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Highest air supply standards

On the campus of the famous Charité - Universitätsmedizin Berlin, planners and building technicians were faced with a special challenge: The total refurbishment of a 23-storey ward building and the construction of a new building to house operating theatres and other medical facilities. The building technology specialist TROX ensured the best air and the highest hygiene standards with its ventilation systems for this project.

Hospitals present planners and architects with particular challenges. Above all others, the issue of fresh air is a critical one. Clean and draught-free air is essential for patients in hospital rooms as it contributes to the prevention of the spread of germs and the dangerous infections they can lead to. With around 100 clinics and institutes and approximately 3,000 patient beds, Charité is one of the largest university clinics in Europe and in order to meet current standards, extensive conversion and renovation work on the multi-storey ward building began in 2014. The “surgically constructed building” dating to the GDR period (1979-1982) was completely gutted, given a new energy-efficient façade and equipped with state-of-the-art building technology. The five-storey plinth serves as an examination and treatment area; the floors of the tower above are largely for inpatient treatment. The equipment rooms for the technical infrastructure are accommodated in the basement, on a mezzanine floor (level 05) and on the top floor.

At the same time, construction started on a new building housing the operating theatres, intensive care unit and the 70-bed central emergency department. It is connected to the ward tower by a five-storey link structure. The refurbishment has once again made the ward tower an impressive landmark for Berlin-Mitte. VAMED Deutschland and Ed. Züblin AG were chosen as the general contractors. The VAMED Group, based in Vienna, is a globally recognised partner for the planning, construction, fitting out and management of healthcare facilities. The general planning was provided by Ludes Generalplaner GmbH from Berlin, a leading office in the field of architecture for the healthcare industry. SAA Schweger Architekten from Hamburg was responsible for the design of the high-rise ward building and the operating theatre building. The new building and ward tower now offer a combined space for around 653 beds. The first wards opened their doors to patients in December 2016.

51 RLT devices of the X-CUBE series

The building technology specialist TROX Austria supplied the ventilation and air conditioning equipment as well as the fire protection systems for this major project. In the high-rise ward building, a large ventilation and air conditioning centre with a total supply and exhaust air volume of 510,000 m³/h supplies the patients with clean, healthy and draught-free air. Eighteen air handling units of the X-CUBE series are used for this purpose. In the new operating theatre building, thirty-three X-CUBE ventilation units supply a total supply and exhaust air volume of 330,000 m³/h. In total, fifty-one X-CUBE air handling units from TROX, with a total capacity of 840,000 m³/h, were installed in the Charité construction project.

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The Linz-based company Herbsthofer GmbH, which specialises in high-quality projects, especially hospitals and industrial facilities, was responsible for the plant engineering. “We have already completed numerous hospital projects in Austria with VAMED. The commissioning of ARGE VAMED/Züblin AG for the prestigious Charité Berlin construction project was a decisive step in Germany for us,” explains Gunther Herbsthofer, a member of the management board.

Hospital projects are always very demanding in terms of technology, hygiene and logistics. Herbsthofer can already look back on many years of experience in 3D CAD planning in this field and amongst other things developed the “Baustelle 4.0©” solution itself. “Choosing the right partners is very important, especially on complex projects,” says Herbsthofer. “It was already clear to us when the order was placed that we should work together with TROX as the technology partner for ventilation devices and smoke extraction”. The strong collaborative partnership as well as TROX’s expertise in special solutions were important for the success of the project.

Highest hygiene standards

Hygiene is a critical aspect of any hospital. The modular, mostly pre-assembled, ventilation units fulfil the highest requirements for hygiene even in their basic design. Thanks to the special shape of its housing, particularly smooth surfaces and the way in which the components are installed, the X-CUBE series meets the requirements of VDI 6022 and H6020 and, to a large extent, the particularly stringent hygiene requirements of DIN 1946/4. For highly sensitive areas, such as operating theatres, a special hygiene version in accordance with AHU Guideline 01 (RLT-Richtlinie 01) is available. The tailor-made modular design reduces assembly and maintenance costs because all work can be carried out quickly and easily. Great flexibility is often required, especially on large construction sites. On the Charité construction project, for example, the available insertion openings were changed due to the rapid progress of construction, which is why some of the ventilation units ordered had to be dismantled again either in the factory or on the construction site. Thanks to the carefully considered modular design, however, this was possible without any significant delays. Other reasons why the X-CUBE series was chosen for the Charité construction project included: The specific design principle with high insulation, air tightness, heat recovery, energy-efficient drives and intelligent control technology enable energy savings in the double-digit percentage range compared to conventional air conditioning units.

Accessible air ducts

A special feature of the Charité project were the panel ducts, some of which were 30 metres long and facilitated simultaneous air guidance and access. The fresh and exit air is transported in both buildings on level 05 and in the ward tower on level 21 via air distribution ducts in the form of powder-coated ducts made of X-CUBE equipment panels. This was made possible by the flexible configuration of the housing construction. The operator’s wish for a particularly hygienic and walk-in solution was thus fulfilled.

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The ducts themselves are connected to openings in the façade with nozzles on the outside of the building and these air intake openings have been architecturally integrated into the façade. The ventilation units are connected directly to the internal end of the panel ducts. In the new operating theatre building, special measures were necessary to avoid the airborne risk of infection and to ensure occupational health standards. These include a laminar low-turbulence displacement flow across the protected area, HEPA air filters and a special pressure balance control system. In addition to the ventilation technology, TROX Austria also supplied the entire fire protection system. The TROX-NETCOM control system controls around 2,300 fire dampers, 220 smoke extraction dampers and 125 fire diffusers. Furthermore, 160 AS-EM SIL2 modules were installed in the basement levels for the secondary dampers of the smoke extraction system and 474 AS-EM modules for the ventilation dampers.

The construction project and the state-of-the-art building equipment enabled the Berlin University Hospital to comprehensively develop the Charité Mitte campus and its more than 300 year-old history.



©TROX: Charité ward building

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@TROX: View over Berlin from the roof of the ward building



@TROX: Combined supply and exhaust equipment of the X-CUBE series (one of 51 X-CUBEs)

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©TROX: X-CUBE housing used as an insulated ventilation duct



©TROX: Fire damper of the FK-EU series as a flow duct with smoke detector integrated into the TROXNETCOM system

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Company profile:

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 27 subsidiary companies in 25 countries on five continents, 14 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.

TROX Austria acts as a hub for all business in the CEE region and is represented in Austria, Hungary, the Czech Republic, Croatia, Serbia, Bulgaria and Romania; as well as in Slovenia and Slovakia through successful and reliable partners.

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