

CASE STUDY

MAT DELIVERS A NEW CL₃ LABORATORY FOR UNIVERSITY HOSPITAL CROSSHOUSE



University Hospital Crosshouse is a large district general hospital located near Kilmarnock. Operated by NHS Ayrshire & Arran, the hospital provides a wide range of services. The board commissioned Medical Air Technology (MAT) to design a scheme for the major refurbishment of an existing laboratory, having worked successfully together on earlier operating theatre projects.

The upgraded laboratory increases the hospital's Containment Level 3 (CL₃) capacity, allowing it to work with a wider range of pathogens, including coronaviruses. CL₃ is the highest containment level in common use in the UK, and laboratories of this type require certain features to be incorporated into the design to ensure appropriate containment.

After receiving the design order, MAT developed and submitted several different room layouts, each of which met the hospital's key requirement to enlarge the lobby leading into the laboratory. Following an option appraisal, MAT and its supply chain then mobilised to site to carry out the entire refurbishment. This included a full strip-out of the existing laboratory, taking it right back to bare brick, then installing a new ventilation system, control panel, furniture, drainage, domestic water and decoration.

The lobby is a vital element of CL₃ laboratory design. It marks the start point of the controlled airflow: the HVAC monitored pressure control system supplies air to the lobby and then draws the air through to the laboratory by a combination of safety cabinet extract and HEPA filtration of exhausted laboratory air, creating a gradation of negative pressure. On this particular project, MAT took air from the existing corridor and introduced it to the lobby via a pressure stabiliser. The laboratory door contained a door transfer grille to allow the pressure regime and design airflow to be met. The air was then extracted via two microbiological safety cabinets, procured by MAT from Contained Air Solutions (CAS).



In addition to designing and installing the laboratory, MAT had to meet two specific challenges during this project. The first involved working on the roof to install the ventilation system. This had to be done out of hours to create minimum disruption to the day-to-day running of the hospital, so the installation team was often working under floodlighting. MAT also had to ensure that all guidelines were followed to provide a COVID-secure workplace. However, thanks to close liaison between MAT and the hospital, these challenges were overcome.



CL3 Laboratory Room Structure and Specialist Airflow Design

A Category 3 or CL3 laboratory is an airtight, gas-tight, leak-proof room that uses specialised airflow design to ensure biocontainment. Conceptualising and designing a safe and compliant CL3 laboratory requires expert knowledge of the importance of room structure and a thorough and advanced appreciation of the way airflow operates.

Control of Substances Hazardous to Health (COSHH) regulations require that at CL3 the workplace must be maintained at an air pressure negative to atmosphere to stop the escape of hazardous pathogens. This is achieved by the specialist airflow created by the HVAC system, a critical part of the containment process, which establishes and maintains the negative pressure and thus ensures containment and operator safety.



MAT - A Specialist Contractor

MAT designs, manufactures and installs bespoke critical ventilation systems and turnkey project solutions for new build and refurbishment projects. As a specialist contractor with many years' experience, it is passionately committed to improving patient protection and end-user safety in demanding clinical, research and drug production arenas. The company has extensive experience of working in live environments and understand the challenges around delivering a project within an operational scenario.

In addition, MAT FM provides a range of competitively priced and highly effective service and maintenance packages for all core products and turnkey solutions offered by MAT or other suppliers, ensuring that equipment is maintained, serviced and validated correctly for optimum performance.



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