Ref No: EmA&ID/2020/SSR/74714

Date: 18.8.2020

To whom so ever it may concern

Sub: Development and supply of extreme temperature thermal conductive and electrical insulating epoxy resin system along with its test certificate conforming to technical specification no: EmA&ID/EMAS/SCM/20/13

Dear Sir/Madam,

1. Quotations are invited for development and supply of extreme temperature thermal conductive and electrical insulating epoxy resin system along with its test certificate conforming to technical specification no: EmA&ID/EMAS/SCM/20/13.

2. Bidder shall quote for development of epoxy resin and cryogenic qualifications conforming to tender technical specification.

3. Taxes and Excise Duties shall be quoted separately. Form AF / H whichever is applicable shall be provided, if required.

The quotation must reach The Head, Electromagnetic Application & Instrumentation Division by 31.8.2020 (12:00 PM) and must be sent in a sealed envelope super scribed with the reference number & the due date given above only through India Ordinary Post/Speed Post.

4. The address on the envelop should read: The Head,
   Electromagnetic Application & Instrumentation Division,
   RCnD Bldg., North Site
   BARC, Trombay,
   Mumbai - 400 085.
   (Kind Attn: S.Sundar Rajan, SO/F)

5. The bidder shall complete the job within 2 months from the date of firm work order issued to the bidder.

6. Head, Electromagnetic Application & Instrumentation Division reserves the rights to accept / reject any or all quotations without assigning any reason.

7. Quotation must also indicate the validity of offer. Quotation must also indicate the GST No and PAN number of the supplier.

8. The quotation has to be signed by authorized person with company seal.

9. Payment will be made by EFT only after satisfactory completion of work on production of bill, delivery challan and advance stamped receipt. Income tax as applicable will be collected at the time of payment.

10. In case of any technical clarifications, the supplier may kindly contact the indenting officer through Email only. (Email ID: sundara@barc.gov.in)


(S Sundar Rajan) 18/8/2020
SO/F, EMAS, EmA&ID

Technical specification

<table>
<thead>
<tr>
<th>Document no.</th>
<th>Revision no.</th>
<th>Date of Issue</th>
<th>No of pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>EmA&amp;ID/EMAS/SCM/20/13</td>
<td>0</td>
<td>17.8.2020</td>
<td>3</td>
</tr>
</tbody>
</table>

Development and supply of extreme temperature thermal conductive and electrical insulating epoxy resin system along with its test certificate

1.0 SCOPE

Tender is invited for development and supply of extreme temperature thermal conductive and electrical insulating epoxy resin system along with its test certificate. The complete job shall be carried out strictly as per requirements, specifications and its compliance standards as detailed in this document. In this specification the supplier shall be referred to as the “supplier” and Bhabha Atomic research Centre shall be referred to as the “buyer”.

Supplier shall provide complete raw material and carry out testings to meet the technical requirements. The supplier shall be qualified as per Para 5.0 of this document. The brief description of contents of the tender specification document is as described below.

Para 2.0 gives the detailed job description.
Para 3.0 gives the general requirements.
Para 4.0 gives the general requirements.
Para 5.0 gives the requirements for raw material procurement.
Para 6.0 gives the requirements of supplier qualifications.
Para 7.0 gives the requirements of packaging and safe delivery.
Para 8.0 gives the confidentiality clause.

2.0 DETAILED JOB DESCRIPTION

2.1 Amide based epoxy resin with aluminum oxide fillers are required for impregnation of system which can work for extreme low temperature and high temperature of upto 200℃.

2.2 Suitable impregnation setup shall be made for qualification of the epoxy resin at the cryogenic temperature (4.2K) and high temperature of (200oC)

3.0 TECHNICAL REQUIREMENTS

The epoxy resin system shall be developed to meet the following technical requirements.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description/Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Material properties</strong></td>
<td></td>
</tr>
<tr>
<td>Viscosity @ 25℃</td>
<td>&lt;10000 cps</td>
</tr>
<tr>
<td>Dielectric strength with S-2 Glass of 0.5 mm at 76K</td>
<td>76.3 KV/mm</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>1.2 g/cc</td>
</tr>
<tr>
<td><strong>Compressive Properties</strong></td>
<td></td>
</tr>
<tr>
<td>Temperature[K]</td>
<td>Compression strength [MPa]</td>
</tr>
<tr>
<td>With S-Glass 50%</td>
<td>1100</td>
</tr>
<tr>
<td><strong>Shear Properties</strong></td>
<td></td>
</tr>
<tr>
<td>Temperature[K]</td>
<td>Shear strength [MPa]</td>
</tr>
<tr>
<td>76</td>
<td>118</td>
</tr>
</tbody>
</table>
### Co-efficient of thermal expansion

<4000um/m

### Process compatibilities

Filament Winding, Vacuum pressure impregnation, wet winding

### Fillers

Alumina

### Epoxy resin along with Aluminum oxide filler

Bisphenol A-epoxy resin (80%) and Aluminum oxide (20%)

### Part-B

Polyoxypropylenetriamine (70%), Glycidoxypropyl trimethoxysilane (15%) and para-nonnolphenol (15%)

### Quantity

2 Set (1 Set is 32Kg)

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### 4.0 GENERAL REQUIREMENTS

4.1 The supplier shall workout a detailed design to meet fabrication requirements and work description, quantity and main fabrication material. They shall submit along with the offer all the salient features, material details of individual items and test qualifications report.

4.2 The part number and the source of all the hardware’s shall be cleared mentioned before purchase of the same from the market. They shall be purchased and installed only after prior approval from BARC. Any component of inferior quality purchased without prior approval will be rejected strictly.

4.3 The Supplier shall indicate in detail the standards adopted for the materials and processes and the quality control procedures followed by them.

4.4 Supplier can suggest the color, aesthetics, and other details as suitable. Supplier must offer best quality/IS certified material only.

4.5 Supplier should have similar work experience and along with the offer, shall submit the details of past experience with documentary proof.

4.6 Materials, tools, manpower etc required for the above work will not be supplied by the user. Supplier has to arrange the above on his own (No free issue material).

4.7 The supplier shall incorporate minor changes in the design as required at the time of execution of work at no extra cost.

4.8 The above job shall be done strictly under the supervision of our engineers.

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### 5.0 RAW MATERIAL PROCUREMENT

5.1 The raw material, electrical components used by supplier for the manufacturing of these components shall be of brand new and shall not be used previously.

5.2 All the material shall strictly confirm to their corresponding IS standards and shall be purchased only after prior approval from the purchaser.

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### 6.0 REQUIREMENTS OF SUPPLIER QUALIFICATIONS

6.1 The supplier shall be evaluated on the basis of the following criteria

6.1.1 The supplier shall have previous experience in carrying out similar such jobs previously to any DAE, ISRO or DRDO labs. The compliance or conformity of having supplied cryogenic electrical insulation systems shall be provided by the supplier.

6.1.2 If the supplier desires to carry out development of the custom electrical insulation from standard available electrical insulation systems, the supplier shall provide the details of the OEM manufacturers, their qualification standards and proof of the same.

6.1.3 The supplier shall provide detailed plan for testing of the developed epoxy resin. All the properties need to be measured in cryogenic temperature. Offer without this detail will be technical rejected.
7.0 REQUIREMENTS OF PRICE AND DELIVERY SCHEDULE

7.1 The complete job is expected to be completed in a duration of 2 Months.

8.0 CONFIDENTIALITY CLAUSE

8.1 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 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 sub-contractors, consultants, advisors or the employees engaged by a party with equal force.

8.2 “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 contractor / sub-contractor, consultant, advisor or the employees of the contractor will invite penal consequences under the aforesaid legislation.

8.3 Prohibition against the use of BARC’s name without permission for publicity purpose. The contractor or sub-contractors, consultants, advisors or the employees engaged by a party shall not use BARC’s name for publicity purpose through any public media like: press, radio, TV or Internet without any prior approval of BARC (wide circular ref.: 2/Misc-9/Lgl/2001/92 date 30/04/2001).