

## **Request for Interest (RFI) for Electron gun**

Society for Innovation & development  
Indian Institute of Science, Bangalore – 560012  
Date : 01<sup>st</sup> May, 2018

The Society for Innovation and Development at the Indian Institute of Science (IISc) invites RFI to procure electron gun for research and experimentation in Additive Manufacturing area. The technical specification of the electron beam gun to be purchased is specified in the table 2.

### **1) Terms and Conditions:**

- 1) The vendor is responsible for the installation and demonstration of working electron gun
- 2) The price should include the cost of installation and training of potential users.
- 3) The system should be provided with at least two-year warranty on all parts. The warranty period should start from the date of installation.
- 4) The vendor should have qualified technical service persons in India.
- 5) The vendors should have supplied multiple electron gun based welding systems globally.
- 6) The vendors should have supplied multiple electron gun systems in India.
- 7) The RFI should be sent as per the following specification (see Table:2) and format
- 8) Please include if any other additional technical details and photographs related the equipment.
- 9) The RFI should be sent to [office.sid@iisc.ac.in](mailto:office.sid@iisc.ac.in)
- 10) The RFI should be submitted within **9 days** from the date of publishing.

### **2) Criteria for shortlisting**

The shortlisting of vendors will be done by a committee set up by Competent Authority, IISc.

The criteria used for evaluation would be:

**Table 1:**

Sr. No.	Criteria	Weightage
<b>1.0</b>	<b>Experience</b>	<b>40</b>
<b>2.0</b>	<b>Technical Aspects</b>	<b>40</b>
<b>3.0</b>	<b>Financial strength</b>	<b>20</b>

**Table: 2 (Specifications and Vendor filling form)**

Gun parameter	IISc requirement	Gun manufacture specification (Nearest matching specs to specified)		Customized development of the gun matching nearest to as per specification
		Model 1	Model 2	
Gun total power	4-6 KW			
Accelerating voltage	60KV- 80KV			
Maximum beam current	50-100 mA			
Beam ON and OFF switching frequency And Voltage variable frequency	10 KHz or larger is preferred			
Dynamic focusing capability by switching the EM coil current with switching speed of	1-10 KHz or Larger is preferred			
Beam current variation between	1-100mA with 0.5mA increment			
Astigmatism correcting coils	To keep the beam diameter and shape constant over $\pm 15-17.5^\circ$ degree deflection and Stigmata coil current switching frequency: 1-20 KHz or larger is preferred)			
Beam deflection angle	$\pm 15-17.5^\circ$ (Half angle)			
Beam deflector or	1-200 KHz or			

<b>scanning coil frequency</b>	(canning speed of electron beam spot between – 0.01m/sec- 8,000 m/s )			
<b>Variable beam diameter</b>	50-800 micron at 400-600 mm working distance ( For the all the beam diameters the dynamic focusing needed)  (Please provide the table for beam diameter variation with the working distances for different beam currents)			
<b>Stability of the gun beam parameters</b>	Gun parameters to be constant for 200 hours			
<b>Gun emission</b>	Should be stable during the 200 hours operation (Allowed variation would be $\pm 0.01\%$ )			
<b>Filament life time</b>	200 hours			
<b>process chamber pressure</b>	The gun should be compatible for process chamber			

	pressure of $10^{-3}$ mbar (The process gas could be He or Ar)			
<b>Filament type</b>	LaB6 or tungsten filament			
<b>Beam position, beam energy and current measurement device</b>	The device should measure all the parameters for all the deflection angles $\pm 15-17.5^\circ$			
<b>Connectivity</b>	Please see Annexure II			
<b>EMI shielding</b>	Please see annexure II			
<b>Other details</b>	Please provide the utility details such as water cooling instruments and etc.			
<b>Estimated time to deliver</b>				
<b>Estimated cost</b>				

## **Annexure I**

### **Electron generator specification**

- **Accelerating voltage: 60KV-80KV**
- **Maximum beam current: 50-100 mA**
- **Beam ON and OFF switching frequency: 10 KHz or larger is preferred**
- **Dynamic focusing capability by switching the EM coil current with switching speed of 1-10 KHz or Larger is preferred**

- **Beam current variation between: 1-100mA with 0.5mA increment.**
- **Astigmatism coils: To keep the beam diameter and shape constant over  $\pm 15-17.5^\circ$  degree deflection ( Stigmator coil frequency: 1-20 KHz or larger is preferred)**
- **Beam deflection angle:  $\pm 15-17.5^\circ$ (Half angle)**
- **Beam deflector or scanning coil frequency: (1-200 KHz or Scanning speed of electron beam spot between – 0.01m/sec- 8,000 m/s )**
- **Variable beam diameter of 50-600  $\mu\text{m}$  at 400-600 mm working distance ( For the all the beam diameters the dynamic focusing needed)**  
  
(Please provide the table for beam diameter variation with the working distances for different beam currents)
- **Stability of the gun beam parameters needs to constant for 100 hours**
- **Gun emission should be stable during the 200 hours operation (Allowed variation would be  $\pm 0.01\%$ )**
- **Filament life time 200 hours.**
- **The gun should be compatible for process chamber pressure of  $10^{-3}$ mbar (The process gas could be He or Ar)**
- **Gun and chamber isolation valve**
- **LaB6 sharp tip with heating and strip type tungsten with v shape**
- **Easily mountable cathode holders**

## **Annexure II**

**HV power supply, EM coil power supply, Stigmata power supply, Scanner power supply, Turbo molecular pump, vacuum gauges should be compatible for following interface connectivity:**

*(High EMI shielding to be provided for all the devices)*

### **Connectivity compatibility**

#### **RS232**

The RS-232 interface makes use of a standard ‘command/response’ communications protocol. All software that addresses the RS-232 interface must adhere to the following parameters:

#### **ETHERNET**

The Ethernet interface communicates using the following protocols:

- TCP/IP
- HTTP

- Telnet
- FTP

These assemblies can auto-switch between 10 Mb/s and 100Mb/s

## **USB**

The USB interface makes use of a standard 'command/response' communications protocol. The USB interface is accessed through a Windows USB driver that emulates a standard communications port (just like in RS-232).