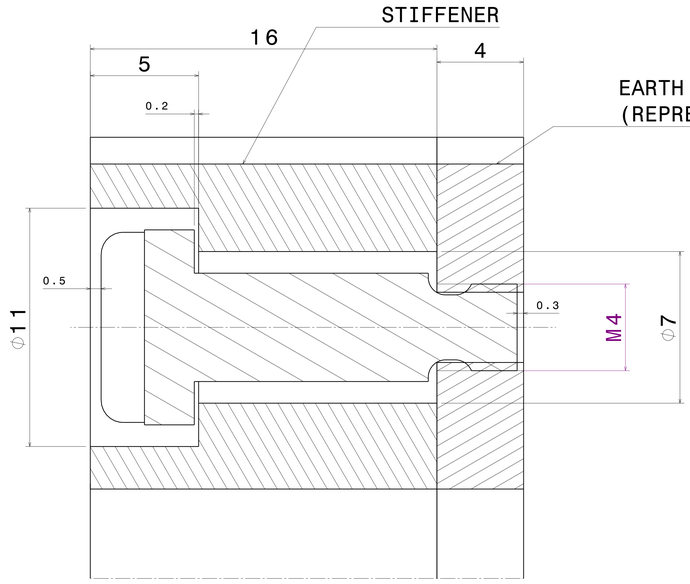
Top view
Scale: 2:1



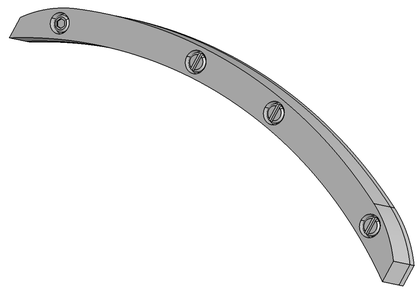
Front view
Scale: 2:1



Right view
Scale: 2:1

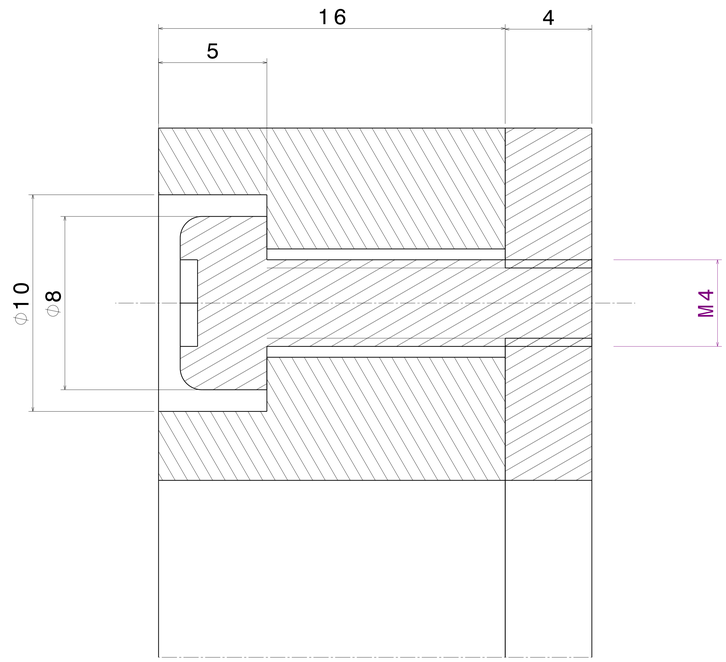


Section view A-A
Scale: 10:1
FLOATING SCREW



Isometric view
Scale: 1:1

ASSEMBLY OF THIS COMPONENT SHALL BE DONE AS SHOWN IN SHEET NO. 02 OF 15.



Section view B-B
Scale: 10:1
FIXED SCREW

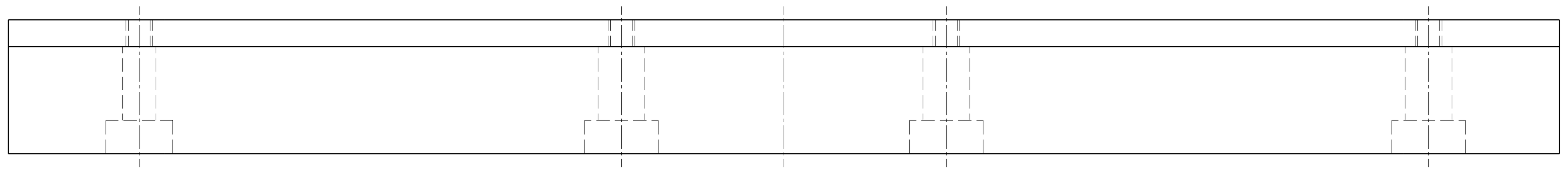
Max. roughness (Ra in µm) of N-Class												
N 12	50	N 8	3,2	N 4	0,2							
N 11	20	N 7	1,6	N 3	0,1							
N 10	12,5	N 6	0,8	N 2	0,05							
N 9	6,3	N 5	0,4	N 1	0,0025							

general tolerance ISO 2768 - m								
linear dimensions	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000	
	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2	
radii, chamfers	0,2...0,5	>0,5...3	>3...6	>6...30	>30..120	>120...400		
	±0,1	±0,2	±0,5	±1	±2	±4		
angles mm ⁄ 100 mm	..10	>10...50	>50...120	>120...400	>400			
	±1,8	±0,9	±0,6	±0,3	±0,15			

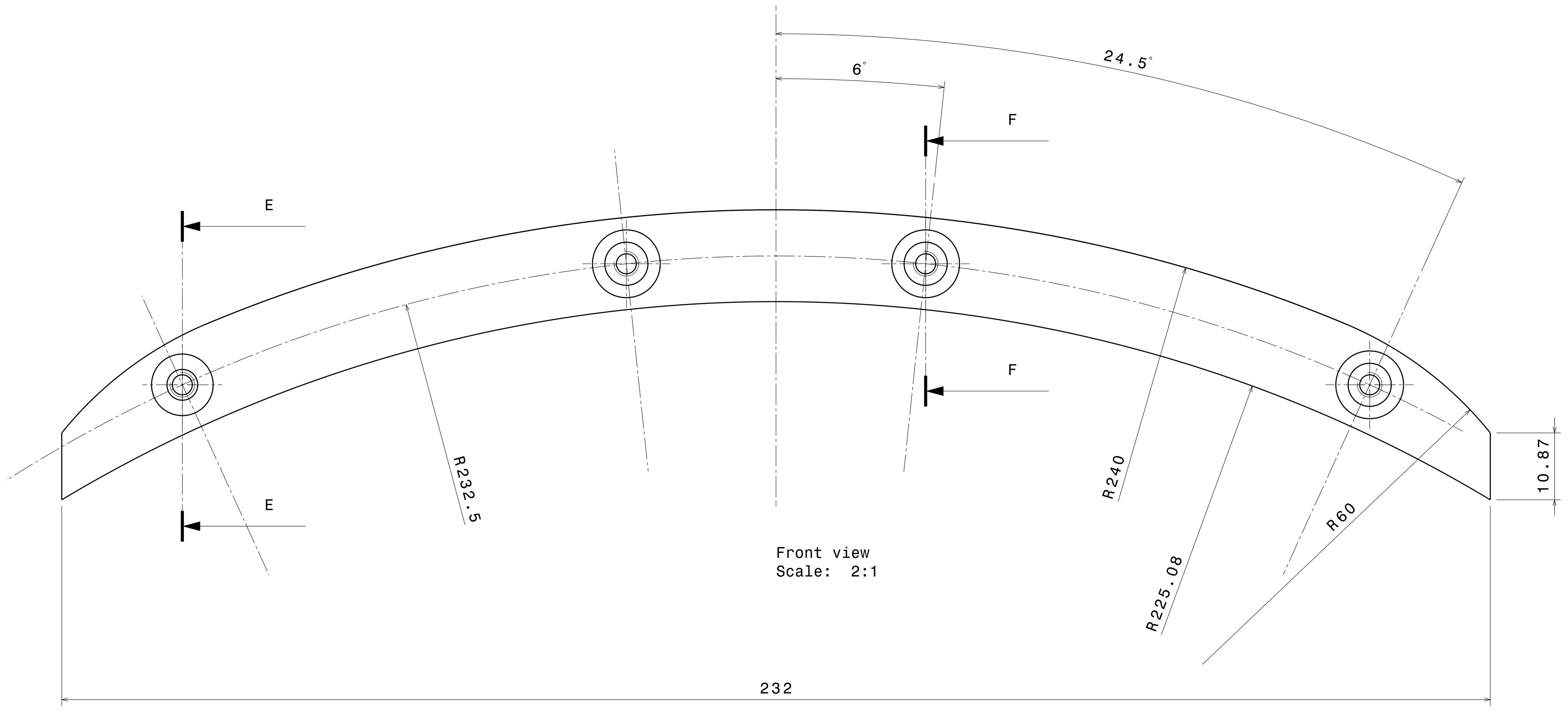
nut 6H, bolt 6g

ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE	-	DATE	TITLE: STIFFENER, FIXED AND FLOATING SCREW FOR EARTH GRID LEFT
DRAWN	KIRIT	29/10/2020	
REVIEWED	BRD,MKG, RKS		REF DRG NO: — REV 00
APPROVED	M.JANA		DRG.NO 32040002 — SHEET 10 OF 15

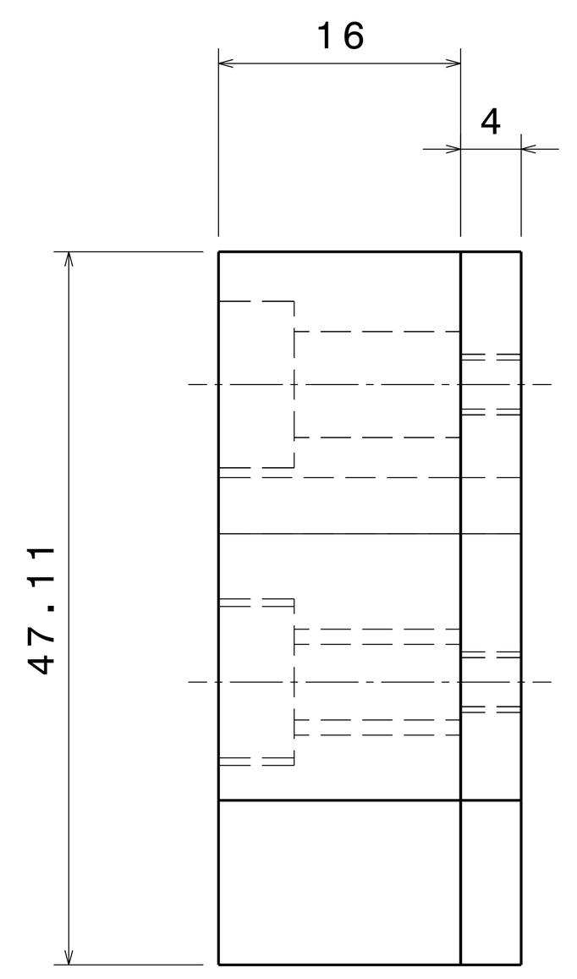
THIRD ANGLE PROJECTION



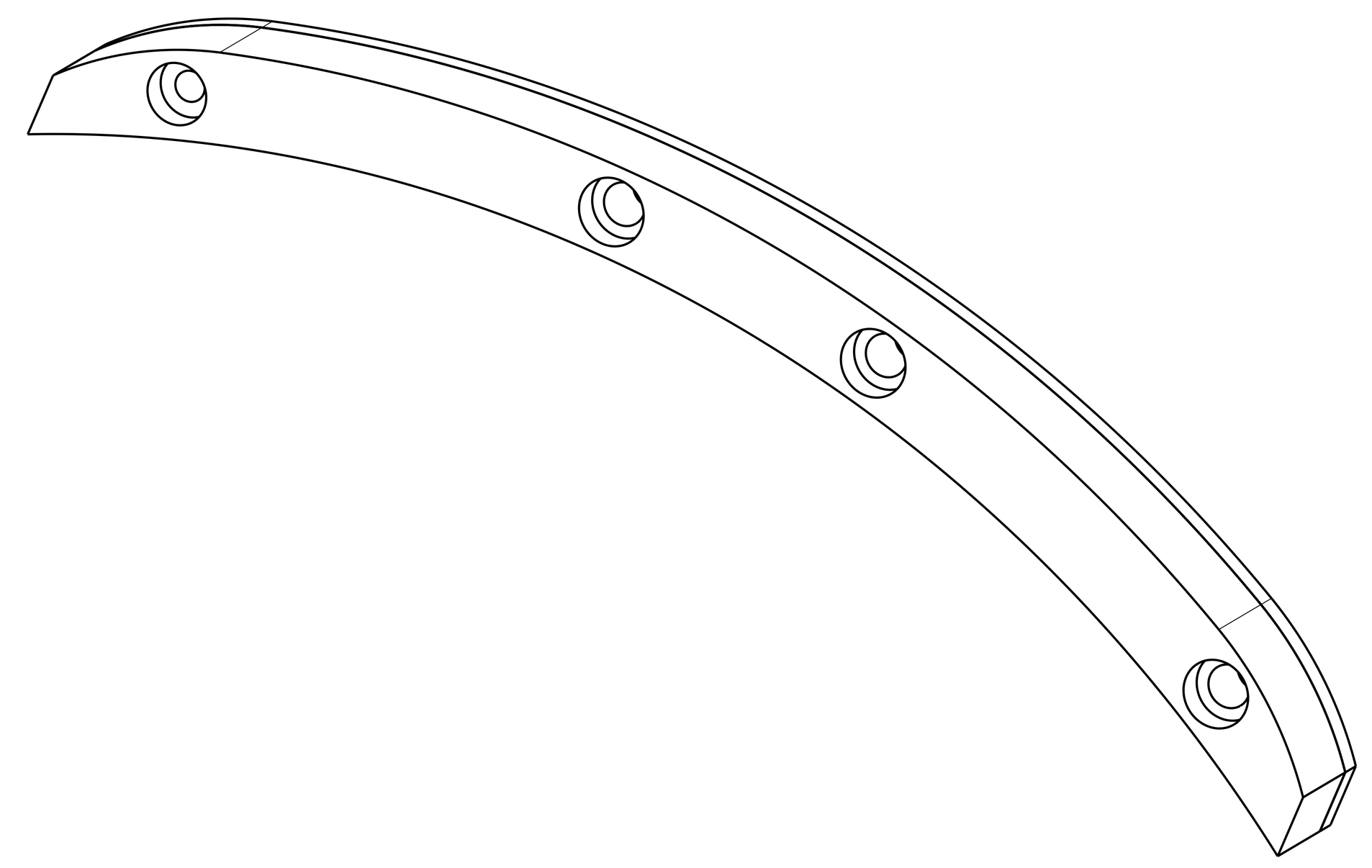
Top view
Scale: 2:1



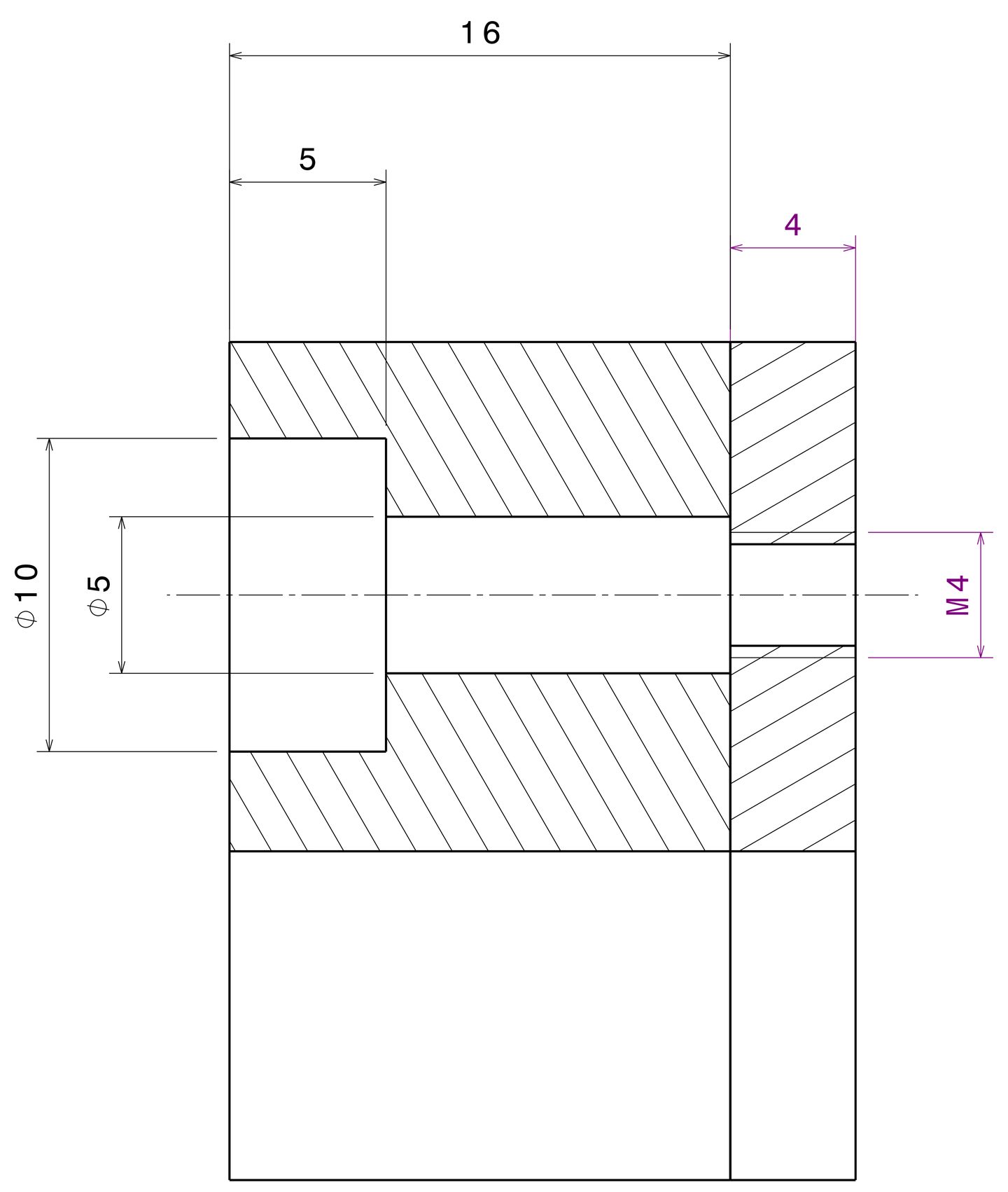
Front view
Scale: 2:1



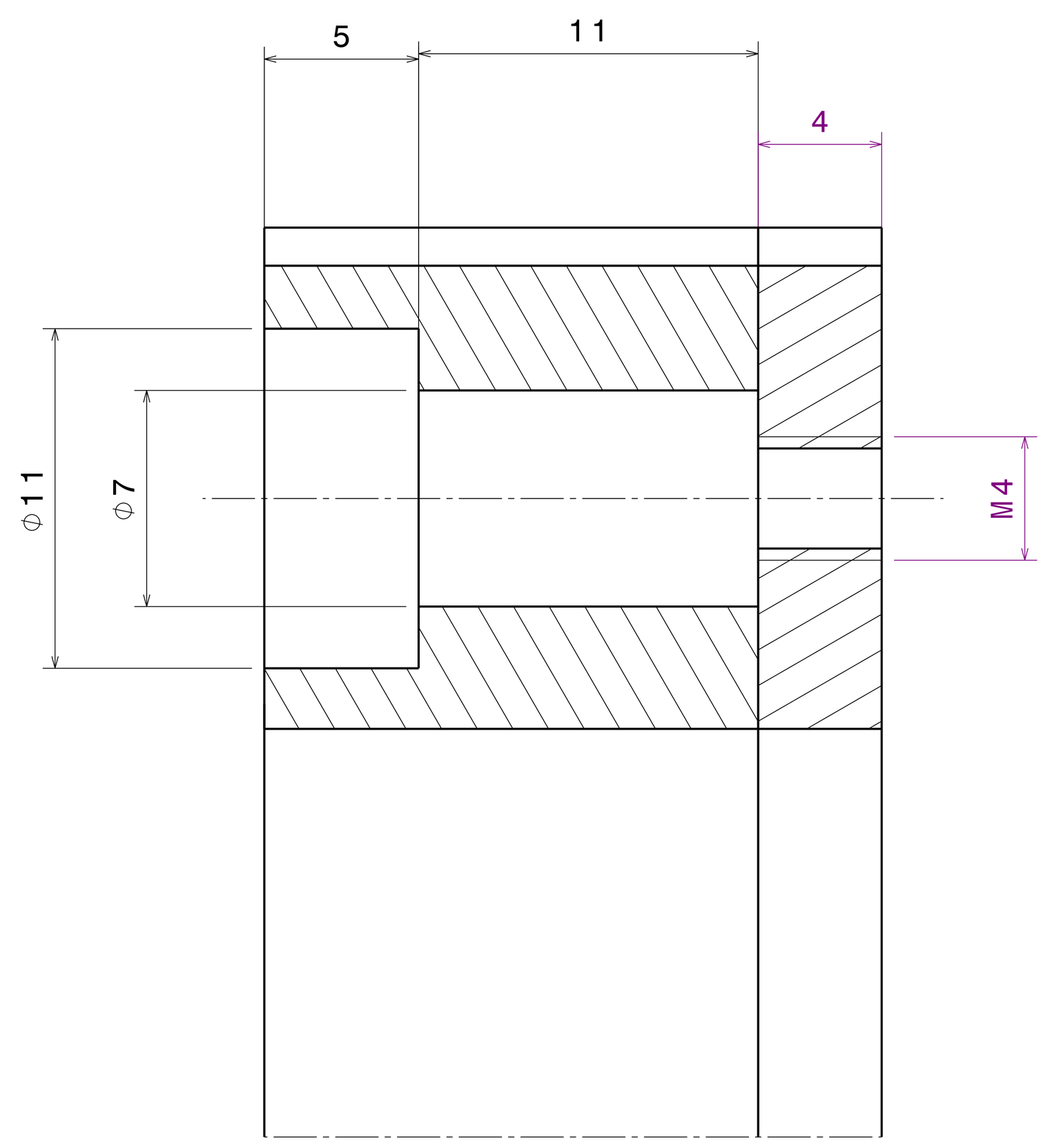
Right view
Scale: 2:1



Isometric view
Scale: 1:1



Section view E-E
Scale: 5:1



Section view F-F
Scale: 5:1

Max. roughness (Ra in µm) of N-Class

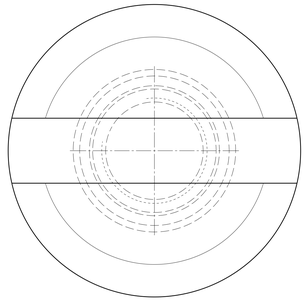
N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

general tolerance ISO 2768 - m

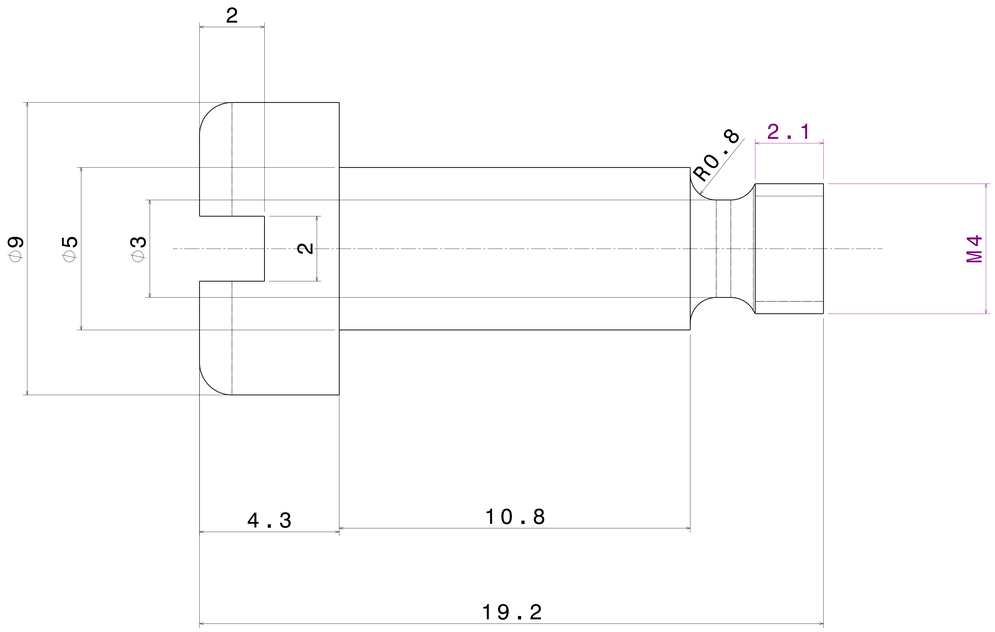
linear dimensions	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
radii, chamfers	0,2...0,5	>0,5...3	>3...6	>6...30	>30..120	>120...400	
	±0,1	±0,2	±0,5	±1	±2	±4	
angles mm / 100 mm	..10	>10...50	>50...120	>120...400	>400		
	±1,8	±0,9	±0,6	±0,3	±0,15		

nut 6H, bolt 6g

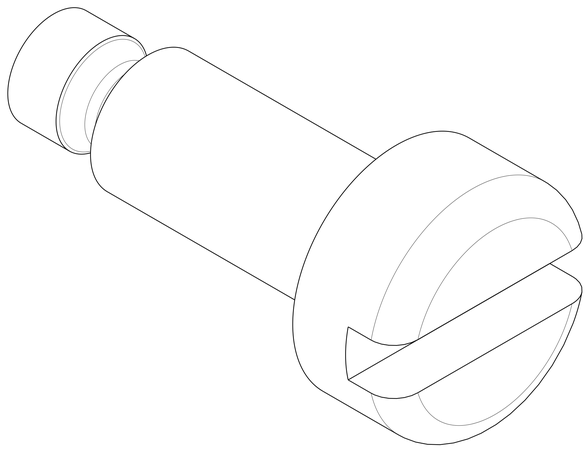
ASS'Y GROUP:	SIZE A1	INSTITUTE FOR PLASMA RESEARCH	
ALL DIMENSIONS ARE IN `mm' UNLESS OTHERWISE STATED		BHAT, GANDHINAGAR-382 428.	
SCALE	-	DATE	THIRD ANGLE PROJECTION — TITLE: STIFFENER FOR EARTH GRID LEFT
DRAWN	KIRIT	29/10/2020	
REVIEWED	BRD,MKG, RKS		REF DRG NO: — REV 00
APPROVED	M.JANA		DRG.NO 32040002 — SHEET 11 OF 15



Front view
Scale: 15:1



Right view
Scale: 15:1



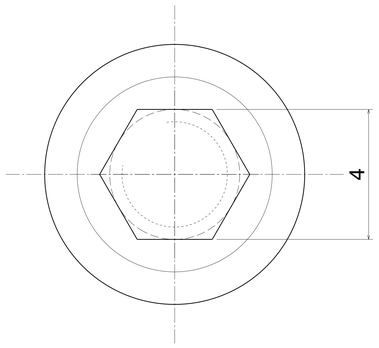
Isometric view
Scale: 15:1

Max. roughness (Ra in µm) of N-Class												
N 12	50	N 8	3,2	N 4	0,2							
N 11	20	N 7	1,6	N 3	0,1							
N 10	12,5	N 6	0,8	N 2	0,05							
N 9	6,3	N 5	0,4	N 1	0,0025							

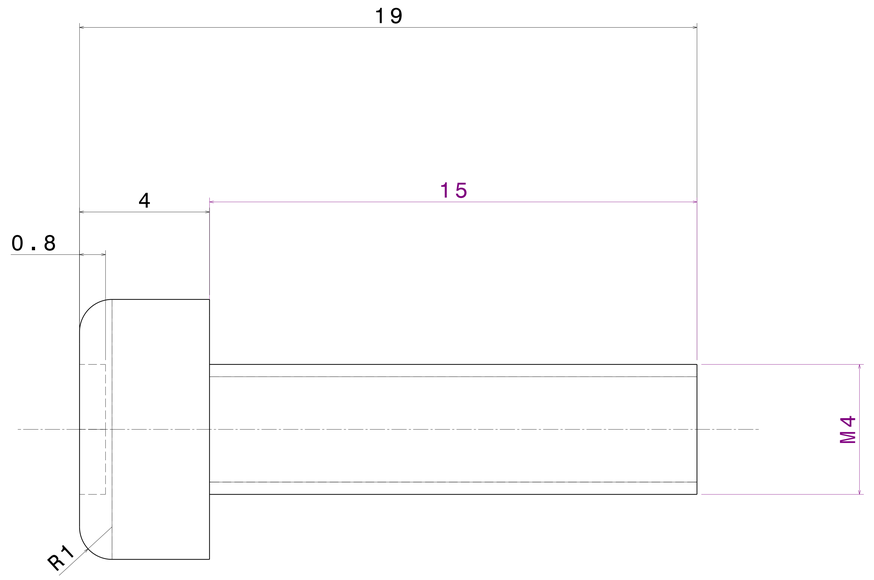
general tolerance ISO 2768 - m							
linear dimensions	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
radii, chamfers	0,2...0,5	>0,5...3	>3...6	>6...30	>30..120	>120...400	
	±0,1	±0,2	±0,5	±1	±2	±4	
angles mm / 100 mm	..10	>10...50	>50...120	>120...400	>400		
	±1,8	±0,9	±0,6	±0,3	±0,15		

nut 6H, bolt 6g

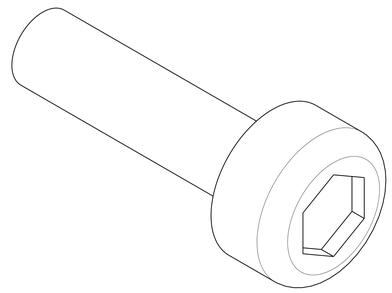
ASS'Y GROUP:	SIZE A1	INSTITUTE FOR PLASMA RESEARCH	
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED		BHAT, GANDHINAGAR-382 428.	
SCALE -	DATE	TITLE	
DRAWN KIRIT	29/10/2020	THIRD ANGLE PROJECTION	FLOATING SCREW FOR STIFFENER - EARTH GRID
REVIEWED BRD,MKG, RKS		REF DRG NO:	REV 00
APPROVED M.JANA		DRG.NO 32040002	SHEET 12 OF15



Left view
Scale: 15:1



Front view
Scale: 15:1



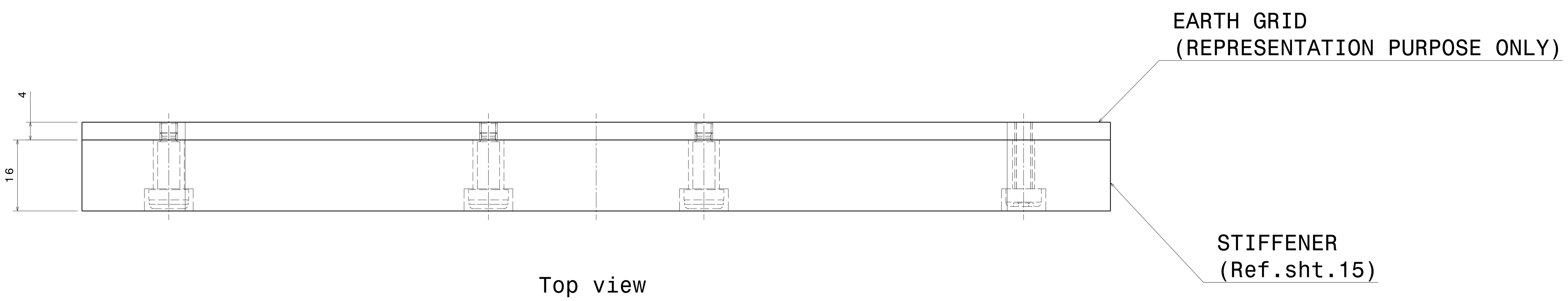
Isometric view
Scale: 10:1

Max. roughness (Ra in µm) of N-Class								
N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

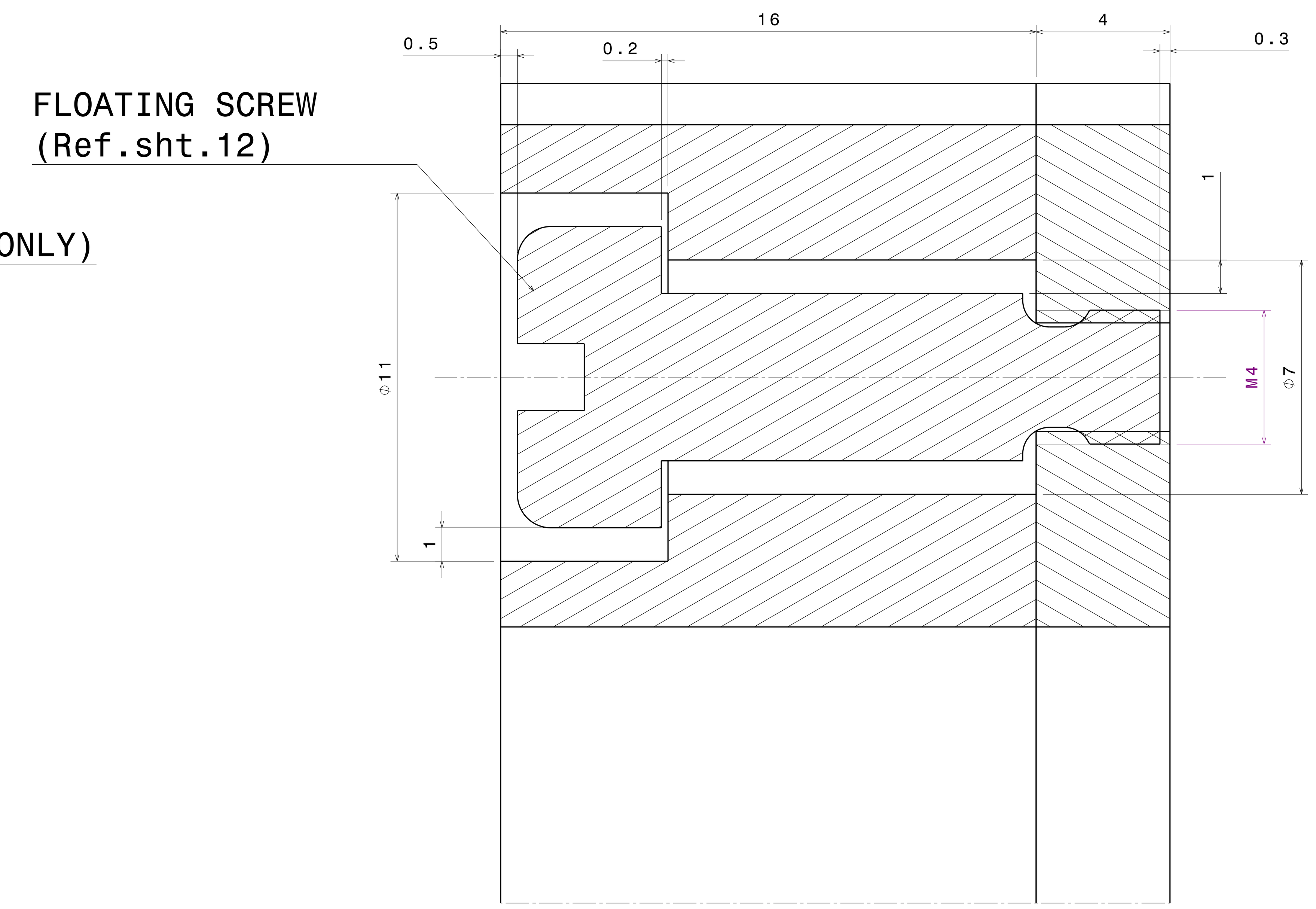
general tolerance ISO 2768 - m							
linear dimensions	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
radii, chamfers	0,2...0,5	>0,5...3	>3...6	>6...30	>30..120	>120...400	
	±0,1	±0,2	±0,5	±1	±2	±4	
angles mm / 100 mm	..10	>10...50	>50...120	>120...400	>400		
	±1,8	±0,9	±0,6	±0,3	±0,15		

nut 6H, bolt 6g

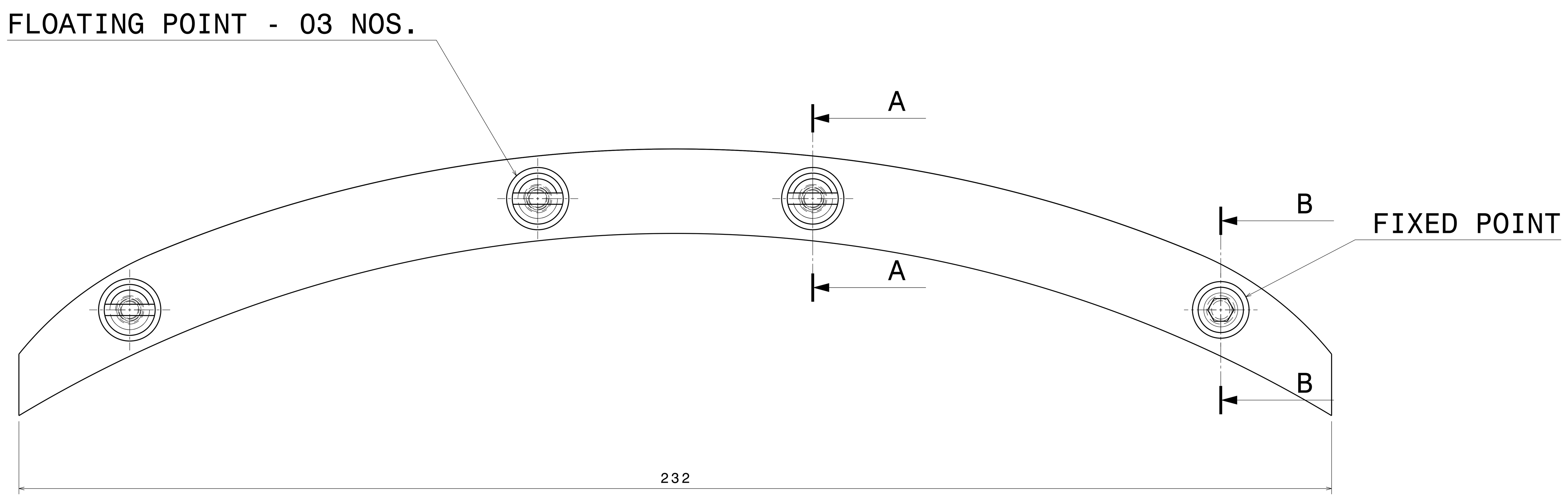
ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE	-	DATE	TITLE FIXED SCREW FOR STIFFENER - EARTH GRID
DRAWN	KIRIT	29/10/2020	THIRD ANGLE PROJECTION
REVIEWED	BRD,MKG, RKS		REF DRG NO: REV 00
APPROVED	M.JANA		DRG.NO 32040002 SHEET 13 OF 15



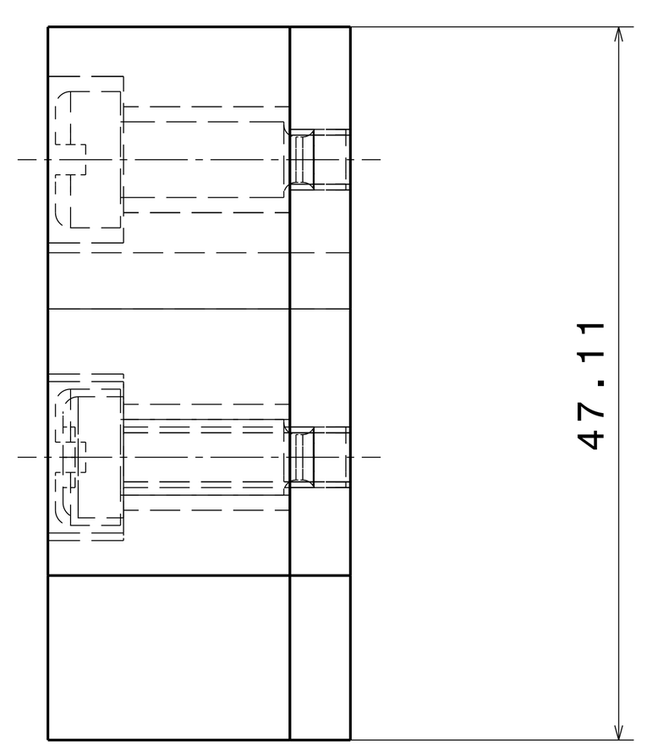
Top view
Scale: 2:1



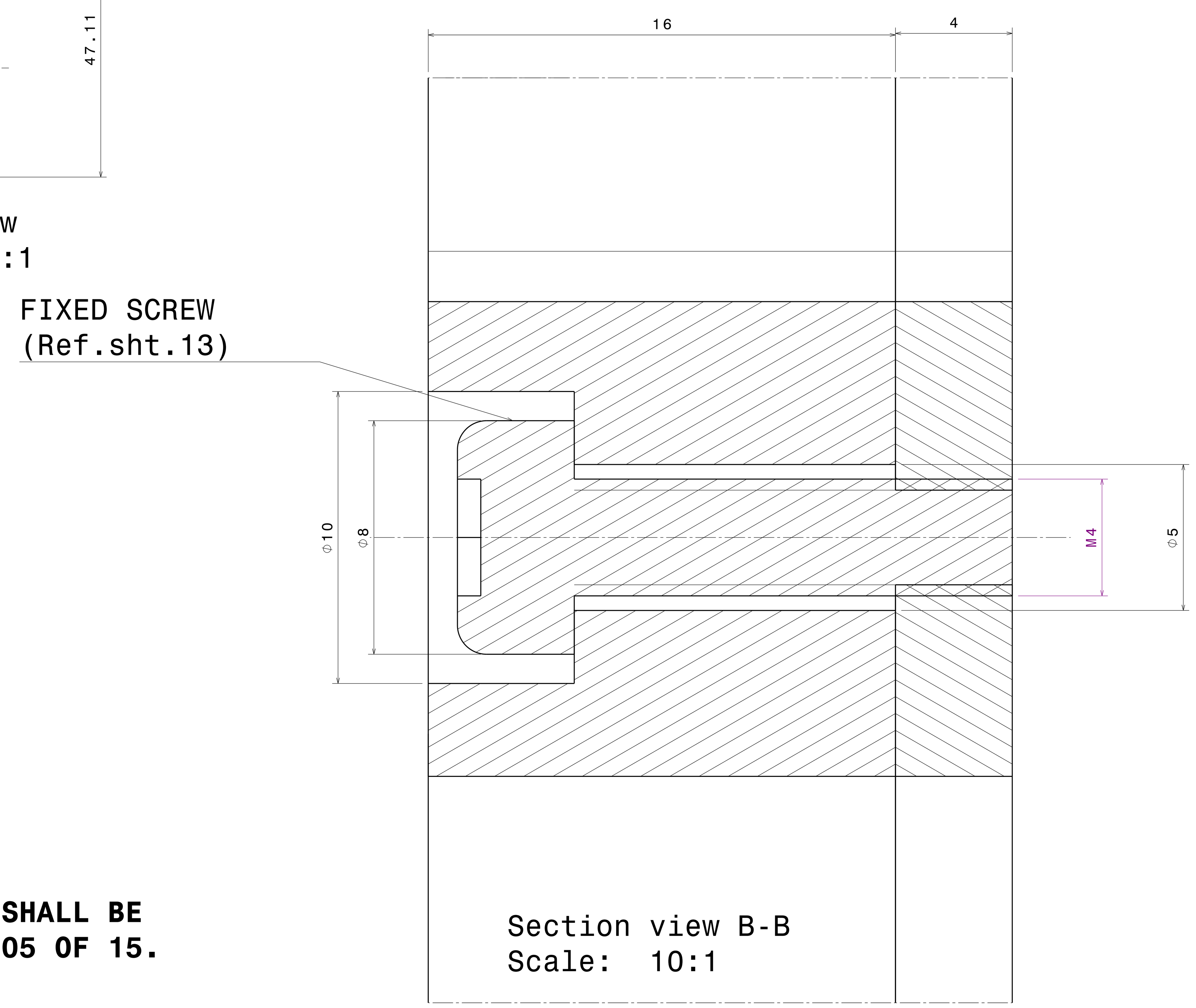
Section view A-A
Scale: 10:1



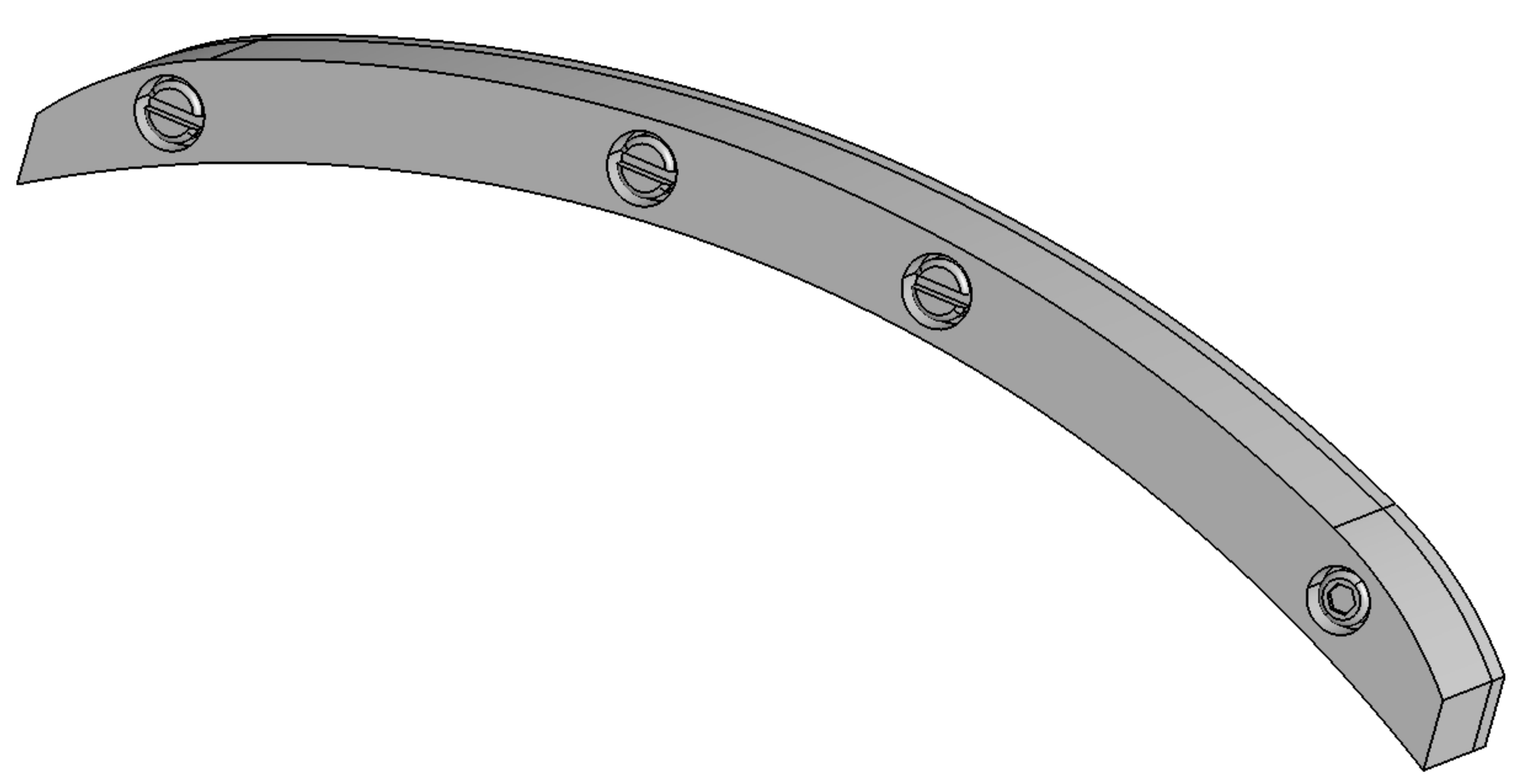
Front view
Scale: 2:1



Right view
Scale: 2:1



Section view B-B
Scale: 10:1



Isometric view
Scale: 1:1

ASSEMBLY OF THIS COMPONENT SHALL BE DONE AS SHOWN IN SHEET NO. 05 OF 15.

Max. roughness (Ra in µm) of N-Class

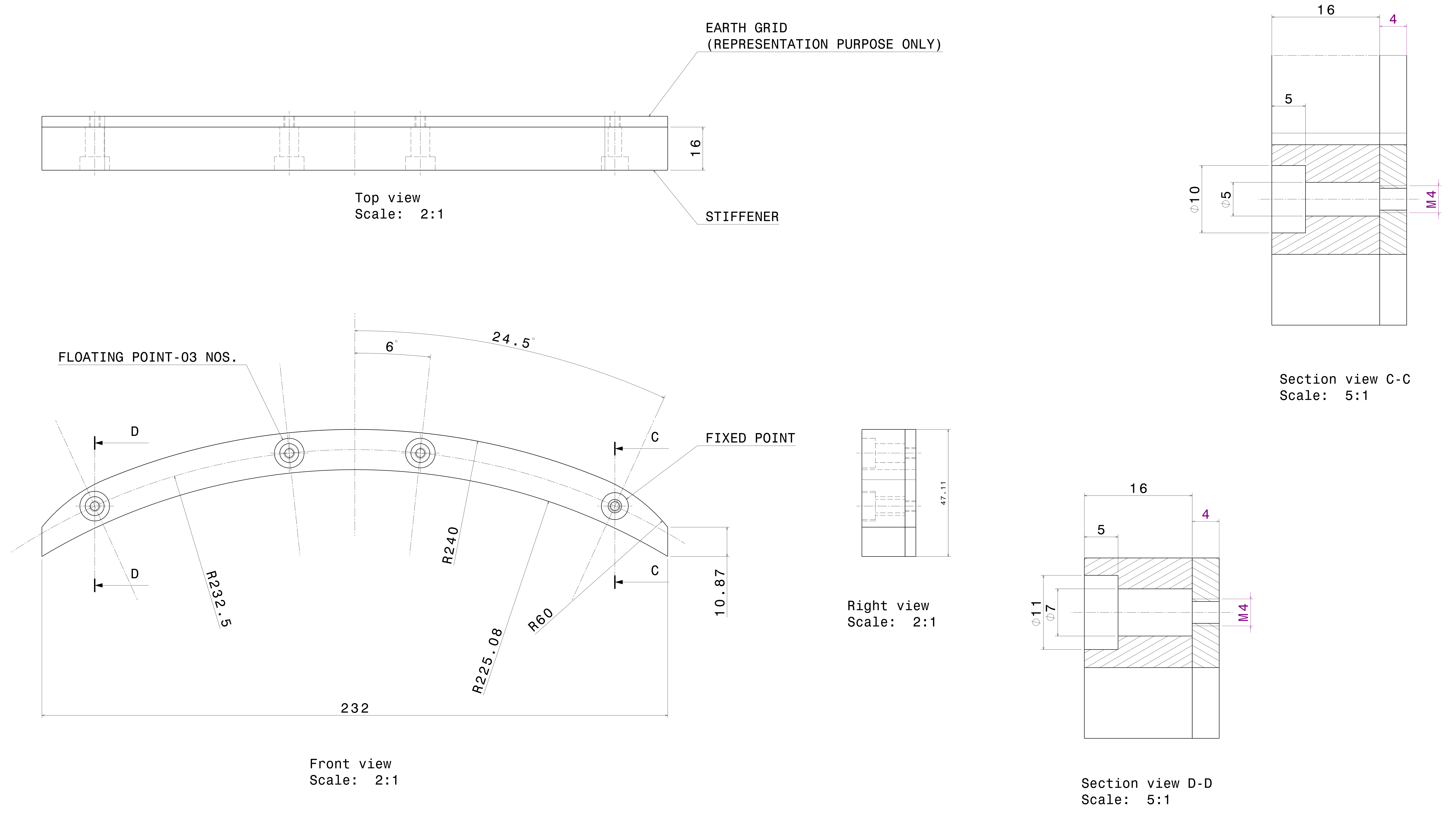
N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

general tolerance ISO 2768 - m

linear dimensions	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
radii, chamfers	0,2...0,5	>0,5...3	>3...6	>6...30	>30..120	>120...400	
	±0,1	±0,2	±0,5	±1	±2	±4	
angles mm / 100 mm	..10	>10...50	>50...120	>120...400	>400		
	±1,8	±0,9	±0,6	±0,3	±0,15		

nut 6H, bolt 6g

ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH BHAT, GANDHINAGAR-382 428.
ALL DIMENSIONS ARE IN `mm' UNLESS OTHERWISE STATED			
SCALE	-	DATE	THIRD ANGLE PROJECTION — TITLE: STIFFENER, FIXED AND FLOATING SCREW FOR EARTH GRID RIGHT
DRAWN	KIRIT	29/10/2020	
REVIEWED	BRD,MKG, RKS		REF DRG NO: — REV 00
APPROVED	M.JANA		DRG.NO 32040002 — SHEET 14 OF 15



Max. roughness (Ra in µm) of N-Class

N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

general tolerance ISO 2768 - m

linear dimensions	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2

radii, chamfers	0,2...0,5	>0,5...3	>3...6	>6...30	>30..120	>120...400
	±0,1	±0,2	±0,5	±1	±2	±4

angles mm / 100 mm	..10	>10...50	>50...120	>120...400	>400
	±1,8	±0,9	±0,6	±0,3	±0,15

nut 6H, bolt 6g

ASS'Y GROUP:		SIZE A1	INSTITUTE FOR PLASMA RESEARCH BHAT, GANDHINAGAR-382 428.
ALL DIMENSIONS ARE IN `mm' UNLESS OTHERWISE STATED			
SCALE	-	DATE	THIRD ANGLE PROJECTION — TITLE STIFFENER FOR EARTH GRID RIGHT
DRAWN	KIRIT	29/10/2020	
REVIEWED	BRD,MKG, RKS		REF DRG NO: — REV 00
APPROVED	M.JANA		DRG.NO 32040002 — SHEET 15 OF 15

ACAD F.NAME:

ELEVATION
1:1

It is to be cut after electro-deposition.

8 thru. holes, For handling, ø10

Ref.Drg.no. 32010005 sht.4/10

264.896

R3

0.1 A

0.1

52.368

92.894

283.8

197.105

2.2

237.632

160°

29

R1

7.4

12

M4, 3 NOS. THROUGH HOLES

PLAN
1:1

267

228.625

223.35

199.58

205.8

377±.1

163.925

145±0.1

128.27

331.4*

50.3

92.615

56.96

108.2

105.2

21.305

13±.100 / 13±.100

0

14.35

15

235.18

24.5°

24.5°

SETTING POINT–C

218.075

204.855

194.305

181.085

170.535

157.315

146.765

133.545

122.995

109.775

99.225

86.005

75.455

62.235

51.685

38.465

301±.1

420

X1

X1

X2

X2

Y

Y

E

E

C

145

265.5±.1

0

290

376±.1

402.5±.1

422

442.05*

D

REFERENCE HOLE–P

SETTING POINT–A

REFERENCE HOLE–Q

SETTING POINT–B

SECTION : Y–Y
5:1

6

6±.0 / .1

6.3

DETAIL–D

R261

R270±.1

10°

229.725

202

R100

R113

12

150

R35

6

6

75°

107.275

101.725

6X6

69.5°

R7

75±.1

4

1

2

6X6

69.5°

6.5°

9.5

6.5

R30

0

5.82

REFERENCE HOLE–P

Distance from stub center to reference hole–p, 90mm

25.18±.05 / .05

21.85

SETTING POINT–A

8

145

Distance from stub center to reference hole–p, 22mm

legend

check dimension= ⬭

help dimension = ( )

rough dimension= [ ]

manual modified= Italic font with underlined

Detail – C
2:1

14.695

9.075

4.145

2.2

R6.61

R6.61

R6.61

27.915

21.85

21.1

5

8.25

19.5

40.789

5.789

SETTING POINT–A

SECTION : X1–X1
(REFERENCE HOLES–P AND Q)

ø8 +0.015 −0.000

⌖ 0.03

SECTION : E–E
5:1

3.6

2.2

R1.1±.05

R2.5

SECTION : X2–X2
(36 HOLES)

⌖ 0.04

ø6 +0.012 −0.000

NOTES:
1. Do not scale the Drawing.
2. Electro polishing to remove sharp edges.
3. surface finish
   External surface : Rz=2.5 µm
   Miscellaneous = Rz=6.3 µm
4. Pressure test
   Internal pressure = 16 bar Nitrogen
5. Leak –rate
   Integral 10^{-8} mbar*l/s He
6. Material – OFE Copper
7. * These dimensions may vary for plate to plate.

n — Max. roughness (Ra in µm) of N-Classes

N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

general tolerance ISO 2768 – m

	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2

	0,2...0,5	>0,5...3	>3...6	>6...30	>30...120	>120...400
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4

	..10	>10...50	>50...120	>120...400	>400
angles	±1,8	±0,9	±0,6	±0,3	±0,15
mm / 100 mm					

metric ISO-threads nut 6H, bolt 6g

REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

REVISION COLUMN

ASS'Y GROUP:

ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED

INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR–382 428.

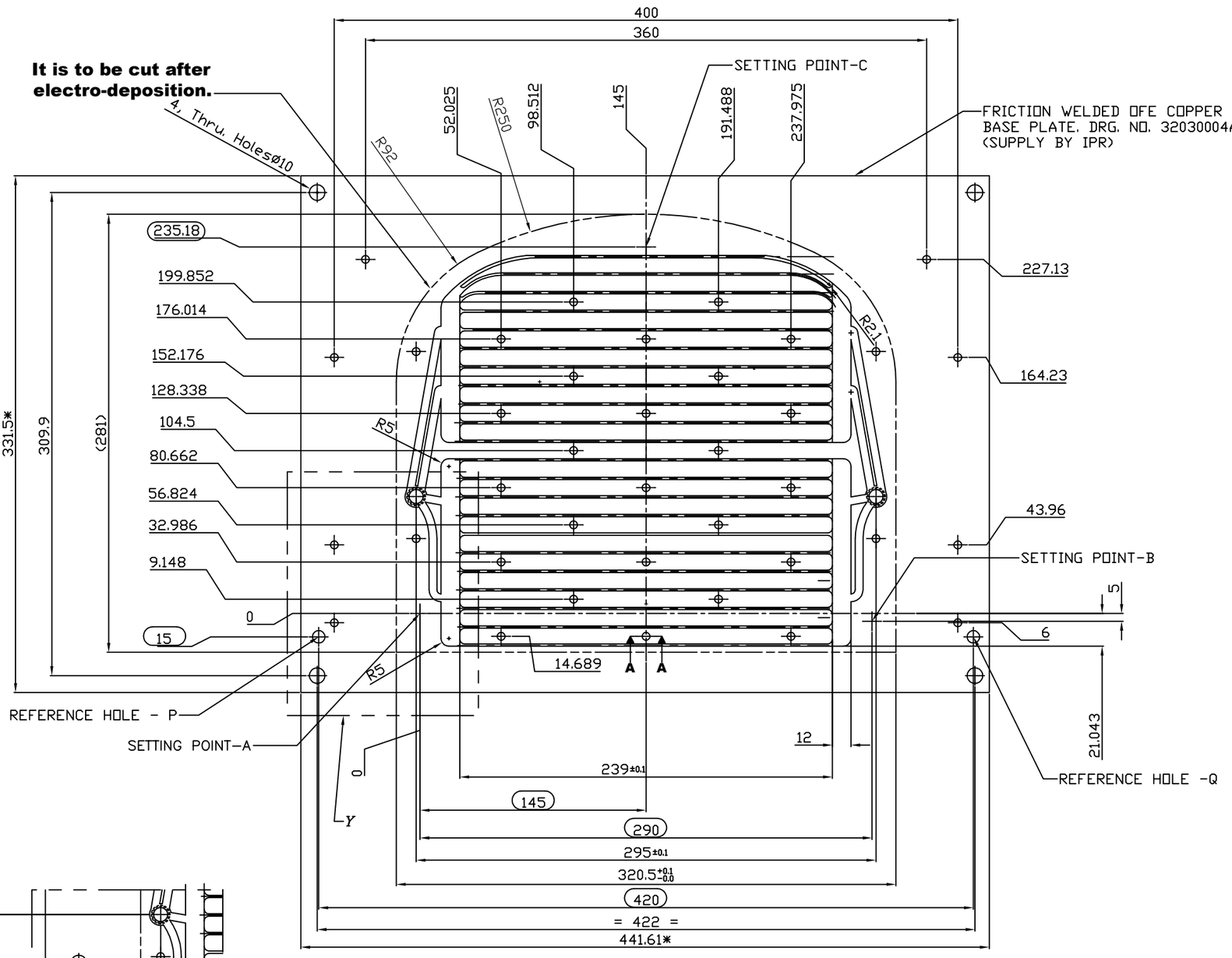
SCALE	NTS	DATE	TITLE: BASEPLATE ACCELERATION GRID BEFORE ELECTRO DEPOSITION
DRAWN	KIRIT	07/2020	
CHECKED			REF DRG NO: PH 000 608 — REV–1
APPROVED			DRG.NO 32050009 — SHEET 01 OF 01

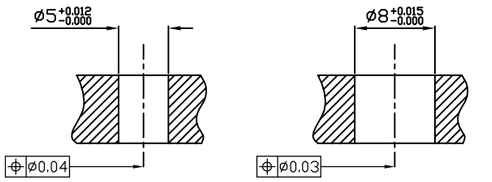
FIRST ANGLE PROJECTION

ACAD F.NAME:

Ref. Drg. No. 32030002
sht. 2 of 9

ELEVATION





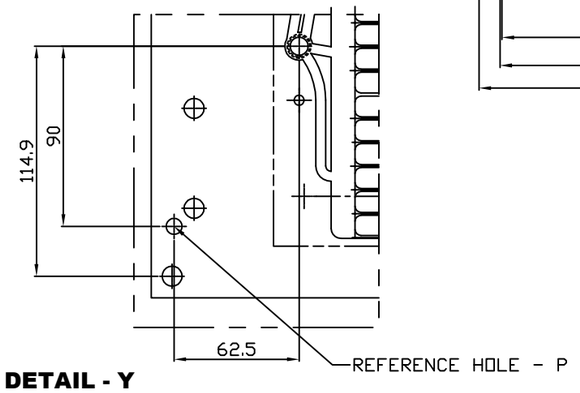
SECTION A-A (37 HOLES)

REFERENCE HOLES- P & Q

legend

check dimension= ⬭

help dimension = ( )



DETAIL - Y

PLAN

NOTES:
1. Do not scale the Drawing.
2. Electro polishing to remove sharp edges.
3. surface finish
   External surface : Rz=2.5 µm
   Miscellaneous = Rz=6.3 µm
4. Pressure test
   Internal pressure = 16 bar Nitrogen
5. Leak –rate
   Integral 10^{-8} mbar*l/s He
6. Material – OFE^{+}Copper
7. * These dimensions may vary for plate to plate.

Max. roughness (Ra in µm) of N-Classes

N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

general tolerance ISO 2768 - m

	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2

	0,2...0,5	>0,5...3	>3...6	>6...30	>30...120	>120...400
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4

	..10	>10...50	>50...120	>120...400	>400
angles	±1,8	±0,9	±0,6	±0,3	±0,15
mm / 100 mm					

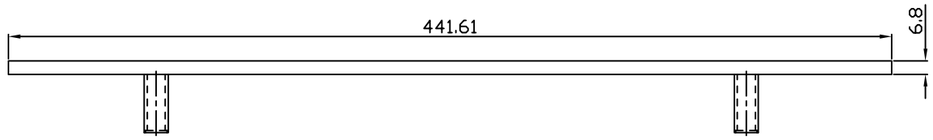
metric ISO-threads nut 6H, bolt 6g

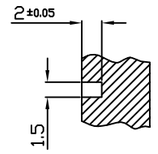
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

REVISION COLUMN

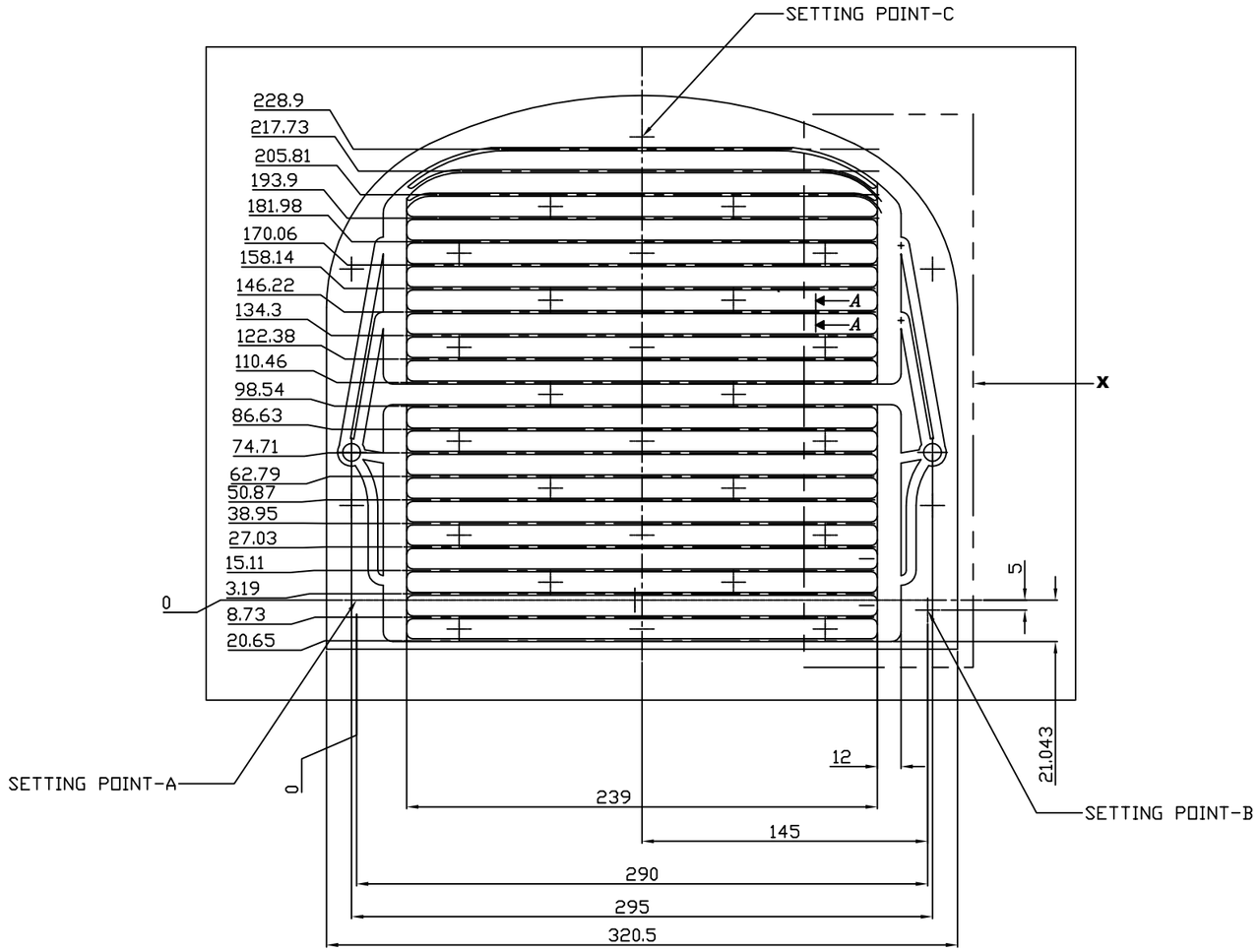
ASS'Y GROUP:		INSTITUTE FOR PLASMA RESEARCH	
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED		BHAT, GANDHINAGAR–382 428.	
SCALE	DATE	TITLE: *Baseplate for Deceleration grid–Before electro deposition*	
REFURBISHED BY: KRM	18/2020	FIRST ANGLE METHOD	
REVIEWED: BRD,MKG RKS		REF DRG NO: PH 000 610 1of2	REV – 00
APPROVED: N.JANA		DRG.NO: 32050010	SHEET 1 OF 2

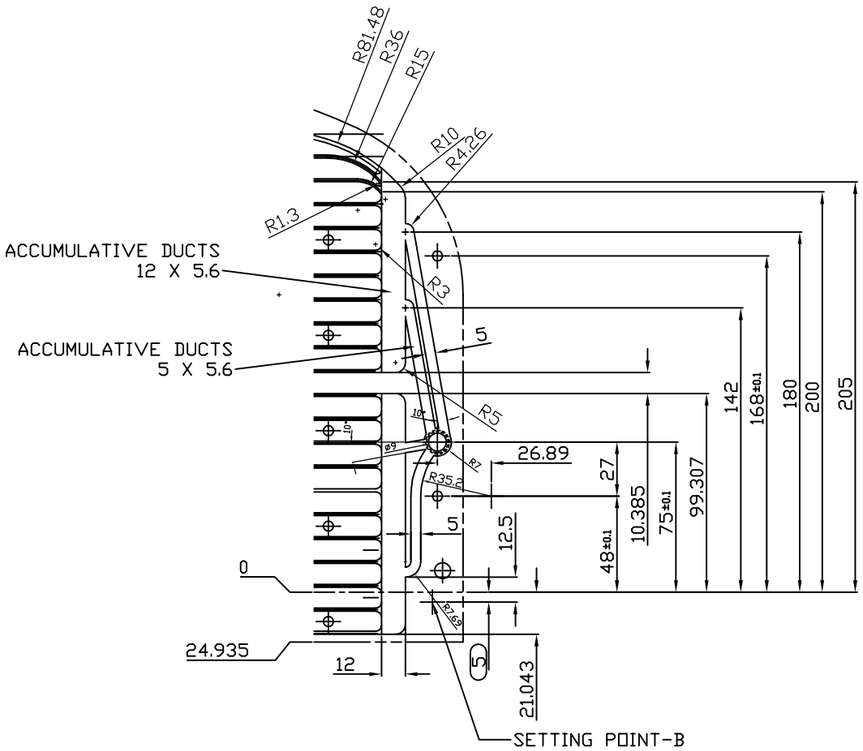
ACAD F.NAME:





SECTION A-A





DETAIL - X

THIS DRAWING IS ONLY FOR COOLING CHANNEL POSITION DIMENSIONS, OTHER OPERATION ARE NOT SHOWN FOR BETTER VISUALIZATION.

Max. roughness (Ra in µm) of N-Classes									
N 12	50	N 8	3,2	N 4	0,2				
N 11	20	N 7	1,6	N 3	0,1				
N 10	12,5	N 6	0,8	N 2	0,05				
N 9	6,3	N 5	0,4	N 1	0,0025				

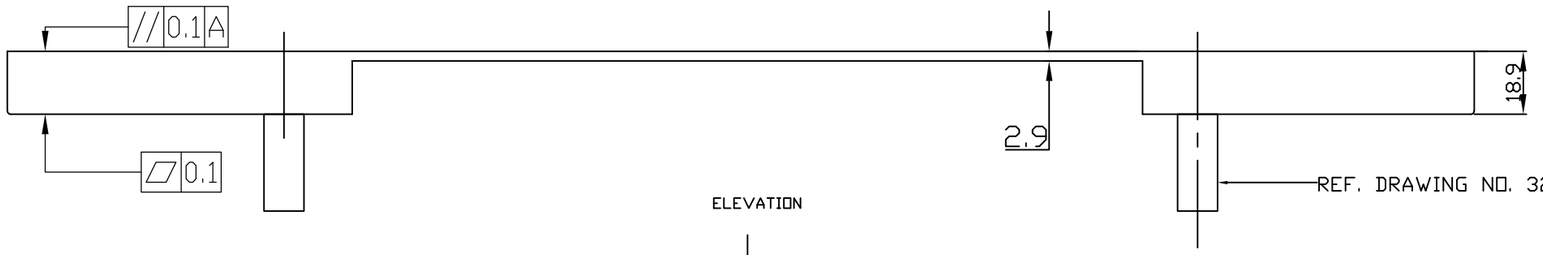
general tolerance ISO 2768 - m							
	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
	0,2...0,5	>0,5...3	>3...6	>6...30	>30..120	>120...400	
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4	
angles	..10	>10...50	>50...120	>120...400	>400		
mm / 100 mm	±1,8	±0,9	±0,6	±0,3	±0,15		

metric ISO-threads nut 6H, bolt 6g

REVISION COLUMN					
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

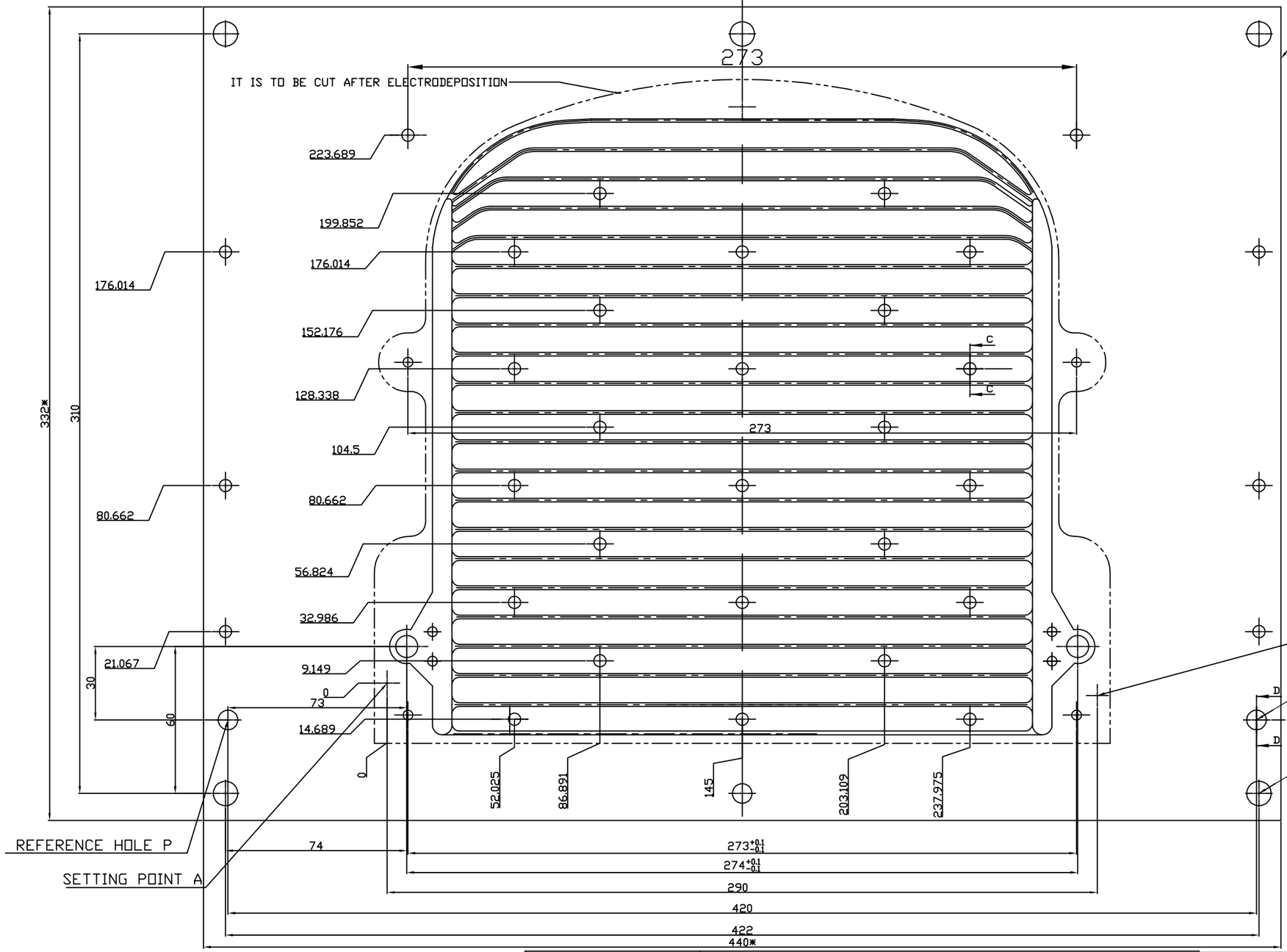
ASS'Y GROUP:			INSTITUTE FOR PLASMA RESEARCH
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED			BHAT, GANDHINAGAR-382 428.
SCALE		DATE	TITLE: *Baseplate for Deceleration grid-Before electro-deposition*
REFURBISHED BY	KIRIT	15/2020	
REVIEWED	BRD,MKG RKS		REF DRG NO: PH 000 610 1of2 REV - 00
APPROVED	N.JANA		DRG.NO 32050010 SHEET 02 OF 2

ACAD F.NAME:



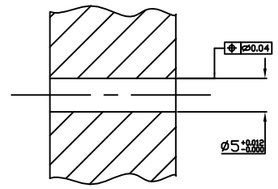
REF. DRAWING NO. 32040002 SHEET 5 OF 15

ELEVATION

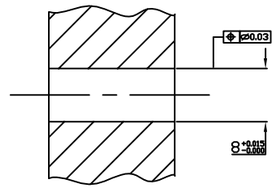


PLAN

FRICTION WELDED OFE COPPER BASE PLATE
DRAWING NO. (SUPPLY BY IPR)



SECTION C-C
(33 HOLES)



SECTION D-D
(REF. HOLES P AND Q)

NOTES:
1. Do not scale the Drawing.
2. Electro polishing to remove sharp edges.
3. surface finish
   External surface : Rz=2.5 µm
   Miscellaneous = Rz=6.3 µm
4. Pressure test
   Internal pressure = 16 bar Nitrogen
5. Leak –rate
   Integral 10^{-8} mbar*l/s He
6. Material – OFE^{+}Copper
7. * These dimensions may vary for plate to plate.

Max. roughness (Ra in µm) of N-Classes								
N 12	50	N 8	3,2	N 4	0,2
N 11	20	N 7	1,6	N 3	0,1
N 10	12,5	N 6	0,8	N 2	0,05
N 9	6,3	N 5	0,4	N 1	0,0025

general tolerance ISO 2768 - m							
	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
	0,2...0,5	>0,5...3	>3...6	>6...30	>30...120	>120...400	
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4	
angles	..10	>10...50	>50...120	>120...400	>400		
mm / 100 mm	±1,8	±0,9	±0,6	±0,3	±0,15		

metric ISO-threads
nut 6H, bolt 6g

REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

ASS'Y GROUP:
ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED

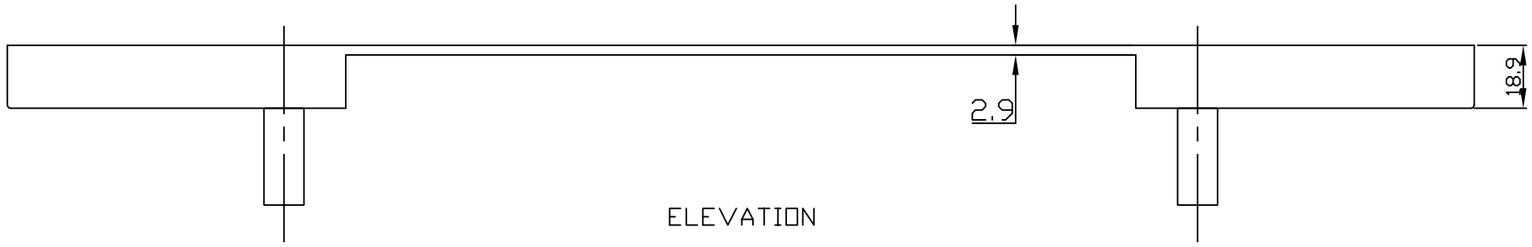
INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR–382 428.

SCALE | DATE
REFERENCED BY | KIRIT PARMAR
REVIEWED BRD,MKG RKS K.JANA
APPROVED

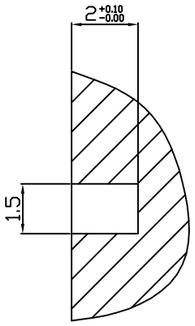
TITLE
BASE PLATE EARTH GRID
Before Electro-deposition

REF DRG NO: PH 000 605 1 OF 2 | REV – 00
DRG.NO 32050011 | SHEET 01 OF 02

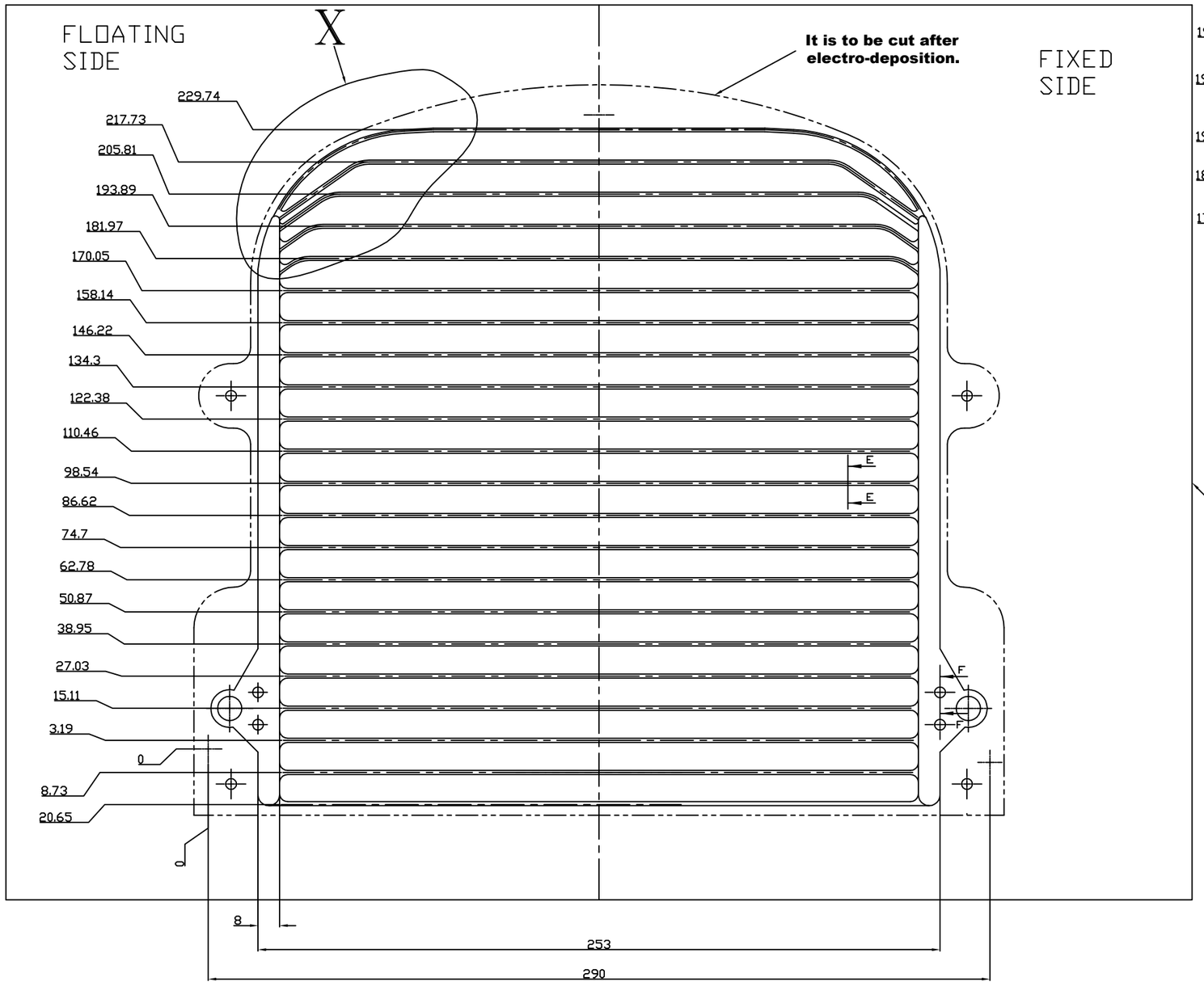
ACAD F.NAME:



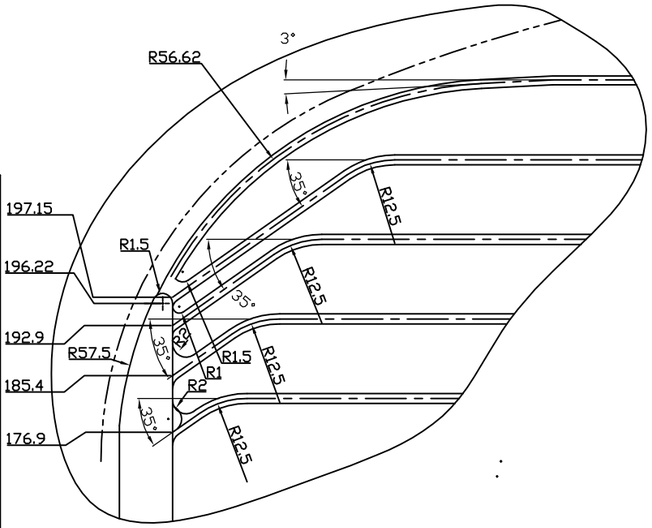
ELEVATION



SECTION E-E



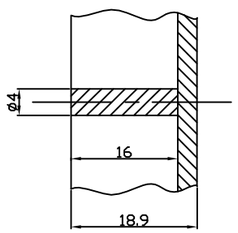
PLAN



DETAIL–X

FRICTION WELDED OFE COPPER BASE PLATE. DRG. NO. 32040004AA (SUPPLY BY IPR)

THIS DRAWING IS ONLY FOR COOLING CHANNEL POSITION DIMENSIONS, OTHER OPERATION ARE NOT SHOWN FOR BETTER VISUALIZATION.



SECTION F-F
(Four locations)

Max. roughness (Ra in µm) of N-Classes									
N 12	50	N 8	3,2	N 4	0,2				
N 11	20	N 7	1,6	N 3	0,1				
N 10	12,5	N 6	0,8	N 2	0,05				
N 9	6,3	N 5	0,4	N 1	0,0025				

general tolerance ISO 2768 - m							
	0,5...6	>6...30	>30...120	>120...400	>400...1000	>1000...2000	>2000...4000
linear dimensions	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
	0,2...0,5	>0,5...3	>3...6	>6...30	>30...120	>120...400	
radii, chamfers	±0,1	±0,2	±0,5	±1	±2	±4	
angles	..10	>10...50	>50...120	>120...400	>400		
mm / 100 mm	±1,8	±0,9	±0,6	±0,3	±0,15		

metric ISO-threads nut 6H, bolt 6g

REVISION COLUMN						
REV	ZONE	DESCRIPTION	DATE	REMARKS	APPROVED BY

ASS'Y GROUP:

ALL DIMENSIONS ARE IN 'mm' UNLESS OTHERWISE STATED

INSTITUTE FOR PLASMA RESEARCH
BHAT, GANDHINAGAR–382 428.

SCALE | DATE

TITLE
EARTH GRID
Before Electro-deposition

REFERENCED BY | SHEET NO/QTY

REVIEWED: SRD,MKG,RKS,KJANA

APPROVED

REF DRG NO: PH 000 605 1 OF 2 | REV – 00

DRG.NO 32050011 | SHEET 02 OF 02

SECTION 'E':

PRICE SCHEDULE

Validate Print Help

Item Rate BoQ

Tender Inviting Authority: Head - Purchase Section

Name of Work: Fabrication, Inspection, Testing and Supply of ION Extractor Grids as per the details mentioned in technical specifications of the tender document

Tender No. IPR/TN/PUR/TPT/ET/22-23/003 Dated 23/06/2022

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 #	NUMBER #	TEXT #
Sl. No.	Item Description	Quantity	Units	Estimated Rate in Rs. P	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	6	13	53	55
1	**Fabrication, Inspection, Testing and Supply of ION Extractor Grids as per the details mentioned in technical specifications of the tender document**						
1.01	Material **(a) Aluminium alloy, 6061T6 (for fabrication of fixtures for CNC machining of all the grids)** **Total Quantity: 17 Nos. as mentioned below :-** (i) PGF1, PGF2, PGF4, PGF5, PGF6, PGF7= 6 Nos. Size as per drawings mentioned in Annexure-III (ii) AGF1, AGF2, AGF4, AGF5, AGF6, AGF7= 6 Nos. Size as per drawings mentioned in Annexure-III (iii) DGF1, DGF3, DGF4 = 3 Nos. Size as per drawings mentioned in Annexure-III (iv) EGF1, EGF3 = 2 Nos. Size as per drawings mentioned in Annexure-III **(b) G10/Epoxy (for non-metal fixtures fabrication for Electro-deposition of all grids. This material must be compatible with electro-deposition chemicals) Total Quantity: 4 Nos. as mentioned below** (i) PGF3 = 1 No. Size as per drawings mentioned in Annexure-III (ii) AGF3 = 1 No. Size as per drawings mentioned in Annexure-III (iii) DGF2 = 1 No. Size as per drawings mentioned in Annexure-III (iv) EGF2 = 1 No. Size as per drawings mentioned in Annexure-III **(c) OFE Copper plates as per Table-2 (Mentioned in the Tender document)** (i) Size: 500+5/-0mm (L) × 400+5/-0 mm (W) × 12.5+0.2/-0.2 mm (T) - Quantity: 10 Nos. (ii) 500+5/-0mm (L) × 400+5/-0 mm (W) × 25+0.2/-0.2 mm (T) - Quantity: 2 Nos.	1.000	Lot			**0.00**	INR Zero Only

1.02	Drawings and Documents (i) 2D Engineering and fabrication drawings, 3D models and its fixtures for both Phase - 1 and Phase - 2 (ii) Quality documents including Quality Assurance Plan, Manufacturing and Inspection Plan, Quality Procedure(s), NDT Procedure(s) (iii) Execution schedule	1.000	Set			**0.00**	INR Zero Only
1.03	Prototype Acceleration Grid (PAG) – Phase - 1 Deliverables: PAG (1 No.) & PAG Fixtures (7 Nos.) **(a) Fabrication of PAG (before & after Electro-deposition)** **(b) Fabrication of PAG Fixtures** **(c) Dimension Inspection including CMM (Coordinate Measuring Machine) measurement of PAG fixtures as per approved drawings including surface flatness and Surface roughness** **(d) Inspection of PAG:** (i) Dimension Inspection including CMM measurement of PAG as per approved drawings including surface flatness and Surface roughness (before and after electro-polishing) (ii) Dimension Inspection for Position, width & depth of water manifolds and cooling channels (iii) Dimension Inspection for Position, Diameters of 214 apertures (iv) Dimension Inspection of detailed dimensions of 10 numbers of randomly selected shaped apertures (v) Radiographic Inspection (preferable of gammy ray) after 1st layer of electro-deposition on PAG (vi) Ultrasonic Measurement of 1st and 2nd layers of electro-deposited PAG **(e) Electro Polishing of PAG** **(f) Factory Acceptance** **(g) Packing, Loading, Transportation and un-loading** **(h) Site Acceptance**	1.000	Set			**0.00**	INR Zero Only
1.04	Acceleration Grid (AG) – Phase - 2 Deliverables: AG Left (1 No.), AG Right (1 No.) & AG Fixtures (7 Nos.) **(a) Fabrication of AG Left and AG Right (before & after Electro-deposition)** **(b) Fabrication of AG Fixtures** **(c) Dimension Inspection including CMM measurement of AG fixtures as per approved drawings including surface flatness and Surface roughness** **(d) Inspection of AG Left and AG Right:** (i) Dimension Inspection including CMM measurement of AG Left and AG Right as per approved drawings including surface flatness and Surface roughness (before and after electro-polishing) (ii) Dimension Inspection for Position, width & depth of water manifolds and cooling channels (iii) Dimension Inspection for Position, Diameters of 387 apertures of AG Left and AG Right (iv) Dimension Inspection of detailed dimensions of 10 numbers of randomly selected shaped apertures of AG Left and AG Right. (v) Radiographic Inspection (preferable of gammy ray) after 1st layer of electro-deposition of AG Left and AG Right. (vi) Ultrasonic Measurement of 1st and 2nd layers of electro-deposited AG Left and AG Right. **(e) Electro Polishing of AG Left and AG Right** **(f) Factory Acceptance** **(g) Packing, Loading, Transportation and un-loading** **(h) Site Acceptance**	1.000	Set			**0.00**	INR Zero Only

1.05	Deceleration Grid (DG) – Phase - 2 Deliverables: DG Left (1 No.), DG Right (1 No.) & DG Fixtures (4 Nos.) **(a) Fabrication of DG Left and DG Right (before & after Electro-deposition)** **(b) Fabrication of DG Fixtures** **(c) Dimension Inspection including CMM measurement of DG fixtures as per approved drawings including surface flatness and Surface roughness** **(d) Inspection of DG Left and DG Right:** (i) Dimension Inspection including CMM measurement of DG Left and DG Right as per approved drawings including surface flatness and Surface roughness (before and after electro-polishing) (ii) Dimension Inspection for Position, width & depth of water manifolds and cooling channels (iii) Dimension Inspection for Position, Diameters of 387 apertures of DG Left and DG Right (iv) Radiographic Inspection (preferable of gammy ray) after 1st layer of electro-deposition of DG Left and DG Right. (v) Ultrasonic Measurement of 1st and 2nd layers of electro-deposited DG Left and DG Right. **(e) Electro Polishing of DG Left and DG Right** **(f) Factory Acceptance** **(g) Packing, Loading, Transportation and un-loading** **(h) Site Acceptance**	1.000	Set			**0.00**	INR Zero Only
1.06	Earth Grid (EG) – Phase - 2 Deliverables: EG Left (1 No.), EG Right (1 No.) & EG Fixtures (3 Nos.) **(a) Fabrication of EG Left and EG Right (before & after Electro-deposition)** **(b) Fabrication of EG Fixtures** **(c) Dimension Inspection including CMM measurement of EG fixtures as per approved drawings including surface flatness and Surface roughness** **(d) Inspection of EG Left and EG Right:** (i) Dimension Inspection including CMM measurement of EG Left and EG Right as per approved drawings including surface flatness and Surface roughness (before and after electro-polishing) (ii) Dimension Inspection for Position, width & depth of water manifolds and cooling channels (iii) Dimension Inspection for Position, Diameters of 387 apertures of EG Left and EG Right (iv) Radiographic Inspection (preferable of gammy ray) after 1st layer of electro-deposition of EG Left and EG Right. (v) Ultrasonic Measurement of 1st and 2nd layers of electro-deposited EG Left and EG Right. **(e) Electro Polishing of EG Left and EG Right** **(f) Factory Acceptance** **(g) Packing, Loading, Transportation and un-loading** **(h) Site Acceptance**	1.000	Set			**0.00**	INR Zero Only
Total in Figures						**0.00**	INR Zero Only
Quoted Rate in Words		**INR Zero Only**					