

CASE STUDY

MAT – DELIVERING A CL₃ LABORATORY FOR A LEADING UK UNIVERSITY



Medical Air Technology (MAT) recently completed a high specification Containment Level 3 (CL₃) facility for a leading UK university that wanted to expand its research capability. The new laboratory, situated on the top floor of the ten-storey faculty building, was partially funded by charitable donations and is part of a major ongoing refurbishment programme.

The biological research programmes planned for the suite using known CL₃ pathogens meant that compliance with Advisory Committee on Dangerous Pathogens (ACDP) and Specified Animal Pathogens Order (SAPO) standards and the Security of Laboratories (part 7 of the Anti-terrorism, Crime and Security Act 2001) was paramount. MAT was involved from design through to commissioning and handover, working closely with the client to ensure that the design was tailored to suit their particular requirements and the limitations of the site.

The turnkey suite comprises a dedicated LPS 1175 SR4 high security lobby and CL₃ anteroom leading to a 75m² CL₃ laboratory. A new CL₂ laboratory of 47m² also forms part of the suite.



CL₃ laboratory with Class II safety cabinets

The ventilation design was for a 100% fresh air-conditioned air supply plant, integrated with microbiological Class II safety cabinets incorporating automatic air bypass to ensure a constant negative pressure suite.

An emergency fail-safe air bypass arrangement linked to the roof-mounted AHU air supply plant ensures that in the event of an AHU shutdown, the suite is able to maintain negative pressure airflow. MAT also installed dedicated CO₂ supplies for incubators, full system controls and integrated building security systems. Integrated formaldehyde cabinet and laboratory fumigation systems enable the client to fumigate the safety cabinet and laboratories independently. CCTV, intruder and personnel safety alarms were included for extra security. The laboratory suite was also modified to suit disabled workers, with the addition of a washroom with disabled access.

The job presented particular challenges due to the location of the new laboratory on the top floor, for example the cabinet extract ductwork had to be installed through the roof of the facility, and much of the ductwork throughout the suite had to be fire rated. In addition, all work had to be undertaken around active laboratories within the faculty.

Stringent health and safety and installation methods ensured the works were carried out safely and the project completed on time and to budget.



GRP interlocked door



Surface-mounted services and gas-tight transfer plate

CL3 LABORATORIES

“Containment laboratories must be designed and built so as to prevent or control the exposure of laboratory workers, other persons and the environment to the biological agent in use.”

The Medical Research Council

A CL3 laboratory is required when handling human pathogens that may be transmitted via inhalation, that often have a low infectious dose to produce effects and that can cause serious or life-threatening disease. These pathogens include HIV, hepatitis B, yellow fever and rabies. CL3 laboratories are the highest containment level laboratories in common use in the UK and the point at which certain features to ensure appropriate containment must be incorporated into the design.

CL3 containment features primary and secondary barriers to minimise the release of infectious organisms into the immediate area and the environment. Every CL3 laboratory has two physical layers of containment:

- The primary barrier, which contains the hazard at source through the use of equipment such as microbiological safety cabinets.
- The secondary barrier, which protects the people and the environment through a combination of design and operating procedures such as air handling and restriction of access.

The CL3 laboratory is an airtight, gas-tight, leak-proof room that uses specialised airflow design to prevent the escape of hazardous pathogens. Design and maintenance of these spaces is complex, and should only be carried out by a specialised contractor like MAT, with a thorough and proven understanding of the myriad of requirements and regulations and the ability to deliver a safe and compliant facility.

Upon completion, the CL3 laboratory must be commissioned to ACDP guidance and COSHH requirements to ensure it is operating correctly. MAT FM can undertake this, carrying out pressure decay testing at both negative and positive pressures and leak testing prior to handover. In line with COSHH requirements, an ongoing service and maintenance plan from MAT FM then provides full verification of the critical ventilation system and an annual major service.



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