

Government of India
Bhabha Atomic Research Centre
Electronics Division

Ref : BARC/ED/RIS/610/2018

Mod Labs., Trombay.
Dated: 11-09-2018.

To,

Sub: Minor Fabrication - Invitation of Quotation.

Fabrication and supply of moly-manganese + Ni coated alumina ceramic bushes per enclosed drawings and annexure

Dear Sirs,

1. Quotations are invited for the fabrication and supply of moly-manganese coated alumina ceramic bushes as below.

Sl. No.	Item	Qty.	Drawing Title
1	Ceramic Bush Type-1	10	Drawing 1
2	Ceramic Bush Type-2	10	Drawing 2
3	Ceramic Bush Type-3	10	Drawing 3

The fabrication of the ceramic bushes and moly-manganese +Ni coating is as per specifications in Annexure 1. The details of the above components are as per enclosed drawings (Drawings-1, 2 and 3)

2. The quotations should be on **printed letter head** and should indicate **sales tax registration number (registered with local ST or CST), PAN of the firm & Service Registration Number.**
3. Bidder shall quote for fabrication of these components with material only.
4. Income Tax @ 2% and surcharge on IT as applicable will be deducted from your bill.
5. Taxes and excise duties shall be quoted separately. Form AF shall be provided where necessary.
6. The item must be provided with on-site guarantee of 1 year. Certificate to this effect may kindly be provided along with delivery of items.
7. The quotations must reach, Head Electronics Division by **5th October, 2018** and must be sent in a sealed envelope, through India Post only, super scribed with the above reference number and due date given above.
8. The address on the envelope should read:
The Head, Electronics Division,
Bhabha Atomic Research Centre,
Modular Labs., Trombay, Mumbai-400 085.
Attn.: **Dr. V. Balagi**
9. The bidder shall have to take an insurance policy against any material issued to him by the purchaser.
10. The fabrication work shall be subject to inspection by our officer. The finished components shall not be dispatched prior to approval by our engineer, at bidder's works. Necessary inspection facilities should be provided to our engineers during fabrication at bidder's premises. The acceptance criteria are enclosed.
11. The bidder shall deliver the finished components, within **18 weeks** (including approval by our engineer) from the date the firm purchase order issued to the bidder. Any delay attributable to the contractor is liable for penalty @ ½ % per week (max. 5%) to be imposed on the contractor.
12. The finished components and the scrap from the free issue material shall be delivered by the bidder at **B.A.R.C.**

13. Head Electronics Division, BARC reserves the right to accept/reject any or all quotations without assigning any reason.

14. Note for Suppliers:

- i. Supplier should be Original Equipment Manufacturer (OEM) and have adequate experience in fabrication of ceramic bushes, inspection and quality control and provide documentary proof of having successfully supplied items with the sizes and tolerances indicated in the drawings.
- ii. Supplier should have in-house facilities for moly-manganese process, instruments for inspection and quality control at in house workshop along with skilled manpower to fabricate items with the sizes and tolerances indicated in the drawings.
- iii. Supplier should submit list of equipment's to carry out the job with the sizes and tolerances indicated in the drawings at the time of submitting their quotation.
- iv. The availability of machines and skilled manpower will be ensured by site visit prior to placement of work order and quotations from suppliers without the required facilities as stated above will be rejected.

15. Enclosures

- Total 3 Nos. drawings (Drawings-1, 2 and 3)
- Annexure-1: Specifications of ceramic and Specifications of moly-manganese

Confidentiality Clause

1.1 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 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-contractors, consultants, advisers or the employees engaged by a party with equal force.

1.2 **"Restricted information" categories under Section 18 of the Atomic Energy Act, 1962 and "Official Secrets" under Section 5 of the Official Secrets Acts, 1923:-**

Any contravention of the above-mentioned provision by any contractor, sub-contractor, consultant, adviser or the employees of a contractor will invite penal consequences under the aforesaid legislation.

1.3 **Prohibition against use of BARC's name without permission for publicity purposes:-**

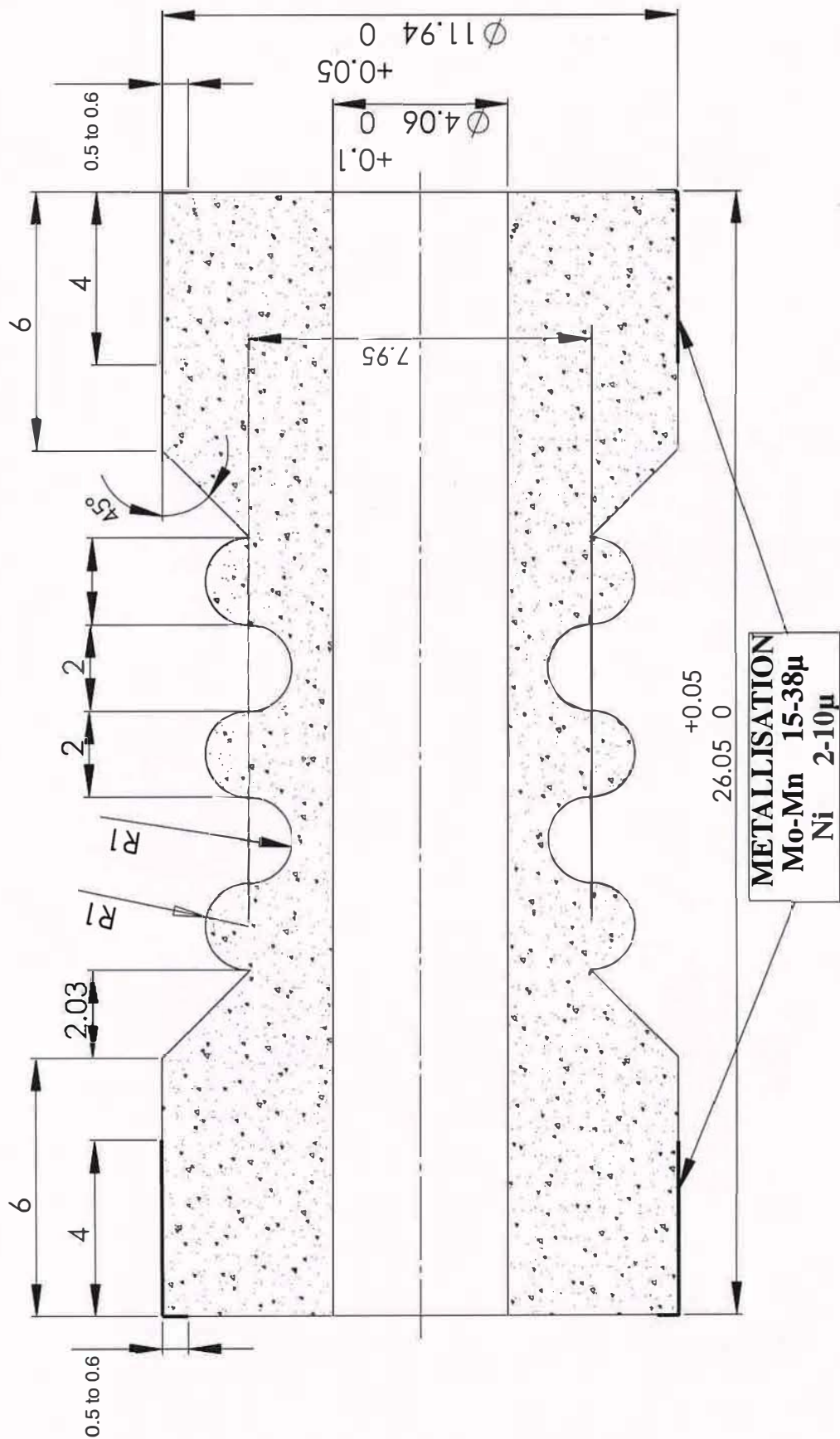
The contractor or sub-contractor, consultant, adviser or the employees engaged by the contractor shall not use BARC's name for any publicity purpose through any public media like Press, Radio, TV or Internet without the prior written approval of BARC.

Handwritten signature and date:
10/9/18
11/9/18

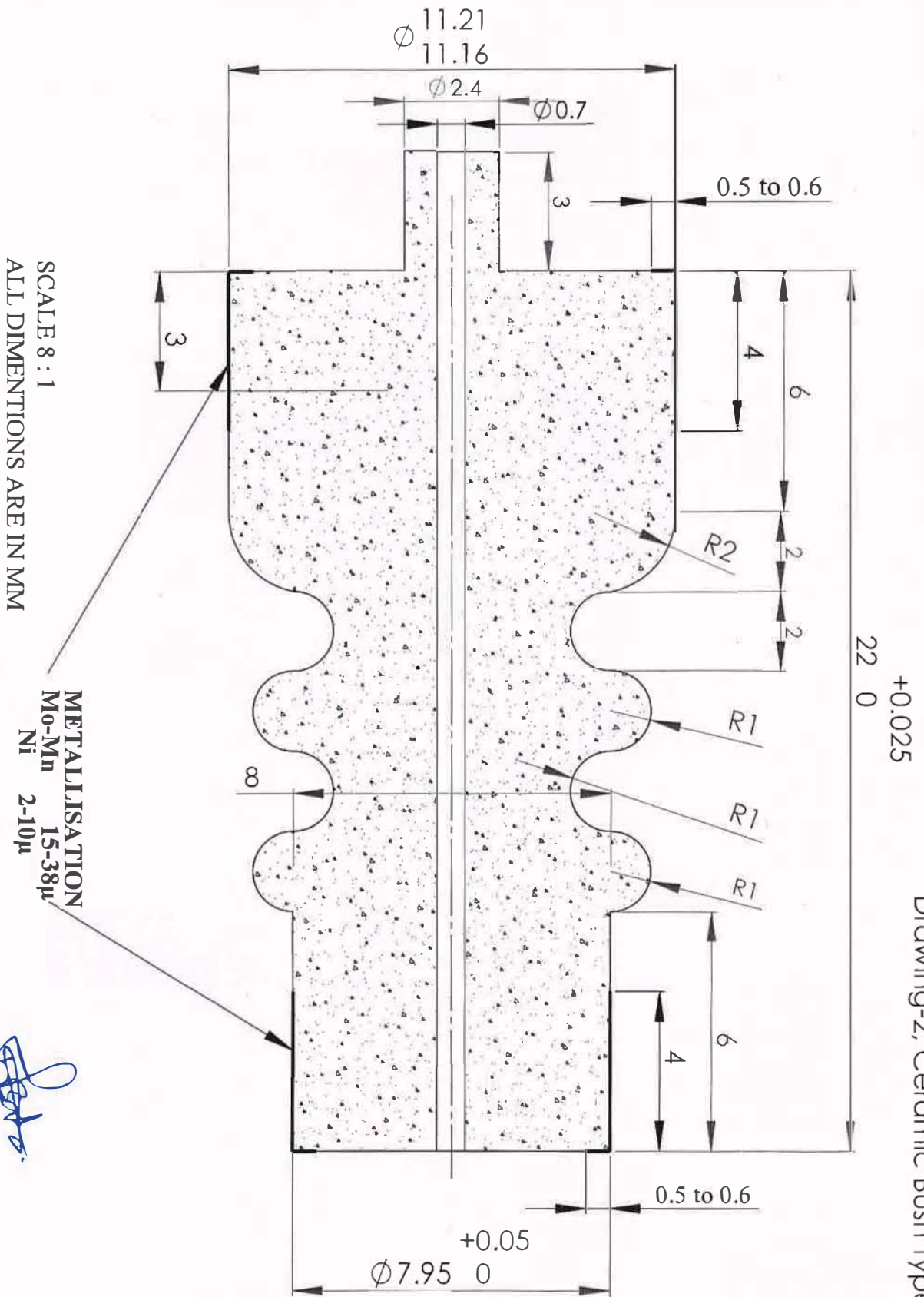
Handwritten signature:
(Anita Behere) 11/9/2018
Head, Electronics Division

अनिता बेहरे / ANITA BEHERE
अध्यक्ष, इलेक्ट्रॉनिक्स प्रभाग / Head, Electronics Division
भारत सरकार / Government of India
भाषा परमाणु अनुसंधान केंद्र / Bhabha Atomic Research Centre
ट्रॉम्बे, मुंबई / Trombay Mumbai - 400 065.

Drawing-1, Ceramic Bush Type-1

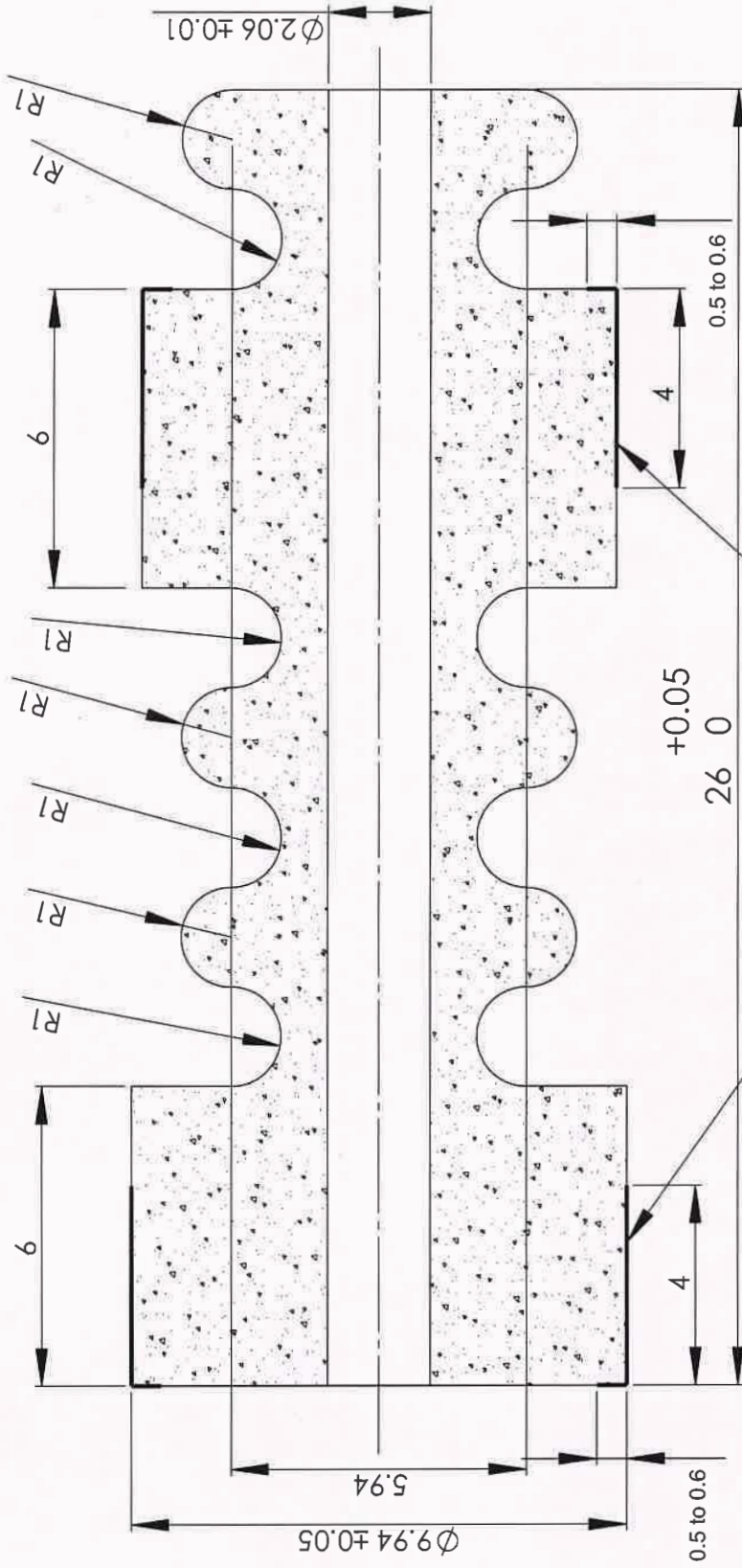


Scale: (8 : 1) ** ALL DIMENSIONS ARE IN MM**



[Handwritten signature]

Drawing-3, Ceramic Bush Type-3



METALLISATION
Mo-Mn 15-38 μ
Ni 2-10 μ

Scale: (8 : 1) ** ALL DIMENSIONS ARE IN MM**

Annexure 1

Specifications of ceramic bushes and moly manganese coating

Specifications of Ceramic:

- | | |
|-------------------------------|--|
| a. Dimensions | : As per enclosed drawings/Figures |
| b. Insulation resistance (IR) | : Not less than 10^{14} ohms at room temperature at 750VDC Not less than 10^9 ohms at 600 °C at 750VDC |
| c. Ceramic material | : Alumina |
| d. Purity | : 99.5% |
| e. Density | : > 3.9 gm/cc |
| f. Grain Size | : < 5 microns |
| g. Colour | : Ivory |
| h. Rockwell hardness (45 N) | : > 80 |
| i. Compressive strength | : > 2500 MPa |
| j. Tensile strength | : > 250 MPa |
| k. Elastic modulus | : > 300 GPa |



Typical values (the values can be within $\pm 25\%$). Test certificate from Govt. authorized lab, indicating compliance to these values shall be provided

- | | |
|---|---|
| l. Volume Resistivity (at 25°C) | : > $10E14$ ohm-cm |
| m. Volume Resistivity (at 600°C) | : > $10E9$ ohm-cm |
| n. Thermal Expansion | : 8 ppm/°C (RT – 1000°C) |
| o. Operating Temperature | : 550°C to 650 °C |
| p. Insulation resistance (IR)
Of formed Ceramic bushes | : Not less than 10^{14} ohms at room temperature at 750VDC Not less than 10^9 ohms at 600 °C at 750VD |
| q. He- leak rate of ceramics | : order of $\times 10^{-9}$ Tor. lit/sec or better, before and after Metallization |
| r. Alumina pieces should be free of surface and internal defects. If possible, dye penetrant test should be performed on each alumina before metallization. | |
| s. Sealing faces should be flat and parallel. | |

- Test report from Govt. authorized lab for Purity of Ceramic should be attached.
- Specific impurities such as Na, Fe, Si and Carbon should not exceed 1000 ppm
- Ceramic bushes should be non-porous and should not allow leakage of any gases at 650°C under high pressure of up to 18 bars.

Specifications of Moly Manganese + Ni :

- Thickness of Moly=manganese + Ni coating: As per the drawings 1; 2 and 3.
- The coating should withstand 1100°C in vacuum. **Actual performance will be evaluated after making the seals using test pieces.**
- The following are the requirement of purity:
 - Zn < 0.001%
 - Cd < 0.001%
 - Pb < 0.002%
 - P < 0.002%
 - C < 0.05%

- d. All other metallic impurities having vapor pressure higher than than 10^{-7} mm hg at 600°C shall be limited to 0.002% each
- e. Impurities having vapor pressure lower than 10^{-7} mm hg at 600°C shall be limited to 0.05% each

Before the final supply, one sample each from all categories should be supplied for testing as a part PDI.

Acceptance criteria:

- A. Dimensions
- B. IR at 25°C (as in 1 q above)
- C. IR @ 600°C (as in 1 q above)
- D. Tests for quality of Mo-Mn + Ni

