

FIRST-CLASS LABORATORY AIR MANAGEMENT SYSTEMS FROM TROX

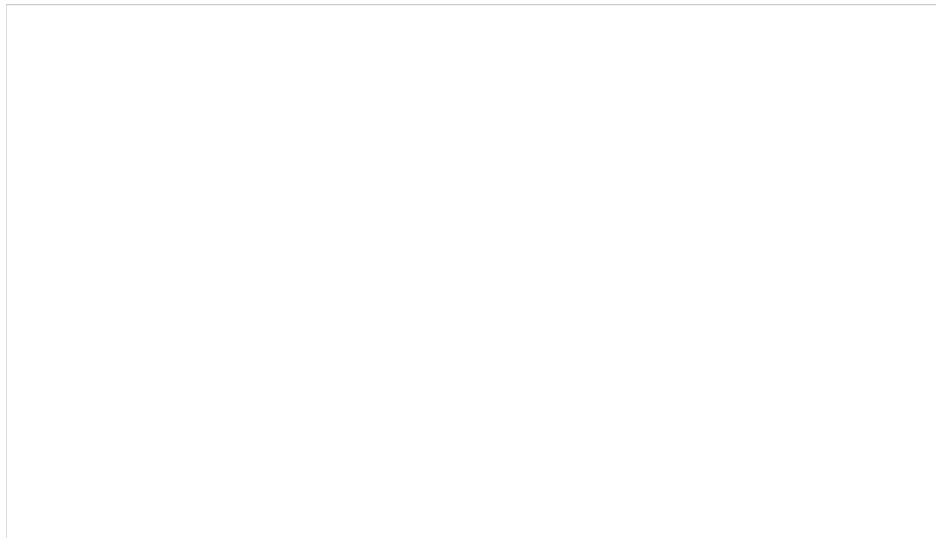
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LABORATORY PROJECT OF THE UNIVERSITY OF BIRMINGHAM

EASYLAB laboratory air management systems, as well as VAV controllers and fume hood controllers from TROX, were used in the energy efficiency optimization of the University of Birmingham's Collaborative Teaching Laboratory (CTL), which was awarded "very good" by the UK's BREEAM sustainability certification.

Constructed in August 2018, the building represents an investment of more than £40 million (approximately €47.6 million) in mathematics, computing, science and technology (STEM). The design of the CTL building is remarkable. The generous use of glass reflects team spirit, collaboration, and community engagement-both driving forces for the project. A large angled brise-soleil of gold anodized aluminum towers over the main entrance. Spanning 72,120 m² and three floors, the three different internal laboratory environments (the dry lab, the wet lab and the e-lab) are embodied by a range of different materials and forms. In the context of this project, "collaboration" refers to two aspects. First, it is about fostering interdisciplinary exchange between the different university institutes. On the other, the new building is intended to reduce redundancies that occur with multiple single-discipline laboratories. In addition, the newly created space is to be used to a much greater extent. Ambitious occupancy rates of up to 70 % are targeted.



SR CTL Universität Birmingham (Fotocredit: Hufton + Crow)

For the stakeholders involved in the design and construction of the building services, including the technical consulting firm Couch Perry Wilkes and the construction company Imtech, which specializes in mechanical and electrical systems, the energy efficiency of the research facility was a top priority. In laboratories, energy consumption per square meter is often three to four times higher than in office buildings. Reasons for this include higher cooling loads and the need for greater amounts of conditioned air for laboratory equipment such as fume hoods.

Therefore, laboratory buildings at intensive research universities can account for 50 to 80% of energy-related (non-residential) carbon emissions. To meet the demanding criteria for the new CTL, laboratory air management expert TROX was called in. In doing so, the best-in-class energy efficiency optimization solutions provided also guarantee compliance with the appropriate safety and comfort conditions for the building occupants.

The new building houses nine laboratories tailored to the respective purposes of use in different sizes, equipment, and for various research purposes. To maximize the environmental performance of these spaces, TROX installed EASYLAB laboratory air management systems, which include a total of 88 variable air volume (VAV) controllers. TROX's EASYLAB systems are used to manage the supply and exhaust air controllers in order to be able to react quickly to changes in the exhaust air volumes caused by technical exhaust air systems (e.g. fume hoods). This ensures balanced ventilation and constant air pressure in the laboratories at all times. Since air-conditioned air is not unnecessarily supplied to the areas, this contributes to a significant improvement in energy efficiency.

TROX also supplied the university with fixtures that optimize the life cycle costs of the university's investment in scientific equipment. In one large room in the CTL, for example, there are no less than 50 fume hoods. To optimize the energy efficiency of this equipment, TROX's laboratory air management system divides the lab into 5 zones, with each zone equipped with 10 fume hoods including TVLK series fume hood controllers. Sash displacement sensors control the flow rates based on the sash height. TROX BE-SEG-02 control panels contribute to workflow safety with traffic light warning systems and warning tones. Each zone is equipped with two supply air VAV controllers, which in interaction with the extract air, ensure a constant and correct room balance.

Thanks to the adaptation of the supply air to the changing requirements of the room, both the excessive supply and the waste of conditioned air are avoided. This ensures that research in the room in question can be carried out not only safely, but also under optimal environmental and financial conditions.

Eight EASYLAB VAV controllers are assigned to the open seating area and are controlled locally to provide point venting with local fault and alarm indication. All project units are equipped with a BACnet MS/TP interface card. This allows the university's building services team to monitor the specialty laboratories' laboratory air management systems through the in-house building control system. The efficiency gains enabled by TROX's laboratory air management systems contributed to the exceptional environmental performance of the entire new building. The building boasts a Class A energy performance certificate and a BREEAM rating of "very good".

Peter James und Lisa Hopkinson, „Carbon, Energy and Environmental Issues Affecting Laboratories in Higher Education“

- A Supplement to the HEEPI Report on General Regulations and Schemes on the Topic“, August 2011.

