



VACGEN

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SEMICONDUCTOR
Chambers,
Load Lock &
Transfer

SEMICONDUCTOR

Chambers, Load Lock & Transfer

Engineered Solutions for Vacuum Technology.

Chambers, load lock and transfer systems are designed to allow easy integration into the semiconductor fabrication deposition tools. VACGEN can supply components and vacuum chambers, enabling customers building complex systems.

VACGEN are an ISO9001:2015 Quality approved supplier and have over 20 years experience in supplying vacuum chambers and electromechanical assemblies for the semiconductor industry.

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Central Distribution Module

Fast Entry Load Lock Module

Cassette Load Lock & Transfer

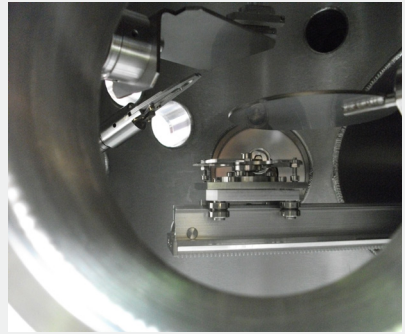
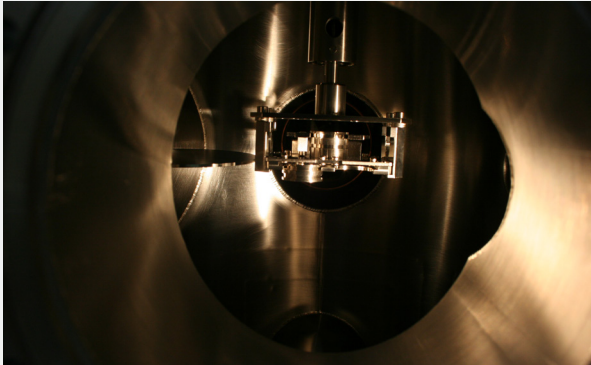
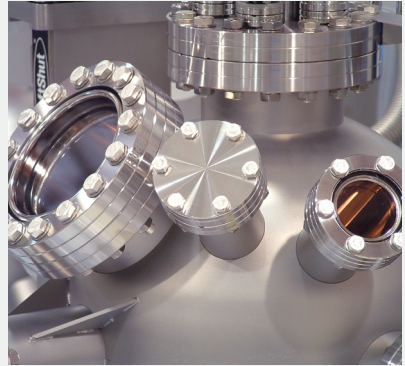
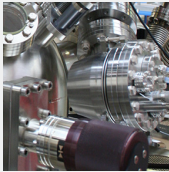
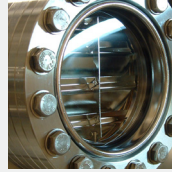
Deposition Process Chamber

Deposition Substrate Manipulator

Wafer Transfer Tools

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System Tool Examples





About Us

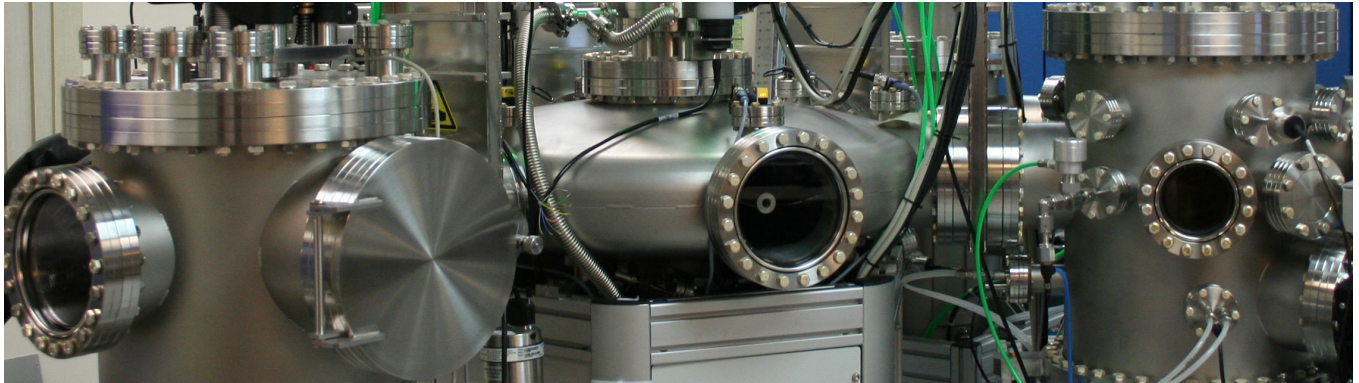
Since 1964, VACGEN (VG) has been the name synonymous with high quality ultra high vacuum products and services. From the manufacture of the first UHV valve to some of the most advanced vacuum research systems built, over 50 years in the research and scientific industry has given us an incredible grounding in the needs of our customers, how we can support new projects through the design phase, delivered product and ongoing support.

VACGEN remains the partner of choice for the next generation of semiconductor equipment manufacturers. From our UK high tech manufacturing base, our focus is on delivering enabling technologies and supporting our customers across industry and academia.

UKAS and BSI ISO 9001:2015 Accredited.

Central Distribution

The central distribution handler is offered in both semi-automated and fully automated configurations. When fully automated, the fast handler gives ultra precise, rapid and repeatable positioning of the sample within the process chambers and is fully managed from the central control system.



R2P2 Distribution Module

SPECIFICATION

Central Distribution

Sample Size 25mm - 100mm

Rapid Transfer Time

Base Pressure 10^{-8} mbar

6 Satellite Exits (Standard Design)

Bakeout Limit 180°C

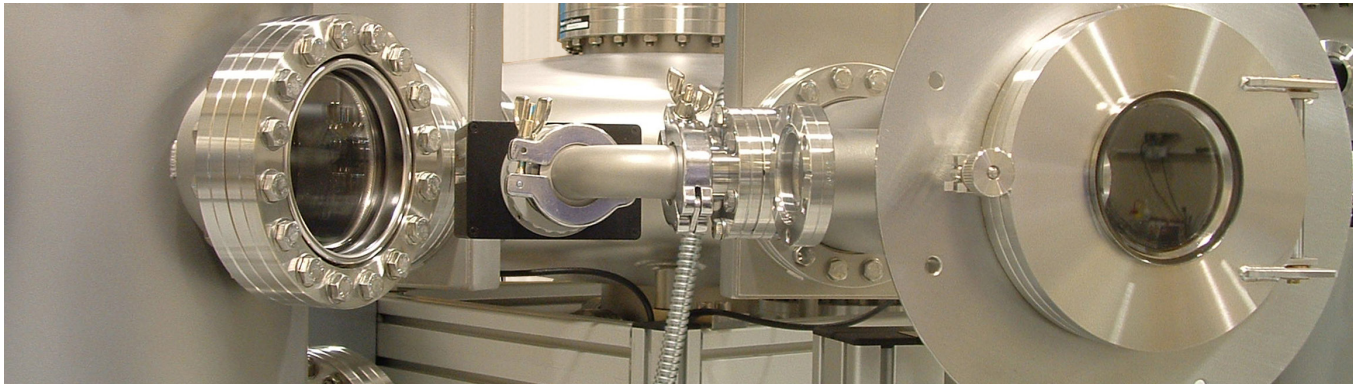
Built to UHV Standards

The standard units are supplied with six exit ports to handle sample sizes of up to 100 mm, but this can be increased to a maximum of eight ports dependent on chamber size and orientation.



Fast Entry Load Lock Modules

Fast Entry Load Lock (FEL) modules allow quick and easy transfer of substrates in and out of the vacuum system without exposing the main vacuum chamber to atmospheric contamination. Samples and/or masks are loaded into the load lock chamber via the quick-access door. Fast Entry Load Lock setup and can accommodate metal, glass or flexible substrates with sizes up to 100 x 100 mm.



Fast Entry Load Lock Module

SPECIFICATION

FEL Modules

Fast Entry Air Lock Door

Optional Viewport on Door

Wafer Storage Manipulators

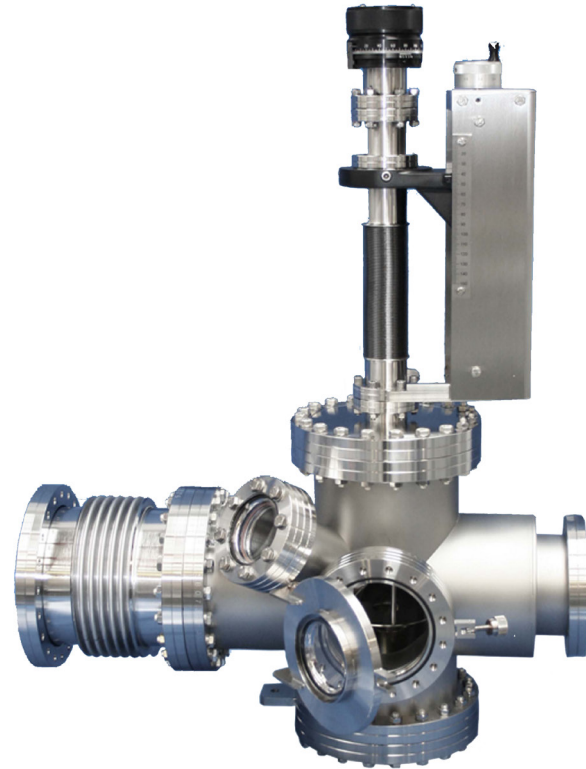
Storage Up To 10 Masks or Substrates
(As shown on example)

Modular Design

Fast Pump Down To Base Pressure

Easy Transfer Between Modules

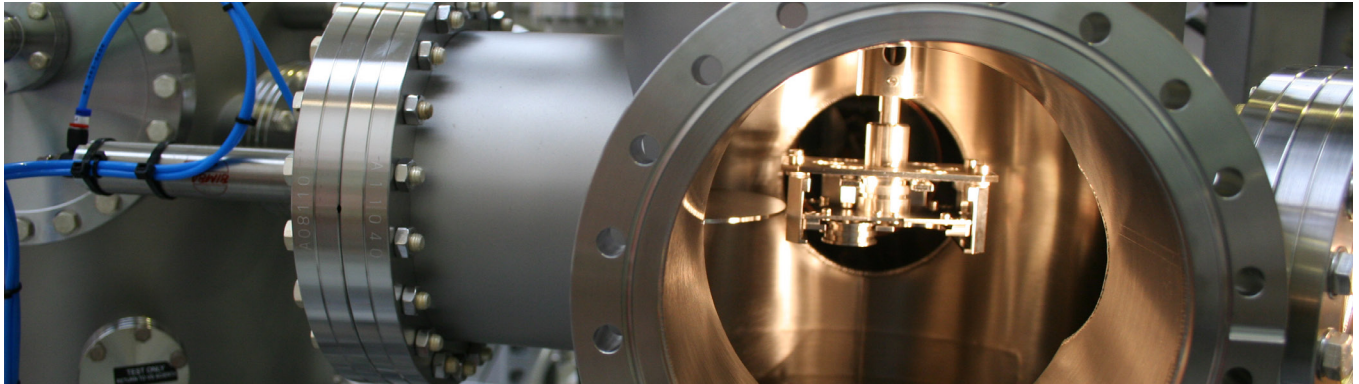
The fast entry load lock (FEL) modules allow quick and easy transfer of wafers between atmosphere and the subsequent deposition and analysis chambers.



Cassette Load Lock & Transfer

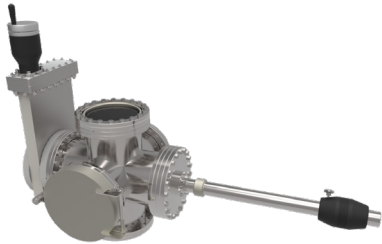
25mm Pucks

A load lock is required to routinely load substrates or targets into the deposition system. The unique VACGEN load lock design can be used to transfer the targets and substrates utilising the same hardware and therefore minimises cost for the overall system. A magnetic transfer arm manoeuvres the puck from the load lock, through a gate valve, into the central distribution module.



Puck Transfer

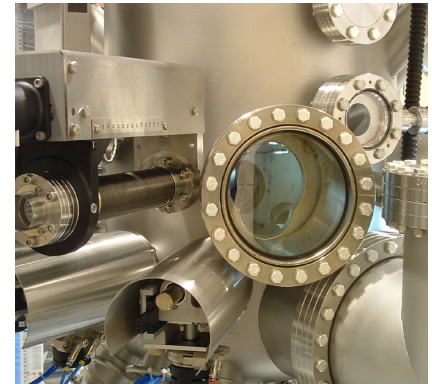
Pre-configured modules including a load lock, fast entry door, magnetic transfer arm and gate valve assembly can be utilised for system design. Wafer storage cassettes & lift assemblies allow for multiple wafers to be stored and used as required.



Pre-configured Load Lock with Gate Valve Assembly, Transfer Arm and Fast Entry Door



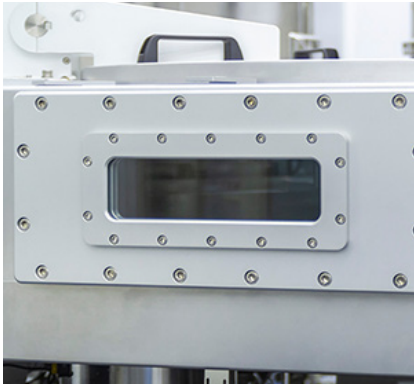
Wafer Cassette Storage



Chamber and Transfer - Exterior

Deposition Chambers

Process chambers are used for depositing thin films of materials onto semiconductor wafers. These chambers provide a controlled atmosphere where precursor gases can be introduced and chemically react to form thin films on the wafer in applications such as ALD and CVD. Vacuum chambers are essential tools in semiconductor fabrication for various processes, including deposition, etching, annealing, and cleaning.



ALD Process Chamber



Mask Inspection Chamber



CVD Process Chamber

SPECIFICATION

Deposition Chambers

Stainless Steel or Aluminium Chambers

Letter Box Wafer Transfer Opening

Easy Connection to Central Distribution

Ultra Clean Internal Surface Finish

Gas Powered Lid Assembly

UHV Compatible

Deposition and process chambers are manufactured to SEMI S2/S8 guidelines to ensure compliance regulation of the chambers. Our employees are trained to meet Copy Exactly! manufacturing techniques to ensure deviations are irradiated from your supply chain.



Deposition Manipulators

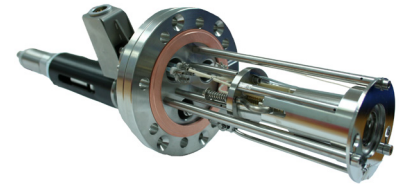
Deposition substrate manipulators are designed to take up to 100mm substrate or wafers. With up to 60RPM rotation speeds for uniform deposition onto the substrate. An adjustable $\pm 50\text{mm}$ Z travel accommodates the wafer transfer and then adjusted into position for deposition. These precision stages give micron level accuracy. In addition to substrate manipulators, deposition sources such as thermal evaporation sources can be built to customer or VACGEN design.



OLED Manipulator



Deposition Sources



OLED Cells

SPECIFICATION

Deposition Manipulators

100mm Substrate or Wafer

60RPM Rotation Speed

1000°C Heating

±50mm Z Travel

±25mm Sample to Heater Adjustment

Integrated Tilt

Optional DC & RF Bias

Optional Helium Clamping

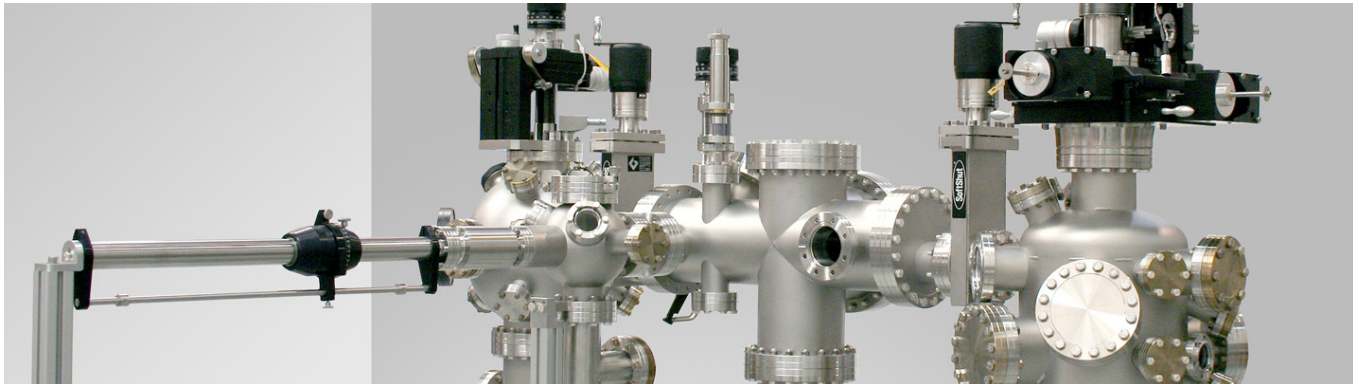
Optional Heater Materials

2 Film Thickness Monitor Port



Wafer Transfer Tools

Electromechanical systems, such as robotic arms, wafer handling robots, and conveyor systems, are used to transport and manipulate substrates within the deposition processing equipment. These systems ensure that substrates are accurately positioned and moved during processing steps.



Transfer Arm on UHV System

SPECIFICATION

Wafer Transfer Tools

Fully Motorised Options

Non-Magnetic RLRP Transfer Arm

Precise Movement

Low Sample Deflection

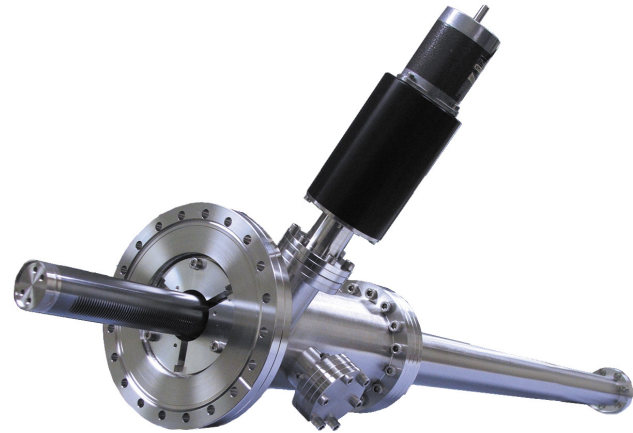
Optional 2" Wafer Transfer Head

Ultra High Vacuum Compatible

Additional Differential Pumping Port

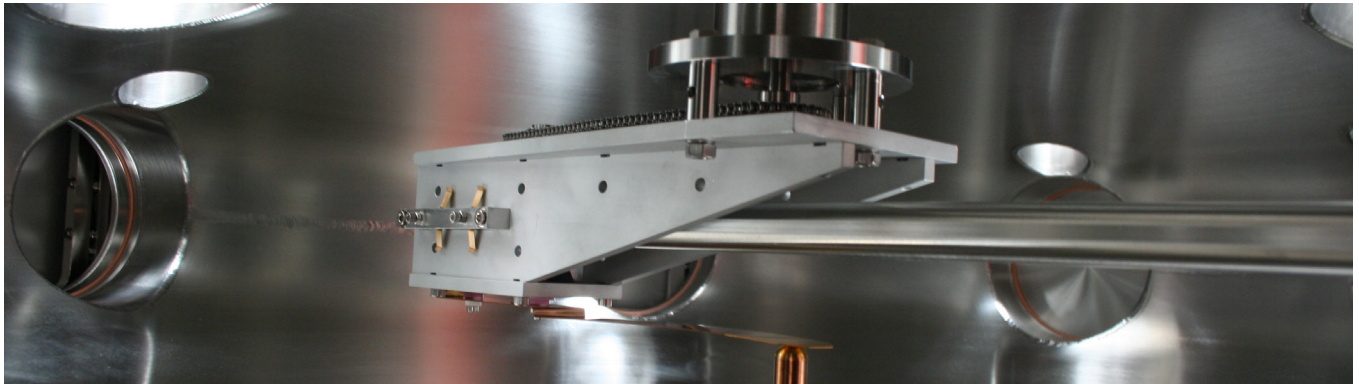
Customised Transfer Solutions

Wafer transfer tools are used to move the wafer around the system from the load lock to the central distribution and between the deposition process chambers.



Bi-Directional Transfer

When space is at a premium on the exterior of the chambers, a transfer device such as a bi-directional transfer arm can be the best solution. Designed with a heavy duty rack and pinion, the transfer device will pass through a 64mm gate valve and is ideally situated between two adjoining chambers.



Bi-Directional Transfer

SPECIFICATION

Bi-Directional Transfer

Positioning Repeatable to $\pm 1\text{mm}$

Customised Transfer Tools

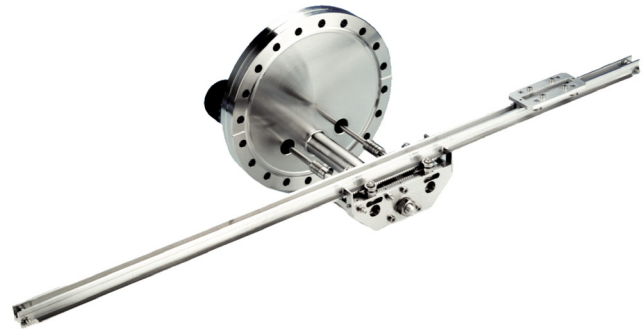
10" Mounting Flange

Chamber Design to Suit Transfer

Rotary Drive Controlled

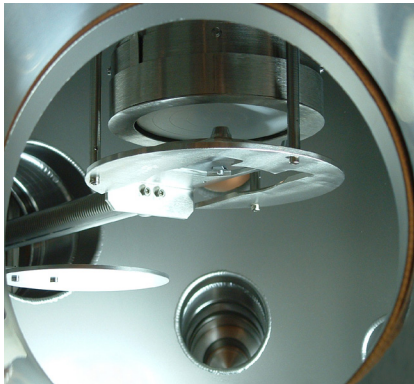
UHV Compatible

Bi-Directional transfer is used to deliver a sample or substrate from chamber to chamber without breaking vacuum.



System Tools

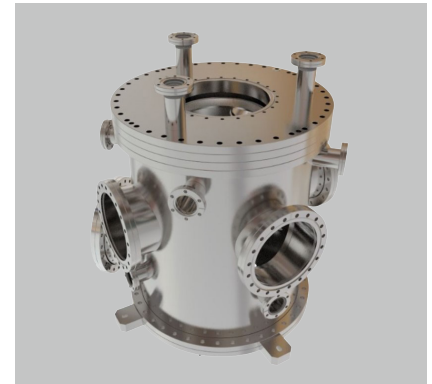
Sample shutter assemblies are used within the deposition chambers and can be fully automated to prevent human error. Effusion cells are highly controllable and efficient deposition sources for MBE and other depositions techniques. Cryo panels and internal cryo shields can be fabricated to improve vacuum conditions and pumping rates.



Transfer Assembly



Effusion Cell



Chamber & Internal Cryo Shield

Manipulators are used to transfer and store substrates or masks within the load lock and subsequent chambers. Cassettes provide ample storage for wafers. Additional system tools include components such as linear or rotary target holders and transfer devices. Source and deposition shutters are used to prevent excess material being deposited onto the substrate.



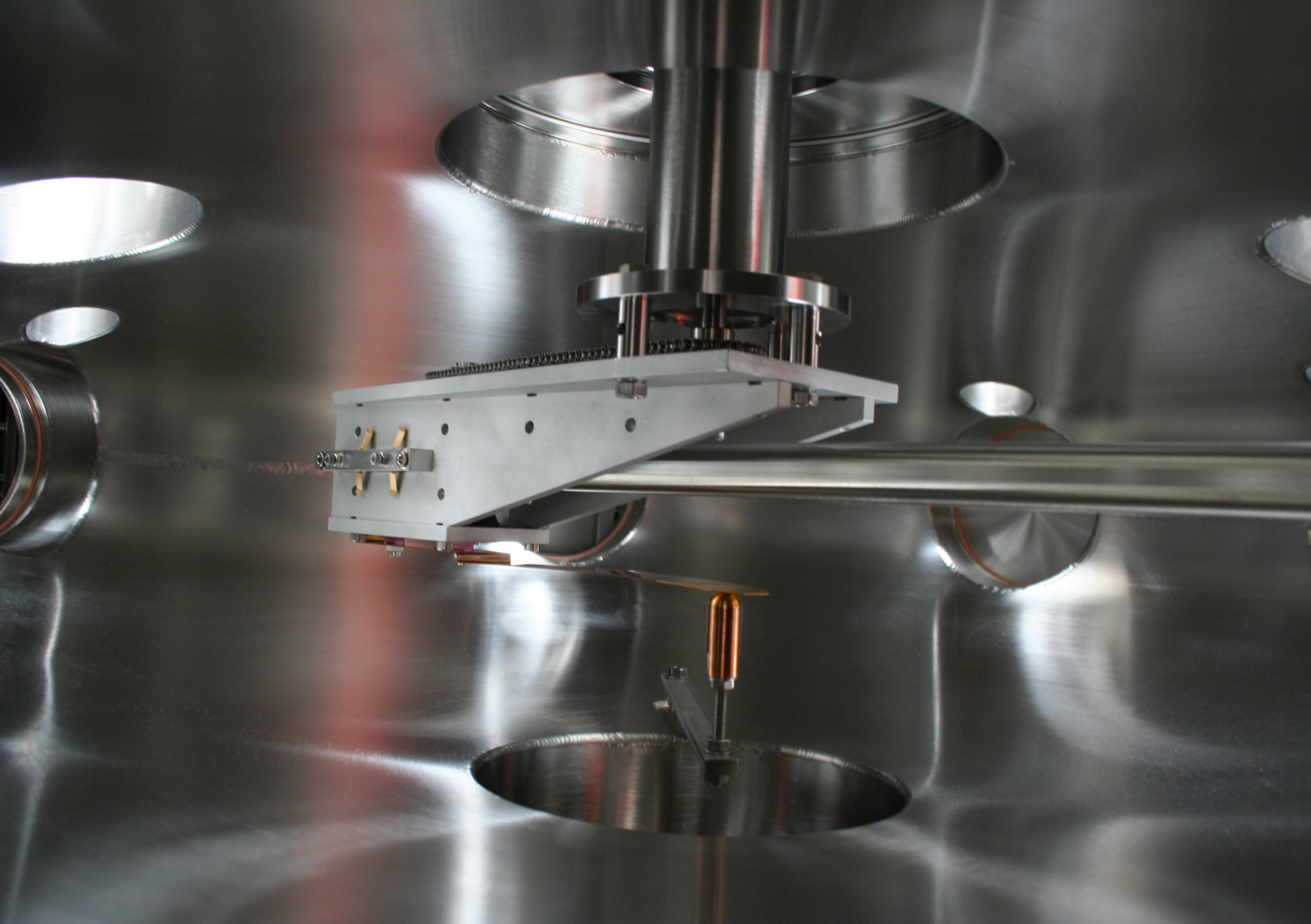
OLED Cells



Viewport & Deposition Shutters



8x 25mm Linear Target Holder for PLD



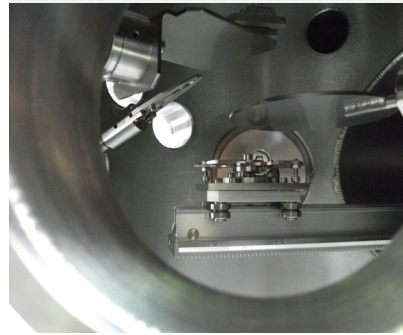
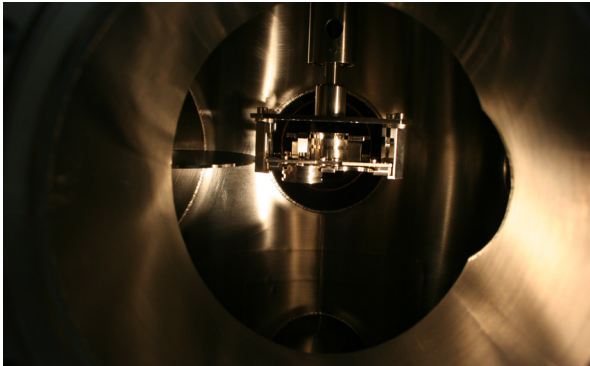
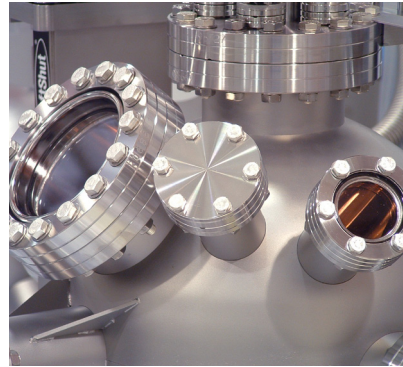
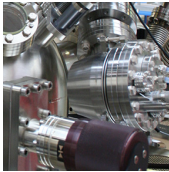
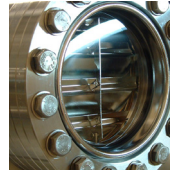
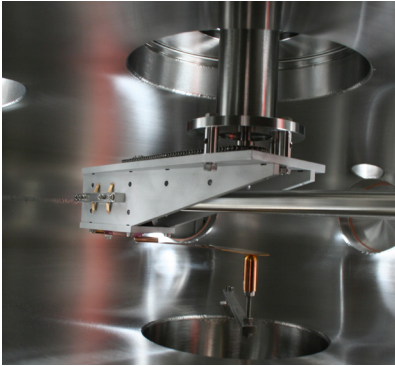
The Value of Partnership

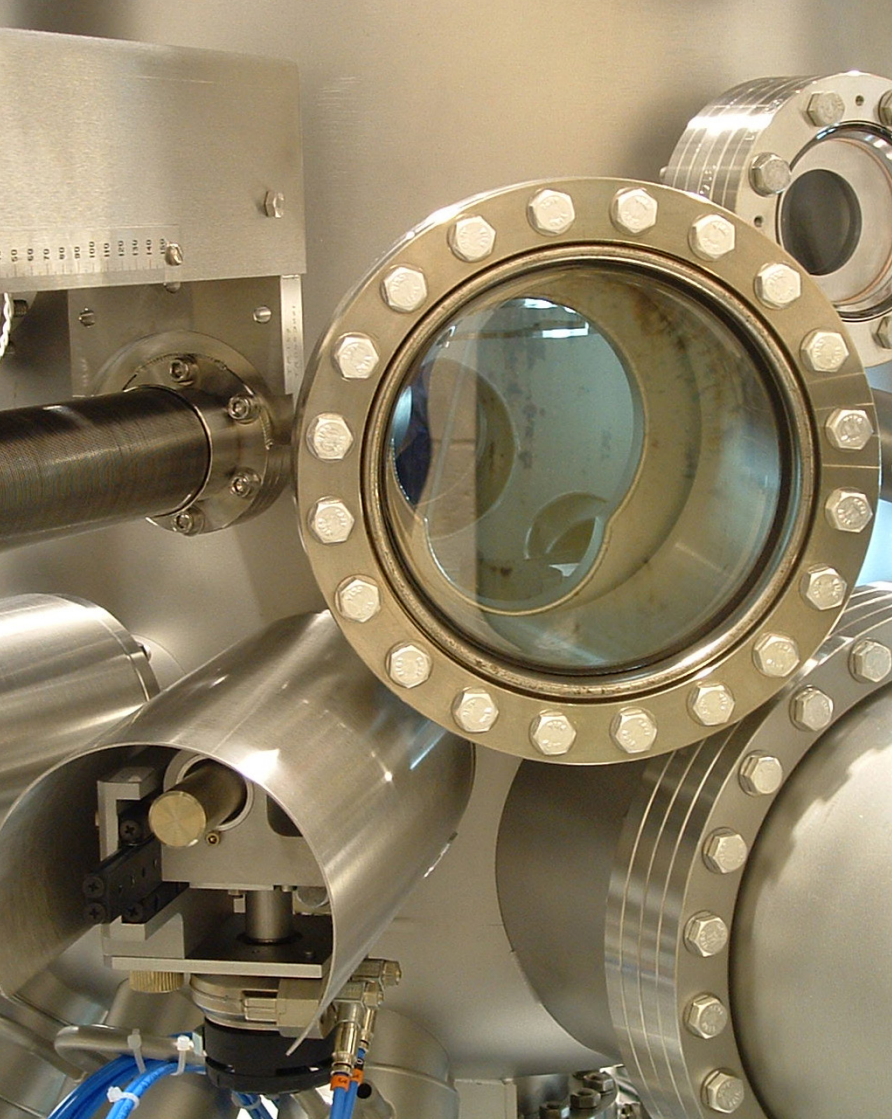
In a high technology business, you have to be confident in the partners you choose to provide mission critical technology, equipment and services. You need to know that your partners can deliver and support what you need, when you need it. As your business grows and develops you need to work with partners that can support that growth. That's where we come in.

We're a fully-fledged UHV equipment manufacturer. At our factory in the UK we exploit extensive engineering resources to take raw materials right through the entire manufacturing workflow, producing finished UHV components, everything happens here.

Our in house design and development functions are world class, and production is supported by extensive CNC machining resources feeding a large clean room assembly area. We can react quickly with significant resources as needed. We take pride in being an agile responsive business.

Owning our product lifecycle ensures unparalleled control of quality, and gives us a deep understanding of each and every one of our products, from the simplest component through to the most complex assembly. We understand how they perform and interact across a host of applications and within numerous environments.





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