Ref No. RED/VLS/AKS/OPA/2DS/MF/194566/2019

16/10/2019

Dear Sir(s),

Sub: Purchase of material, friction welding, machining, pressure testing and safe delivery of six numbers of Al-SS friction spin welded vessel as per given specification SP/FRICTION_JOINT/01

Sealed quotations are invited by Head, VLS, RED, on behalf of the President of India for the job of 'Purchase of material, friction welding, machining, pressure testing and safe delivery of six numbers of Al-SS friction spin welded vessel as per given specification SP/FRICTION_JOINT/01.'

1. Quotations have to be submitted on printed letterheads and rate shall be typewritten only. Handwritten rates will not be considered.
2. Quotations have to be sent by speed post of Indian post only.
3. The taxes and transportation charges shall be quoted separately. GST registration number and PAN should clearly be typewritten in the quotation.
4. The quotation must reach Head, VLS, RED, Room No202, Hall no-7, BARC, Trombay-400085 by 04/11/2019. Quotation will be opened on 05/11/2019 at 2.00 PM.
5. The above-mentioned REFERENCE NO. and DATE AND TIME OF OPENING OF BIDS MUST BE CLEARLY MENTIONED ON THE SEALED ENVELOPE containing the quotation.
6. The work shall be completed within 60 days from the receipt of work order.
7. The offer shall be kept open for acceptance for a period of 30 days from the date of opening of the quotation.
8. The purchaser reserves the right to place an order for a quantity more and less than that indicated in above mentioned specifications.
9. The item shall be subject to inspection, and evaluation at bidder’s premises by purchaser or his representative. Necessary access and facilities required for carrying out inspection, and evaluation of the items shall be provided to the purchaser or his representatives.
10. Payment will be made as per rules after delivery of the items satisfactorily. Part payments and advanced payments are not possible.
11. Income tax and Educational cess as applicable shall be deducted from the bill. The bidder shall mention their PAN number in the quotation.
12. The purchaser reserves the right to accept/reject any or all the quotations received without assigning any reason whatsoever.
13. Specifications/sketches given to the bidder must be returned along with quotation.
General Notes:
1) The work shall be subject to inspection by the purchaser or his authorised representative. Work shall be conducted under their supervision and to the full extent of satisfaction.
2) Payment will be made as per rules, after the completion of the work to purchaser's satisfaction against submission of original bill in triplicate and advance stamped receipt.
3) Income tax and Educational cess as applicable will be deducted from the bill.
4) Bidder shall mention their PAN and GST Nos. in the quotation.
5) Head, RED reserves the right to accept/reject any or all the quotations received without assigning any reason whatsoever.
6) Bidder shall furnish detailed information regarding whether an ex-employee of BARC is working in their organisation or whether any of their relative is working in DAE/BARC or whether he/she is an ex-employee of DAE/BARC. In case of absence of such information, or wrong information the quotation or contract is likely to be rejected or cancelled.

CONFIDENTIALITY CLAUSES:
I. Confidentiality:
No party shall disclose any information to any third party concerning the matters under this contract generally. In particular, any information identified as "Proprietary" in nature by the disclosing party shall be kept strictly confidential by the receiving party and shall not be disclosed to any third party without the prior written consent of the original disclosing party.
This clause shall apply to the sub-bidders, consultants, advisers or the employees engaged by the party with equal force.

II. "Restricted information" categories under Section 18 of the Atomic Energy Act, 1962 and "Official Secrets" under Section 5 of the Official Secrets Act, 1923:-
Any contravention of the above-mentioned provisions by any bidder, sub-bidder, consultant, adviser or the employees of a bidder will invite penal consequences under the aforesaid legislation.

III. Prohibition against use of BARC's name without permission for publicity purposes:-
The contractor or sub-contractor, consultant, adviser or the employees engaged by the bidder shall not use BARC's name for any publicity purpose through any public media like Press, Radio, T.V. or Internet without the prior written approval of BARC.

Thanking you,

Yours Sincerely,

(S. K. Sinha)
Head, VLS,RED
For and on behalf of the President of India
(The Purchaser)

Enclosure: 1) Specification No: SP/FRICTION_JOINT/01
Specification No: SP/FRICTION_JOINT/01

This document covers the scope, technical specification, for **Purchase of material, friction welding, machining, pressure testing and safe delivery of six numbers of Al-SS friction spin welded vessels.**

1.0. SCOPE

Scope covers

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1.</td>
<td>Purchase of raw material (Al 6061T6 and SS 304L) for making vessels</td>
</tr>
<tr>
<td>2.</td>
<td>Fabrication of six numbers of friction spin welded vessels</td>
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<tr>
<td>3.</td>
<td>Burst Testing of two vessels</td>
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<tr>
<td>4.</td>
<td>Safe delivery of two burst tested and balance four vessels</td>
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2.0 DESCRIPTION:

Six numbers of pressure vessels as shown in figure-1 are to be made by friction welding SS (SS304L) and Al (Al 6061gr T6) pipes. Table-1 gives the sizes and materials of pipe to be used for fabricating the vessel.

<table>
<thead>
<tr>
<th></th>
<th>Material</th>
<th>Outer Diameter</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS 304L</td>
<td>130mm</td>
<td>15mm</td>
<td></td>
</tr>
<tr>
<td>Al 6061 gr T6</td>
<td>130mm</td>
<td>15mm</td>
<td></td>
</tr>
</tbody>
</table>

Vessel fabrication is to be carried out in two steps. First, SS (SS304L) and Al (Al 6061gr T6) pipes (as shown in figure-2) are to be friction welded and then machined to dimension as shown in figure-1. In the second stage, cover plates are to be welded. Two vessels will be subjected to burst test at supplier premises to ascertain burst pressure. Remaining four vessels along with two burst tested vessels should be supplied to REZ store, Hall-7, BARC, Mumbai-85.

Supplier has to do weld joints qualification as per details given in paragraph 3.0 and burst test as per details given in paragraph 4.0. All qualification and testing shall be carried out in presence of purchaser.
3.0 Qualification of joints strength:

Trials shall be conducted to finalise the welding parameters for optimum joint strength. The optimum joint strength is one in which joint strength is greater than the parent Al 6061 gr T6 material. List of test and qualifying criteria is given in table-2.

<table>
<thead>
<tr>
<th>Test</th>
<th>Qualifying criteria</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile strength</td>
<td>Failure should be from parent material not from joint.</td>
<td>AWS B4.0 (Standard Methods for Mechanical Testing of Welds)</td>
</tr>
<tr>
<td>Bend test</td>
<td>Any crack in joint should not be visible optically.</td>
<td>AWS B4.0 (Standard Methods for Mechanical Testing of Welds)</td>
</tr>
</tbody>
</table>

4.0 Burst Test:

Two manufactured vessels will be burst tested at room temperature at supplier premise. Supplier has to made all the necessary arrangements for the tests. Pressure will be increased in steps of 50 bar with hold time of 10 min.

5.0 Safe delivery:

Balance four vessels along with two pressure tested vessels should be delivered to REZ store, Hall-7, BARC, Mumbai-400085.

6. Notes to Bidders:

1. No free issue material be provided.

2. During the process of welding, machining or testing or prior to it, the purchaser reserves the right to incorporate minor changes to the reference drawing which do not necessitate a change in machining procedure, inspection procedure or size of raw material. This shall not be taken as reason for revision of quoted price.

3. All drawings/sketches must be returned along with quotation.

4. The purchaser shall carry out inspection at various stages of fabrication to be identified before the start of fabrication. The supplier shall offer all necessary facilities to the purchaser’s representatives for carrying out the same.
5. The supplier must keep the record of the inspection in form of reports and it must be submitted to the purchaser for his approval. The supplier must also submit all test certificates and the test results for the record and reference of purchaser.

6. The purchaser reserves the right to undertake additional inspection, if deemed necessary by him.
Figure-1: Friction Vessel
Figure-2: SS and Al pipe