



# Delhi Technological University

(formerly Delhi College of Engineering)

Govt. of NCT of DELHI

Shahbad Daultapur, Bawana Road, Delhi 110 042

Tel : +91-11-2787 1016, Fax : +91-11-2787 1023

[www.dtu.ac.in](http://www.dtu.ac.in), [www.dce.edu](http://www.dce.edu)

Tender Ref no. F.DTU/SP/211/08-02/19-20

Dated:

Tender ID No: 2019\_DTU\_174015\_1

## CORRIGENDUM

Reference to aforementioned tender id, dated: 12-06-2019 subject: Supply of Three Target PF Magnetron Sputtering Machine for Nanomaterials Research Laboratory of Department of Applied Physics, DTU, due to advancement of system for future use. The tender specification may be read as under:

**General description:** Three-target RF magnetron sputtering system required for carrying out thin film deposition.

S.No	Item description	Quantity
	<p><b><u>System</u></b></p> <p>A three target RF magnetron sputtering system for multilayer thin film deposition at high substrate temperatures with automatic operation with following specifications is required:</p> <p><b><u>Detailed Technical Specifications:</u></b></p> <p>a) <b>RF Magnetron sputtering module with D shape SS chamber 500mm x 500mm or higher size</b></p> <p>RF Magnetron sputtering module with three numbers 2" diameter magnetron with indirect water cooled and tilting auto shutter. The assembly will be mounted on a SS structure to be fixed to the SS chamber with hinges and SS handle. The targets should be mountable on the target holders with clamp on arrangement. Substrate holder should have rotational and positioning facility.</p> <p>The SS chamber size should be such that it can accommodate, three 2" diameter magnetron target holder, shutter and substrate heater. The chamber will have two viewing ports of 4". It should be mounted on a castor wheel based stage having adjustable feet.</p> <p>The base plate will have following ports. Blanks should be provided for each port</p> <p>(i) One KF 25/16 port for combination cold cathode/pirani gauge</p>	<b>One</b>

- (ii) One KF 16 port for venting
- (iii) One KF 16 port for gas valve
- (iv) Two 1" ports for electrical feed through
- (v) One extra 1" port with blanks fitted
- (vi) One KF 16 port with blank fitted

Distance between target and Sample holder should be adjustable in the range of 10 cm -15 cm.

**b) Vacuum Pumping System**

- 1) TMP/DP 650lit/sec and Rotary Vane Pump 300li/sec based vacuum pumping system with ultimate pressure better than  $1 \times 10^{-7}$  Torr within 90 minutes

(Make of pumps: Leybold/ Pfeiffer/Edwards/ Alcatel)

- 2) Gauges

Combination cold cathode/pirani with penning gauges with digital display cable and power cable

(Make of gauges: Leybold/Pfeiffer/Edwards/Inficon)

**c) Mass flow controllers**

Mass flow meters (0 to 100 sccm) along with control unit with digital display to be provided (i) one for O<sub>2</sub> and (ii) One for Ar

**(Make of MFC: Bronkhorst OR Alicat Scientific OR MKS Instruments)**

**d) Vacuum Valves**

**1. Roughing/Backing valve and vent Valve**

1" Right angled bellow sealed. ISO KF 25 compatible.

(Make of Valves: Leybold/Pfeiffer/Edwards)

**2. Gas valve**

One gas valve to be provided. SS tubing will be also be provided from MFC to gas valve

**3. Vent valve**

Electro magnetic operated bellow sealed vent valve to be provided.

**4. Variable conductance high vacuum cum throttle valve**

Poppet motorized valve DN 150K compatible/ Equivalent

**e) Heating assembly**

The substrate holder will be made of copper plate backed by SS plate to achieve a temperature of upto 800 °C. A heating assembly to be provided to heat the substrate. It will consist of a PID temperature controller, a thyristor, a transformer and a thermocouple

**f) Sputtering power supplies**

**1. RF Generator**

Frequency:13.56 MHZ, Power output: **300 W**

190-250 VAC, 50/60 Hz, 1 phase, Input impedance: 50 ohms

**Impedance matching network**

Auto, 300 W, 13.56 MHz

One RF power supply with 3 out auto selection.

(Make of RF: Seren/Advance Energy/Huttiger)

**2. DC Power supply and relevant cables**

1kW DC power supply with arc suppression facility

(Make of DC: Seren/Advance Energy/Huttiger/International supplier)

**g) Safety devices like water flow switch, vacuum switch, RP/DP interlock and magnetic valves.**

Should have water cooling arrangement to the magnetron sources to ensure uniform cooling of the target during sputter deposition. For cooling the magnetron

Digital Thickness Monitor with controller ON/OFF to measure and increase/decrease should have one or 2 sensors.

**Auto System:-**

PLC with HMI/PC operation auto system and control.

**h) Sputtering Targets for thin film deposition**

1. Cu, Ti, Zn, Cr and Mo metal targets (2" diameter)

2. TiO<sub>2</sub>, BaTiO<sub>3</sub>, HfO<sub>2</sub>, MoO<sub>3</sub>, WO<sub>3</sub>, ITO and ZnO oxide targets (2" diameter) with Cu backing plate

**i) Gas Cylinders for deposition**

1. Ar Gas Cylinder with stainless Steel Regulator

2. O<sub>2</sub> Gas Cylinder with stainless Steel Regulator

**j) Substrates**

1. Si/SiO<sub>2</sub> (300 nm), resistivity (1-10 Ω-cm), diamtere (3 inch), single Side polished --- 15 piece

2. Si wafers, resistivity (1-10 Ω-cm), diamtere (3 inch), single Side polished, P-Type and N-type both --- 20 piece (10 for each)

**k) Chiller**

Werner Finley/Daichi water chiller should be supplied for the cooling of magnetrons, which is important for the smooth functioning of the quoted equipment.

**l) Warranty**

The complete system and accessories excluding consumables should be under warranty for a period of one year from the date of installation. Extended warranty of one year is preferable. In case of breakdown during the warranty period, a competent service engineer of the supplier should make as many visits as are necessary to rectify the problem and replace the faulty parts. But it should be repaired within 48 hours from the date and time of complaint lodged by the user. The supplier should provide all spares required for making the equipment operational. All the warranty replacement part should be dispatch on DDP (free domicile) at site. DTU will return defective parts after replacement.

	<p><b>CAMC:</b> Please also mention the financial involvement for two years on site Comprehensive Annual Maintenance after normal Warranty. The charges shall be paid to the firm in half-yearly installments after satisfactory service. It is essential to quote the charges and terms &amp; conditions for the service contract, tender not containing service contract charges shall be considered incomplete and shall be rejected. <b><i>The CAMC charges will be included in computing the total cost of the equipment.</i></b></p> <p><b>Downtime:</b> During both warranty and CAMC period not more than 5% downtime will be permissible. For downtime exceeding 1%, penalty equal to 1/365 of the 5% of the order value per day may be imposed. Downtime will be counted from the date and time of the filing of complaint with in the business hours.</p> <p><b>Maintenances:</b> Vendor should be easily accessible and available on demand within 24 hours of any problem in the sputtering unit. Two compulsory visits per year for maintenance must be included for the initial 3 years after installation.</p> <p><b>Training and demonstration:</b> Vendor should provide us training on operation and application at DTU, Delhi after installation.</p> <p>Manual, One set of operating manual, service manual, maintenance and safety instructions, recommended recurring spare parts list, mechanical and electrical drawings, part lists, air, water and electrical diagrams (in English) should be provided with the system.</p>	
--	--	--

Assistant Registrar (S&P)