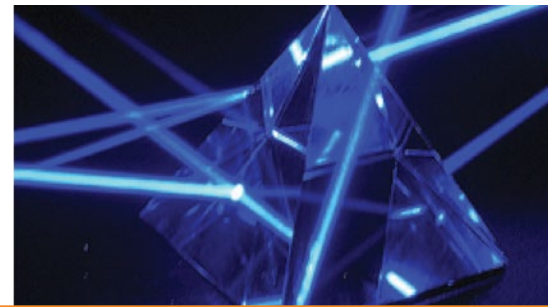




# INTEGRITY ELECTRON BEAM DEPOSITION

FOR PRECISION OPTICS AND OPHTHALMIC COATINGS



## DENTON VACUUM ENABLES INNOVATION AND HAS FOR OVER 50 YEARS.

With thousands of thin film deposition tools installed globally — including a large, globally installed base of precision optical deposition systems — engineers and researchers rely on Denton's thin film innovations to drive higher throughputs, better yields and low cost of ownership (COO) while benefiting from comprehensive service and support, and a dedicated R&D program that delivers enabling technologies.

Whether investigating or manufacturing — from small, dedicated research groups to large, multi-user fabrication facilities — the Integrity electron beam deposition system delivers consistent, repeatable, enabling results through wide process capability, ease-of-use, and superior reliability and support.

For a direct path to enabling your innovation, the Integrity electron beam deposition system accommodates a broad and deep spectrum of features that can increase both your capacity and capability.

### Denton's Integrity Electron Beam Deposition System for Precision Optical and Ophthalmic Coatings

- Anti-reflectance and High-reflectance Coatings
- Laser Facets
- Optical Sensors and Filters
- Band Pass Filters
- Infrared Filters and Coatings
- Neutral Density Filters
- Metallization
- Beam Splitters

# PERFORMANCE AND VALUE

## Process Stability

- Shorter Calibration Time
- Higher Yield

## Adhesion & Stress Control

- Pre-clean Capability Low
- Low-Damage Deposition

## Thin Film Process Control

- Deposition Rate Control
- Optical Monitoring
- Planetary Fixtures

## Throughput & Productivity

- Flip Fixtures
- RF and or DC Ion
- Sources for IAD and Pre-Clean



Denton Integrity-class systems enable high rate, uniform deposition in a development or production environment.

- Easily serviced/maintainable design
- High reliability, proven sub-components



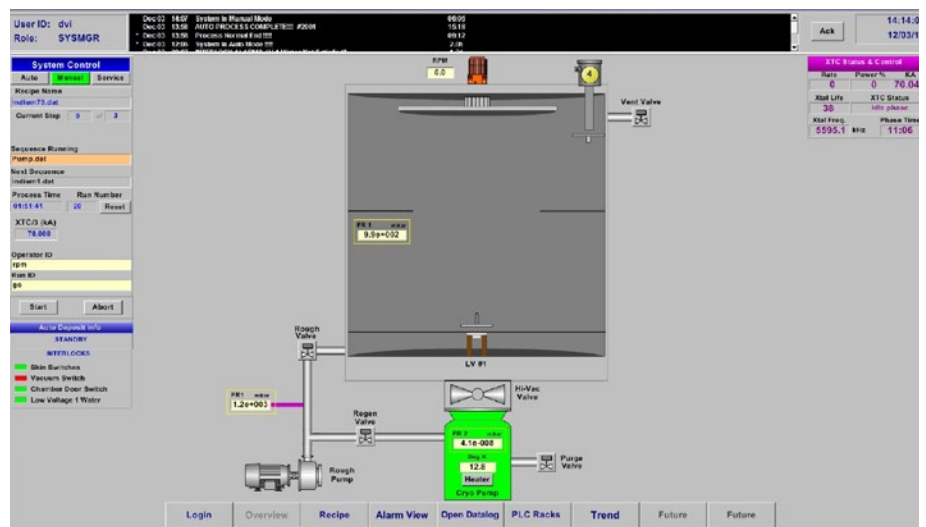
Multi-planetary Wafer Handling Fixture for High Uniformity, Multi-source Evaporation



In-situ Flip Fixture

## SYSTEM CONTROL INDIUM DEPOSITION CONTROL SYSTEM OPTIONS

- Developed on the GE Fanuc Cimplicity® HMI
- Visual system configuration and status
- Password-protected access levels
- Windows 10 operating environment
- Dynamic Data Exchange (DDE)
- Data acquisition through MS Access®
- Remote diagnostics through Ethernet port
- Full disclosure of source code to customer
- Available with an economical PAC controller with a color screen HMI



# DENTON VACUUM INTEGRITY PRECISION OPTICS INNOVATION

Designed for high-quality optical coatings with low absorption and scattering, the Denton Vacuum Integrity precision optics system provides an array of precision-designed and configured electron beam and ion-assisted electron beam deposition technologies to help you precisely leverage and control the reflectance, transmittance, absorbance and resistance in your optical applications, including:

## Optical Coating Innovation

- Unique fixturing options
  - Knudson cells
  - Planetary fixtures in a variety of configurations
  - Domes
  - Flip fixtures
  - Heating and cooling options

## Ion Beam Assistance

Proprietary filament-free ion beam deposition sources and components that enable wider process windows, better performance and lower maintenance cost of ownership. High, independent current density and ion energy provides for optimal film performance, including:

- Dense, defect-free films
- Filament-free design eliminates contamination and need for frequent filament changes
- Superior control of film microstructures, stoichiometry, and stress
- Enhanced packing and low pin-hole density
- Stable deposition rates and uniformities
- Low ion energy operation mode for pre-clean and plasma treatment without plasma damage

## Optical Monitoring System

Denton Vacuum's LambdaPro® optical monitoring system delivers both fast and accurate process development and production for thin film monitoring:

- Optical ranges for UV, VIS or IR spectral, among others
- Integration of all required steps to generate a complete recipe with monitoring strategies for each layer

## Integrated Deposition Rate Controller

- Equipped with a Programmable Rate Controller optimized for low-power use
- Rate controller integrated to tool's control system
- Option available to validate rate prior to deposition



Figure 1: Denton Vacuum proprietary filament-free ion beam source.

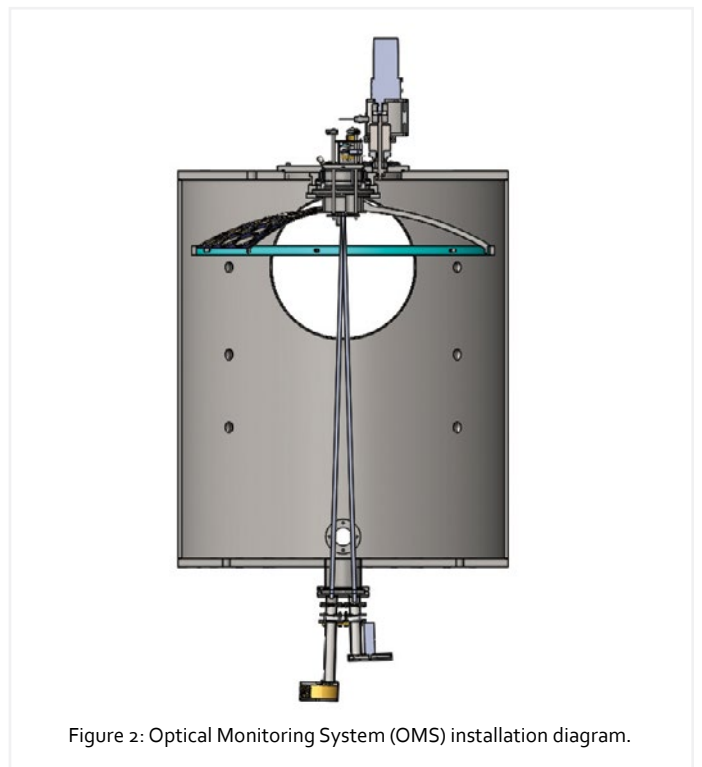


Figure 2: Optical Monitoring System (OMS) installation diagram.

# SPECIFICATIONS

## Chamber

- Standard chamber sizes include 22, 26, 36, 39, 44, 50, 60, and 64 inches
- 304 stainless steel construction, water-cooled via exterior welded 304 stainless steel u-channel
- Optional chamber temperature control includes re-circulating water chiller/heater; +15°C - +50°C integrated to system controls for power and automatic temperature setpoint operation
- Full-width opening door, two internally-shuttered 100 mm viewports with welding glass holders
- Two complete sets of removable, stainless steel, evaporant shields (multi-piece construction to facilitate removal and reinstallation, with integral handles)
- Ports for crystal monitoring and optical monitoring

## Pumping system

- Cryogenic or turbo-molecular pump
- Oil-free system roughing pump
- High-vacuum regeneration and roughing valves
- Two full-range gauge transmitters; one Pirani gauge transmitter
- Multi-pocket electron beam source
- Power supply interfaced to the deposition rate controller
- Multiple source options available

## Shutters

- Electro-pneumatic source shutter assembly dedicated to the low-voltage sources

## Deposition controller

- One quartz crystal rate controller interfaced to system computer for automatic source control
- Optional LambdaPro® optical monitoring system (OMS) or spectroscopic ellipsometer

## Substrate fixturing

- Single rotation (flat or variable angle rotating dome)
- Planetary
- Flip (laser diodes)
- Custom-engineered and fabricated fixturing available through option

## ProcessPro control system

# OPTIONS

- CE Certification
- Plasma cleaning
- Secondary source
- Rate stabilization control
- Alternative substrate size adaptors
- SECS/GEM interface automation standards

# SERVICE AND SUPPORT

All Denton Vacuum systems include pre-shipment startup and training, as well as onsite installation, start up and training at no additional cost.

All Denton Vacuum Integrity systems are backed by an 18-month warranty on parts and labor, over 50 years of process knowledge, an in-house process engineering group, worldwide representation and support, and a Global Factory Service Center.