



**NATIONAL INSTITUTE FOR RESEARCH AND  
DEVELOPMENT OF ISOTOPIC AND MOLECULAR  
TECHNOLOGIES**

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**Tender documentation**  
**Integrated equipment dedicated for**  
**nanoimprint technology**

**Director General**  
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## I. DOMAIN OF USE

The equipment is destined for research and development activities in view of the fabrication of imprints at micro and nano-scale necessary for the build-up of devices which find their use in the field of Molecular Electronics, Molecular and Biomolecular Physics.

## II. GENERAL TECHNICAL CHARACTERISTICS

1. The **Integrated equipment dedicated for nano-imprint technology** is composed of two independent units:

(i) **The nanoimprinting system**, denoted as **Lot no.1**: actual nanoimprinting machine which is able of imprints of both thermal and UV cure type.

(ii) **The plasma treatment system**, denoted as **Lot no. 2**: plasma treatment system which needs to have the capability of reactive ion etching, capability which is necessary for the removal of the residual layer resist, of PMMA type (PolyMethyl Methacrylate), which remains from the imprinting process.

The plasma treatment system must be configured with the following main components:

- a) Base unit;
- b) Vacuum chamber;
- c) Etching electrode;
- d) PC control integrated into the system;
- e) High frequency generator;
- f) Vacuum pump;
- g) Optical emission spectrometer
- h) Accessories

2. The equipment will need to operate within the offered parameters in Clean Room of Class ISO5 according to ISO 14644-1:1999.

3. The offer will need to specify all the utilities and consumables, which the beneficiary will have to provide in view of the installation and proper operation of the offered equipment.

## III. TECHNICAL/PERFORMANCE CHARACTERISTICS

**NOTE:** Technical and performance characteristics contained in the present Tender Documentation are *minimal, mandatory and eliminatory*. Offers which *do not comply* with these requirements are declared *not eligible* (Article no. 36(2) a from Government Decision 925/2006)

### 1. **Lot no. 1: The nanoimprinting system**

1.1 The nanoimprint machine is offering the following imprinting technologies:

- (i) Thermo-plastic imprinting;
- (ii) Thermal cure imprinting;
- (iii) UV cure imprinting;
- (iv) Simultaneous thermal and UV cure imprinting.

1.2 The imprinting technology is offering the capability that the imprinting pressure is achieved, at least on one side of the imprinting sandwich, by applying an uniform field of compressed air/gas pressure, as opposed to the pressure generated by a solid plate.

1.3 Maximum size of imprinted sample: at least 77 mm in diameter (3 inches).

1.4 Maximum size of imprinting mould: at least 77 mm in diameter (3 inches).

1.5 The range of imprinting pressure: (1 – 34) bar or larger.

1.6 The range of the imprinting temperature: (20-200)<sup>0</sup>C or larger.

1.7 The maximum heating rate: equal or higher than 30<sup>0</sup>C per minute.

1.8 The maximum UV radiation on sample surface: equal or higher than 40mW/cm<sup>2</sup>

1.9 The maximum imprinting resolution: 20 nm or better.

1.10 The nanoimprint system is equipped with its own personal computer, with Windows operating system, keyboard, optical mouse and flat screen monitor of at least 19 inches.

1.11 The nanoimprinting system has its own dedicated software for operation, control and analysis.

1.1.11. The nanoimprint system must be supplied with all necessary auxiliary equipment required for its proper operation such as: gas pressure booster, vacuum pumps, chilling system, etc.

## **2. Lot no. 2: The plasma treatment system**

### **2.1 The base unit**

2.1.1 Type: Stand alone or table top.

### **2.2. The vacuum chamber**

2.2.1 Dimensions: of sufficient size to accept for treatment three inches wafers.

2.2.2 The vacuum chamber will have the capability to be slowly pumped down to prevent the spinning around of small parts placed inside.

2.2.3 The vacuum chamber will have the capability to be slowly ventilated to prevent the spinning around of small parts placed inside.

### **2.3 The etching electrode**

2.3.1 Type: Dedicated RIE (Reactive Ion Etching) electrode with shower head gas distribution.

### **2.4 PC control, integrated into the system**

2.4.1 Operating system: Windows

2.4.2 Capability of storing automatic programs.

2.4.3 Saving of process data as an Excel file and also as a parameter-time diagram.

2.4.4 Network adapter for exporting data to other computers via the network.

2.4.5 Set and actual values for the following parameters:

- base pressure;
- maximum pump down time;
- ratio of mass flows (for process gases);
- process pressure;
- HF-power,
- plasma treatment time;
- flushing time;
- venting time;

2.4.6 Setting of allowed windows for the following parameters and alert if set parameters are out of window:

- mass flow;
- process pressure;
- HF-power;
- temperature.

2.4.7 Alert listing with detailed description of failure.

2.4.8 Online pressure control for pressure stabilization during total process with adjustable sensibility.

2.4.9 Online display of all process steps in automatic mode.

2.4.10 Safety interlocked.

2.4.11 Data archive saves data and parameters of processes in automatic operation.

2.4.12 Indication and control of set point and actual value of mass flow controller.

2.4.13 Software language: English.

2.4.14 Password protected software access;

### **2.5. High frequency generator**

- 2.5.1 Frequency: 13.56 MHz;
- 2.5.2 Power range: (0 – 600) W or larger.
- 2.5.3 Automatic impedance matching.

#### 2.6 Vacuum pump

- 2.6.1 Suction power: at least 2.5 cubic meters per hour.
- 2.6.2 Base pressure:  $6 \times 10^{-3}$  mbar, or less.
- 2.6.3 Can work with corrosive gases.

#### 2.7 Optical emission spectrometer

- 2.7.1 Type: Dedicated spectrometer for:
  - controlling the plasma process;
  - end point detection of plasma process.

#### 2.8 Accessories

- 2.8.1 The required valves and tubing so to be capable of working with corrosive gases like NH<sub>3</sub>, H<sub>2</sub>O, CF<sub>4</sub>, SF<sub>6</sub>.
- 2.8.2 At least 3 mass flow controllers:
  - one piece of non-corrosive type;
  - two pieces of corrosive type.
- 2.8.3 Pirani pressure gauge to measure the pressure in the vacuum chamber.
- 2.8.4 All necessary connections for gas, power and exhaust.
- 2.8.5 Measurement device for measuring the bias voltage.
- 2.8.6 A starting kit of consumables specific for the offered equipment.

### IV. ACCOMPANING DOCUMENTS

1. Documents to be submitted by the contractor, required by the beneficiary, to accompany the delivered goods:
  - a) Declaration of conformity for the good;
  - b) Warranty certificate;
  - c) Operation and maintenance manual;
  - d) The list of delivered components.

### V. PERSONNEL TRAINING

1. Personnel training will be provided on the occasion of installing the equipment on the beneficiary premises by authorised personnel.
2. The training period will be for minimum three days.
3. All instruction materials and manuals will be in Romanian or English and will contain all the information necessary for the operation and maintenance by the authorised personnel.

### VI. WARRANTY CONDITIONS

1. The manufacturer will have to warranty the beneficiary that:
  - (i) all components are new, unused, and correspond to the latest design/generation.
  - (ii) The offered equipment is not a demo equipment, refurbished or refused by another beneficiary.
2. The warranty period is of **12 months** from the date of installation and start up of the system.

### VII. SERVICE DURING THE WARRANTY PERIOD

1. The intervention time is a **maximum of three working days** from signalling of malfunction by the beneficiary.
2. During the warranty period the equipment servicing and the parts to be replaced **will be provided free of charge** by the contractor.
3. In case of components which are going to be sent back for repairs, the contractor will need to provide a replacing item for the full duration of the repair.

4. The contractor will have to provide, free of charge, information and consultation (by phone or internet) for an unlimited number of requests.

#### **VIII. REQUIREMENTS FOR ENVIRONMENT PROTECTION, WORK SAFETY, AND FIRE PREVENTION**

1. The contractor will ensure that the delivered goods comply with the requirements of Government Decision no. 1022/2002 concerning the regime of goods and services which may endanger life, health, work safety and environment protection.

#### **IX. PACKING, LABELLING, SHIPMENT, STORAGE AND HANDLING REQUIREMENTS**

1. The contractor will pack the equipment in a way which will ensure the integrity of the equipment during handling, shipping and storage. Containers will be labelled according to international norms so to be ensured integrity during handling and against unfavourable weather conditions.
2. The goods will be labelled according to the enumerated standards which do apply in each particular case; the CE marking will be apply where and whenever necessary.

#### **X. DELIVERY TERMS**

1. The delivery will be made Delivery Duty Paid at INCDTIM Cluj premises, with shipment, installation and training included in the price offered.

#### **XI. SITE ACCEPTANCE CONDITIONS**

1. The receipt of goods will be finalised by a Site Acceptance Document signed by both parties.

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