



## THE CLIENT

University of Glasgow – The James Watt Nanofabrication Centre undertakes fundamental, applied and commercial research, development and small-scale production using a vast array of developed process modules and background IP which can provide integrated processes to deliver circuits, devices, systems and solutions.

## THE BRIEF

Cleanroom Solutions were asked to design and build a cleanroom facility for nanofabrication, comprising of an ISO4 E-Beam room with close temperature control to +/- 0.05 degree C & humidity control 45%RH +/- 5%, plus ISO6 service area & control room with temperature control to +/- 1 degree C & humidity control 45% RH +/- 5%.



R&D



21°C+/- 0.05 / 45%+/-5%



200m<sup>2</sup>



## “An interesting build to be part of...”

Cleanroom Solutions Project Director Sean Gaylard said: “This was another cleanroom build that required us to ensure an E-Beam could function effectively – a similar build to the Cambridge Graphene Centre controlled environment we produced. “The team at Glasgow actually asked us to install a sophisticated noise cancellation system within the cleanroom – and that was really interesting to be a part of. “The facility had the Glasgow underground to contend with, too – so that equipment was vital to ensure the E-Beam functioned correctly in writing nano lines on wafers. It’s so sensitive to any noise or vibrations that any tiny change can make a big difference. To be responsible for ensuring the control in such extraordinary circumstances was really special for us.”

**Sean Gaylard**  
Project Director



# NANOFABRICATION FACILITY

Contact Us

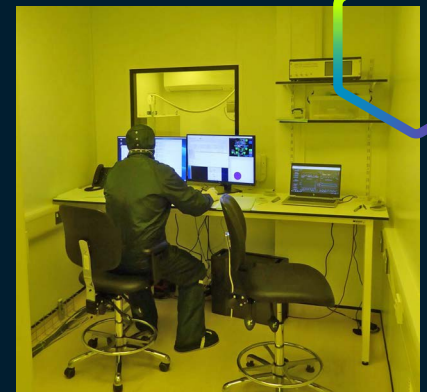


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## THE TECH SPECS

**ISO7 corridor:** Built to link the existing cleanroom to the new E-Beam facility. The lighting comprised of LED panel lights complete with yellow filters (LY5). A full Spicer Consulting noise cancellation system was designed and installed to reduce airborne electrical & vibration noise within the E-Beam room.

**E-Beam Room:** An Astra T50 ceiling grid system complete with FFUs was installed throughout. All FFUs installed within the E-Beam room are EC Low noise fan type and are controlled from a local Unitronics touch screen located in the service area. Nitrogen & CDA SS pipework and valves were installed throughout the cleanroom. A house vacuum system was designed and installed within the E-Beam room to provide localised house vacuum for cleanroom cleaning practices.

**HVAC:** The system was designed to provide very close control

temperature and humidity. Chilled water was used for cooling and hot water was used for heating. Sensible cooling coils were installed within the plenum areas connected to a chilled water and controls system providing control to +/- 0.05 degree C – though it actually performed at +/-0.03 degree C.

**Laminar flow:** The ISO4 E-Beam room was designed to provide full laminar flow airflow via ceiling-mounted FFUs and passing through floor mounted grills and returning to the plenum via built-in room return air ducts. Fresh air was provided via a roof mounted Air Handling United (AHU) combining cooling coils, frost coils, reheat coils and full controls system. The fresh air was ducted into the independent plenum areas and incorporated inline electric trim heaters for close temperature and humidity control.

**ISO 6&7 areas:** Designed using conventional airflow with air provided into the areas using FFUs and low-level grills located within room built-in return air ducts returning to the localised plenums mixing with close controlled fresh air.

## THE RESULT

**Cleanroom Solutions Project Director Sean Gaylard said:** "This was another cleanroom build that required us to ensure an E-Beam could function effectively – a similar build to the Cambridge Graphene Centre controlled environment we produced.

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