	Title: Development and supply of “ <i>Large bore all-metal Vacuum Valve</i> ”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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Type of document	Expression of Interest (EOI)
IDM number	NA
References	As specified in the document
Current Document phase	Published
Current Document Version	Final
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Title	Development and supply of “ <i>Large bore all-metal Vacuum Valve</i> ”
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Author	ITER-India, IPR
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Distribution list	Open to All
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Written by	Reviewed by	Approved by
ITER India	ITER India	ITER India

Table of Contents

Abbreviations:.....	4
1 Section-I: Instructions to Bidders and Essential Eligibility Criteria	5
1.1 Instructions and Information to the Bidders	5
1.2 Tender Fee / EOI Fee & EMD.....	7
1.3 Pre-qualification Process.....	9
1.3.1 Pre-qualification steps	9
1.3.2 Schedule for pre-qualification	9
1.3.3 Pre-qualification criteria/ Essential Eligibility Criteria (EEC).....	10
1.3.4 Pre-requisite infrastructure	12
1.4 Process flow for Final award of Contract	13
2. Section – II Technical specifications and scope of supply and work	14
2.1 Preamble:	14
2.2 Scope and purpose of the document.....	16
2.3 Introduction and application of The Valve.....	16
2.4 Plan of the development and final delivery	17
2.5 Present design status of the design of the Valve	17
Sub-System 1: Sealing System:	21
Sub-System 2: Valve plate:	21
Sub-System 3: Casing and interfacing flanges:	21
Sub-system 4: Plate actuator:.....	22
Sub-System 5: Seal Protection System (SPS):	22
Sub-system 6: Locking system	24
Sub-system 7: I&C components.....	24
2.6 Material, welding, manufacturing and fabrication requirements	25
2.7 General analysis Requirements for the Valve	26
2.8 Summary of the key requirements for valve design	28
2.9 Quality Assurance (QA) requirements	31
2.10 Nuclear safety requirements.....	31
2.11 Clarification on the design responsibilities:	32
2.12 Scope of Work	34
2.13 Scope of Supply	35

	Title: Development and supply of “ <i>Large bore all-metal Vacuum Valve</i> ”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
--	---	-----------------------------------


2.14	Provisions for the multiple iteration in the design / manufacturing during the project execution.....	36
2.15	Classification, codes and standards.....	36
3	Section-III Bid Submission Content, Format & Instructions	39
3.1	Bid Submission Covers & Contents	39
3.1.1	Cover/Folder-1 Contents	39
4	List of Annexes	40

List of Tables

Table 1:	Schedule for pre-qualification.....	10
Table 2:	Essential Eligibility Criteria (EEC).....	10
Table 3:	Pre-requisite infrastructure	13
Table 4:	Chemical composition of X2CrNiMo17-12-2 controlled nitrogen.	25
Table 5:	List of applicable documents for FEA.....	27
Table 6:	Summary of key requirements for valve design	28
Table 7:	Classification, codes and standard requirements (I)	37
Table 8:	Classification, codes and standard requirements (II)	38
Table 9:	List of contents for Cover-1.....	39

List of Figures

Figure 1:	Isometric View of NB Cell.....	14
Figure 2:	Cross section of one NB injector.....	15
Figure 3:	Overall dimension of the Valve.....	16
Figure 4:	Flow chart- Plan of the development	17
Figure 5:	Conceptual design of the valve- pendulum type.....	18
Figure 6:	(top) Sealing interface between the Fast Shutter and the Drift Duct with the Absolute Valve; (bottom) Sealing interface between the Fast Shutter and Drift Duct with the Absolute Valve	20

	Title: Development and supply of “ <i>Large bore all-metal Vacuum Valve</i> ”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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Abbreviations:

DNB: Diagnostic Neutral Beam

NB: Neutral Beam

H&CD: Heating and Current Drive

ITER VV: ITER Vacuum Vessel

EOI: Expression of Interest

IO: ITER Organization

NDA: Non-Disclosure Agreement

RH: Remote Handling

DD: Drift Duct

FS: Fast Shutter

NBI PHTS: Neutral Beam Injectors Primary Heat Transfer System

LSD: Load Specification Document

FEA: Finite Element Analysis

D-T phase: Deuterium- Tritium phase

SPS: Seal Protection System

MIC: Mineral Insulated Cable

PED: Pressure Equipment Directive

PIA: Protection Important Activity

PIC: Protection Important Component

SIC 1: Safety Important Class 1

MIC: Mineral Insulated Cable


VQC: Vacuum Quality Class

QA: Quality Assurance

MIP: Manufacturing and Inspection Plan

QP: Quality Plan

MRR: Manufacturing Readiness Review


	Title: Development and supply of “ <i>Large bore all-metal Vacuum Valve</i> ”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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1 Section-I: Instructions to Bidders and Essential Eligibility Criteria


1.1 Instructions and Information to the Bidders

This EOI cum Pre-Qualification (PQ) document has been prepared for the pre-qualification of Bidders to participate in the tender titled **Development and supply of “Large bore all-metal Vacuum Valve”** In order to be considered for the pre-qualification, the Bidder should follow the instructions specified below:

- i. Bidders should carefully read the contents of this EOI cum PQ document and provide required information with sufficient details so that the capabilities of the applicant Bidder can be assessed fully.
- ii. EOI Documents are available on CPP Portal <https://eprocure.gov.in/eprocure/app> as well as ITER-India web site <https://www.iterindia.in/tenders> under “Opportunities for Industry/ITER India Tenders” menu select Public/Global Tender option for download.
- iii. **Bidders can submit registration form for Scope Appraisal meeting as per Annexure-1 through email (purchase@iterindia.in) on or before 06-11-2024.** ITER-India will hold Scope Appraisal Meeting (SAM) with interested bidders via on-line mode through MS Teams/off-line at ITER-India, Institute for Plasma Research, Block-A, Sangath Skyz, Bhat-Motera Road, Koteswar, Ahmedabad – 380005, Gujarat on **08-11-2024** – Time 10 am to 11:30 am to give explanation about the project, pre-qualification process and requirements. Link for on-line meeting will be shared with the registered bidders and information for same will be uploaded on our website. Clarifications required by Bidders will be discussed in the meeting. The participating Bidders in the Scope Appraisal Meeting (SAM) will inform ITER-India about their queries latest by **06-11-2024**.
- iv. Bidders should provide the required information, as given in prescribed formats. **Applications duly filled in / scan copies of original shall be uploaded in web site: <https://eprocure.gov.in/eprocure/app> before closing date and time of online submission of tender. No applications shall be received in physical form.**
- v. The applicant should sign each page on the application along with enclosures with rubber stamp before scanning / uploading.
- vi. Uploading of the offer document after the due date and time shall not be permitted. Closing date and Time being displayed on e-Tendering portal for bid submission shall be final and binding on the applicants/bidders.
- vii. All documents shall be in English Language.
- viii. All documents and other information supplied by ITER-India, and submitted by the Bidder to ITER-India shall remain or become the property of ITER-India. Applicants must treat all information provided by ITER-India as strictly confidential. Bidder should not copy any part of the document or figures to use for any other purposes. ITER-India will not return any pre-qualification documents submitted by the bidders.
- ix. All costs incurred by an applicant Bidder towards Scope Appraisal Meeting and preparing the documents shall be borne by the applicant Bidder, and ITER-India is not liable for such costs.

	Title: Development and supply of “ <i>Large bore all-metal Vacuum Valve</i> ”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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- x. Submittals will be assessed to ascertain that the Bidder possesses the experience and has required capability as mentioned Essential Eligibility Criteria (EEC) to carry out the scope of the tender.
- xi. ITER-India reserves the right to approach past clients of the applicant Bidders to confirm the claims of the bidders.
- xii. The technical details provided in this document are indicative and preliminary only. Firm and detailed information, specifications, drawings, scope of supply & work, applicable terms and conditions will be provided in the tender document. **The tender document will be issued only to the pre-qualified bidders.**
- xiii. Bidders will not be considered for pre-qualification, if they make misleading or false representations in statements, attachments and any other documents submitted as proof of the qualification requirements.
- xiv. Bidders applying for pre-qualification should note that this pre-qualification process is intended to provide preliminary information. The information contained herein shall not in any-way be construed as binding on ITER-India.
- xv. ITER-India reserves the right not to proceed with the pre-qualification procedure at any time without notice or liability.
- xvi. ITER-India will notify successful pre-qualified Bidders and also intimate bidders who are not pre-qualified with reasons for such dis qualification. It should be noted however, that ITER-India will not discuss any aspect of the evaluation process.
- xvii. Bidders are advised that ITER-India will not respond to enquiries or enter into communication concerning or relating to the selection process or to the pre-qualification procedure as otherwise described in the pre-qualification document.
- xviii. ITER-India may ask the Bidders any further information or clarification in writing for review of pre-qualification proof submitted by the bidders.
- xix. Bidders will not be required to submit on their own, additional information or material subsequent to the date of submission and such material if submitted will be disregarded. General responses such as “included in brochure” without specific item reference and information without summaries shall be avoided. It is essential that all pages of the submission should be uniquely numbered and used to cross reference the supporting documents.
- xx. The Bidder shall ensure that all the documents submitted are duly stamped, signed and numbered serially. Bidders must ensure that only relevant documents are attached with the bid/offer. The tender/bid must contain the name, designation and place of business of the person or persons submitting the bid.
- xxi. Fraud and Corruption – ITER-India, IPR requires that the Bidders engaged through this process must observe the highest standards of ethics during the performance and execution of the awarded project(s). The following terms apply in this context: ITER-India, IPR will reject the application for shortlisting, if the applicant recommended for short-listing, has been determined by ITER-India, IPR to having been engaged in corrupt, fraudulent, unfair trade practices, coercive or collusive. These terms are defined as follows: (a) "Corrupt practice" means the offering, giving, receiving or soliciting of anything of value to influence the action of ITER-India, IPR or any personnel during the tenure of

	Title: Development and supply of <i>"Large bore all-metal Vacuum Valve"</i>	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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empanelment. (b) "Fraudulent practice" means a misrepresentation of facts, in order to influence a procurement process or the execution of a contract, to ITER-India, IPR, and includes collusive practice among Bidders (prior to or after Proposal submission) designed to establish proposal prices at artificially high or non-competitive levels and to deprive ITER-India, IPR of the benefits of free and open competition. (c) "Unfair trade practices" means supply of services different from what is ordered on, or change in the Scope of Work which was agreed to. (d) "Coercive practices" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation during the period of empanelment. (e) "Collusive practices" means a scheme or arrangement between two or more Bidders with or without the knowledge of the ITER-India, IPR, designed to establish prices at artificial, non-competitive levels; ITER-India, IPR will reject an application for award, if it determines that the bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, unfair trade, coercive or collusive practices in competing for any assigned project during the tender/contract execution.

xxii. The Project Director, ITER-India reserves the right of selection or rejection of any or all Bidders.

xxiii. Submissions shall be made in documents addressed to,

Senior Officer (Purchase & Stores)
ITER-India, Institute for Plasma Research,
Block- A, Sangath Skyz, Bhat-Motera Road,
Koteshwar, Ahmedabad 380 005, Gujarat, India
Tel: + 91-79-2326 9656
E-mail: purchase@iterindia.in / rakhi.dharamdasani@iterindia.in

- The covering letter shall be titled '**Development and supply of *"Large bore all-metal Vacuum Valve"***' and clearly marked in English with following information:


Name of Applicant Bidder:
Name of Contact Person:
Contact Number (Tel, E-mail):
Copy Number (i.e. Original or Copy):

1.2 Tender Fee / EOI Fee & EMD


a) **Tender Fee: No tender fee is applicable for this tender**

b) **Earnest Money Deposit (EMD):** Bids must be submitted along with Earnest Money Deposit (EMD) for **INR 10,00,000.00 (Indian Rupees Ten Lakh only)** by a Demand Draft (DD) or through Real-time Gross Settlement (RTGS) or through National Electronic Funds Transfer (NEFT) or through Bank Guarantee (BG) as per the details mentioned below:

- The DD shall be drawn in favour of **Institute for Plasma Research A/c ITER-India** and payable at Ahmedabad, INDIA. Bidder's name and PQ-NIT number shall be indicated on the reverse side of the Demand Draft. **Scan copy of the DD to be uploaded on CPP Portal and the original DD must reach to the Senior Purchase Officer within 5 days from the due date for bid submission.** Demand Draft (DD) should not be prior dated to the date of EOI.

	Title: Development and supply of “ <i>Large bore all-metal Vacuum Valve</i> ”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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- ii) EMD in the form of Bank Guarantee (EMD-BG) on non-judicial stamp paper of appropriate value can be submitted as per the format given in **Annexure-6**. Scan copy of the EMD-BG to be uploaded on CPP Portal and **the original BG must reach to the Senior Purchase Officer within 5 days from the due date for bid submission.**
- iii) EMD can be submitted through RTGS / NEFT by bidders **prior to bid submission due date.**
- iv) The proof of payment of EMD i.e. DD/ RTGS/ NEFT/BG (scan copy) shall be uploaded with bid documents on CPP portal.
- v) All charges for DD/RTGS/ NEFT/BG shall be borne by the bidder.
- vi) Bank details of ITER-India for **RTGS/NEFT** are as mentioned below:
Beneficiary Name - Institute for Plasma Research A/c ITER-India
A/c No. 30360884053
State Bank of India
IPR Bhat Branch, Gandhinagar-382428
IFS Code : SBIN0010864
MICR : 380002096
- vii) EMD of unsuccessful bidder(s) in pre-qualification process will be returned, without any interest, within 30 days from the date of declaration of pre-qualification results by Purchaser.
- viii) EMD of successful bidders who qualify for tender award, will be returned, without any interest, within thirty days from the date of finalization of technically qualified L1 bidder.
- ix) EMD of technically qualified L1 bidder will be returned after award of Contract and receipt of error free Security Deposit Bank Guarantee as per Contract terms.
- x) The bidder shall submit along with EOI documents their account details, IFSC code, the name & address of his bankers and copy of cancelled cheque for refund of EMD and payment as applicable.
- xi) The EMD shall be forfeited if the bidder withdraws or amends or impairs or derogates from the submitted tender in any respect within the period of bid validity.
- xii) The bidder seeking EMD exemption, must submit the valid supporting document for the relevant category with the bid. Following categories of bidders are exempted from submission of EMD:
 - (a) Under MSE category, only manufacturers of offered goods are eligible for exemption from EMD. Traders are excluded from the purview of this Policy. Manufacturers for Goods who are seeking EMD exemption shall submit valid supporting document to this effect at the time of bid submission. Necessary

	Title: Development and supply of “ <i>Large bore all-metal Vacuum Valve</i> ”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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documents will be validated by the Purchaser including validation online through Udyam registration website of Ministry of MSME.

- (b) Start-ups as recognized by Department for Promotion of Industry and Internal Trade (DPIIT) are also exempted from submission of EMD subject to furnishing proof of valid registration/recognition certificate from DPIIT along with turnover details.

- (c) Seller registered with DPS- DAE and/or NSIC.

Such bidder shall have to upload scanned copy of relevant registration document along with their bid.

1.3 Pre-qualification Process

1.3.1 Pre-qualification steps

The steps involved in the process of pre-qualification are as follows.

Step-I: “Expression of Interest” is published nationally.

Step-II: ITER-India will hold Scope Appraisal Meeting (SAM) (ref [clause 1.1-iii](#)) with the interested bidders to make the bidder understand the project, pre-qualification requirements and any clarifications desired by Bidders. This will be an interactive meeting(s) where Bidders may also highlight the issues / clarifications they feel necessary during their presentation and can make innovative suggestion for the project.

Step-III: Following to the SAM, the Bidders shall submit ‘Response to EOI’ on-line through portal as per the pre-qualification requirement. The documents and information must be in the format asked for.

Step-IV: Expert committee of ITER-India evaluate the ‘Response to EOI’ submitted by Bidders against the pre-qualification EEC requirements as per Table 2. If it becomes necessary to seek clarifications from the bidders regarding EEC and any other terms and conditions, the same will be sought through email/online CPPP portal from the bidders. In such an event, the bidder will furnish all the required clarification to the Sr. Officer (Purchase & Stores), ITER-India, on or before the date fixed for submission of such clarifications, by ITER-India. If the clarifications sought for, are not received through email/online CPPP portal before the due date, such pre-qualification documents are liable to be rejected without any further notice. Purchaser shall not bear the responsibility of delay in receipt of required clarification(s). The evaluation process will be confidential.

Step-V: ITER-India declares the pre-qualified bidders and informs in writing to the qualified Bidders, based on the expert committee recommendations

1.3.2 Schedule for pre-qualification

The tentative schedule for the pre-qualification process is presented in Table 1 below.


	Title: Development and supply of “Large bore all-metal Vacuum Valve”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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Table 1: Schedule for pre-qualification

Sr. No.	Activity	Schedule
1	Expression of Interest is published nationally	15-10-2024
2	Deadline for Registration for the Scope Appraisal Meeting (SAM)	06-11-2024
3	ITER-India will hold Scope Appraisal Meeting (SAM) with the interested bidders	08-11-2024
4	Bidders submit documents online as per the EEC requirement (refer to Table 2) and EOI No.: I-I/EOI/AV/PQ-01/2024-25 to ITER-India	Between 20-11-2024 and 03-12-2024
5	Declaration of qualified Bidders by ITER-India	Will be notified


NOTE: If there is any change in the above specified dates, the same will be intimated by ITER-India.

1.3.3 Pre-qualification criteria/ Essential Eligibility Criteria (EEC)

The Bidder applying for pre-qualification against the EOI (vide EOI No.: I-I/EOI/AV/PQ-01/2024-25 DATED 15-10-2024) must satisfy the following EEC [Table 2](#) Table 2: Essential Eligibility Criteria (EEC). A documentary proof in this regard has to be submitted in the format described in the EOI document.


Table 2: Essential Eligibility Criteria (EEC)

Sr. No.	Criteria for Technical / Professional Capacity, Competency, Experience and financial competency	Documentary evidences to be submitted in response to EOI
1	The bidder shall be any Indian Entity	Company registration certificate or other relevant document
2	The Bidder shall have valid ISO 9001:2015 certification.	Valid ISO 9001:2015 certificate
3	<p><u>Experiences (Each of the <u>experience listed below shall be within 15 years as on the date of issue of this EOI</u>):</u></p> <p>(i) The Bidder shall have designed and manufactured valve complying with ASME Sec III NB or ASME Sec III NC or RCC-MR</p> <p>(ii) The bidder shall have designed and manufactured valve of at least 1.6 meter bore diameter</p>	<p>For each of the mentioned criteria (i) to (v), separate evidences shall be provided as below:</p> <p>Copy of unpriced PO / contract, technical document (which establishes the mentioned criteria) and Work completion certificate issued by the client / dispatch clearance /</p>

	Title: Development and supply of “ <i>Large bore all-metal Vacuum Valve</i> ”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
--	---	-----------------------------------

	<p>(iii) The bidder shall have designed and manufactured metal seated / metal sealed valve.</p> <p>(iv) The bidder shall have designed and manufactured valve of 200 mm dia or higher and was tested for He leak tightness at least of the order of 10^{-7} mbarl/s</p> <p>(v) The bidder shall have experience in seismic design of valve</p>	<p>acceptance test report approved by the client or its TPI. Bidder can submit single PO which complies with any 2 or more type of experience jointly.</p> <p>For criteria (v) Copy of PO / contract, technical document (which establishes the seismic design through FEA / calculation) approved by client / Third Party Inspection Agency (TPIA)</p>
4	<p>Infrastructure: Clean room with min. ISO class 7 certification with size of at least area of 120m²</p>	<p>Photograph(s) along with general area drawing (which shall bring out the size of clean room) of the clean room and with valid certificate (issued by independent certification agency) to establish the clean room with min. ISO class 7 certification with size of at least area of 120m²</p>
5	<p>Commercial: Average yearly turn-over of min 40Crore INR for last three FY (FY 2020-21, 2021-22, FY 2022-23)</p>	<p>Audited financial statement / CA certificate for respective FY</p>

- a. Preference to Make In India (MII): Preference shall be given to Class-I Local Supplier as defined in Public Procurement (Preference to Make In India) Order 2017, as amended from time to time and its subsequent orders/notifications issued by concerned Nodal Ministry for specific goods/products. The minimum local content to qualify as Class-I (minimum 50% currently) or Class-II Local Supplier (minimum 20% currently) is as per Government notification no. P-4501/2/2017-PP (BEII) dated 16.09.2020 issued by Ministry of Commerce & industry in this regard. **Only Class-I Local Suppliers and Class-II Local Suppliers are eligible to bid for this enquiry.** Non-Local Suppliers are not eligible to bid for this tender. Government notification no. P-4501/2/2017-PP (BEII) dated 16.09.2020 shall apply for this tender.
- b. Class-I Local Suppliers and Class-II Local Suppliers will submit duly signed Self-certification under preference to Make in India order on their letter head as per **Annexure-4** along with the offer/bid failing which bid may not be considered for further evaluation.
- c. Purchase preference will be given to MSEs having valid Udyam Registration and whose credentials are validated online through Udyam Registration portal as defined in Public Procurement Policy for Micro and Small Enterprises (MSEs) Order, 2012 dated 23.03.2012 issued by Ministry of Micro, Small and Medium Enterprises and its subsequent Orders/Notifications issued by concerned Ministry. If the bidder wants to avail themselves of the Purchase preference, the bidder must be the manufacturer / OEM of the offered product on GeM. Traders are excluded from the purview of Public Procurement Policy for Micro and Small Enterprises and hence resellers offering products manufactured by some other OEM are not eligible for any purchase preference.

	Title: Development and supply of “ <i>Large bore all-metal Vacuum Valve</i> ”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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- d. Any bidder from a country that shares a land border with India¹, excluding countries as listed on the website of the Ministry of External Affairs², 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 Bidder is registered³ with the Registration Committee constituted by the Department for Promotion of Industry and Internal Trade (DPIIT). Bidders shall enclose the certificate in this regard as per **Annexure-5**.
- e. In Bids for Turnkey contracts, including Works contracts, the successful bidder shall not be allowed to sub-contract works to any contractor from such Restricted Countries unless such contractor is similarly registered. In such cases, the bidders shall enclose the certificate as per **Annexure-5**.
- f. If Bidder has proposed to sub-contract Services or incidental Goods directly/ indirectly from the vendors from such countries, such vendor shall be required to be registered with the Competent Authority. However, if Bidder procures raw material, components, and sub-assemblies from such countries' vendors, such vendors shall not require registration.

"Bidder from such Restricted Countries" means: -

- An entity incorporated, established, or registered in such a country; or
 - A subsidiary of an entity incorporated, established, or registered in such a country; or
 - An entity substantially controlled through entities incorporated, established, or registered in such a country; or
 - An entity whose beneficial owner is situated in such a country; or
 - An Indian (or other) agent of such an entity; or
 - A natural person who is a citizen of such a country; or
 - A consortium/ joint venture where any member falls under any of the above
- g. **No exemption with respect to “Experience Criteria” and “Turnover Criteria” will be given to Micro or Small Enterprise (as per latest definitions under MSME rules) and to Start-up recognized by Department for Promotion of Industry and Internal Trade (DPIIT).**

1.3.4 Pre-requisite infrastructure


This being long-term R&D developmental contract with very stringent quality requirements and the valve needs to be manufactured complying to French nuclear requirements, the bidder is required to have the following infrastructure ([Table 3](#)) in-house. The necessary evidences as mentioned below shall be provided in response to this EOI.

Bidder shall note that, in case such facilities (listed in Table 3) are not available at the time of EOI, the same shall be established till the time of bid submission against Tender. This shall be further assessed by ITER India representative by visiting the facility of bidder as a part of tender evaluation process.

¹<https://mea.gov.in/india-and-neighbours.htm>

²<http://meadashboard.gov.in/indicators/92>

³<https://dipp.gov.in/sites/default/files/Revised-Application-Format-for-Registration-of-Bidders-15Oct2020.pdf>

	Title: Development and supply of “Large bore all-metal Vacuum Valve”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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In case of the failure of meeting the above requirement and not receipt of the necessary evidences within the stipulated time, the bidder shall be considered technically disqualified and subsequently it will result in rejection of the bid.

Table 3: Pre-requisite infrastructure

	Infrastructure required	Evidences to be submitted in response to EOI or to be submitted along with technical bid against tender document
1	In-house precision machining center capable of handling size of at least 1m x 1.5m.	Details of machine which establishes the Inhouse precision machining center capable of handling size of at least 1m x 1.5m.
2	Inhouse Precision measurement capabilities (Laser tracker / table top CMM / portable CMM/ equivalent) that can measure dimensions up to 3m.	Details of precision measurement instrument which establishes the inhouse Precision measurement capabilities (Laser tracker / table top CMM / portable CMM/ equivalent) that can measure dimensions up to 3m.

1.4 Process flow for Final award of Contract

The proposed plan includes the following steps till the award of contract.

Step-1: Publication of Eoi

Step-2: Scope Appraisal Meeting

Step-3: Submission of EEC document (Table 2) against EOI by bidder

Step-4: Evaluation of EEC documents by ITER-India and announcement of pre-qualified bidders by ITER-India, IPR

Step-5: The tender document for the tender titled ‘Development and supply of “Large bore all-metal Vacuum Valve”’ shall be issued to the pre-qualified bidders

Step-6: Pre-bid meeting with the pre-qualified bidders to clarify the queries raised by them

Step-7: (a) Submission of Technical and commercial (except price) bid including documents against pre-requisite infrastructure as per Table 3 in one folder/part (called as techno-commercial bid) (b) Submission of Price bid in another folder/part.

Step-8: Opening and evaluation of techno-commercial bid by ITER-India

Step-9: Announcement of techno-commercially qualified bids to qualified bidders

Step-10: Opening of price bid of techno-commercially qualified bidders.

Step-11: Contract for ‘Development and supply of “Large bore all-metal Vacuum Valve” ‘ will be awarded to the techno--commercially qualified bidder with lowest price.

2. Section – II Technical specifications and scope of supply and work

2.1 Preamble:

ITER Organization and ITER India

ITER Organization (Entity responsible for executing ITER Project) based at St. Paul lez Durance, Cadarache, France is the end user of the 1.6 m bore diameter valve under narration in this EoI.

The objective of ITER is to demonstrate the scientific and technological feasibility of nuclear fusion energy for peaceful purposes. The seven ITER partners are China, European Union (host country), India, Japan, South Korea, Russia and United States of America. Further details about ITER Project can be found on <http://www.iter.org>.

As part of the commitment to ITER Project, ITER-India intends to procure and supply one Large bore all-metal Vacuum Valve to ITER Project for Diagnostic Neutral Beam (DNB) System.

The Neutral Beam (NB) System of ITER and position of “The Valve” in the NB system

The Neutral Beam system for ITER consists of two heating and current drive (H&CD) NB injectors and a diagnostic neutral beam (DNB) injector. The DNB shares port #4 with the H&CD NB. As they are directly coupled to the ITER vacuum vessel, the injectors are extensions of the primary confinement barrier of radioactive materials coming from the vacuum vessel. See [Figure 1](#) and [Figure 2](#).

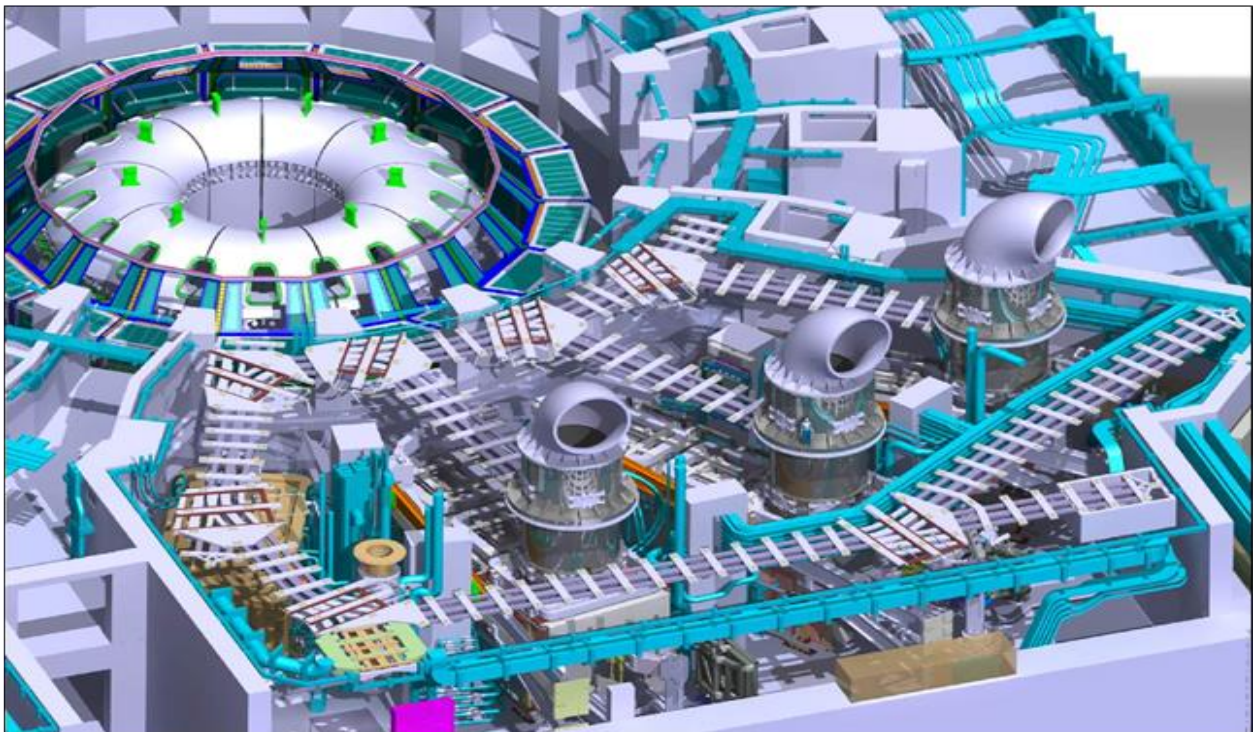


Figure 1: Isometric View of NB Cell

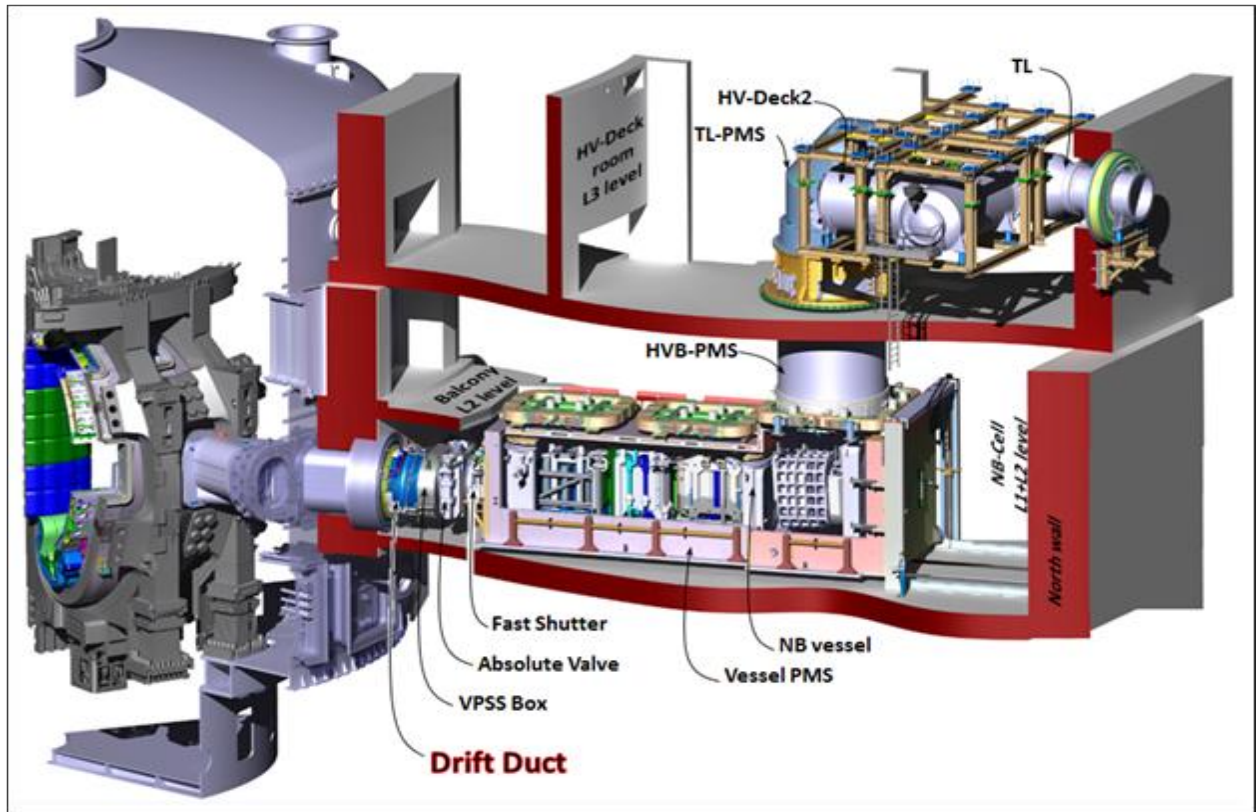


Figure 2: Cross section of one NB injector

DNB injector is connected to the Torus primary vacuum via “Large bore all-metal Vacuum Valve (**The Valve**)”, as shown in Fig. 1, that provides isolation between the ITER VV and the DNB Vessel. This component shall provide the primary vacuum containment for this section of the NB system and therefore provides a part of the first confinement barrier of the in-vessel radioactive inventory.

The following needs to be noted:

The tasks as defined in this document will be of developmental in nature. Hence the interactions will be required between the pre-qualified suppliers and ITER-India in the finalization of the best suited design of the valve and the actuator. The design and the finalization of the valve procurement specifications will progress simultaneously to achieve the best optimized design and layout within the constraints. Further, the pre-qualified suppliers are required to involve in the technical discussions leading to the finalization of procurement specification. The specifications in this document are preliminary and the final procurement specifications will be issued to the pre-qualified suppliers as part of tender document.

The pre-qualified suppliers are required to support ITER-India in the finalization of procurement specifications without any cost to ITER-India.

2.2 Scope and purpose of the document

This document describes the requirements for the pre-qualification of Bidders to participate in the tender titled ‘Development and supply of -Large bore all-metal Vacuum Valve’. In order to be considered for the pre-qualification, the Bidder should follow the instructions provided in the document.

“Large bore all-metal Vacuum Valve” shall be referred as ‘The Valve’ hereafter in this document.

2.3 Introduction and application of The Valve

The valve is typically installed between two high vacuum systems to isolate each other for different operational scenarios.

Typical dimensions and constraints of the Valve:

- Required dimension: Nominal bore diameter is 1600 mm
- Dimensional constraints / Space Envelope for design: The overall space envelop available is as mentioned in [Figure 3](#).

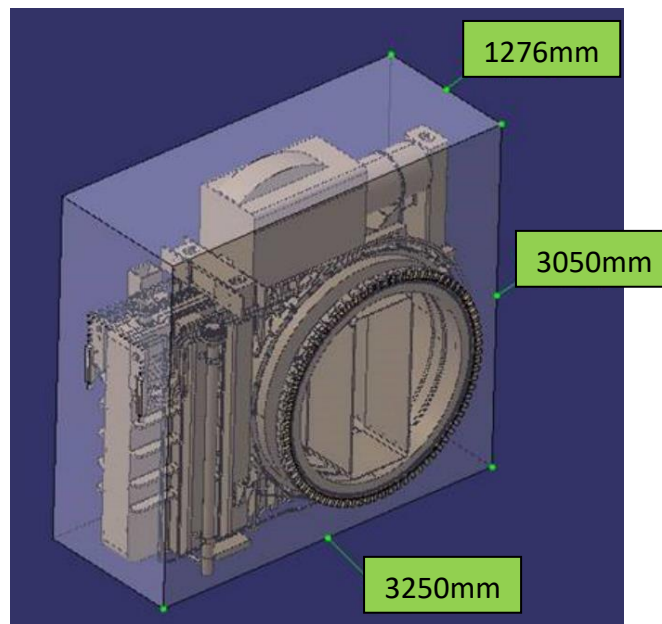


Figure 3: Overall dimension of the Valve

2.4 Plan of the development and final delivery

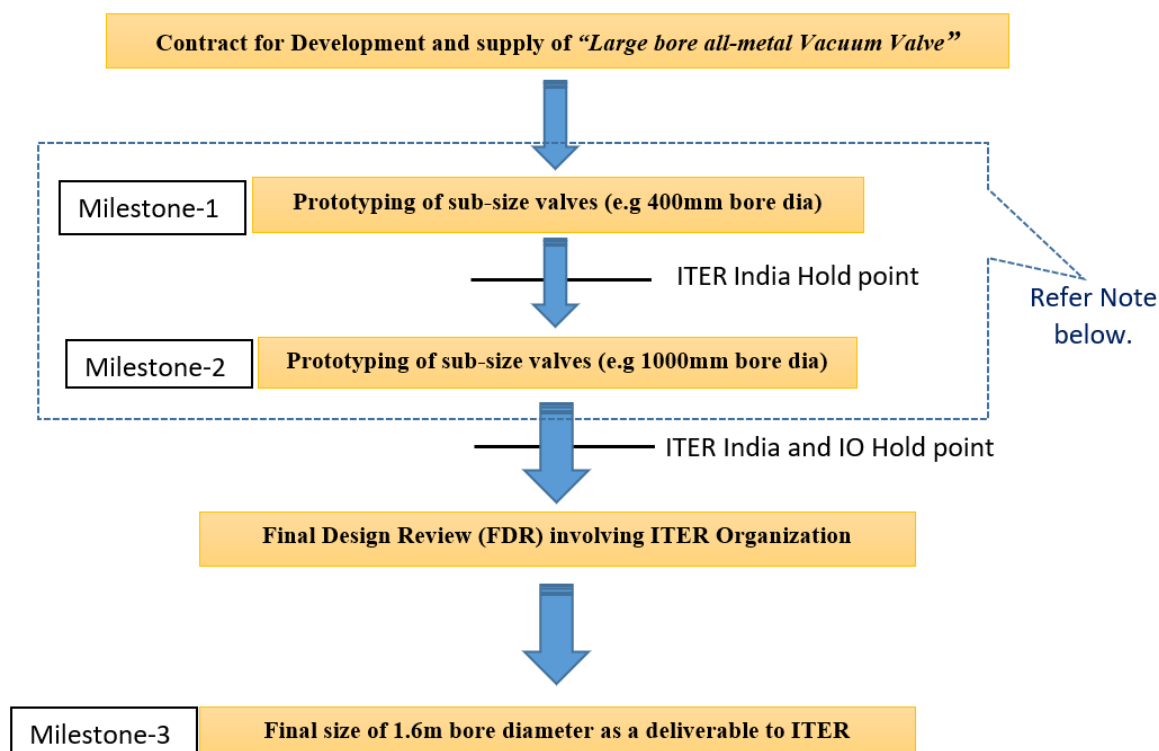


Figure 4: Flow chart- Plan of the development

The above chart (See [Figure 4](#)) shows only the global plans of the project tentatively. There would be several sub-steps, phases and intermediate milestones in form of prototypes / functional mock-ups, developments which are required to accomplish the technical specification requirements, scope of supply and scope of work identified in this EOI.

Note: Number of intermediate milestones and size for each milestone are indicative. Bidder may propose the alternative (if any) keeping the final size and functionality in view, in response to this EOI. ITER-India will take final decision on number prototyping of valves before issuing the tender document to the pre-qualified bidders.

2.5 Present design status of the design of the Valve

Considering the critical requirements of the valve, ITER invested in the conceptual design and the available conceptual design details will be shared to the successful bidder (contractor) after signing of Non-Disclosure Agreement (NDA). Following sections describe the conceptual configuration of the valve. The bidder may propose alternate design, meeting the functional requirements.

Conceptually, the valve design is a pendulum type valve (See [Figure 5](#)) with a nominal bore dimension of 1600 mm. As per the present configuration, axial length of 760 mm between the

outer faces of the casing; overall width of the valve is 3120 mm with edge of the rectangular pocket being 2140 mm from the axis of the valve bore.

Dimensional constraints are as mentioned in [clause 2.3](#), [Figure 3](#) above. The valve plate is suspended from a pendulum and carries a pair of all-metal seal rings.

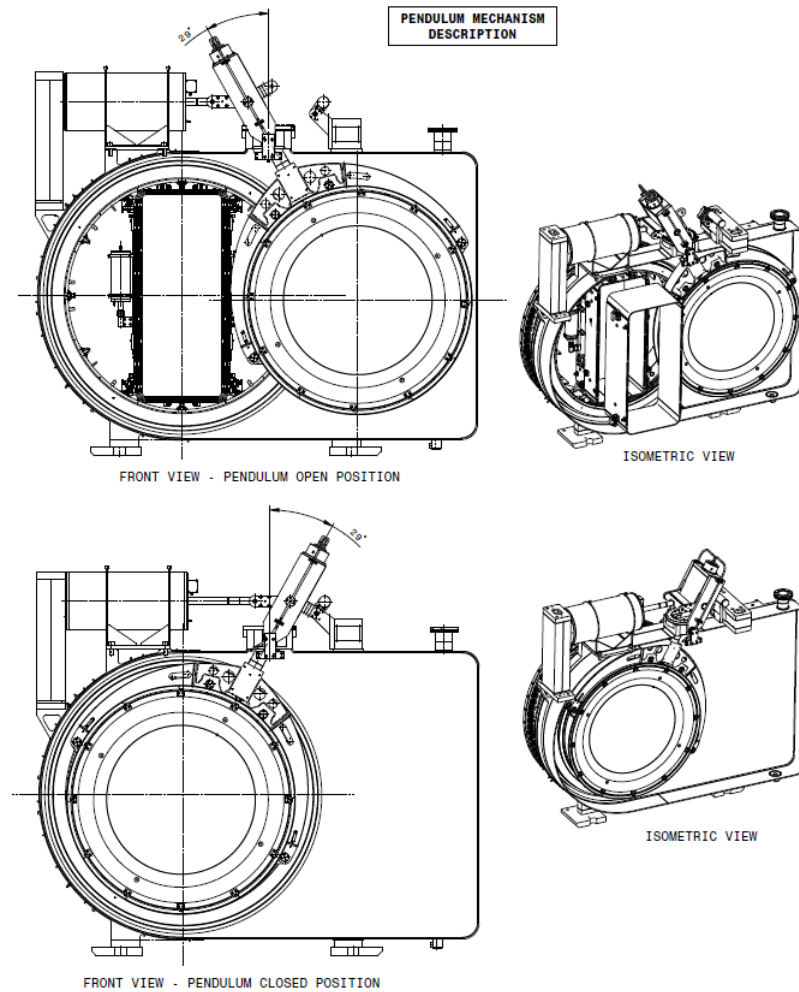



Figure 5: Conceptual design of the valve- pendulum type

	Title: Development and supply of “ <i>Large bore all-metal Vacuum Valve</i> ”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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Basically, the Valve conceptual design can be split in sub-systems defined as below:

- Sub-system 1: Sealing System
- Sub-system 2: Valve plate
- Sub-system 3: Casing & Interfacing flanges
- Sub-system 4: Plate actuator system
- Sub-system 5: Seal Protection System
- Sub-system 6: Locking system
- Sub-system 7: I&C work package

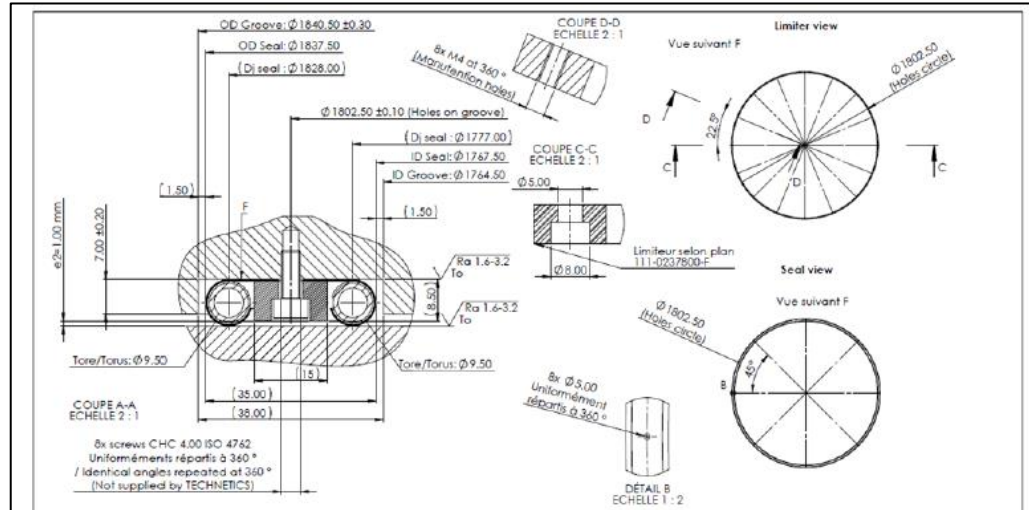
The re-use of this sub-systems division is not mandatory; the bidder can propose any suitable design and sub-systems compliant with the ITER requirements defined in this document (and further will be elaborated in the tender document).

The valve is connected to the Fast Shutter and to Drift Duct (both are out of scope of the present EOI). Both these interfaces consist of similar flanges with a bore diameter of 1,600 mm to a standard design compatible with the NB cell RH equipment.

The Valve interfacing flanges (*Sub-system 3*) **shall** be compatible with:

- Flange for Drift Duct (DD) on one side
- Flange of fast Shutter (FS) on the other side

The sealing solution adopted by IO and the RH requirements for these two pairs of flanges has been defined, along with associated remote handling procedures and tooling. The interfaces flanges design has already been frozen. The Absolute Valve **shall** integrate these interfacing flanges with the sealing system already defined by IO (spring energized metallic seal (see [Figure 6](#)). In the conceptual design of the Valve, flange interface with the two neighboring components (DD on one side and FS on other side) are identical.



Type	HNRD229 U	
ϕ Tore (mm)	Tore intérieur / ID, tofus	Tore extérieur / OD, tofus
ϕ Torus	9,5	9,5
Revêtement d'étanchéité / Sealing lining	Argent	Argent
Revêtement intercalaire / Inner lining	304L	304L
Ressort / Spring	Inconel 718 (H ¹)	Inconel 718 (H ¹)
e2 (mm)	1	1
Y2 (N/mm)	285 (+/-10%)	285 (+/-10%)

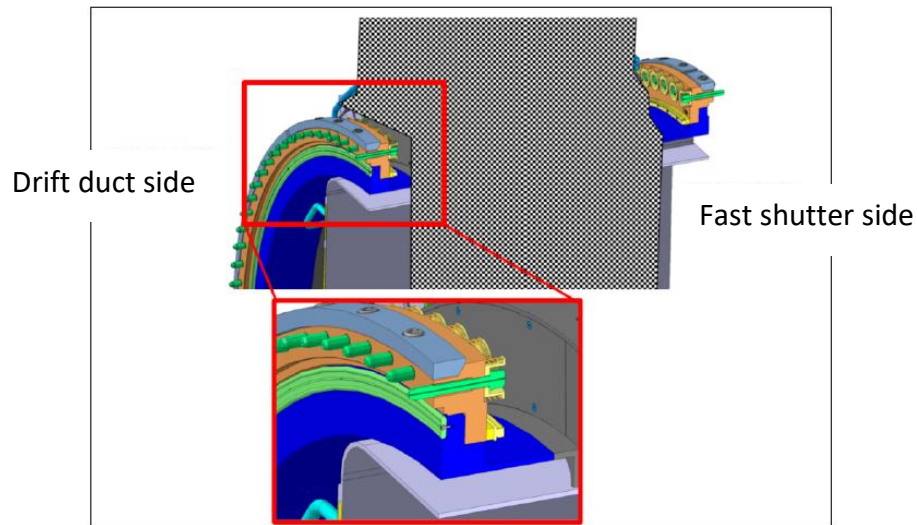



Figure 6: (top) Sealing interface between the Fast Shutter and the Drift Duct with the Absolute Valve; (bottom) Sealing interface between the Fast Shutter and Drift Duct with the Absolute Valve

Design of the flanges at the interfaces shall be supplied in form of CATIA model at the time of tender.
The maximum Weight of the Valve shall be less than 10 tons.

	Title: Development and supply of “ <i>Large bore all-metal Vacuum Valve</i> ”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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The Valve services include:

- coolant from the NBI PHTS
- system, pneumatic actuator “air” lines,
- Power-electric connections from casing and seal seat ring heating systems
- Connections for I & C systems.

(Details of the above shall be provided in the tender document)

The Valve will be connected to the Service Vacuum System in order to monitor any interspaces used for double seals, double bellows, etc , when needed.

Sub-System 1: Sealing System:

The contractor **shall** present a clear proposal of a full metallic sealing system during the design phase.

In order to comply with the Vacuum boundary requirement and the first confinement barrier of the in-vessel radioactive inventory requirements, the sealing system **shall** be a full metallic system.

The technology and engineering of an all metal gate valve with a diameter of 1.6 m, **shall** be compliant with high vacuum, with the required maximum leak rate when sealed of $1 \times 10^{-8} \text{ Pam}^3/\text{s}$.

The sealing system **shall** withstand accidental over pressurisation to 0.2 MPa.

As the plate and seals become first confinement barrier, they **shall** withstand CAT. III load cases defined in the Load Specification Document (LSD) [LSD will be provided along with tender].

A seal actuation system may be used to drive the compression of the seals; this system **shall** be compliant to the technical requirements defined in this document.

Sub-System 2: Valve plate:

The contractor **shall** present a clear proposal of a Valve plate during the design phase.

It **shall** be capable of bearing a pressure differential of up to 0.2 MPa in upset operating conditions. This load case (valve closed) is clearly identified in the LSD. To protect the plate from the plasma radiation load, water cooled heat shield **shall** be added to the downstream, plasma facing side.

Sub-System 3: Casing and interfacing flanges:

The contractor shall present a clear proposal of a casing (including interfacing flanges) compliant with the NB cell environment during the design phase.

The valve casing **shall** provide first confinement functionality in all operational valve states.

This functionality is also required under normal & upset operating conditions and **shall** be maintained during emergency and faulted scenarios to prevent releases in excess of the guidelines established for accidents. The Valve (overall envelope – casing) shall ensure the confinement for tritium

The integration of the Absolute Valve in the Beam line **shall** not result in any significant constraint of the casing against thermal expansion.

The casing and flanges **shall** withstand the combination loads defined in the LSD.

The material of the casing **shall** be complaint with [Clause 2.6](#) of this document.

The Valve casing shall integrate the interface handling feature (lifting point) according to Remote Handling Code of Practice (RHCP) [this shall be provided along with the tender document). The Valve shall have at least three lifting points of identical design to the crane twist-lock fittings. The horizontal triangle, made by the 3 lifting point centres shall enclose the Valve centre of gravity.

Re-ionised “heat” loads (as defined in LSD) can affect internal parts of the Valve. The Valve shall be equipped by a system that protect the parts exposed to these heat loads, this system is likely to be actively cooled.

The internal cooling system of the Valve shall comply to the draining strategy defined in the memorandum [to be provided along with tender document).

The Valve casing shall also comply to the same draining strategy defined in the memorandum (to be provided along with tender document).

The Valve casing shall be baked at a temperature greater than 180°C with a pressure of 0.01MPa (vacuum). Baking system of the Valve shall be designed to perform up to 500 times in the life of ITER without any maintenance on the Valve. from the commissioning phase to the end of life. The design needs to be validated established through FEA. During D-T pulse operation, the estimated baking cycles are 40.

All other surfaces of the Valve, exposed to the primary vacuum shall be baked at a temperature greater than 180°C.

[Sub-system 4: Plate actuator:](#)

Opening and closing times shall be typically less than 10 minutes for each operation

Code and standards and classification of this sub-system shall be defined according to section 16 of this document.

This sub-system shall withstand the loads defined in LSD.

[Sub-System 5: Seal Protection System \(SPS\):](#)

As introduced in the section above, a significant thermal load (see LSD) called Re-ionisation can affect some internal parts of the valve.

The re-ionised power inside the valve has been defined regarding several potential scenario of the gas profile inside the NB ducts. The results of re-ionization inside the valve are defined in the LSD.

The requirements on the sub-system 5 will mainly depend on the proposal of the Sub-systems 1 and 2 developed by the contractor. The sealing system may not have to be protected, against re-ionisation heat loads, depending on the design proposal.

In this section, it is assumed that the design proposal of sub-system 1 and 2 are such that sealing systems are affected by re-ionisation heat loads and SPS is required.

A design proposal of the SPS shall be developed to protect the valve internal parts potentially affected by these re-ionised loads. This design proposal is likely to be actively cooled; the cooling system shall be defined accordingly. The layout of the design proposal shall eliminate upstream facing edges and makes some allowance for beam divergence.

The SPS shall also provide protection for the seals and seats of the valve against dust transmitted (mainly during beam operations) when the valve is opened.

The conceptual design of the SPS is a liner made of two rectangular static ducts and a sliding shutter, located inside the bore of the valve, without flexible hoses or pneumatic actuators on the downstream duct (the ITER VV side) as they are not allowed.

This liner protects the seals and seats and VALVE bore from divergent beam energy and re-ionised particles and, more importantly, shuts the gap between the two sides of the valve (when it is opened) preventing deposition and accumulation of dust on the seals and seats area located at the bottom of the VALVE.

The sliding shutters of the Seal Protection System shutters have to be capable of a linear movement of 125 mm. This in order to close fully the gap when the valve is opened. As well, they shall also open to a position just beyond the end stop contact faces of the seals to allow the necessary clearance when the valve plate is being closed.

The linear movement of each shutter is driven by means of two bi-directional pneumatic actuators located inside the main cylindrical conduit of the VALVE.

The pneumatic actuators shall be compatible with the vacuum environment and the vacuum requirements [will be detailed in the tender document].

The moveable shutters slide inside the fixed ducts and have internal dimensions equal to those specified for the beam envelope: 1,457 mm high by 597 mm wide with a 30 mm corner radius.

The valve SPS can be served by the NBI PHTS (high resistivity) cooling circuit. It has the following properties:

- Operational Inlet pressure 2.2MPa (+/-0.2MPa) => 2.4 MPa (absolute)
- Max Operational inlet temperature. 38°C
- Max outlet temp. <90°C
- resistivity >5 MΩ.cm

In case of maintenance, on the NB line, the SPS shall be designed to be dried with hot gas; the pressure of this hot gas has been designed to not have an impact on the PED classification of the SPS - see LSD.

Sub-system 6: Locking system

In order to prevent accidental openings during maintenance operation in the neutral beam injector, a locking system shall be implemented. This locking system is defined as PIC-SIC 1 component.

As SIC1 component, two position indicators for the valve plate in fully opened position and two position indicators for VALVE plate in fully closed position shall be implemented to provide a redundant signal to state the position of the locking rod of the valve plate.

The conceptual design is based on locking being achieved with a normally closed (spring closed) pneumatic actuator which opens with 6 bar (g) air pressure once the pendulum arm is closed position confirmed by its position sensor.

A stainless steel rod is guided through bushings, ridged enough to guarantee it's function even when the pendulum arm is accidentally opened. Two position indicators for open and two position indicators for closed position provide a redundant system to state the position of the locking rod.

The contractor is free to propose any design proposal of the locking system compliant with the requirements of this technical specification and the SIC-1 classification of the locking system.

Sub-system 7: I&C components

Thermocouples, electrical heaters, position indicators are likely to be used on the Valve design to comply with the different requirements of the sub-systems defined in the document.

Thermocouples placed at the inlet and at the outlet of the DD liner cooling pipe, shall allow calorimetry.

As there is no possible maintenance once the Valve is installed, the redundancy of each heating element shall be implemented if used on the design of the contractor, for the baking requirements.

In case of failure on one heating element, the second one can be connected in the electrical room and the complete assembly can continue to work normally.

Cable Assemblies and Cables shall be made only of the specified materials (to the standard relevant for the initial form of the material). Detailed material listing shall be provided along with the tender document.

The supplier shall design the Mineral Insulated Cables (MICs) in accordance with the requirements of this technical specification.

The MICs shall be Mineral Insulated type.

The MICs shall be compliant with the following conditions of use:

- Normal operating pressure: Vacuum
- Vacuum Quality class: VQC1-B
- Normal operating temperature: 550°C (when baking in operation)
- Maximum temperature: 650°C

The MICs shall be compliant with the ITER Vacuum Handbook requirements applicable to their VQC classification.

2.6 Material, welding, manufacturing and fabrication requirements

All the materials for use in vacuum shall respect the requirements from chapter 5 of the Vacuum Handbook (will be provided to the successful bidder).


The Valve Stainless Steel (SS) shall be the X2CrNiMo17-12-2 controlled nitrogen (the X2CrNiMo17-12-2 controlled nitrogen is described in the RCC-MR Code Section A3.1S)

The chemical composition determined by ladle and product analyses of X2CrNiMo17-12-2 controlled nitrogen shall comply with the requirements given in Table 4 below.

Table 4: Chemical composition of X2CrNiMo17-12-2 controlled nitrogen.

Chemical composition, X2CrNiMo17-12-2 controlled nitrogen	Content in Wt. %
<i>Elements</i>	<i>Range or Max</i>
Fe	balance
C	0.030
Mn	1.60 - 2.00
Si	0.50
P	0.030
S	0.015
Cr	17.00 - 18.00
Ni	12.00 – 12.50
Mo	2.30 – 2.70
N	0.060-0.080
Cu	1.00
B	0.0020
Additional ITER specific requirements:	
<i>Elements</i>	<i>Range or Max</i>
Co	0.05
Nb	0.01
Ta	0.01
Ti	0.10

All welds of the casing which provides the first confinement barrier shall be identified in the IO Template (will be provided to the successful bidder).

	Title: Development and supply of “ <i>Large bore all-metal Vacuum Valve</i> ”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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The manufacturing feasibility shall be clearly demonstrated. As first confinement barrier, the casing of the Valve shall be developed and manufactured in accordance of the code and standards defined in this clause. This component shall be designed according to RCC-MR class 2.

In addition to the requirements in the applicable nuclear manufacturing codes, the contractor has to ensure the vacuum Tightness of the valve with metallic seals.

For the manufacturing of the in-vessel components (in the case of the valve, this correspond to the internal system which are not part of the first confinement barrier) generally there are two types of technical procedures:

1) Manufacturing procedures for parts or components which are addressed by conventional Codes and directive requirements:

These procedures are typically related to conventional welding, brazing joining, and NDT. The related specifications shall be prescribed in accordance with Code or Directive or Order requirements. To be compatible with ESP and ESPN requirements, the recommended manufacturing Code is EN 13445.

2) Manufacturing procedures for parts or components which are not addressed by conventional Code requirements:

For this type of manufacturing procedures ITER specific Technical Specification Documents shall be prepared or they will be defined in the Procurement technical specification Documents. The justifications shall be supported by R&D.

Note: The raw material for the prototype and intermediate milestones may be of conventional SS304L grade (3.1 material certificate and material procurement according to ASME)

2.7 General analysis Requirements for the Valve

The contractor **shall** carry out the design, calculation and analysis (FEA) complying to ITER Load specifications and applicable codes & standards (RCCMR-2007, boiler and pressure vessel code, etc.) and submit the documentation and reports to ITER-India for review and approval.

The contractor shall use the instructions and guidelines for structural analysis and structural analysis reports given in the

Table 5 below. All these documents shall be provided to the successful bidder.

Table 5: List of applicable documents for FEA


Applicable document	
Instructions for Structural Analyses	Instructions for Structural Analyses
	Procedure for Analyses and Calculations
	Template for structural analysis reports
	Software Qualification
Instructions for Seismic Analyses	Instructions for Seismic Analyses
	Procedure for Analyses and Calculations
	Template for seismic analysis reports
	Software Qualification Policy
Instructions for CFD Analyses	Instructions for Computational Fluid Dynamics Analyses
	Procedure for Analyses and Calculations
	Template for CFD analysis reports
	Software Qualification Policy

2.8 Summary of the key requirements for valve design


Table 6: Summary of key requirements for valve design

Valve overall dimensions (maximum, about beam axis) (Maximum Limit for Dimensions)	Horizontal width ~3250 mm Height ~3000 mm Length (along beam axis from flange to flange) ~1250 mm Nominal bore diameter: 1600mm mm All numbers including piping
Weight conditions	< 10 tons
Duct dimension (Major axis vertical)	Vertical 1457 mm Width 597 mm
Operational conditions	Valve in open position during ITER operational periods, typically many weeks. Valve closed for planned maintenance of the caesium oven. For this planned maintenance it is expected to close the AV ones per year.
Operation of the valve	The valve will be operated and controlled by the vacuum systems. The valve position signal (open / closed) shall be provided. It will be managed by the central vacuum control system. Signal for temperatures of the valve and for the shield (SPS) temperatures shall be provided.
Opening and closing times	Typically, 10 minutes for each operation.
Type of seal and seat	Metallic with metal to metal interface
Maximum leak rate for absolute sealing across absolute valve	Maximum leak rate $\leq 1 \cdot 10^{-8}$ Pa·m ³ /s for 100 cycles. (at a pressure difference of 1 atmosphere)
Maximum single leak rate for absolute sealing across one seal	$\leq 1 \cdot 10^{-5}$ Pa·m ³ /s (at a pressure difference of 1 atmosphere) and a pumped interspace to 100 Pa

Maximum allowable leak rate of the casing of the AV	1E-10 Pa.m ³ /s air equivalent from exterior atmosphere to internal vacuum.
Valve interspace pressure	To be vacuum pumped to <100 Pa so that the overall leak rate will be met with the single leak rates for 100 cycles.
Maximum leak rate for low conductance operation	For low conductance operation a maximum leak rate of 10 ⁻² Pa.m ³ /s for about 3000 cycles is required.
Valve interspace surface temperature	Operation: <100°C
Valve interspace surface area	To be defined during finalization of design
Valve interspace volume	To be defined during finalization of design
Baking temperature	Casing to 200°C
System replacement period	≥ 20 years as it is RH class 3
Normal operating temperature	Seal Protection System water cooled with 38 °C inlet temperature and a ΔT of 50 °C
Pressure requirements	
Identified operational scenarios call for the valve to sustain a bi-directional maximum pressure differential of 2 bar across the valve, acting as an absolute seal between the ITER VV and the Neutral Beam Vessel.	
Max. design pressure external	0.16 MPa
Max. design pressure internal	0.2 MPa
Radiation	
At the absolute valve	Typically, 10 Sv/h during operation but may be reduced due to shielding from ITER vacuum vessel and blanket
Magnetic field	B = 75 mT
Materials	

	Title: Development and supply of “ <i>Large bore all-metal Vacuum Valve</i> ”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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Overall system	All components to be metallic. Typically, stainless steel AISI 316LN.
Heat loads	
Radiation from the plasma (to the gate when AV closed)	~500 W/m ² , due to Bremsstrahlung, synchrotron and impurity radiation
Nuclear heating	0.008 W/cm ³
Fail safe position	Open

	Title: Development and supply of “ <i>Large bore all-metal Vacuum Valve</i> ”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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2.9 Quality Assurance (QA) requirements

Prior to commencement of the task, a Quality Plan must be submitted for ITER-India’s approval giving evidence of the above and describing the organisation for this task; the skill of workers involved in the study; any anticipated sub-contractors; and giving details of who will be the independent checker of the activities (see [Procurement Requirements for Producing a Quality Plan \(ITER_D_22MFMW\)](#)).

The contractor shall fulfill the ITER Quality requirements, as detailed in [ITER Procurement Quality Requirements \(ITER_D_22MFG4\)](#).

Documentation developed as the result of this task shall be retained by the contractor for a minimum of 5 years (10 years in case PED is applicable) and then may be discarded at the discretion of the IO. The use of computer software to perform a safety basis task activity such as analysis and/or modelling, etc. shall be reviewed and approved by the IO prior to its use, in accordance with Quality Assurance for ITER Safety Codes (ITER_D_258LKL).

Absolute Valve is classified as Quality Class QC-1, the requirements mentioned in “Quality Classification Determination (ITER_D_24VQES)” shall be complied.

Before start of manufacturing, Manufacturing Readiness Review (MRR) shall be conducted as per the IO procedure “Working Instruction for Manufacturing Readiness Review (ITER_D_44SZYP).

All the above-mentioned IO reference documents will be provided along with the tender documents to the qualified bidders.

2.10 Nuclear safety requirements

(This clause is applicable only for the final deliverable of 1.6m valve)

The Valve is identified as Protection Important Components (PIC) since it provides primary vacuum barrier and radiological confinement.

The Contractor and its sub-contractors shall take a note that:

ITER is a nuclear facility identified in France by the number-INB-174 (French quality order 7th February 2012) and the valve is classified as a Protection Important Component (PIC) as per French regulation. Therefore, (1) The compliance with the INB-order must be demonstrated in the chain of Contractor and its Subcontractors (2) Protection Important Activities (PIA) are also subjected to supervision done by Nuclear Operator

The Valve, being Protection Important Components (PIC), and shall be subject to continuous / random / surprise check by ITER-India/ IO / ASN, the Contractor and its subcontractors shall ensure the following during the entire course of execution of this contract:

Contractor shall ensure the generic safety requirements, as described in “Provisions for Implementation of the Generic Safety Requirements by the External Interveners ITER_D_SBSTBM v2.2” shall be complied

in entire chain of supplier and subcontractor with a specific stipulated management system to perform protection important activities.

ITER-India / IO will be performing the Overall Surveillance for External Interveners Chain for Protection Important Components, Structures and Systems and Protection Important Activities following the document- “ITER_D_4EUQFL - Overall Surveillance Plan of the Chain of External Actors for Protection Important Components, Structures and Systems and Protection Important Activities”

The (Protection Important Activity) PIA shall be clearly identified in the Manufacturing and Inspection Plan (MIP). The safety functions and associated PIA shall be described in a Quality Plan (QP) of contractor. The same shall also be described in the Quality Plan of the sub-supplier as applicable. These documents (MIP/IP & QP) shall be approved by ITER-India and IO before starting the manufacturing process. The PIAs, will be identified by ITER-India / IO during MRR / MIP reviews / production process and contractor shall incorporate them into MIP. This identification will be based on “ITER_D_SBYJXD - Guideline for Identification of the Protection Important Activities (PIA)”

2.11 Clarification on the design responsibilities:

To note, the design description, configurations provided in this document are provided as reference. The Bidder is free to update the design, develop alternate configuration within the constraints of the dimensions as per [Clause 2.3](#) of this document and meeting the functional requirements as per technical specification.


Contractor shall have access to the present conceptual design under the Non-Disclosure agreement (NDA). As a part of scope of work, it will be Contractor’s responsibility to prepare the detailed drawings and 3D CAD to bring the maturity to the level of manufacturing drawings, incorporate the necessary tolerances in mutual agreement with the purchaser.

Additionally, during the contract execution, it will be contractor’s responsibility to identify all the manufacturing processes so as to meet the dimensions, tolerances and assembly and finally shall guarantee the fulfillment of the requested assembly and functionality.

Further, in case there is any lacking information / clarifications required, the same shall be brought to the notice of purchaser at the time of EOI submission and / or tender submission. All of such cases will be handled on case to case basis taking into consideration the contractor’s bidder’s inputs / experience and the modalities to handle such cases will be mutually agreed. It may be noted that such cases may also require additional FEA analysis of sub-systems / complete system as per the load specification.

As described in the subsequent sections of this document, several prototypes / mock-ups / test stands are envisaged at different stages of development. Detail design along with analysis (as per the load conditions and functional requirements) of all of such prototypes / mock-ups / tests stands and their manufacturing shall be the responsibility of contractor.

In view of the above, it is expected that along with manufacturing efforts, there would be extensive design / FEA task involved to make the present design realizable.

	Title: Development and supply of “ <i>Large bore all-metal Vacuum Valve</i> ”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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The bidder, at the time of tender submission and / or during the contract execution, can request/propose changes to the design via a formal request specifying advantages and drawbacks. Those changes will be analyzed and approved by purchaser.


The Contractor retains the responsibility for selection and execution of manufacturing processes and quality controls in order to fulfill all the requirements specified in this Technical Specification (and subsequent tender specification). During such proposals, the contractor shall note the constraints on the overall dimensions, functionality and mechanical performance of the system. However, should there be any requirement to introduce configuration modification for assembly, integration or inspectability, the same should be provided as an additional point. The base line design shall be conformed in any case. The proposal shall be supplemented with appropriate technical justification and shall be subjected to the acceptance of purchaser.

During the execution of the contract, as and when required, there may be need for enhanced assessment on particular aspect related to design / manufacturing. Such needs are to be established by mutual agreement between purchaser and contractor.

As the configurations is not prototyped / functionally tested, there would be need of thorough assessment from the perspective of their compatibility with respect to its functions along with the manufacturing feasibility. It is therefore mandatory that contractor carefully considers theses aspects while making the proposals with the understanding that the responsibility of the demonstration of the functionality within the constraints of design and tech specification remains with the contractor.

Important...!! Specific points related to Metal Seal:

As mentioned in the [Clause 2.5](#) above, it is important to note that vacuum sealing is to be ensured by double metal seal installed on the valve Plate. The information provided in this document is only at the conceptual stage and it is bidder’s responsibility to provide the detailed plan of such development with the target of its application to the final size of 1.6m bore diameter valve. Such plan shall include the design, FEA, calculations, material and manufacturing considerations, prototyping needs, handling aspects, jigs and fixtures for various purposes, coating aspects, test plans and test bench etc. Bidder may be asked to submit such plan along with the bid submission in response to Tender. It is important to note that the detail designing followed by manufacturing and ensuring the leak tightness as per technical specification shall be contractor’s responsibility.


	Title: Development and supply of “ <i>Large bore all-metal Vacuum Valve</i> ”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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2.12 Scope of Work

The broad scope of work is described here. The detailed scope will be provided in the tender documents.

1. Understanding of the overall requirement and perform the design and analysis activities, develop the configuration suitable for the functionality, requirements and dimensional constraints as presented in this document along with its annexures
2. Prepare detailed design report for review and approval of purchaser
3. Perform the manufacturing feasibility study based on the information provided in the tender document.
4. Identify the area where the further detailing is required. This may be in form of design / configuration / analysis / calculations.
5. Identify the mock-ups / prototype / test-bed for each sub-components / sub-system identified in the design description document.
6. Provide the comprehensive proposal on the development stages which will be mutually agreed between purchaser and contractor
7. For each of the major sub-components, identify the risk associated, challenges, critical aspects and methodology to mitigate the same.
8. Perform all the engineering design / manufacturing design required for the manufacturing complying with the requirements of Tender along with the FEA as required case to case basis. It may be noted that conceptual drawings required along with interface tolerances shall be provided by purchaser.
9. Perform all engineering design and analysis for jigs, fixtures and tooling, complying with the requirements of technical specification with consideration of manufacturing, inspection, testing, assembly, metrology.
10. Preparation of the engineering documents like detailed engineering drawings, manufacturing drawings, FEA reports (as required) for prototypes, test bed, sub-systems, sub-components and for main components.
11. Procurement of materials specified according to the material specifications (shall be provided in detail along with tender)
12. Perform the welding related activities (qualification, inspection, testing etc)
13. All aspects of manufacturing including cutting, forming, welding, inspection, marking, and cleaning complying with the requirements (detailed requirements shall be provided along with tender document)
14. Preparation of the quality assurance, qualification procedures, quality documentations like Quality Plan, MIP and QA procedures, required to set the manufacturing process as defined in ITER Procurement Quality Requirements
15. Development and implementation of the metal seal. Detailed plan of the development shall be provided by the bidder.

Because of the critical requirements embedded, the contractor is required to practice collaborative approach with the purchaser during the execution in terms of addressing the

	Title: Development and supply of “Large bore all-metal Vacuum Valve”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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challenges, project needs, mitigating risks and analyzing the failures to move forward. In view of this purchaser requests bidder to go through all the documents thoroughly, understand the project requirements and send the clarifications as required. Purchaser considers to address concerns / queries from the bidder during the EOI stage and pre-bid stage to the extent possible so as to ease the contract execution.

Clarification on the hiring external services / sub-contractor / consultancy:

Considering the complexities involved in the project which required multi-disciplinary expertise, it is allowed to hire external services in form of sub-contractor and / or consultant, with prior approval of purchaser. It is important to note that such external parties shall also be bound by the requirements and instructions provided in this EOI and tender thereafter including confidentiality of the information and the contractor shall provide assurance on the same. The overall responsibility and liability of the execution of the contract shall be on the contractor only. The contractor is free to invite such external agencies during the technical discussion / meeting / interactions with prior intimation to purchaser.

2.13 Scope of Supply

The broad scope of supply is described here. The detailed scope of supply shall be provided in the tender documents.


Overall there are three main **functional** deliverables envisaged:

- 1. All metal valve with ~400mm bore diameter**
- 2. All metal valve with ~1000mm bore diameter**
- 3. All metal valve with 1.6m bore diameter with ITER Requirements, to be delivered to ITER** (Detailed ITER requirements shall be provided in the tender documents).

For Sr No. 1 and 2 above, refer [Clause 2.4](#) along with its note.

Additionally, it may be noted that, the list does not include the intermediate prototypes / mock-ups / test bed required.

Contractor shall incorporate their own experience / expertise to identify such requirements so as to reach to the stage of final deliverables mentioned here. Complete detailed proposal shall be submitted by bidder for each sub-system / sub-component, their criticalities, associated risk, challenges and the methodology proposed by bidder to handle them in form of sub-size prototypes / mock-ups shall be included in the proposal. As mentioned in the design description, some of the sub system need to be tested on a stand-alone test bench. The same shall be clearly brought out by the bidder in their proposal.

	Title: Development and supply of “ <i>Large bore all-metal Vacuum Valve</i> ”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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Such proposals from bidder shall be thoroughly discussed with the respective Bidders individually and shall also be evaluated internally. Based on this, the final requirements of the stages of development shall be provided in the tender document.

2.14 Provisions for the multiple iteration in the design / manufacturing during the project execution

Considering the nature of project, iterations may require to be carried out in terms of design / configuration and manufacturing methodology etc. Bidder shall take such iterations into account while providing the techno-commercial proposal.

2.15 Classification, codes and standards

As mentioned above, the final goal of this development is to develop and realize the valve for ITER application and there would be a need of incorporating the ITER defined codes and standard requirements at an appropriate stage. It is therefore important to take these into consideration from the very initial stage of the development.

Refer [Table 7](#) and [Table 8](#) for the sub-system wise classification, codes and standard requirements.

Note: The code requirements mentioned in Table 4 and Table 5 are applicable only for the final deliverable of 1.6m dia valve. For the prototypes and intermediate stage valves, contractor may propose to use ASME with prior agreement.


	Title: Development and supply of “Large bore all-metal Vacuum Valve”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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Table 7: Classification, codes and standard requirements (I)

Items	First Confinement barrier	Vacuum boundary	SIC Classification	Quality class	design code	Manufacturing code
Sub-system 1: Sealing System	NO: when the Valve closed during Plasma operation YES: when the Valve closed during Maintenance operation of RH class 1 & 2 NB components	YES: when the Valve closed during Plasma operation No: when the Valve closed during Maintenance operation	NON-SIC: when the Valve closed during Plasma operation SR: when the Valve closed during Maintenance operation of RH class 1 & 2 NB components	QC-1	SDC-IC	RCC-MR or ASME VIII- Div 2
Sub-system 2: Valve plate	NO: when the Valve closed during Plasma operation YES: when the Valve closed during Maintenance operation of RH class 1 & 2 NB components	YES: when the Valve closed during Plasma operation No: when the Valve closed during Maintenance operation	NON-SIC: when the Valve closed during Plasma operation SR: when the Valve closed during Maintenance operation of RH class 1 & 2 NB components	QC-1	SDC-IC	RCC-MR or ASME VIII- Div 2
Sub-system 3: Casing & Interfacing Flanges	YES	YES	SIC-1	QC-1	RCC-MR Class2	RCC-MR Class2
Sub-system 4: Plate actuator system	This will depend of the design proposed by the contractor			QC-1	This will depend of the design proposed by the contractor	
Sub-system 5: Seal Protection System	NO	NO for the component itself but as it is cooled the feeding pipes shall be VQC1A	NON-SIC	QC-1	SDC-IC	RCC-MR or ASME VIII- Div 2
Sub-system 6: Locking system	NO	NO	SIC-1	QC-1	RCC-MR Class2	RCC-MR Class2
Sub-system 7: I&C work package	NO	NO	NON-SIC Except SIC-2 Related to Locking system	QC-1	EN standards	EN standards
Sub-system 8: Pack service	NO	NO	NON SIC		EN standards	EN standards



	Title: Development and supply of “Large bore all-metal Vacuum Valve”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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Table 8: Classification, codes and standard requirements (II)

Component	PED Class	ESPN Nuclear level(*)	Seismic Class	Vacuum Class (1)	Tritium class	RH class
Sub-system 1: Sealing System	NA	NA	1 (SF)	VQC-1A	1A	3
Sub-system 2: Valve plate	NA	NA	1 (SF)	VQC-1A		
Sub-system 3: Casing & Interfacing Flanges	NA	NA	1(SF)	VQC-1A		
Sub-system 4: Plate actuator system	NA	NA	1 (SF)	TBD according to new design		
Sub-system 5: Seal Protection System	0	N3	1 (SF)	VQC-1A		
Sub-system 6: Locking system	NA	NA	1 (SF)	NA		
Sub-system 7: I&C work package	NA	N3	1 (SF)	TBD according to new design		
Sub-system 8: Pack service	NA	NA	1 (SF)	NA		
Sub-system 9: Trolley support of the Valve	NA	NA	1 (SF)	NA		

	Title: Development and supply of “Large bore all-metal Vacuum Valve”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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3 Section-III Bid Submission Content, Format & Instructions

3.1 Bid Submission Covers & Contents

3.1.1 Cover/Folder-1 Contents


The following table provides the guideline for preparing and arranging the bid documents.

Notes:

1. All the documents shall be properly arranged into sections.
2. Pages shall be numbered, initialed and stamped.
3. Apart from the given specific templates, bidder may also use the tender documents to insert any comments/mark-up within the text

Table 9: List of contents for Cover-1

Checked box☑ : Yes ; Un checked box☐ : No			
Sr. No.	Content	Detail	
1.	Covering Letter & Bidder Information	<ul style="list-style-type: none"> ➤ Covering Letter ➤ General information about the bidder as per the template provided in this document (Annexure-2) 	<input type="checkbox"/>
3.	EEC	<ul style="list-style-type: none"> ➤ All documents as asked for compliance to EEC are enclosed with all supporting documents 	<input type="checkbox"/>
4.	EMD	Proof of Payment of EMD or Valid document as per applicability for exemption from payment of EMD (In case of EMD in the form of Demand Draft (DD)/ Bank Guarantee (BG), original DD/ BG shall reach to Purchaser within 5 days from the bid submission due date)	<input type="checkbox"/>
6.	Submission of EOI Document	<ul style="list-style-type: none"> ➤ Provide signed and stamped Format for submission of EOI document as per Annexure-3 	<input type="checkbox"/>
7.	Declarations for MII and Eligibility Declaration	<ul style="list-style-type: none"> ➤ Annexure-4 and ➤ Annexure-5 	<input type="checkbox"/>
8.	PAN, GST, MSME registration details and any other details	<ul style="list-style-type: none"> ➤ PAN ➤ GST registration ➤ MSME (Udyam Registration) ➤ Start-up registration ➤ Registration with DAE, DPS 	<input type="checkbox"/>

		Title: Development and supply of “Large bore all-metal Vacuum Valve”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
9.	Any other details	To specify	<input type="checkbox"/>

4 List of Annexes

Annexure-1: Registration form for Scope Appraisal Meeting


Annexure-2: General information to be furnished by the bidders

Annexure-3: Format for the Submission of EOI Document

Annexure-4: Declaration as per Make in India Order

Annexure-5: Eligibility Declaration

Annexure-6: Format for EMD-Bank Guarantee

	Title: Development and supply of “ <i>Large bore all-metal Vacuum Valve</i> ”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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Annexure-1

Registration form for Scope Appraisal meeting

This form duly filled in, signed and stamped shall reach to the Sr. Officer (Purchase & Stores) at the above address latest by **06-11-2024**

From:

Name and address of Applicant Bidder
Name of Contact Person
Contact Number (Tel, E-mail)

To:

Sr. Officer (Purchase & Stores)
ITER-India, Institute for Plasma Research,
Block- A, Sangath Skyz, Bhat-Motera Road,
Koteshwar, Ahmedabad 380 005, Gujarat, India
Tel: + 91-79-2326 9656/9529
Email: purchase@iterindia.in

Subject: Registration for Scope Appraisal Meeting


Dear Madam,

This is with reference to your EOI No.: I-I/EOI/AV/PQ-01/2024-25 dated 15-10-2024 We understood the requirements of the project and intend to participate in the Scope Appraisal meeting. The following members will attend the meeting:

- 1.
- 2.
- 3.

Signature
Name:
Position:
Address:
Tel:
Date:

BIDDER STAMP

	Title: Development and supply of “Large bore all-metal Vacuum Valve”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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Annexure-2


General information to be furnished by the bidders

1.	Name of the Bidder	
2.	Bidder's details along with address for placement of Order	
3.	Bidder's Proposal No. and Date	
4.	Name and designation of the officer of the Bidder to whom all references shall be made for expeditious co-ordination.	
5.	Postal Address, Telephone & Fax Nos. and e-mail Address of Registered Office	
6.	Address, Telephone Nos., Fax Nos. and e-mail ID of Office through which the proposed work (if entrusted) will be handled with name & designation of person-in-charge	
7.	Core Competence of business	
8.	Areas of other business activity, if any & place of such business	
9.	Any additional information which the tenderer considers relevant for evaluation of this tender	
10.	Bank details of the Bidder	
11.	GST Registration details of the bidder	
12.	PAN details of the bidder	
13.	MSME (Udyam) registration details with category (General/SC/ST/Women), if any	
14.	Start-up registration details, if any	
15.	Registration with DPS-DAE and NSIC	

1. Legal status of the Bidder (attach copies of original document defining the legal status)
Individual/ Proprietary firm/ firm in partnership/ limited company or Corporation/ Any other (please specify)

Authorized signatory from Bidder

Bidder's stamp

	Title: Development and supply of "Large bore all-metal Vacuum Valve"	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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Annexure-3

Format for the Submission of EOI Document

[On the letterhead of applicant Bidder with Name and address of applicant Bidder, name of contact person, contact number (Tel, E-mail)]

Ref:

To:


Senior Officer (Purchase & Stores)
ITER-India, Institute for Plasma Research,
Block- A, Sangath Skyz, Bhat-Motera Road,
Koteshwar, Ahmedabad 380 005, Gujarat, India
Tel: + 91-79-2326 9656 / 9529
E-mail: purchase@iterindia.in

Subject: Submission of documents applicable for the pre-qualification requirement associated with the tender titled "Development and supply of "Large bore all-metal Vacuum Valve"

Ref.: **EOI No.: I-I/EOI/AV/PQ-01/2024-25 dated 15-10-2024**

Dear Sir,

1. Being duly authorized to represent and act on behalf of _____ (herein after referred to as "the Applicant Bidder") and having reviewed and fully understood all of the pre-qualification requirements and information provided by ITER-India, the undersigned hereby applies for pre-qualification process for the tender titled "Development and supply of "Large bore all-metal Vacuum Valve".
2. This application is made by me/us on behalf of Bidder duly authorized to receive the tender document, if pre-qualified
3. We have submitted all the requisite information and other certificates & proofs as applicable to Essential Eligibility Criteria
4. We have furnished all information and details necessary for pre-qualification as per this EOI
5. ITER-India, IPR and its authorized representatives are hereby authorized to conduct any inquiries or investigations to verify the statements, documents, and information

	Title: Development and supply of <i>"Large bore all-metal Vacuum Valve"</i>	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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submitted in connection with this pre-qualification application, e.g. towards finance, resources, experience, infrastructure and competence of applicant Bidder

6. We hereby confirm that we have read and understood all the stipulations given in this pre-qualification document and decision of ITER-India with regard to our pre-qualification shall be final and binding on us
7. The undersigned declare that the statements made and the information provided in the duly completed pre-qualification forms are complete, true and correct in every details

Signature

Bidder's stamp

Name:


Position:

Address:

Tel:

Date:

List of Enclosures:

	Title: Development and supply of “Large bore all-metal Vacuum Valve”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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Annexure-4

Certificate from 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 suppliers other than companies) giving the percentage of Local Content, in line with PPP-MII order, if applicable [to be submitted on the letter head of the issuer.]

Make In India (MII) order Certificate

In line with Government Public Procurement Order No. P-45021/2/2017-PP (BE-II) dated 04.06.2020 as amended from time to time and as applicable on the date of submission of tender/enquiry, we hereby certify that we M/s _____ are Class I local supplier/ Class II local supplier (To strike off inapplicable option) against ITER-India **Eoi No. I-I/EOI/AV/PQ-01/2024-25 dated 15-10-2024.**

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

We, M/s _____, the Statutory Auditor(s) / Cost auditor (applicable in the case of companies) of M/s _____ (to specify name of bidder) / M/s _____ a practicing cost accountant or practicing chartered accountant (applicable in respect of bidders other than companies) of M/s _____ (to specify name of bidder), have verified and certify that M/s _____ are Class I local supplier/ Class II local supplier (To strike off inapplicable option) against ITER-India **Eoi No. I-I/EOI/AV/PQ-01/2024-25 dated 15-10-2024.** as defined under the PPP-MII Order.

For and on behalf of,

Date:

	Title: Development and supply of <i>"Large bore all-metal Vacuum Valve"</i>	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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Authorized Signatory

(With Company Seal & Signature)

Name of the Statutory/Cost Auditor or Practicing Cost/Chartered Accountant (as applicable):

Firm Reg No:

Membership No.

	Title: Development and supply of “Large bore all-metal Vacuum Valve”	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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Annexure – 5

Eligibility Declaration (On company letter head) (Along with supporting documents, if any)

Eoi No. I-I/EOI/AV/PQ-01/2024-25 dated 15-10-2024

Title: Development and supply of “Large bore all-metal Vacuum Valve”

Bidder’s Name: _____ (Address and contact details)

Bidder’s Offer No. _____ Date: _____

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

We have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries, and solemnly certify that we fulfil all requirements in this regard and are eligible to be considered. We certify that:

- (a) *we are not from such a country or, if from such a country, we are registered with the Competent Authority (copy enclosed). and;*
- (b) *we shall not subcontract any work to a contractor from such countries unless such contractor is registered with the Competent Authority.*


Penalties for false or misleading declarations:

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

(Signature with date)

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

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

	Title: Development and supply of <i>"Large bore all-metal Vacuum Valve"</i>	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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Annexure – 6

EMD BANK GUARANTEE (ON NON-JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

BG NUMBER:

Issue date:

Beneficiary:

ITER-INDIA, INSTITUTE FOR PLASMA RESEARCH,
BLOCK A, SANGATH SKYZ,
BHAT-MOTERA ROAD, KOTESHWAR,
AHMEDABAD, INDIA
(HEREINAFTER CALLED AS THE BENEFICIARY/PURCHASER)

DATE:

BANK GUARANTEE NUMBER:

BANK GUARANTEE AMOUNT:

TENDER NUMBER AND TITLE:

APPLICANT/BIDDER:

BIDDER'S NAME WITH COMPLETE ADDRESS TO BE SPECIFIED
(HEREINAFTER CALLED THE APPLICANT/BIDDER)

GUARANTOR:


(INSERT BANK NAME AND BRANCH ADDRESS)

Reference: **Eoi No. I-I/EOI/AV/PQ-01/2024-25 dated 15-10-2024**

Whereas Applicant / Bidder is willing to submit its bid against the above referred tender by the Beneficiary / Purchaser for *"Development and supply of "Large bore all-metal Vacuum Valve"* as per the tender conditions, Applicant / Bidder is required to submit a Bank Guarantee as EMD.

At the request of the Applicant, we as Guarantor, hereby irrevocably undertake to pay, without any delay or demur on the part of the bank, within 48 hours, on demand in writing from the Beneficiary or any officer authorized by it in this behalf and without recourse to the Applicant and without any demure or protest or obligation to the Beneficiary any sum or sums not exceeding in total an amount of INR ----- (Rupees ----- only)

1. If the Bidder withdraws or amends, impairs or derogates from the bid in any respect within the period of validity of this bid.

	Title: Development and supply of <i>"Large bore all-metal Vacuum Valve"</i>	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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2. If the Bidder having been notified of the acceptance of his bid by the Purchaser during the period of its validity. If the Bidder fails to furnish the Security Deposit as per the tender/contract. Fails or refuses to execute the contract.

We undertake to pay the Beneficiary up to the above amount upon receipt of its first written demand, without the Beneficiary having to substantiate its demand, provided that in its demand the Beneficiary will note that the amount claimed by it is due to it owing to the occurrence of one or both the two conditions, specifying the occurred condition or conditions.

This guarantee will remain in force up to 6 months from the bid submission date and any demand in respect thereof should reach the Bank not later than the above date (i.e. expiry date).

The liability of the Guarantor under this Guarantee shall not exceed for INR ----- (Rupees -----) (the "Guaranteed Amounts").

This Guarantee shall be valid up to ----- (the "Expiry Date").

Notwithstanding anything to the contrary contained herein, no obligation of the Guarantor to pay any amount under this Guarantee shall arise prior to the fulfilment of the following conditions precedent:

Written claim / demand(s) in terms of this Guarantee of an aggregate amount less than or equal to the Guaranteed Amounts is/are made by the Beneficiary hereunder; and such written claim/demand(s) is/are delivered to the Guarantor on or before the Expiry date..... the (Name of Bank) branch located at (branch address). This guarantee shall lapse on the cited date without the need to proceed with any formality judicial or extra judicial.

Payment of the guaranteed amount, or any part thereof, will only be made following presentation by the beneficiary to the bank at the bank's (address of branch) branch of a complying demand and this original guarantee for endorsement in the case of a part payment or surrender in the case of final payment of the guaranteed amount.


This guarantee is subject to the uniform rules for demand guarantees (URDG) 2010 revision, ICC publication No 758.

Notwithstanding anything contained hereinabove:

I. Our liability under the bank guarantee shall not exceed Rs.

II. The bank guarantee shall be valid upto _____

III. The beneficiary's right as well the Bank's liability under this guarantee shall stand extinguished unless a written claim or demand is made under this Guarantee on or before ____ (being the date of expiry of claim period which in no case should be less than 1 year from the date of expiry of validity period of BG as per clause (II) above.)

	Title: Development and supply of <i>"Large bore all-metal Vacuum Valve"</i>	EOI No.: I-I/EOI/AV/PQ-01/2024-25
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In Witness Whereof the Bank has executed this Bank Guarantee on the day of, 20xx through its duly authorized representative.

For (Bank Name).....
Signature.....
Name of the Officer
Designation of the officer
Code No.
Name of the Bank and Branch
Seal