

TROX LABORATORY AIR MANAGEMENT SYSTEM INSTALLED FOR QUADRAM INSTITUTE

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date rubric
05.12.2019 press / products / projects

A dedicated laboratory air management system, supplied by TROX, has been installed to optimise safety and environmental performance in a major new clinical and research facility. The TROX EASYLAB system, incorporating TROX VAV controllers, specialist filters, grilles and diffusers, will assist Norfolk-based Quadram Institute to meet the stringent requirements for its world-class research.

The new Quadram Institute building, based at the Norwich Research Park, brings together the former Institute of Food Research, the University of East Anglia Clinical Research Facility and the gastrointestinal endoscopy unit of Norfolk and Norwich University Hospital to conduct ground-breaking translational research and clinical care around four research themes: Food Innovation and Health; Gut Microbiology; Microbes in the Food Chain; and Population Health. The new facility will house 300 researchers, as well as clinicians and support staff. In addition, as the largest unit of its type in Europe, it will welcome up to 40,000 endoscopy outpatients each year. The building provides distinct accommodation for each department, as well as shared office space, meeting rooms and amenities to encourage interaction between all user groups.

The Quadram Institute creates an eye-catching landmark building for the city of Norwich. It has a linear shape and striking high-performance terracotta, louvered, façade, and open, flexible research laboratories with extensive glazing, to showcase the science within.

The team delivering the project, including main contractor Wates Construction, consulting engineers BuroHappold and specialist M & E contractors SES Engineering Services, had as their key priority the creation of a safe and secure environment for research with advanced levels of air management. The Quadram Institute includes Containment Level 2 and 3 Laboratories, as well as being a major Clinical Trials facility and a centre of excellence for endoscopy. This necessitated an added requirement for control and repeatability of air management conditions, in addition to the wider requirements for energy efficiency. To meet the complex and critical air management demands of the project, BuroHappold Engineering and SES Engineering Services worked in close co-operation with TROX UK to design and install the air management systems for the new site.

During the design phase, wind tunnel testing was carried out to determine safe fume efflux parameters for the scheme. TROX also analysed the air terminal device requirements of different zones in the building during the design phase, to determine the best possible designs of grilles and diffusers to maintain the optimum safe and comfortable working environment for researchers, staff and patients. To account for the specific research operations carried out in separate departments across the site, TROX worked with the design team and other experts to determine the most appropriate HEPA filter cells and diffusers, and installed specific room pressure control capabilities for the Containment Level 3 labs, and volume offset tracking controls for the Containment Level 2 spaces.

The resulting TROX EASYLAB room air management system installed in the new facility ensures that supply and extraction of air is optimised automatically in each laboratory to maintain safe working environments. In addition, TROX Variable Air Volume (VAV) controllers ensure that the energy efficiency of the building's central air conditioning and cooling system is also optimized for best-in-class environmental performance across the site as a whole.

Laboratory air management system

The TROX EASYLAB room air management system manages the supply and extract controllers in order that they respond rapidly to changes in extract volumes by the technical extract (for example fume cupboards) to ensure the correct air flow balance and room pressure for safety at all times in the laboratories. The air management requirements for the Containment Level 3 suite, for example, were particularly challenging. For this critical zone, the TROX EASYLAB system controls a pressure cascade, within which laboratories are controlled at larger negative pressures than the adjacent circulation spaces serving them, to ensure there can be no reversal of airflow under normal operational conditions. The suite also has an automated ventilation sequence that allows ventilation shut down, fumigation and purge of labs in a number of combinations to allow maximum flexibility. This automated ventilation sequence works by switching the TROX EASYLAB between different flow rate set points and pressure set points to achieve the desired ventilation strategy.

In addition to maintaining safe air control for building occupants, the EASYLAB system optimises the energy efficiency of the system. As the system requires the use of microbiological-grade filters (which are associated with increased energy requirement), the prevention of wastage by the system makes an important contribution to the site's overall environmental performance.

VAV controllers

Working in conjunction with the EASYLAB system, the TROX TVZ and TVA BCO Series VAV controllers ensure that the supply of conditioned air throughout the building can increase and decrease automatically in line with requirements. This provides significantly-increased control over air supply and extraction compared with traditional systems.

Air terminal devices

The effective selection of the optimum TROX air terminal devices also maintains effective comfort conditions across the building, by ensuring that conditioned air is delivered into the occupied zones in the best possible way. This avoids common problems such as draughts, 'dumping' of cold air, or stagnation/inadequate circulation. These devices ensure the effective control of air velocity, turbulence intensity and temperature differential.

Ian Thomas, Product Technical Manager - Air Products at TROX UK, commented: "The Quadram Institute will be carrying out essential research and it was important that the building itself could operate safely at all times, with advanced control of air supply and extraction to meet the stringent requirements. The TROX EASYLAB system will enable the Institute to continue its vital work, confident in the knowledge that the best possible systems are in place to ensure best-in-class performance."

Project image: Image courtesy of the Quadram Institute

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TROX is a global leader in the development, production and sale of components, units and systems for the ventilation and air conditioning of rooms. With 28 subsidiary companies in 27 countries on five continents, 16 production facilities, and importers and representatives, TROX is present in over 70 countries. Currently, the TROX GROUP has around 4,000 employees worldwide and generates revenues of about EUR 500 million.

For further information or should you have any questions about TROX, please contact:

Clare Tomalin
Marketing Manager, TROX UK
Tel: +44 (0) 1842 754545
Fax: +44 (0) 1842 763051
Email: ctomalin@troxuk.co.uk
www.troxuk.co.uk