

INSTITUTE FOR PLASMA RESEARCH

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NOTICE FOR EXPRESSION OF INTEREST AND
SELECTION OF CONTRACTOR FOR DESIGN, FABRICATION,
SUPPLY AND INSTALLATION OF “SPECIAL PURPOSE WINDING MACHINE
FOR PROTOTYPE MAGNETS”

(EOI No. EOI/IPR/001/08-09 DATED 21-10-2008)

“Expression of Interest” (EOI) is invited from reputed fabricators/manufacturers for design, fabrication, supply and installation of “**Special purpose Winding Machine for Prototype Magnets**”.

The EOI document containing eligibility requirements, technical description of Special purpose Winding Machine for manufacturing Prototype Magnets Winding Packs etc. can be obtained from the Purchase Officer, Institute for Plasma Research, Bhat, Gandhinagar:382428, Gujarat, India. The EOI documents can also be downloaded from IPR Website www.ipr.res.in/purchasetenders.html. The EOI documents will be issued up to 12-11-2008.

Interested and eligible fabricators/manufacturers may submit the EOI proposals along with the supporting documents mentioned in the EOI to the Purchase Officer, Institute for Plasma Research at the above address latest by **5-12-2008** superscribing the envelope with “EOI No.EOI/IPR/001/08-09 dated 21-10-2008 for design, fabrication, supply and installation of “**Special purpose Winding Machine for Prototype Magnets**”.

Content:

1. Instructions to Parties and Terms and Conditions.
2. Roadmap from obtaining EOI proposals to finalize the Contract.
3. Essential Eligibility Criteria to submit EOI proposal.
4. Technical & Functional requirements of a Special Purpose Winding Machine for Manufacturing Prototype Magnets Winding Packs
5. Over-view of Scope of Work for final tender.

1. Instructions to Parties and Terms and Conditions:

This is an invitation for the "Expression of Interest" (EOI) for DESIGN, FABRICATION, SUPPLY AND INSTALLATION OF "SPECIAL PURPOSE WINDING MACHINE FOR PROTOTYPE MAGNETS". This SPWM will be used for winding single / double pancake coils for fabricating irregular shaped fusion grade magnet-winding packs as envisaged under the XI plan activities of IPR (Fig 1 shows an example).

Following are general instructions to parties and terms and conditions.

- (a) This invitation of EOI is for the design, fabrication, supply and installation of 'Special Purpose Winding Machine for Prototype Magnets' at IPR.
- (b) This is a request for EOI and this is not a tender notice.
- (c) EOI is invited from Engineering Industries (Parties) registered in India since last 5 years.
- (d) The EOI document containing eligibility requirements, technical description of the Prototype Magnets architecture of the application etc. can be obtained from the Purchase Officer, Institute for Plasma Research, Near Indira Bridge, Bhat, Gandhinagar:382428, Gujarat, India. While requesting for the EOI documents, such request shall indicate the **"REQUEST FOR THE EOI DOCUMENTS AGAINST EOI/IPR/001/08-09 DATED 20/08/08 FOR DESIGN,FABRICATION, SUPPLY AND INSTALLATION OF "SPECIAL PURPOSE WINDING MACHINE FOR PROTOTYPE MAGNETS"**. The request for EOI documents by post/courier should reach to Purchase Officer, IPR latest by 12-11-2008.
- (e) The EOI documents can also be downloaded from IPR Website: www.ipr.res.in/purchasetenders.html.
- (f) Parties who have responded to this EOI notice and selected as per terms and conditions given in the EOI document, will only be eligible to participate in tendering process.
- (g) **Last date to submit the EOI:** The EOI should be submitted to the Purchase Officer, Institute for Plasma Research, at the above address on or before 5th December, 2008.
- (h) No request for the extension of due date will be considered.
- (i) Late and delayed received EOI will not be considered. IPR will not be responsible for postal / courier delays or any other delays in receipt of the EOI. EOI notice number and date, due date and title of EOI should be mentioned on envelop, without which EOI may be rejected.
- (j) Party submitting the EOI against this notice shall be deemed to have read and understood EOI documents in complete.
- (k) Where counter terms and conditions have been offered by the party, the same shall not be deemed to have been accepted by IPR, unless our specific written acceptance thereof is obtained.
- (l) Clarification, if any, can be obtained from the following office provided such request is received at least 07 working days prior to the last date of submission of proposal for EOI.

Institute for Plasma Research,
Near Indira Bridge,
Bhat, Gandhinagar: 382428, Gujarat State (India)
e-mail: ramesh@ipr.res.in,pradhan@ipr.res.in,vijayan@ipr.res.in
Web site: <http://www.ipr.res.in>

- (m) IPR reserves the right to accept or reject any or all the EOI received from the parties without assigning any reasons. Mere submission of EOI proposal will not entitle a party to get selected to obtain final tender documents.
- (n) EOI proposal submitted by the party shall be complete in all respects and shall include all details asked for in this notice. The following documents will be submitted along with EOI proposal. Party will submit EOI proposal and all supporting documents in duplicate.

Document set – 1 (in duplicate):

- (i) Organizational Structure
- (ii) Name and address of contact person of party.
- (iii) Core competence of the party.
- (iv) Qualification & relevant experience of the key personnel (s) of the Party.
- (v) Details of (a) party's Design Capabilities (b) party's Quality Policy and Program, (c) Quality Audit program, (d) non-conformity control and reporting and (e) testing and inspection facilities.
- (vi) Annual Report indicating Balance sheet and Profit and Loss account statement for the last 3 years.

Document set – 2 (in duplicate):

Documents as per section -3.

2. Roadmap from obtaining EOI to finalize the Contract:

Following roadmap will be followed from obtaining proposals for EOI to finalize the contract.

- (a) This is the invitation of EOI is for the design, fabrication, supply and installation of 'Special Purpose Winding Machine for Prototype Magnets' at IPR and this is not the tender.
- (b) The EOI document contains Essential Eligibility Criteria (Refer Section-3). EOI received from the parties satisfying these Essential Eligibility Criteria will only be considered for further evaluation.
- (c) Description of the prototype winding packs and the functional requirements is given in Section-4.
- (d) Overview of technical specifications, requirements, scope of supply and delivery schedule for design, fabrication, supply and installation of 'Special Purpose Winding Machine for Prototype Magnets' at IPR to be included in final tender document are given in Section-5.
- (e) Party will submit EOI proposal with all necessary supporting documents as mentioned in point – (n) of section -1.

- (f) A pre-bid meeting will be held with eligible parties at IPR to explain the scope of work to be carried out for this package. Date of meeting will be intimated at a later date.
- (g) IPR reserves the right to incorporate the suggestions made by the party during the meeting held at IPR at its sole discretion in final tender document.
- (h) A Committee for Selection of Parties (CSP) will be constituted by a competent authority of IPR to select the parties for issuing final tender document.
- (i) During pre-bid meeting, party will make presentation to the CSP which will cover following points.
 - (i) Party's overall profile.
 - (ii) Party's strengths in design, mechanical fabrication areas, automation and controls areas fabrication facilities etc.
 - (iii) Party's experience in design and manufacturing of special purpose machines. List of projects executed to be presented and few will be discussed in detail.
 - (iv) Party will discuss few challenging cases where it made specific efforts to manufacture special purpose machines for winding pack or its component manufacturing using non-conventional and innovative techniques and approach for schedule and cost control.
 - (v) Party's experience to meet job specific requirements, like (a) winding SS cables in a winding set-up (b) winding pack handling etc.
 - (vi) Party's understanding on overall scope of work and responsibility for this project. Identification of all activities involved in this job and their discussion in detail.
 - (vii) Critical areas identified by the party having serious impact on the precession of the job to be carried out. Party's proposed solutions for these problems.
 - (viii) Any special packing and shipment requirements foreseen by the party.
 - (ix) Party will justify his design, manufacturing and financial capabilities to manufacture the Special Purpose Winding Machine in given time schedule.
 - (x) Codes and standards regularly followed by the party both in mechanical fabrication and automation controls.
 - (xi) Details of party's Quality Policy and Program and testing and inspection facilities. Party will discuss QC strategy for the job under this EOI.
 - (xii) If some design, manufacturing, testing and inspection facilities are not available with the party, it should mention about their access to such required facilities at other places.
 - (xiii) Project planning and Execution methodology followed by the Party, with specific emphasis on schedule and cost control. Use of specific project planning software.

- (xiv) Party's views on need to form consortium to meet quality, cost and time schedule.
 - (xv) Last three years track record of the party in terms of projected and actual delivery schedule and cost for projects above Rs. 50 lakhs.
 - (xvi) Commitments and loading of the party in terms of projects costing Rs. 10 lakhs and above up to March 2011.
 - (xvii) Commitment from Party's highest authority for complete and credible involvement of the party till completion of the deliveries.
- (j) CSP will select the parties based on submitted documents, presentations and discussions. During the assessment for this selection CSP will give specific weightage to the party for innovative suggestions on design and fabrication feasibility, cost optimization and control and schedule control. Selection of the parties will be mainly based on design capabilities, fabrication and automation from an integrated point of view, involving optimization of manufacturing, shipping, assembly, schedule and commercial terms and conditions.
 - (k) IPR will prepare final tender document in two parts, Part-A will contain detailed scope of work, deliverables, and project execution plan, rules for consortium (if required) and technical bid format and commercial terms and conditions. Part-B will contain Price Bid format.
 - (l) Final tender documents will be given to only parties selected by CSP as per above point (2-j).
 - (m) Party will submit the offer against final tender document in two parts. Detail procedure about submitting final technical (Part-A) and Price Bid (Part-B) will be given in final tender document.
 - (n) First only technical offers (Part – A – Technical Bid and Commercial terms and conditions) will be opened.
 - (o) Tender Award Committee (TAC) will be constituted by a competent authority of IPR to evaluate technical offers and shortlist the vendors.
 - (p) TAC will hold technical discussions with vendors for Part-(A) of the offer.
 - (q) TAC will shortlist the vendors technically acceptable for the design, fabrication, supply and installation of 'Special Purpose Winding Machine for Prototype Magnets' at IPR as per drawings, technical specifications and delivery schedule given in the tender document.
 - (r) Price Bid (Part-B) of only short listed vendors (ref. above point – q) will be opened.
 - (s) TAC awards the contract to the vendor/consortium.
 - (t) IPR reserves the right to place the order for with one party or more than one vendors.

3. Essential Eligibility Criteria:

Party must satisfy following eligibility criteria to get his EOI offer selected for the further evaluation. The party is required to submit the following elaborations/ details along with the EOI to get qualified for the bid.

1. A schematic of the proposed special purpose winding set-up considering the attached figure as the baseline geometry.
2. Brief description of the various units of the special purpose machine.
3. Functional description of various units of the special purpose-winding machine.
4. Listing of the design and engineering calculations involved
5. Process controls requirements

Further, the Party must be a company registered in India for minimum five years.

Additionally,

- (a) Party must have designed and manufactured special purpose winding machines costing more than 10 lakhs for institutions and/or industries.
- (b) Party must have well defined Quality Policy and Program.
- (c) Party must have well defined organizational set-up for Quality Surveillance, Quality Assurance, Quality Audit, non-conformity control and reporting.
- (d) Party must have sound financial status. Average yearly turnover of the party for last three years should be more than Rs. 50 lakhs.

4. Technical & Functional requirements of a Special Purpose Winding Machine for Manufacturing Prototype Magnets Winding Packs

Following are some of the basic primary requirements/specifications of the special purpose winding machine/station. However, the scope is not limited to these requirements only and serves only the purpose of understanding on the part of the vendor. **The vendor can only treat these as the baseline guidelines and is required to propose a detailed conceptual design of the machine to be able to qualify for the bid.** Vendors are encouraged to discuss with IPR personals for understanding/clarifications.

Following are the requirements of SPWM

- 1) It is intended to be used for winding single / double pancake coils for fabricating winding packs.
- 2) The basic conductor could have cross sectional dimensions up to 50 mm. The conductor jacket (wall) thickness could be up to 3 mm. The conductor wall material will be strain-less steel 304L, 316L or 316LN grade. The loosely twisted wires inside the conductor do not affect the winding parameters of the conductor. (Fig-2)
- 3) The winding packs can consist of single/multiple (a) layers (b) pancakes (c) double pancakes. Double pancakes are that type of winding where the winding begins from the middle of the winding length.
- 4) Geometrically, the winding pack could be regular or irregular in shape. A reference irregular winding pack schematic is shown in fig 1.
- 5) The SPWM may adopt these figures as a baseline winding pack to be fabricated and may do the design of the components and controls accordingly.
- 6) The base conductor, which will be used for winding will have fixed cross section and fixed shape (circular, square, rectangular).
- 7) The wound single/double pancake height will be 100 mm maximum. The overall irregular winding pack size comprising of layers/pancakes/double pancakes could be as big as 5000 mm in lateral dimensions.
- 8) In the double pancake type of constructions, there will be a defined inter-pancake transition between the lower half of the double pancake and upper half of the double pancake. This transition shall be made over a certain arc length and the wound conductor is required to traverse a conductor width vertically at the end of the transition.
- 9) The SPWM shall have arrangements for
 - (a) cleaning of the conductor length to be wound
 - (b) insulation wrapping on the conductor with insulating tapes with half overlapping.
- 10) The SPWM shall have precision conductor bending and forming unit taking appropriate spring-back measures of the conductor material and geometry. The

spring-back characteristics have to be estimated by the vendor for given conductor (to be wound) dimensions and materials components.

- 11) The conductor-bending unit in the SPWM must have suitable driving mechanisms so as to form the conductor in a plane and gradually across a plane with a pre-determined lift. The vendor as a part of the SPWM design will do the selection of the driving mechanism and their controls.
- 12) The forming unit in the SPWM must be mounted on suitable platform so as to give appropriate movement to the guiding formers. The vendor as a part of the SPWM design will do the design of the platform for roller/former movements.
- 13) The SPWM shall be equipped with suitable straightening unit for conductor straightening as and when required during the winding. The straightening unit should have appropriate driving mechanisms. The vendor as a part of the SPWM design will do the design of the straightening unit and their driving mechanisms.
- 14) The SPWM will have an unwinding unit that accommodates the supplied conductor spool with a tensioning and break-lock type of arrangement. This unit should also be equipped with a drive, traversing mechanism while unwinding as well as suitable motors on to it. The vendor as a part of the SPWM design will do these designs in the SPWM.
- 15) The SPWM must have an encoder-metering unit encoding each unit length of the arc of the winding during the winding and correspondingly providing suitable feedback to the bending and forming unit. The feedback could be in the form of applied tension, arc length traversed, relative movements of the different section of the rollers in the forming unit etc.
- 16) The entire winding operation must be automated.

For the ease of winding and for obtaining the required accuracies, the vendor may add on extra features in the winding machine/set-up.

5. Scope of Supply

The vendor shall make a detailed design of the SPWM with all its features and will explain as to how the winding of a winding pack as shown in figure-1 could be

carried out. This design document will be submitted to IPR. The vendor is encouraged to get the design document reviewed on its own initiative from experts both within India and outside India. The vendor can also have consultants to assist him on the design and realization of the SPWM. IPR shall also get this design document reviewed of its own. This design document shall form the basis of the further fabrication of the SPWM. Only after the approval of IPR on this design document, the fabrication of SPWM would commence. However, despite the design document approval, the responsibility of the functionality of the SPWM lies with the vendor. Vendor can carry out mock-ups and trials towards the validation of the concepts on its own and present those as the supporting evidences in the design document.

- 1) The vendor shall fabricate/procure each of the mechanical components as per the applicable standards, each of the control hardware and units as per the specifications and standards and shall integrate all those. The vendor shall carry out all intermediate trials, as they feel necessary toward the realization of the SPWM. The vendor shall deliver SPWM as a functional unit at IPR.
- 2) The vendor is required to demonstrate to IPR representatives a prototype winding as per fig-1 with the SPWM first in its premises and then at IPR. The vendor should have all the necessary facilities/infrastructure at its premises for demonstrating the same.
- 3) The vendor shall install and commission the SPWM at IPR.

IPR shall provide the following to the vendor:

- 1) Dummy conductor for winding demonstration as a Free Issue Material (FIM)

A space with crane, water, compressed air and electric power for demonstrating the winding at IPR on the installed SPWM.

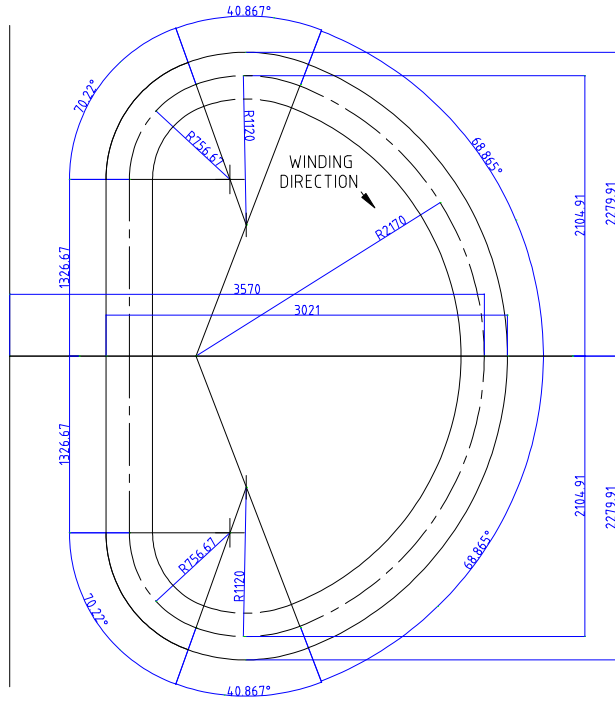


Fig1 (a)

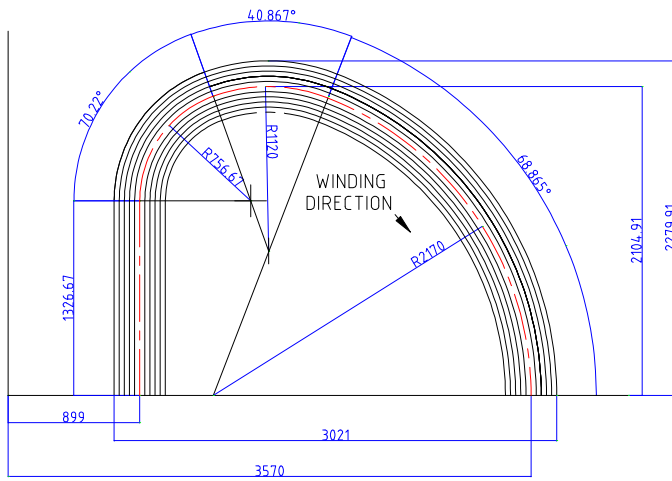


Fig 1 (b)

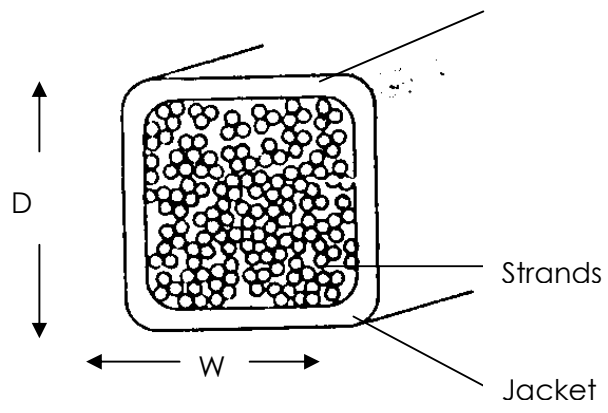


Fig-2

W,D = 50 mm (max)