Parylene Coating System Technical Specification

1. System Description

It covers the technical requirements for the purchase of a fully automatically controlled Parylene Coating System that can co-coat surfaces on planar or topographed samples of types Parylene N, C, D, and F (including VT4/AF-4), operating on the principle of dimer vapor phase polymerization in a vacuum environment.
The system must be a CE certified, industrial-grade device suitable for research laboratory use.

2. General Requirements

i. The system must be able to coat Parylene N, C, D, and F materials.

ii. The system should be able to provide uniform coating on 3D shapes and high aspect-ratio structures.

iii. The coating thickness should be from 50nm to 50 µm.

iv. The system should include a vacuum chamber, dimer evaporator, pyrolysis zone, cold trap, vacuum pump, automatic control unit and temperature-controlled lines.

v. The system should be able to operate in fully automatic, semi-automatic and manual modes.

3. Vacuum Chamber and Mechanical Properties

i. Hopper volume must be at least 20–30 L and must be compatible with wafers up to 4" in diameter.

ii. The sample carrier inside the chamber should have a rotary system.

iii. The coating chamber of the system must have a diameter of at least 30 cm and a height of 30 cm and must be made of stainless steel.

iv. Surfaces inside the chamber must be made of stainless steel suitable for the Parylene process.

4. Vacuum System

i. The system should come with a single-stage or multi-stage dry-type industrial-grade vacuum pump.

ii. Minimum pump capacity should be 18-20 m3/h.

iii. The achievable ultimate pressure should be equivalent to or better than the 1Pa mbar level.

iv. There should be a digital pressure gauge that shows the pressure of the coating chamber of the system.

5. Cold Trap

i. The system must have a chiller-based cold trap.

ii. The type that can operate without using liquid nitrogen will be preferred.

iii. The cold trap should ensure that the monomers from the pyrolysis unit are retained without being transported to the chamber.

iv. The cold trap chamber should be cooled down to -90C with a closed-circuit circulator.

6. Dimer Evaporator and Pyrolysis Zone

i. The dimer feed unit and the pyrolysis zone should be integrated within the system. The system must have an evaporator chamber for evaporation of powdered Parylene material in the form of dimers. The material should be heated up to 150-170 C in the evaporation chamber.

ii. The system should have a crusher chamber for the thermally crushing of the vaporized parylene material into its monomers (pyrolysis). The pyrolysis temperature should be at least in the range of 650–750 °C.

7. Control Software and User Interface

i. The system must run on a PC-based operating system that provides fully automatic control (Windows compatible).

ii. The touch screen should be at least 10 inches.

iii. The following software features must be included:
- Creating and saving a coating recipe/program
- Creating parameter-time graphs
- Data recording and export in Excel/CSV format
- Ethernet/USB connection
- Alarm, error recording and maintenance reminder system
- Interlock mechanism for all critical situations such as door, temperature, pressure

iv. At least monitoring and technical service access should be provided via remote connection. If remote control is available, it is preferred.

8. Security

i. Emergency stop button

ii. Door locking interlock system

iii. Over-temperature and over-pressure protections

iv. It must be CE compliant.

9. Electrical Requirements

i. The system should work in harmony with the Turkish electricity infrastructure.

10. Monitoring, Recording and Reporting

i. The system must have the following data recording features:
- Pressure
- Temperature
- Time
- Error and alarm logs

ii. This data must be viewable and exportable via PC.

11. Delivery and Installation

i. The instrument must be delivered complete with vacuum pump, starting consumables (O-ring, basic filters, seals), cold trap, control software, sample carrier, all cables, operation manuals.

ii. On-site assembly, commissioning and user training should be provided.

12. Warranty and Service

i. At least 12 months warranty should be provided.

ii. In case of malfunction, a document stating that intervention can be made within 10 days at the latest must be submitted.

iii. Spare parts and technical service support should be provided for at least 10 years.

iv. The company will be responsible for all kinds of transportation, transportation, assembly and insurance expenses during transportation. The contractor is obliged to deliver the device in working condition.