

**Technical Compliance-Sheet for Procurement of BSC & HAM chamber**  
**(To be filled and return along with tender)**

<b>Sr. No.</b>	<b>Section</b>	<b>Parameter / Text</b>	<b>Compliance</b>	<b>Vendor Response</b>
1	1.0	Introduction		
	1.1	Basic Symmetric Chamber (BSC)	Provide Ultra High Vacuum environment (vacuum better than $1 \times 10^{-9}$ mbar)	
	1.2	Horizontal Access Module chamber (HAM)	Provide Ultra High Vacuum environment (vacuum better than $1 \times 10^{-9}$ mbar)	
2	2.1	Overall Dimensions of Basic Symmetric Chamber (BSC)	Length: 4820 mm, OD : 2680 mm, overall Height: 5210 of the chamber	
	2.2	Overall Dimensions of Horizontal Access Module (HAM)	Length: 3032 mm, OD : 2165 mm, overall Height: 2918 of the chamber	
3	<b>3.0</b>	<b>The Scope of work</b>		
	3.1	Study of the design of "BSC" / "HAM" provided with contract document to meet the functional requirements (dimensions, surface finish, weld joints, lifting lugs and its locations)	Achieve manufacturing feasibility, and propose necessary changes if necessary for purchaser's approval.	
	3.2	Preparation and qualification (where necessary) and get approval	Manufacturing Drawings, Manufacturing and Inspection plan (MIP), Quality Assurance Plan (QAP), Manufacturing process sheets (MIS), with manufacturing procedures, Welding Procedures - (WPS), (PQR), Welder Qualification (WPQ)	
	3.3	Material Procurement	Assessment of material Quantity requirement and subsequent procurement in one lot	
	3.4	Additional scope of work	Dispatch, transit insurance and Transport of supplies to delivery site after FAT is additional scope	

**Technical Compliance-Sheet for Procurement of BSC & HAM chamber**  
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	3.5	Cleaning of manufactured / fabricated parts of BSC / HAM chamber	<p><b>- Cleaning:</b></p> <ul style="list-style-type: none"> <li>- Establish Cleaning procedure for vacuum chamber parts and get approval</li> <li>- Establish post Cleaning handling and storing procedure for vacuum chamber parts</li> <li>- Establish cleaning set up to clean the components as per approved procedures</li> </ul>	
	3.6	Manufacturing, Fabrication and Assembly	Manufacture, fabricate and assemble the BSC and HAM Chamber as per approved manufacturing drawings, MIP and QAP	
	3.7	Tools, Jigs & Fixtures	<p>Design and manufacture necessary Tools, Jigs &amp; Fixtures covering scope of work necessary for -</p> <ul style="list-style-type: none"> <li>- Handling,</li> <li>- Lifting,</li> <li>- Machining and temporary storage</li> </ul>	
	3.8	Special transportation structure / fixture & tools for handling of the chambers delivered to purchaser's site	<p>Design, manufacturing, testing and supply of these tools</p> <p>Provide necessary performance guarantee for the tools</p>	
	3.9	Make necessary arrangement for the provision of equipment's (vacuum pumps, gauges, vacuum leak detector etc.) for demonstration of ultimate vacuum and during vacuum leak testing	<p>Provision of equipment's (vacuum pumps, gauges, vacuum leak detector, gas etc.)</p> <ul style="list-style-type: none"> <li>- During Demonstration of ultimate vacuum</li> <li>- During vacuum leak testing</li> </ul>	
	3.10	Provision of blank off flanges	<p>Provide necessary blank-off flanges wherever necessary</p> <ul style="list-style-type: none"> <li>- for leak testing</li> <li>- to seal off all the opening of the chamber during transportation</li> </ul>	

**Technical Compliance-Sheet for Procurement of BSC & HAM chamber**  
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	3.11	Provision of flanged connections	Provision of flanged connections - to mount gauges, pumps and other control instruments whenever it is necessary during execution of scope of work	
	3.12	Supply of temporary support structure	Provide dismantlable structure which shall be used to store parts of BSC and HAM chambers when they need opening during operations	
	3.13	Inspection and testing	Carry out identified and approved stage wise inspection and maintain the records of observations	
	3.14	Loading, transportation safe handling	The chamber shall be handled safely to prevent any distortion  - The parts of BSC and HAM shall not be subjected to other additional loads / stresses not mentioned in this specification  All supplies shall be delivered at LIGO Lab, RRCAT, Indore, MP.	
	3.15	Records of manufacturing, inspection and testing for entire scope of supply	Covering scope of work digital records shall be captured in the form of photographs, video with commentary and supply them with final deliverables.	
	3.16	Factory acceptance testing and reporting	Factory acceptance testing and preparation of corresponding reports for dispatch clearance ( as detailed in respective annexures:  - - Raw material test reports and certificates (Annexure-1) - Visual & Dimensional inspection (Annexure-5) - Cleaning inspection (Assensexure-4) - Helium leak testing of all welds and sealing joints (Annexure-6) - Demonstration of ultimate vacuum of $1 \times 10^{-9}$ mbar (Annexure-7)	

**Technical Compliance-Sheet for Procurement of BSC & HAM chamber**  
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			<p>following approved procedure</p> <ul style="list-style-type: none"> <li>- Packing inspection (As per section 9)</li> <li>- Obtain certificate for "shipping release" from purchaser (or his authorised representative)</li> </ul>	
	3.17	Packing	<p>After acceptance of FAT, all the stores shall be packed in as per approved packing procedure.</p> <p>Loading of the packed supplies on transporter vehicle and unloading of it at delivery location on the site of delivery</p>	
	3.18	Onsite acceptance of supplied goods after they are delivered at RRCAT, Indore	<p>Unpack the delivered supplies from packing and perform its inspection.</p> <p>Complete the check points for final acceptance on site:</p> <ul style="list-style-type: none"> <li>- Check for any physical damage to supplied deliveries</li> <li>- Verification of readings and indicators on the gauges / impact sensors mounted on the vacuum sealed equipment(s), packing and merchandises delivered as part of scope of work</li> <li>- Visual and if necessary dimensional inspection to confirm distortion and dimensions are within acceptable limits</li> <li>- Obtain final acceptance certificate from the purchaser for release of payment</li> </ul>	
4	4.0	Design function parameters of BSC and HAM chambers	<p>Assessment of Functional parameters and guarantee for performance by demonstration during inspection and testing after manufacturing of supply goods. (Parameters defined in Table no. 1)</p>	

**Technical Compliance-Sheet for Procurement of BSC & HAM chamber**  
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5	5.0	Material Procurement and applicable specifications	Material procured shall be of Hot Rolled Annealed and Pickled (HRAP) condition as per specifications provided in <ul style="list-style-type: none"> <li>- Table-2 for Basic Symmetric Chamber (BSC)</li> <li>- Table-3 for Horizontal Access Module (HAM) Chamber</li> </ul>	
	5.5	Inspection of procured material	Testing and inspection of raw material and standard bought out items: <ul style="list-style-type: none"> <li>- Inspection &amp; testing of all materials shall be carried out by vendor at his cost in laboratory approved by Purchaser</li> <li>- testing may be witnessed by Purchaser</li> <li>- Purchaser may ask for test coupons from procured material and perform independent testing</li> </ul>	
	5.6	Material procurement quantity	Vendor shall procure the material in sufficient quantity of appropriate size in one lot considering all applicable allowances as mentioned for manufacturing, qualification testing and specimen coupons	
6	6.1	Welding consumables	Following point related to Welding and consumables: <ul style="list-style-type: none"> <li>- Welding consumables procurement and usage shall meet specification of annexure-3.</li> <li>- Weld Qualification shall be as per clause #5 and #6 of annexure-3</li> <li>- Average heat input shall be quantified based on qualified welding procedure</li> </ul>	
	6.2	Weld consumable usage	Vendor shall provide details of - <ul style="list-style-type: none"> <li>- Storage</li> <li>- Procedure for traceability of usage</li> </ul>	

**Technical Compliance-Sheet for Procurement of BSC & HAM chamber**  
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	6.3	Welding details	Vendor shall provide details of welding considering: <ul style="list-style-type: none"> <li>- Shop welding plan (SWP)</li> <li>- Weld procedure specifications (WPS)</li> <li>- Weld procedure qualification records (PQR)</li> <li>- NDT applicable and to be performed to inspect soundness of weld for any defect</li> </ul>	
	6.5	Welder qualification	To qualify welders vendor shall submit: <ul style="list-style-type: none"> <li>- Weld PQR</li> <li>- Welded samples of weld procedure qualification</li> <li>- Welder shall be deployed on job work after approval from purchaser</li> </ul>	
7	7.0	Inspection and testing	All inspection and testing shall be as per annexure-5 based on: <ul style="list-style-type: none"> <li>- Approved drawings and MIP &amp; ITP</li> <li>- Using approved test and inspection procedures by qualified &amp; certified personnel</li> </ul>	
	7.3	Reference temperature for dimensional check	All dimensional check shall be carried out: <ul style="list-style-type: none"> <li>- at uniform 25 deg. C as per approved procedures and meet drawing specification</li> <li>- If the dimension check is not carried out at ref. uniform temp then it shall be compensated correspondingly</li> <li>- All records of the tests and inspection shall be maintained by the vendor and the shall be submitted to the purchaser</li> </ul>	

**Technical Compliance-Sheet for Procurement of BSC & HAM chamber**  
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	7.5	Additional scope for inspection and testing	<p>If deemed necessary Purchaser will have right to specify additional Inspection / testing other than specified in tender specification document</p> <ul style="list-style-type: none"> <li>- Cost of such test / Inspection will be borne by The purchaser.</li> <li>- Any additional checks deemed necessary which are not previously included in MIP, shall be performed by vendor without additional cost to purchaser</li> </ul>	
	7.6	Vendor responsibility for inspection and testing	<p>Quality surveillance as well as quality audit by the purchaser or his authorized representative shall not relieve the vendor from the responsibility of meeting the specification or the inspection duties. Vendor shall be responsible to demonstrated compliance with the function requirement as specified in drawings related to dimension, tolerance, assembly fits and vacuum</p>	
	7.8	Change request	<p>Vendor who want to deviate from specification provided and approved for acceptance to purchaser:</p> <ul style="list-style-type: none"> <li>- he shall submit the deviation request (in prescribed format) and get it approved by providing necessary justification for the change which is necessary</li> <li>- Change request procedure shall be mutually decided and agreed upon between vendor and purchaser before commencement of concerned work</li> </ul>	
8	8.0	Cleaning, storage and workmanship	<p>Vendor shall note:</p> <ul style="list-style-type: none"> <li>- Surface treatment shall follow Annexure-4</li> <li>- Clean condition and good</li> </ul>	

**Technical Compliance-Sheet for Procurement of BSC & HAM chamber**  
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			<p>workmanship are essence at all stages of storage, handling, manufacturing, inspection, testing, assembly and final packing and shall be maintained by using clean room areas, proper covers and care</p> <ul style="list-style-type: none"> <li>- Direct contact of stainless steel parts of vacuum chambers is not allowed with other items of carbon steel at any stage. Stainless steel and carbon steel material and parts shall be stored in separate areas</li> <li>- Stainless steel fabrication area shall be shielded from contamination in the form of dust, fumes and weld splatters</li> </ul>	
9	9.0	<b>Handling, packing and delivery</b>		
	9.1	Work area	<p>Vendor shall include following details in his bids:</p> <ul style="list-style-type: none"> <li>- Details of work shop floor space and its layout for taking up activities details in scope of work of manufacture, testing and assembly of BSC and HAM</li> <li>- Details of clean work area (class 100000 (ISO 8) for activities of storage, assembly and testing and packing</li> </ul>	
	9.2	Corrosion and damage to surface	<p>Vendor shall ensure:</p> <ul style="list-style-type: none"> <li>- no corrosion of surfaces of clean parts,</li> <li>- no damage to machined surfaces during storage, handling, inspection and packing</li> <li>- no distortion of parts to alter their finished dimensions during transportation and handling</li> </ul>	
	9.3	Contamination to inner surface	<p>Vendor shall cover all the openings to prevent any ingress of contaminant to</p>	



**Technical Compliance-Sheet for Procurement of BSC & HAM chamber**  
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			protect inner surfaces	
	9.4	Packing details	Items placed in packing shall be properly identified on the package box by providing details of: - Content with name of the part and its dimensions, weight and quantity in number - Packing list placed inside package - net and gross weight of package - Handling and storage instructions - Package number	
	9.6	Shipping release certificate and delivery of shipment	Vendor shall initiate delivery only after obtaining shipping release certificate from Purchaser after the acceptance and approval of FAT report	
	9.7	Transport of shipment	Vendor shall ensure that: - Shipment is delivered directly without any transshipment to the delivery site specified by purchaser - Road survey will be made by him for the route of shipment transport, to avoid any delay, obstructions, clearances - Any necessary changes to the access road along the shipment transport route. - To obtain required clearance from statutory bodies for transportation of supplies. This responsibility lies within the scope of the vendor - Moving supplies up to installation location at delivery site is responsibility of vendor (as specified)	
10	10.0	<b>Documentation</b>		
	10.1	Input drawings	Purchaser shall supply set of drawings - as mentioned in table-4 for BSC - as mentioned in Table-5 for HAM	

**Technical Compliance-Sheet for Procurement of BSC & HAM chamber**  
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	10.2	Design verification and preparation of drawings	<p>Purchaser shall supply 3D CATIA model and 2D Drawings derived from the model for BSC and HAM Chamber</p> <ul style="list-style-type: none"> <li>- Vendor shall make structural design verification of all the applicable parts as per ASME Section-VIII, Div-1 or equivalent code as applicable</li> <li>- Vendor shall make necessary changes based on the design verification (if necessary) and prepare manufacturing drawing for approval by purchaser</li> <li>- At the end of manufacturing scope of work, vendor shall prepare as built 2D drawings and 3D model of equipment and its parts and supply to purchasers in the format compatible with CATIA / SOLIDWORKS and pdf version for records</li> <li>- To use CAD software other than SOLIDWORKS, vendor need to seek permission from the purchaser</li> </ul>	
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**Technical Compliance-Sheet for Procurement of BSC & HAM chamber**  
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	10.3	Manufacturing drawings	<p>The vendor shall ensure that:</p> <ul style="list-style-type: none"> <li>- manufacturing drawings include all dimensions with tolerances for individual components, subassembly and assembly</li> <li>- tolerances shall be progressive covering intermediate stages</li> <li>- drawings for all necessary specific customised tools to be used are prepared</li> <li>- shop manufacturing drawings include details for surface finish, welding, specified inspection method, bill of material, allowances for cutting, machining and final finish, and applicable standard if any</li> <li>- all drawings are prepared in approved CAD software only and supplied in respective CAD and pdf format with one set of hard copy for approval</li> <li>- necessary supporting justification shall be provided wherever there is substantial changes compared to the supplied drawings data</li> <li>- he shall accommodate minor changes to the dimensions during course to execution of scope of work</li> <li>- he prepares as built drawings at the end of scope of work covering accounting for approved changes and deviations</li> </ul>	
	10.4	Applicable codes and standards	<p>This section provide the details of applicable codes and standards related to design, material, manufacturing welding, inspection and testing. Latest edition of applicable codes &amp; standards shall be used. Vendor shall seek clarification in</p>	

**Technical Compliance-Sheet for Procurement of BSC & HAM chamber**  
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			<p>case they come across any ambiguity</p> <ul style="list-style-type: none"> <li>- Take note of the list provided in this section</li> </ul>	
	10.5	Specific details applicable to scope of work	<p>This section provide details of imposed conditions used in administration of scope of work related to</p> <ul style="list-style-type: none"> <li>- Specification for material (Annexure-1)</li> <li>- Specification for rolling, machining and manufacturing (Annexure 2)</li> <li>- Specification for welding and welding qualification of the austenitic stainless steel (Annexure 3)</li> <li>- Specification for cleaning and cleanliness (Annexure 4)</li> <li>- Specification for inspection and testing (Annexure 5)</li> <li>- Specification for vacuum leak tightness and leak testing (Annexure 6)</li> <li>- Specification for Vacuum requirement (Annexure 7)</li> <li>- Various parts details &amp; Load specification for BSC / HAM (Annexure 8)</li> </ul> <p>Details of applicable codes and standards related to design, material, manufacturing welding, inspection and testing, latest edition of applicable codes &amp; standards (included in section 10.4) shall be used. Vendor shall seek clarification in case they there is doubt on the content or otherwise</p>	

**Technical Compliance-Sheet for Procurement of BSC & HAM chamber**  
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	10.6	Conflict and interpretation	In case of conflict is observed by vendor in specifications mentioned in documents, the vendor shall contact purchaser for guidance and clarification. The purchaser's decision given in such situation shall be considered as final.	
	10.7	Details of document submissions to be made	Vendor shall prepare documents and submit to purchaser for approval covering all stages of manufacturing, testing and supply of BSC and HAM as stated in table-7	
	10.8	Deviation report	The vendor shall record all deviations incorporated after due approval, which necessitated throughout the manufacturing, inspection and testing stages. Standard forms shall be used by the vendor for raising Deviation Requests (DRs) supplied by purchaser to seek approval before its implementation	
	10.9	Work progress report	The vendor shall prepare detailed monthly progress reports on the works performed and submit soft and hard copy for each month to the purchaser. - Decision on date of submission by purchaser shall be made by mutual agreement with vendor.	
	10.10	Records of manufacturing, inspection and testing of entire scope of work	This work is a prototype in nature (Manufacture and assembly of BSC / HAM), and Vendor shall prepare and submit a comprehensive note on: - the manufacturing experience, covering all the activities - highlight of specific details of difficulties / problems faced, if any, - Procedure by which difficulties were overcome by including necessary details.	

**Technical Compliance-Sheet for Procurement of BSC & HAM chamber**  
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			- All deviation / change requests with mention of their necessity, its impact on the functional requirement specified and status of approval by purchaser	
11	11.0	<b>Delivery</b>	Scope of work covered under this contract shall be accomplished within nine months from the date of approval of manufacturing drawings - List of deliverable are listed in annexure-9 and detailed in Table 21, 22 & 23	
12	12.0	<b>Guideline on Notification / Hold points</b>	Table-8 is provided as guideline on Notification and hold points for purchaser - Vendor shall take note of this list and with suggestion / modification done should include it in the bid covering points included in this guideline	
13	13.0	<b>Guideline to vendors</b>		
	13.1	Currency used for quoted prices in bid submission	Vendor shall quote all prices in Indian Rupees - INR	
	13.2	Roadmap for the tender process	Table-9 provide roadmap for the tender process from notification to selection of vendor for award of contract	
	13.3	Bidding, bid scrutiny and evaluation of bids	Following are guideline for interested vendors: - Vendors interested in participating in this procurement should express their interest to purchaser - Vendor can participate in pre-bid meeting at IPR (on intimated date)	

**Technical Compliance-Sheet for Procurement of BSC & HAM chamber**  
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			<p>Vendor shall provide details covering points listed here in items to illustrate their resources, approach to breakdown work, project execution plan, delivery schedule in fulfilment of specified functional requirements for procurement</p> <ul style="list-style-type: none"> <li>- Human Resource available and planned organization structure to undertake scope of work</li> <li>- Facility and Equipment Resources to cater necessary machining, handling, testing and assembly</li> <li>- Work schedule (compatible for reading in Microsoft Project ) to achieve delivery schedule</li> <li>- WBS and Project execution plan (PEP)</li> </ul>	
	13.4	Placement of contract	<ul style="list-style-type: none"> <li>- Vendor shall submit the bids in the format provided with the tender document</li> <li>- Prices quoted in bids shall be Ex-works basis covering scope of work describe in tender document</li> <li>- Vendor shall quote prices for each of the chamber viz. BSC and HAM, separately as indicated in bid format.</li> </ul>	
		Note for Vendor	<p>Vendor should take note of following while quoting their prices for individual chambers (one BSC &amp; one HAM)</p> <ul style="list-style-type: none"> <li>- The purchaser reserves the right to select the each of lowest techno-commercial compliant bid for BSC and HAM separately from the opened bids and place separate procurement contract for one BSC chamber with one vendor and for</li> </ul>	

**Technical Compliance-Sheet for Procurement of BSC & HAM chamber**  
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			one HAM chamber with another vendor.	
		Vendor selection criteria's	Purchaser's decision in selection of successful vendor will take into account: <ul style="list-style-type: none"> <li>- Essential eligibility criteria fulfilment</li> <li>- understanding of work scope that reflects from clarity and content in the bid submission,</li> <li>- Past experience of handling similar works successfully, timely completion of work to the satisfaction of customer,</li> <li>- Presentation made during vendor meet explaining the available resources and its management, plan for execution of scope of work, project management and schedule of delivery</li> </ul>	

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

**Signature of Bidder**  
**(Official seal)**

**Place:**

**Date:**