

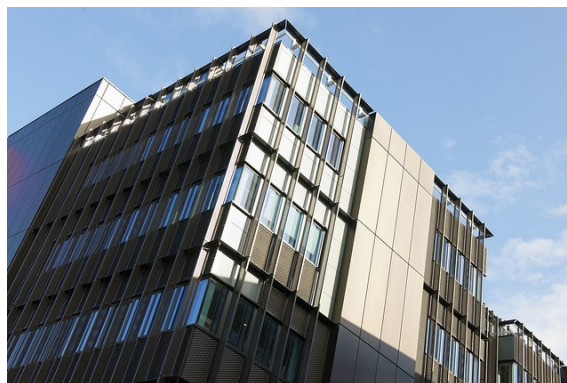


TROX AIR MANAGEMENT SYSTEM HELPS UNIVERSITY OF WOLVERHAMPTON ACHIEVE ITS SUSTAINABILITY TARGETS

When the University of Wolverhampton constructed its new £25 million science block, the energy efficiency of the new facility was of utmost importance. The University has set ambitious targets as part of a five year Sustainability Strategy and this was a valuable opportunity to improve the site's environmental performance. The resulting variable air volume (VAV) air management system supplied by TROX for the new science block has enabled the University to make significant strides towards these targets, by improving carbon footprint in the most energy-intensive part of the university.

The University of Wolverhampton is located across four campuses in the West Midlands and has a student body of over 19,000. The new Rosalind Franklin Science Building, which was built as part of a wider £250 million investment programme, is an exciting addition to the City Campus in Wolverhampton.

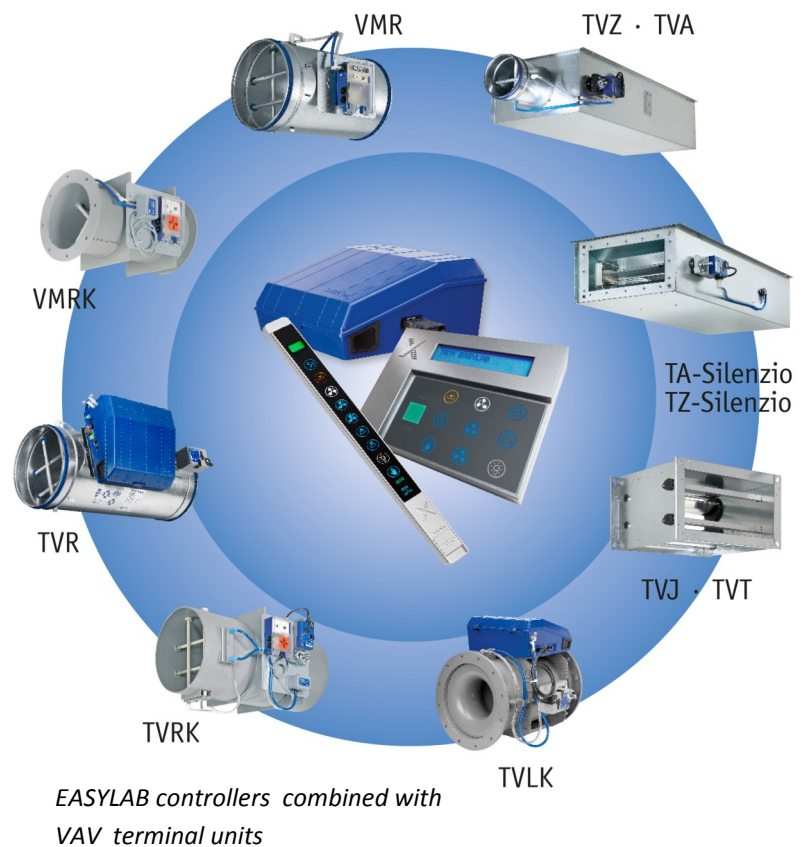
Named to commemorate Rosalind Franklin's pivotal role in the discovery of DNA, the new science block incorporates an existing 1960s teaching building, which has been refurbished and extended outwards and upwards, creating an important state-of-the-art facility. In addition to creating an outstanding learning environment for around 2,500 students and approximately 150 staff, the building includes an outreach laboratory at ground level, with floor-to-ceiling windows, aimed at encouraging public engagement with science.



Energy efficient design of the science block was crucial for the University. The energy consumption of laboratories is often three or four times that of offices on a square metre basis¹. This can mean that laboratory buildings are responsible for between 50% and 80% of the total energy-related (non-residential) carbon emissions of research-intensive universities. One of the major reasons for high energy consumption in laboratories relates to the need for larger volumes of conditioned air. In addition to the higher cooling loads associated with IT-intensive spaces, laboratories involve elevated energy consumption associated with fume cupboards, which require high volumes of air supply and extraction to ensure that work can be carried out safely. Providing energy efficient air management was therefore fundamental to achieve outstanding environmental performance for the new building.

The company chosen to supply the high-efficiency air management system for the Rosalind Franklin Science Building was TROX UK – an international manufacturer of

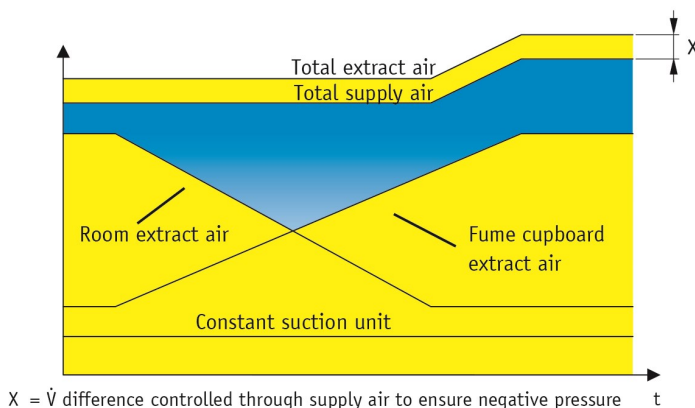
components, devices and systems for the ventilation and air conditioning of rooms, with specialist expertise in air management for laboratories. TROX installed its EASYLAB room air management system (to optimize the energy efficiency of supply and extraction of air in the laboratories), in addition to Variable Air Volume (VAV) controllers for the building's central air conditioning and cooling system. TROX also analysed the air terminal device requirements of different zones in the building, installing the best possible designs of grilles and diffusers to maintain the optimum learning environment for students and staff.



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 at all times in the laboratories. This significantly improves energy efficiency, as it prevents unnecessary supply of conditioned air to the space. The energy savings are made possible by offsetting one form of exhaust air against another. By scaling down room exhaust air extraction in line with fume cupboard extraction when sashes are open, the room air management system is able to prevent over-supply and extraction of conditioned air from the space.

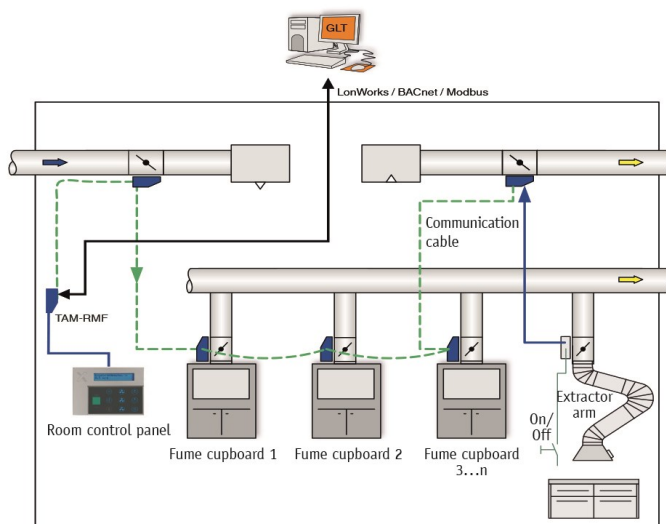
¹ Peter James and Lisa Hopkinson, 'Carbon, Energy and Environmental Issues Affecting Laboratories in Higher Education - A Supplement to the HEEPI Report on General Regulations and Schemes on the Topic', August 2011.

When sashes of fume cupboards are open, the volumes of air required to maintain a safe working environment for laboratory personnel increase significantly. For example, a 900mm wide cupboard with a maximum sash height of 500mm and face velocity of 0.5 m/s would extract approximately 225 l/s of conditioned air from the room.



This would be fixed on a constant volume cupboard, whereas on a variable volume cupboard the minimum air volume could be around 55 l/s when the sash is down. Converting from constant volume to variable volume would therefore save 170 l/s when the sash is in the down position for a single cupboard. As the Rosalind Franklin Science Building incorporates more than 50 fume cupboards, the energy saving potential of the EASYLAB system is considerable. The fume cupboards have also been equipped with auto-close mechanisms, which ensure that sashes close automatically if they are left open unnecessarily. The installation of TROX EASYLAB has also meant that the energy saving mode on the Building Management System (BMS) can now be utilized effectively to reduce energy consumption when laboratories are unoccupied. Air change rates can be reduced, without impacting safety, at times such as weekends and evenings, when the laboratories are not being used. The BMS adjusts the mode during 'Night Set' periods in accordance with a pre-programmed time schedule. A local key switch override is used by the occupants to return to standard air change rates if the lab needs to be used outside the anticipated operational hours.

To work in conjunction with its EASYLAB system, TROX has installed VAV controllers within the building's central air conditioning system. These VAV controllers ensure that the supply of conditioned air, throughout the building, can increase and decrease automatically in line with building load. This provides a significant opportunity to reduce energy consumption compared with traditional constant speed systems – where components are set to work at full load at all times.



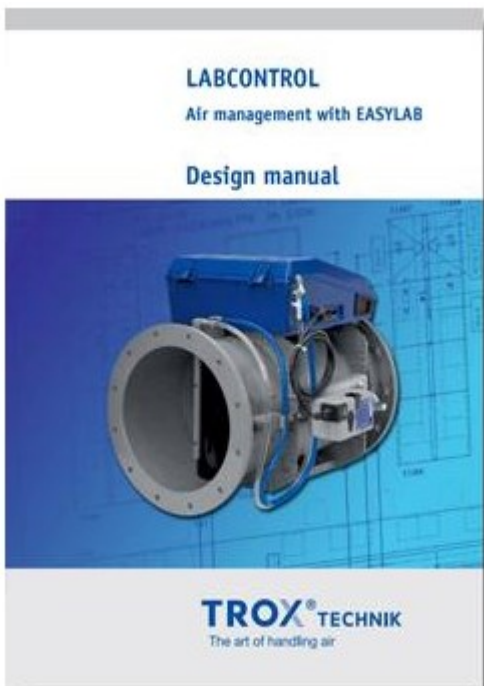
Finally, the effective selection of the optimum air terminal devices will ensure that conditioned air is delivered into the occupied zones of the building in the best possible way to ensure an effective learning environment. TROX determined the best grilles and diffusers to install in different parts of the building to avoid 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, "Research-intensive universities such as the University of Wolverhampton face particular challenges when working towards ambitious environmental performance targets. Tackling energy consumption in laboratory areas, however, can deliver considerable reductions in carbon emissions.



"We are proud to have played a part in bringing this impressive building to fruition, and in assisting the University in its work towards its sustainability goals".

Further information about EASYLAB and air management within laboratories is available on our website (www.troxuk.co.uk) and in the LABCONTROL Design Manual.



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