Government of India
Bhabha Atomic Research Centre
Laser & Plasma Technology Division
Trombay, Mumbai-400085

REF: LPTD/works/SG/ 196183 Date: 08/11/2017

Sub : **Minor Fabrication - invitation of quotations**.

Dear Sirs,

1. Quotations are invited for the minor fabrication of two numbers of high efficiency low power plasma torch for high-pressure application (HELP-hp1) with specifications and details as per Annexure-D.
2. Bidder shall quote for fabrication of these components with material.
3. Taxes and excise duties shall be quoted separately. Form AF shall be provided where necessary.
4. The quotations must reach, ***Head, Laser & Plasma Technology Division*** by **20.11.2016** and must be sent in a sealed envelope ***super scribed*** with the above reference number and due date given above.
5. The address on the envelope should read :

   The Head,
   Laser & Plasma Technology Division
   Bhabha Atomic Research Centre,
   Trombay, Mumbai - 400 085.
   (Attn.: S.Ghorui)
6. The bidder shall have to take an insurance policy against any material issued to him by the purchaser.
7. The fabrication work shall be subject to inspection by our engineer.
8. The bidder shall, complete the work within ***30 days*** from the date the firm work order is issued to the bidder. Installation will be done at **M-34, PRIP Shed, Near Engg.Hall-8, BARC, Trombay, Mumbai-400 085.**
9. Head, Laser & Plasma Technology Division, BARC, reserves the right to accept/reject any or all quotations without assigning any reason.

Yours faithfully,

Head, Thermal Plasma Technology Section

घोडुइ एस. / **Ghorui S.**
वैज्ञानिक अधिकारी (जी) / SO (G)
अध्यक्ष, थ प्ला प्रौ अ / Head, TPTS
ले एवं प्ला प्रौ प्र / L & PT Division,
भा प अ केन्द्र / Bhabha Atomic Research Centre
मुंबई-400 085. / Mumbai - 400 085.

Encl.: **As above.**

Copy to: Accounts Officer, G.S.S. The quotations will be opened at 3.00 PM. on 20.11.2017

Annexure-D

1. Justification and Scope of work:

Thermal Plasma Technology Section of Laser & Plasma Technology Division is involved in design and development of arc plasma torches. The present work involves fabrication of a high efficiency (>60%) and low power (<10kW) tungsten electrode plasma torch for continuous operation at high pressure (<3atm). There is no free issue of material. Scope of the work includes procuring material of appropriate dimension, quantity and quality, fabrication of the components as per the design and specification, assembling of the components to form the final device and delivery of the item to the users place. Welding of the joints as necessary must be performed by certified welders only. Work shall be carried out to Indian Standards and Code of Practices. In absence, latest issue of International Standards shall be followed. Any discrepancies / conflict noticed shall be directed to the Executing Officer for his direction/approval. Required precision, overall dimension of the components and material of construction are provided for proper budgetary estimate. Detail fabrication drawing of each and every component will be provided only after the issue of the final work order.

2. Design Specifications

2.1 Dimensional details

Parameter	Specification
2.1.1 Torch diameter	55mm to 115 mm
2.1.2 Anode i.d.	4mm
2.1.3 Torch height	248mm or less
2.1.4 cathode diameter	10 mm or less

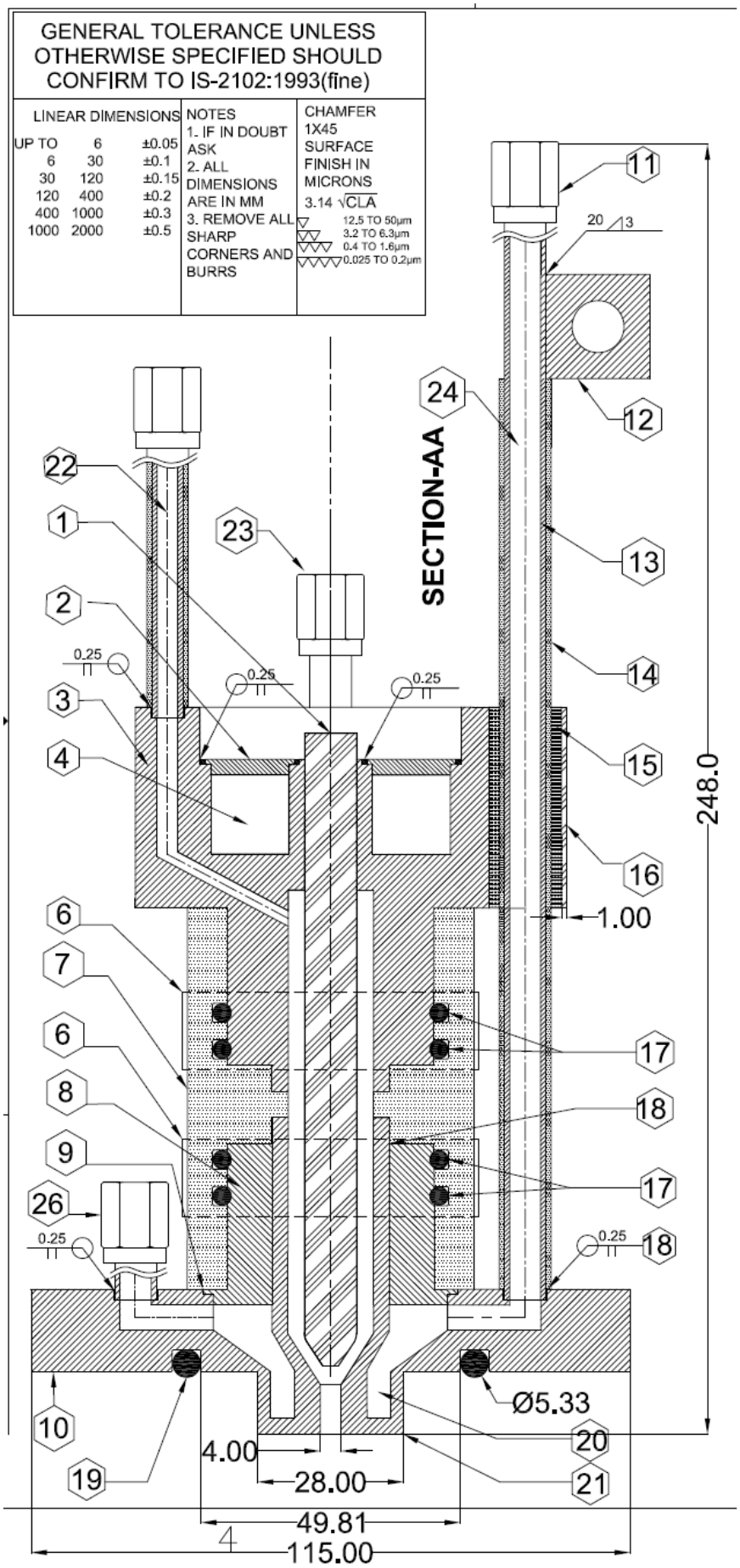
2.2 Operational details

2.2.1 Arc current	400A or less
2.2.2 Arc voltage	50V or less
2.2.3 Maximum power	50kW or less
2.2.4 Plasma gas	Argon/Nitrogen
2.2.5 Torch efficiency	60% or more

2.3 Material details

2.3.1 Cathode	Tungsten
2.3.2 Cathode material purity	99.9% or better
2.3.3 External body (other than parts of the electrodes)	SS304
2.3.4 Electrodes other than the cathode	Oxygen free high conductivity (OFHC) copper
2.3.5 Insulator dielectric strength	24kV/mm or better
2.3.6 Maximum permissible insulator temperature	300 ^{O}C or more

3. Overall Design and Dimension of the Torch:



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4. Material of construction and quantities:

26	AND WATER INLET	COPPER	1	1/2" NPTM END CONNECTION
25	CAT WATER INLET	COPPER	1	TEFLON OUTER COVER
24	AND WATER OUTLET	COPPER	1	TEFLON OUTER COVER
23	CAT WATER OUTLET	COPPER	1	1/2" NPTM END CONNECTION
22	PLASMA GAS INLET	COPPER	1	TEFLON OUTER COVER
21	ANODE NOZZLE	COPPER	1	MACHINED FROM A SOLID CYLINDER
20	COOLANT CAVITY		1	FORMED BY SEALING FROM THE TOP
19	O-RING	VIT0329	1	TRAPEZIUM GROOVE
18	BRAZING JOINT	COPPER	1	SILVER BRAZING
17	O-RING	VIT0222	2	PISTON GROOVE
16	HOLDING CLAMP	SS304	1	
15	OUTER SLEEVE	TEFLON	1	
14	INNER SLEEVE	TEFLON	1	
13	WATER OUTLET	COPPER	1	
12	ELEC CONECTN PORT	COPPER	1	
11	FEMALE CONNECTOR	SS304	1	1/2" NPTM END CONNECTION
10	MOUNTING FLAGE	COPPER	1	MACHINED FROM SINGLE BLOCK
9	BRAZING JOINT	COPPER	1	SILVER BRAZING
8	ANODE CAVITY CAP	COPPER	1	TIGHT FIT WITH NOZZLE WALL
7	ISOLATOR& HOLDER	TEFLON	1	MACHINED FROM SINGLE BLOCK
6	TIGHTENING RING	ALUMINUM	1	
5	HOLDING BOLTS	SS304	3	
4	COOLANT CAVITY	COPPER	1	
3	CATHODE HOLDER	COPPER	1	MACHINED FROM SINGLE BLOCK
2	COOLANT CAVITY CAP	COPPER	1	SILVER BRAZED WITH HOLDER
1	CATHODE	TUNGSTEN	1	SILVER BRAZED WITH HOLDER
PN	DESCRIPTION	MATERIAL	QT	REMARKS