Johnsen ULTRAVAC
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E-BEAM EVAPORATION SYSTEM - MODEL 6300.

Johnsen Ultravac has supplied the leading research and production facilities with a variety of deposition systems designed to meet specific process requirements by using a variety of techniques such as MBE, ECR, Laser Ablation, Sputtering and a wide range of E-beam Evaporation systems. The vacuum system is based on our modular 6000 series and customized to suit customer's exact specifications.

The following system incorporates many of the features that have been developed by Johnsen Ultravac. That has allowed us to standardize our chamber design, substrate assembly, sample handling, and to supply a proven user-friendly PLC/PC pump down and process control automation system.

The E-beam Evaporation system as outlined below can accommodate a variety of substrate sizes.

The preliminary system details are:

1. The main chamber consists of a 500 mm diameter vacuum chamber by approximately by 1,200 mm high with top and bottom differentially pumped O-ring sealed flange assemblies to facilitate substrate loading and source replenishment. Substrate loading will be based on the plug-in-and-play principle. The base plate contains the evaporation source, ie 6 x 25cc crucible configurations.

The chamber has two 14" CF pumping ports, (2) viewports with periscope assembly and a number of other ports placed around the circumference of the chamber for gauging, gas introduction, feedthrough ports and future diagnostic equipment.

2. The bottom plate flange assembly contains the evaporation source, feedthrough ports, and shutter. Shielding and liners are provided where required.

3. Two substrate carrier assemblies will be provided. Each one will carry up to 12 x 4" wafers.

A variable speed, DC motor driven, powers the Ferrofluidic sealed rotary feedthrough at a speed of up to 30 RPM, higher on request.

The mounting and removal of substrate assembly is an easy two step fail safe procedure. The planetary system is LASER aligned to ensure maximum performance.

4. With respect to uniformity it may be of interest to know that our standard JUV planetary assemblies for 16 x 3"substrates, uniformity is specified at 0.25 degrees or less (deposition @ 10,000 Ang Al).

5. The proposed vacuum system is pumped by a combination of cryo pumps and dry pump. Two 14" CF CTI-10 or equivalent pumps are installed on the process section of the chamber. Matching electro-pneumatic VAT gate valves are installed to isolate the pumps from the main chamber.

An Ebara 300 CFM dry pump or equivalent is used for roughing the process chamber, load-lock chamber and regeneration of the cryo pumps.

The cryo pumps are complete with purge gas heater and bake-out blanket on the cryo pump. The regeneration procedure of the cryo pumps are part of the automated PLC control system.

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6. Vacuum gauging consists of two hot Cathode gauge systems such as the MKS 919 series complete with controllers, gauges and cables and 1 thermocouple gauge systems such as the MKS 286 series complete with 2 thermocouple gauges and one 286 controller.

7. The E-beam evaporation sources comprise of a single electron-beam source with 6 x 25 cc crucibles, complete with matching 15 KW power supply, X & Y sweep, and rotation. Other source configuration can be provided on request. The source is mounted on the base flange with appropriate power- and cooling feedthroughs and electro-pneumatic shutter.

8. A range of diagnostic equipment is installed on the system and includes an Inficon IC/6 rate monitor with two shuttered sensors.

9. The deposition system will be automated using the Advantech soft-touch PC based flat panel screen PLC/PC system. For monitoring safety and control pump sequencing, we recommend the PLC/PC as this is considered the most reliable method for this purpose. The automation system is user friendly and interface with operator is simple.

10. The complete system is mounted in a stainless steel support frame with integral 19" electrical rack, central power distribution panel with emergency off-switch, utilities manifolds, safety interlocks where necessary, exhaust venting. In addition, all shut-off valves, right/angle valves, gas inlet valves are installed where required. All chamber components, frame, panels, pumping lines and materials are machined from 304 stainless steel.

11. A complete, permanently installed, bake-out package consisting of strategically placed heating tapes on chamber, main gate valve and ports is supplied. The bake-out system is divided into 3 zones, 5 circuits per zone. Each zone is individually controlled.

12. The main chamber and major manufactured components are He leak checked to 2 x 10-10 Torr individually during manufacturing phase and also as a complete system. Ultimate pressure range is 2x10-8 Torr range after bake-out.

13. The price include a full and comprehensive design package for customer review and approval, factory demonstration of complete system and on site commissioning with maximum of four days of operator training. System is guaranteed for a period of one year on Johnsen Ultravac manufactured products. Components which are not made by Johnsen Ultravac carry their own original equipment manufacturer's warranty.

Complete turn-key system as described above.

PRICE: ON REQUEST

The system includes:

* Qty (1) Series 19, 20" diameter modified gate valve

* Qty (2) Series 10, 12" diameter gate valve

* Qty (2) CTI-10 Cryo pump package

* Qty (1) Ebara or equivalent 300 CFM dry pump

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* Qty (1) Small mechanical pump for differentially pumped O-ring sealed flanges
* Qty (1) 6-pocket Temescal or equivalent E-Beam source (complete assembly)
* Qty (1) SIMBA or equivalent E-beam power supply (complete assembly)
* Qty (1) Inficon IC/6 rate monitor, crystal sensor (complete assembly)
* Qty (1) Neslab System-2 water-to-water exchanger
* Qty (1) Merlin closed loop chiller for crystal sensor
* Qty (1) DM100-S Mass Spectrometer, 1-100 AMU, with electron multiplier
* PLC/PC based full process and vacuum automation package, interlocked for safety and process
* Continuous soft bake-out package (process, load-lock and l/l gate valve)
* Gauging package, (2) 146 Controllers, (6) T/C and (1) 919 hot cathode gauge package
* Lift-platform assembly (recommended for the long-throw version)

VACUUM AND PROCESS specifications:

- Ultimate System vacuum pressure: < 5 x 10E-8 Torr
- Full pump-down (chamber + load-lock) from atmosphere to 7.5 x 10E-7 Torr: < 60 minutes
- Load-lock cycle, time measured from atmosphere to “ready to evaporate”: < 1 minute.
- Uniformity: 0.25% or less over 3" wafer rated at 10,000 Angstroms Al, < 1% for 4" wafers.

OPTIONS:

- ✓ PLUGIN-AND-PLAY Source flange assembly
- ✓ IN-SITU replenishment of maximum two materials

TERMS: Negotiable

Delivery Schedule:
Design: 4 - 6 weeks subject to customer's requested changes to above system.
Manufacturing/integration/testing: 32-36 weeks after design approval (subject to timely delivery of key components).

Shipping/installation/commissioning/training: TO BE CONFIRMED.

In conclusion, Johnsen Ultravac 6000 series offers a flexible approach to metallization process. Computer aided design of our systems permits ease of customization.