GOVERNMENT OF INDIA
BHABHA ATOMIC RESEARCH CENTRE
Atomic Fuels Division

Ref: AFD/FAS/2020/109224

Date: 02/11/2020

Sub: Extrusion and supply of Aluminium tubes and rods as per attached Specification

Dear Sir,

Your sealed offer is invited for & on behalf of President of India for Extrusion and supply of Aluminium tube and rods as per specification. The specifications, terms and conditions are enclosed in Annexure I & II.

Your offer in sealed envelope duly marked with above reference no. should be sent by Speed/Register Post only, so as to reach us on or before 25/11/2020 and should addressed to

R K Srivastava
Atomic Fuels Division
Bhabha Atomic Research Centre
Trombay, Mumbai-400085.

Yours faithfully

(R K Srivastava)
SA/F, FAS, AFD

(Amit Sharma)
SO/G, FAS, AFD

For and on behalf of President of India
1. **Scope of work:**

1.1 Extrusion and Supply of Aluminum tubes and rods as per attached Annexure I and II

1.2 **Quantity:** As mentioned in the Annexure I and II

1.3 Total work completion time duration: Twelve weeks from the date of order.

1.10 Packaging: Each tube and rod shall be packed suitably to prevent any damage during transportation and storage. A box shall not contain more than 200 Kg of Material.

1.11 Vendor shall submit the two tubes and two rods of not less than 500 mm length for dimensional inspection to the purchaser. Bulk production shall be started only after clearance from purchaser.

1.12 Material used for Extrusion shall be of Indian origin. If the vendor is not a primary producer, then the material required for extrusion shall be procured from a reputed Indian producer only. A copy of purchaser order placed for material procurement shall be forwarded to purchaser (BARC).

2. **Terms & Conditions:**

2.1 The items shall be suitably packed to prevent any damage during transportation and delivered to the purchaser’s site, only after consent of the purchaser for the delivery of the finished components is received.

2.2 Prior to dispatch and delivery, the tubes and rods shall be cleaned so that no dirt, grease or any other stains are present on the surface before final packing.

2.3 All work pertaining to fabrication and inspection shall be performed by the vendor and no help or assistance of any sort shall be extended from purchaser’s side.

2.4 Quotations shall clearly mention the rate for Extrusion of per Kg of tubes and rods. Consolidated offers giving total cost shall be summarily rejected.

2.5 Taxes, if any, shall be specified separately apart from the base cost.

2.6 Validity of offer (min 90 days) and work completion period shall be clearly mentioned in the offer letter.

2.7 Income tax @ 2% of amount of bill and surcharge on IT as applicable shall be deducted at source. Education cess @ 3 % on IT & surcharge will also be deducted from the supplier’s bill.

2.8 Quotations are to be in printed letter head / quotation format which should consist of registered GST Number, PAN of the firm etc.

2.9 Quotations that are received by email, fax, any other computer generated form without signature, handwritten etc. shall be considered as invalid & rejected.

2.10 Payment will be arranged after satisfactory completion of work and on production of bills in triplicate, delivery challan in duplicate, advanced stamped receipt. Advance, Part Payment or against delivery cannot be made.
2.11 Vendor may fill up form of option for payment through ECS/RTGS with pre-stamped receipt at the time of payment.

2.12 Any delay which is attributed to the supplier is liable for penalty @ ½ % per week (Max 5%) to be imposed on supplier.

3. Confidentiality Clause:

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 confidentially 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-contractors, consultants, advisers or the employees engaged by a 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 contractor, sub-contractor, consultant adviser or the employees of a contractor 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 contractor shall not use BARC’s name for any publicity purpose through any public media like Press, T.V. or Internet without the prior written approval of BARC.

(R K Srivastava) 
SA/F, FAS, AFD

(Amit Sharma) 
SO/G, FAS, AFD
For & on behalf of President of India
Annexure-1

Material Specification for Al Tubes

1.0 Scope
This specification defines the requirements of material for Aluminum alloy tubes, Grade AA 5052 (57S) confirming to the requirements specified in ASTM-B-221, temper condition - M/F.

2.0 Size and Quantity
   a) OD Ø80±0.6 mm× 12 ± 1 mm thick × 1200 ±5mm long
   b) straightness 1.5 mm/meter or better
   c) Qty : 3.5 MT ±5%

3.0 Manufacturing
The tubes shall be manufactured by Hot Extrusion route and shall be homogenized. Manufacturing Lot is defined as tubes made from same heat of material, fabricated through same working schedules and heat treated in one batch.

4.0 Technical Requirements
4.1 Chemical Composition
The chemical composition limits in lot sample are as specified below:

<table>
<thead>
<tr>
<th>Element</th>
<th>Limit¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boron</td>
<td>20 ppm (max)*</td>
</tr>
<tr>
<td>Chromium</td>
<td>0.15 – 0.35 %</td>
</tr>
<tr>
<td>Copper</td>
<td>0.10</td>
</tr>
<tr>
<td>Iron</td>
<td>0.40</td>
</tr>
<tr>
<td>Manganese</td>
<td>0.10</td>
</tr>
<tr>
<td>Silicon</td>
<td>0.25</td>
</tr>
<tr>
<td>Zinc</td>
<td>0.10</td>
</tr>
<tr>
<td>Magnesium</td>
<td>1.8 – 2.4%</td>
</tr>
<tr>
<td>Aluminium</td>
<td>Balance</td>
</tr>
</tbody>
</table>

¹ Limits are in max weight % unless shown as a range, or stated otherwise.
Other elements shall be individually 0.05% max and in total 0.15% max.
*10 ppm will be preferred

Chemical Analysis report for each extrusion/heat treatment lot shall be submitted from a NABL approved/accredited lab. The report must mention Heat no. of the sample.
4.2 Mechanical Properties

Two samples (one from top portion and other from bottom portion) from each extrusion / heat treatment lot shall be tested at room temperature in accordance to ASTM-E-8 (with 25 mm gauge length). The tubes shall have the following tensile properties in the longitudinal direction:

- U.T.S. : 170 MPa (min.)
- Y.S. : 70 MPa (min.)
- % Elongation : 18% (min.)

Mechanical test report from NABL approved/accredited lab shall be submitted. The report must mention Heat no. of the sample.

5. Packaging

The material shall be free from dirt, Grease, oil, scratch and dents. The material shall be suitably packed to avoid and damage during transportation. Damage of material during transportation will be considered as inadequate packing and will be rejected. The collection of damaged material will be the responsibility of Vendor.

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Annexure-2

Material Specification for Al Rods

1.0 Scope

This specification defines the requirements of material for Aluminum alloy rod, Grade AA 1050/1060/1071 (1S) confirming to the requirements specified in ASTM- B- 221, temper condition - M/F.

2.0 Size and Quantity

a) \( \phi 17 \pm 0.2 \text{ mm} \times 1000 \pm 5\text{mm} \)

b) Straightness 1.5 mm/meter or better

c) Qty : 1.5 MT \( \pm 5\% \)

3.0 Manufacturing

The rod shall be manufactured by Hot Extrusion Route. Manufacturing Lot is defined as rod made from same heat of material, fabricated through same working schedules.

4.0 Technical Requirements

4.1 Chemical Composition

The chemical composition limits in lot sample are as specified below:

<table>
<thead>
<tr>
<th>Element</th>
<th>Limit(^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boron</td>
<td>20 ppm (max)(^*)</td>
</tr>
<tr>
<td>Chromium</td>
<td>0.15 – 0.35 %</td>
</tr>
<tr>
<td>Copper</td>
<td>0.05</td>
</tr>
<tr>
<td>Iron</td>
<td>0.35</td>
</tr>
<tr>
<td>Manganese</td>
<td>0.05</td>
</tr>
<tr>
<td>Silicon</td>
<td>0.25</td>
</tr>
<tr>
<td>Titanium</td>
<td>0.03</td>
</tr>
<tr>
<td>Vanadium</td>
<td>0.03</td>
</tr>
<tr>
<td>Zinc</td>
<td>0.10</td>
</tr>
<tr>
<td>Zinc</td>
<td>0.05</td>
</tr>
<tr>
<td>Aluminium</td>
<td>99.5% (min.)</td>
</tr>
</tbody>
</table>

\(^{1}\) Limits are in max weight % unless shown as a range, or stated otherwise.

Other elements shall be individually 0.03\% max and in total 0.15\% max.

\(^*\)<10 ppm will be preferred
Chemical Analysis report for each extrusion/heat treatment lot shall be submitted from a NABL approved/accredited lab. The report must mention Heat no. of the sample.

4.2 Mechanical Properties

Two samples (one from top portion and other from bottom portion) from each extrusion / heat treatment lot shall be tested at room temperature in accordance to ASTM-E-8 (with 50 mm gauge length). The rods shall have the following tensile properties in the longitudinal direction:

U.T.S. : 60 MPa (min.) [if it is more than 95 MPa matter shall be reported]
Y.S. : 15 MPa (min.)
% Elongation : 35% (min.)

Mechanical test report from NABL approved/accredited lab shall be submitted. The report must mention Heat no. of the sample.

5.0 Packaging

The material shall be free from dirt, Grease, oil, scratch and dents. The material shall be suitably packed to avoid and damage during transportation. Damage of material during transportation will be considered as inadequate packing and will be rejected. The collection of damaged material has to be borne by Vendor.