



The innovative air handling unit. By TROX.



TROX® TECHNIK
The art of handling air



► The art of handling air ►►

TROX understands the art of competently handling air like no other company. TROX is the leader in the development, manufacture and sale of components and systems for the air conditioning and ventilation of rooms. With 24 subsidiary companies in 24 countries, 14 production facilities, another 25 own sales offices, more than 50 importers and representatives, a total group turnover of €390 million, and 3,600 employees worldwide, TROX is a world market leader in the area of ventilation and air conditioning components.

TROX is developing from a mere component manufacturer to a complete system supplier, true to the maxim "one-stop shop". The innovative X-CUBE by TROX is a milestone in the market for air handling units and defines new, considerably higher standards for quality, performance, flexibility, reliability, energy efficiency, and hygiene. Compelling all down the line.

"In Germany, TROX is the only manufacturer that manufactures almost all components to set up a centralised air conditioning system, from external weather louvres to air handling units to diffusers and control systems."



A handwritten signature in blue ink that reads "Reuter".

(Lutz Reuter, Chairman of the Board of Management of TROX GmbH)

TROX X-CUBE – The only true measure

System quality from a single source

With the X-CUBE air handling units TROX sets new standards and now offers from a single source all components of an air handling system, ideally complementary to each other.

The extensive know-how and expertise of TROX in the fields of acoustics, fire and smoke protection, and filter technology, to name but a few, have been incorporated in the X-CUBE. Customers benefit through less coordination effort and the opening up of new and exciting opportunities in air conditioning.

Unlimited configuration options

With 2 m/s air velocity the units cover an air volume flow rate range of 1,200 to 86,000 m³/h (0.3 to 24 m³/sec) and offer unlimited configuration options. They can in fact be used for all types of air handling. X-CUBE units are available as supply or extract air units, or as preassembled combination units with the casings arranged side by side or on top of each other. While even the standard construction version is of extremely high quality, a special hygiene construction variant according to DIN 1946/4 and a weatherproof variant for outdoor use complete the product range.

Each unit is customised to meet the individual requirements of each customer. All components ideally complement each other, and customers can expect the excellent quality for which TROX is so well known. TROX provides the best solution for virtually every application.



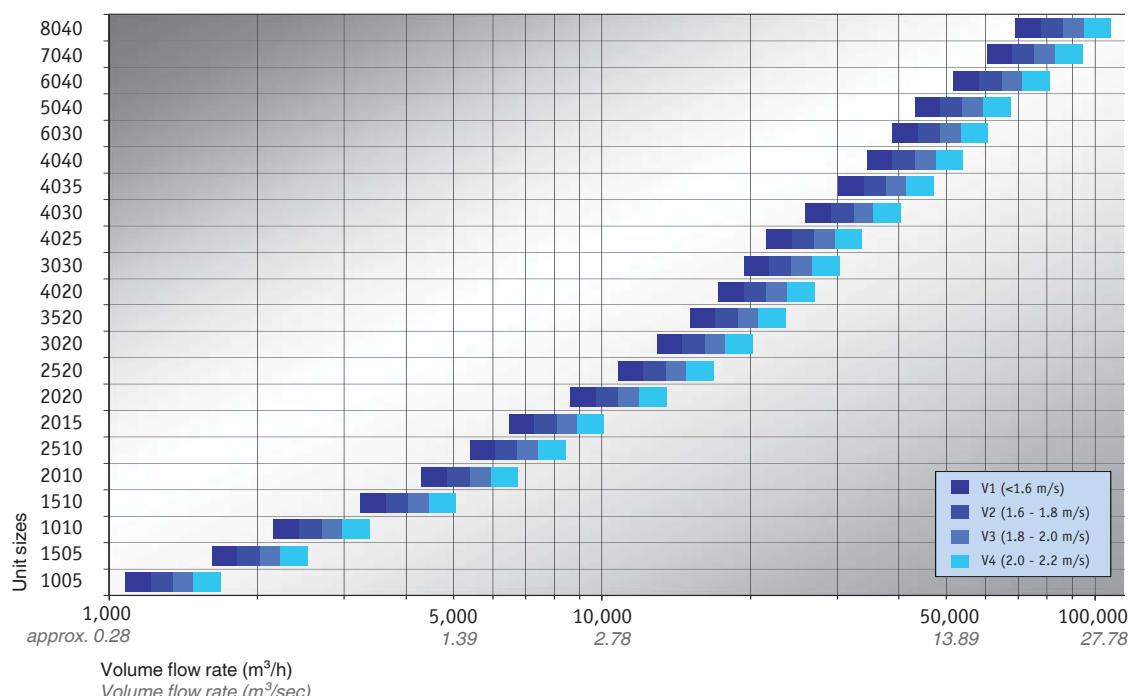
The TROX information centre in Neukirchen-Vluyn, Germany



X-CUBE measurements in Research and Development



Microsite www.trox-x-cube.com



X-CUBE volume flow rates and unit sizes according to DIN EN 13053 (intermediate sizes not shown)



*The TROX air handling units are examined by
TÜV SÜD, Germany*

The future is now

No compromises

In order to implement its innovative design and manufacturing philosophy with no compromises, TROX has been investing €20 million into a new 15,000 m² production facility with the latest manufacturing technology in Anholt, Germany. Investments for the entire TROX Group amount to €50 million in 2011. This is one reason why production and logistics can be ideally matched to the X-CUBE units.

150 new jobs were created. In Anholt alone, TROX has developed 52,000 m² of production area since 1961. The Anholt plant is the largest of all 13 manufacturing plants with a total production area of 168,500 m².



*Performance certified
and approved
by Eurovent.
Certification Diploma
Number: 13.02.005*

Made in Germany

Thanks to its most advanced manufacturing technology in Germany, TROX can supply excellent quality and meet the most demanding delivery times. Almost needless to mention that TROX implements the relevant industry standards and has all its components and processes certified. The TROX focus on quality provides customers with many advantages. To begin with, even the X-CUBE standard construction version meets all requirements of the AHU Guideline 01, the VDI 6022 Guideline, and the technical performance is certified by Eurovent.

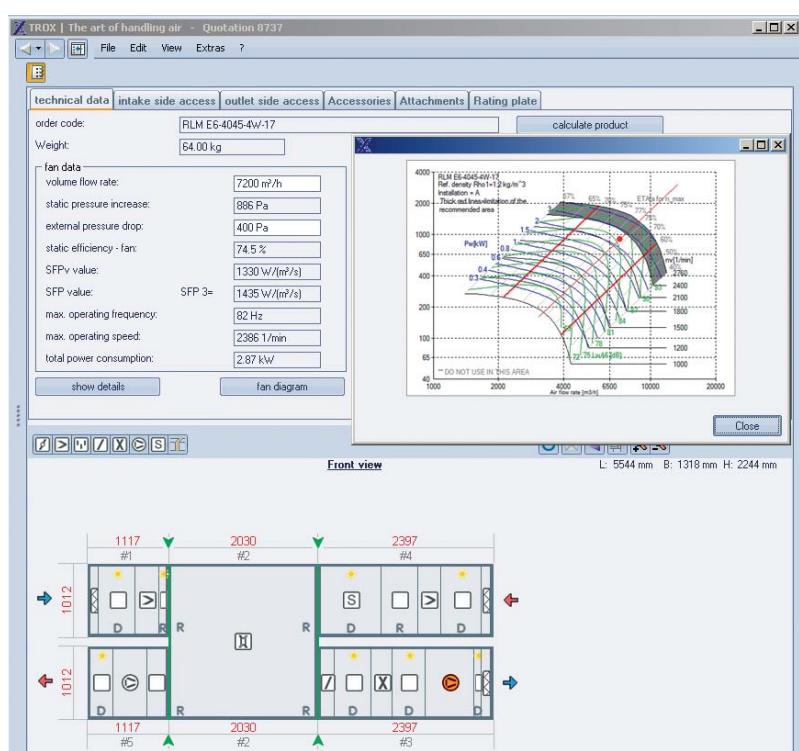
TROX finds the best solution

The X-CUBE units offer maximum flexibility and can easily be configured to each application situation. A dedicated configuration programme, developed by TROX, facilitates system design such that customers need not make any compromises.

*Certification according
to the energy efficiency
label of the German AHU
Manufacturers Association*



A configuration and design tool facilitates project planning

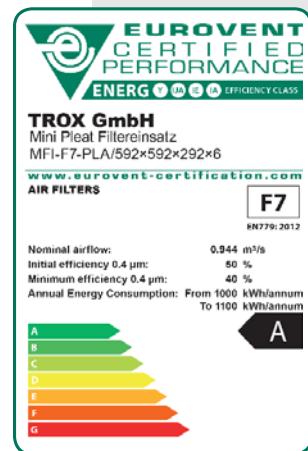


Exciting advantages for today and tomorrow

The most advanced technology and outstanding innovations make the TROX X-CUBE an exciting system for today and tomorrow.

■ High energy efficiency

Energy efficiency was the guiding concept in the development of the X-CUBE. Construction, insulation, low leakage, heat recovery, energy-efficient motors, and intelligent control technology have resulted in a double-digit savings potential when compared to conventional air handling units.



Highest energy-efficiency class according to Eurovent

■ Unparalleled hygiene

With the special shape of the casing, its smooth surfaces, and the way in which the components are installed, the X-CUBE complies with the VDI 6022 guideline. Even the high-quality standard version meets the very critical hygiene requirements of the DIN 1946/4 standard. A special hygiene unit that complies with AHU Guideline 01 is available for the most demanding requirements.



Quality in each detail

■ Easy installation and maintenance

The modular structure and low level of wiring required - a result of the extended use of field bus technology - help to save installation and maintenance costs since all work can be carried out quickly and easily. Work safety is another important aspect as, for example, there are no sharp edges anywhere.



Ergonomic operating elements

■ Intuitive operation

The X-CUBE can be operated comfortably and safely using the touch panel. Virtually all status information is available at a glance. Operating errors are eliminated.



High-quality casing design

■ Seamless integration with modern building management systems

The X-CUBE with its modular, expandable control system can be integrated into almost all modern building management systems using various bus systems.



Weatherproof variant

► Sophisticated details ►►



Large square inspection ports and energy-efficient LED illumination for easy inspection.



Doors with external latches facilitate access and cleaning. For transport, the handles can be removed independent of the latches.



Robust base frame with reinforced holes for the insertion of transportation rods.



The panels have integral cover profiles and can be removed and re-installed easily with metric threaded screws.

Perfect for your requirements

The X-CUBE can be perfectly adapted to your individual project requirements

■ Size

Available in any size from 612 mm to 4,896 mm in width (1 to 8 filter elements) and 306 mm to 2,448 mm in height (½ to 4 filter elements).

■ Configuration

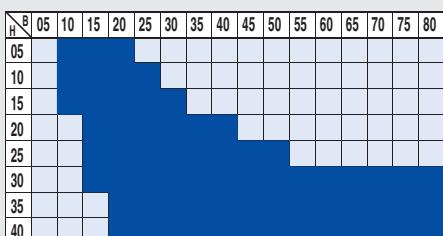
Any arrangement of the components is possible. The X-CUBE is available as supply or extract air unit or as a pre-assembled combination unit with the units arranged side by side or on top of each other.

■ Functionality

All types of air treatment: air filtration, heat recovery, heating/cooling, humidification/dehumidification, and shut-off.

■ Application

The units are available as high-quality standard versions, e.g. for office buildings. There is also a special hygiene construction variant according to AHU Guideline 01 for hospitals and laboratories, and a weatherproof variant for outdoor use.



Unit sizes (10 ≈ 1 filter element)

TROX®
X-CUBE



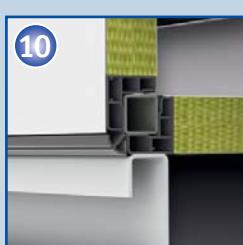
The robust TROX minipleat filters have a compact depth, low initial pressure differential, and high dust loading capacity. Like the TROX pocket filters made of glass fibre or NanoWave® medium, which can be used as an alternative, they comply with energy efficiency class A and are certified by Eurovent. Filter classes M5 to F9 are available.



The powder-coated steel frame is completely covered by the panels, i.e. not visible from the outside; it provides a high level of flexibility.



The low-leakage TROX multileaf dampers (DIN EN 1751, class 4) with aerodynamically profiled blades have been optimised for use in air handling units.



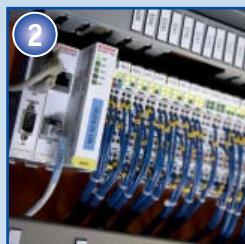
The casing construction incorporates thermal and sound insulation; this results in the elimination of thermal bridging even close to the ground.



The plug fan with an IE2 motor or even more energy-efficient permanent magnet motor ensures high efficiency even under partial loads. The aerodynamically profiled steel or plastic fan blades achieve the highest efficiency with the lowest noise level. The PM motor complies with the future IE4 energy class according to IEC 60034-30.



A wide spectrum of energy-efficient heat recovery systems, such as a regenerative thermal wheel with hygroscopically coated thermal mass, allows for optimum adaptation to each application situation. Plate heat exchangers or composite circulation systems can be used as an alternative.



The modular control solution on industrial PC basis enables communication with virtually all building management systems via BACnet, LON, Modbus, or OPC. Wiring is simple. Further integration of TROX air conditioning components, such as volume flow rate controllers, smoke detectors, or adjustable diffusers, can also be achieved.



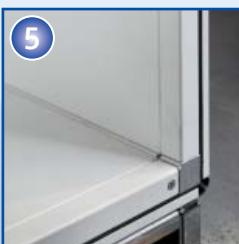
The TROX splitters with aerodynamically profiled frames achieve 30% less pressure drop than conventional splitters. The distance between the splitters can be individually adjusted with distance pieces in variable widths. These double as handles to facilitate removing the splitters when the casing needs to be cleaned.



The internal 3D module connectors facilitate the accurate location and positioning the modules for on-site assembly.



The innovative thermally isolated panel construction with foamed seal ensures low leakage values and eliminates thermal bridging. Due to its minimal heat losses the casing is classified as thermal transmittance class T2.



The internal surfaces are powder-coated or stainless steel, smooth and without any protruding parts. This makes cleaning both safe and easy.



Optimum corrosion protection on both the inside and outside, due to galvanised sheet steel that is pre-treated and then powder-coated in RAL 9016 (other RAL colours as options).



The heat exchanger for cooling and dehumidification is equipped with a stainless steel condensate drip tray sloped on all sides. This ensures complete condensate drainage and that the entire unit is easy to clean.

Numerous equipment variants

The X-CUBE components come in different variants and allow for almost unlimited combinations to meet nearly every application requirement.

- Various TROX filters, e.g. minipleat filters or pocket filters using glass fibre media
- Several energy-efficient heat recovery systems such as recuperative cross-flow or counter cross-flow plate heat exchangers, thermal wheels, or circulation systems for heat recovery
- Sound attenuator splitters that can be adapted to the acoustic requirements of each unit
- Energy-efficient radial fan with EC, PM, or IE2 motor
- Various TROX multileaf dampers in standard or low-leakage configuration according to DIN EN 1751
- Project-specific heat exchangers for heating or cooling
- Various humidification systems such as steam humidifiers or adiabatic humidifiers
- Various dehumidification systems such as rotary dehumidifiers
- Modular and adaptable control solutions for different bus systems



Clear symbols on the panels guide technicians and facilitate maintenance.



Intuitive operation based on the clear visualisation of the complete system using the touch panel with TROX software.



Adjustable external hinges with 180° opening angle facilitate cleaning and benefit hygiene. Since the hinge section on the door consists of two parts, the door can be easily removed.

Casing properties certified according to EN 1886 by TÜV Süd

- Leakage class L1 (M)
- Mechanical strength class D1 (M)
- Filter class up to F9 (M)
- Thermal transmittance class T2
- Thermal bridging class TB2





Model box thermal imaging



Computer-aided data analysis



On site installation of a weatherproof X-CUBE



The X-CUBE expert team

It's TROX

The unparalleled flexibility and impressive performance characteristics of the innovative unit design speak for themselves and are actually sufficient reason to have an X-CUBE. There is, however, another strong argument: TROX.

TROX offers customers more than just perfect air handling units.

The whole picture

The air handling units have benefited from the TROX decades of experience and attention to detail. All components ideally complement each other. TROX engineers look beyond the actual air handling unit; they take into account the whole ventilation and air conditioning system.

Own test laboratories allow TROX to optimise the acoustic, energy-related or aerodynamic characteristics of the unit and all its components. TROX is the only German manufacturer of air handling units whose know-how extends to filters, fire and smoke protection, sound attenuators, and to all other components and systems.

TROX service from design to commissioning

TROX is a solution provider. Service starts with the design of air handling units, encompasses commissioning, and goes on to the training of engineers and maintenance staff. It is service which TROX customers have come to expect.

Competent sales team

The TROX sales team is available to TROX customers for all questions in this field. Additional expert sales engineers provide highprofile consultation services.

Customised delivery

X-CUBE units can be delivered as individual modules for installation on site, or they can be supplied pre-assembled if the maximum length does not exceed 12 m. As usual, TROX guarantees on-time delivery.

The new plant in Anholt (Germany)

The new Anholt production facility, where the X-CUBE units are produced, has been equipped with the most advanced manufacturing technology.

This includes powder coating equipment for fully-automatic coating with short colour changing times, integrated pre-treatment of surfaces, and the most modern recovery technology. Here a surface area of 210 m² can be coated per hour.

The sheet metal centre consists of a material storage tower, punching equipment, metal cutting guillotine, and sheet forming machinery; it can produce 110 panel sheets per hour.

The metal profile manufacturing cell is equipped with a high-frequency CO₂ laser that cuts with high pressure technology to produce burr-free edges. Every 25 seconds a completely machined profile leaves the conveyor.

The very modern plastic profile machining centre has been designed for high speeds and maximum quality. Approximately 1,000 km profile length are produced here every year.

The fully-automatic foam seal equipment identifies the size and height of each panel and applies 2K sealing foam to panels every 60 seconds.



Optimised plant acoustics thanks to TROX splitters



Sheet metal production with the latest laser technology



Press brake



The state-of-the-art sheet metal centre for panel production



TROX Anholt plant (Germany)

References

TROX Production facility in Anholt, Germany

The new 15,000 m² production plant in Anholt is equipped with four X-CUBE supply air handling units with a volume flow rate of 40,000 m³/h each for ventilation and air conditioning. This air handling unit is just one example of the close integration and combination of X-CUBE units with other TROX components to arrive at an energy-efficient system. For instance, the temperature-dependent control of the diffusers, in this case jet nozzles, as well as the integration of the smoke detectors are all part of the modular and expandable control system of the X-CUBE units.



Templo Mormons, Curitiba (Brazil)

The use of near-surface geothermal energy for the heating and cooling of the building illustrates the sustainable energy philosophy behind this production site. 48 geothermal probes were placed 150 m deep in the ground. In summer, the building is cooled directly by the low temperature in the ground; in winter, the building can be heated by switching on an additional heat pump. The heat pump will generate approximately 70 % of the total heat required.

Cooling the building by utilising geothermal energy has a positive side effect: The effectiveness of the system is increased since the closed loop takes heat during the cooling phases and is as such 'regenerated'. The heat source is, then, improved.



KEUCO head office, Hemer (Germany)

The savings potential is enormous. Exploiting geothermal energy reduces the CO₂ emission of the production plant by roughly 90 t per year. This is equivalent to the annual CO₂ emission of 77 cars.

International expertise

For many years, TROX has been producing air handling units in Spain, South Africa and South America for the local markets. That experience has been incorporated in the development of the X-CUBE units and now benefits customers throughout Europe.



Edificio Castelo, Rio de Janeiro (Brazil)



King Shaka Airport (South Africa)



Deutsche Bank, Barcelona (Spain)



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Czech Republic

TROX Austria GmbH

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TROX Danmark A/S

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TROX France Sarl

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South Africa

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Switzerland

TROX Hesco (Schweiz) AG

Turkey

TROX TURKEY TEKNIK KLIMA
SAN. Ve TIC. LTD. STI

United Arab Emirates

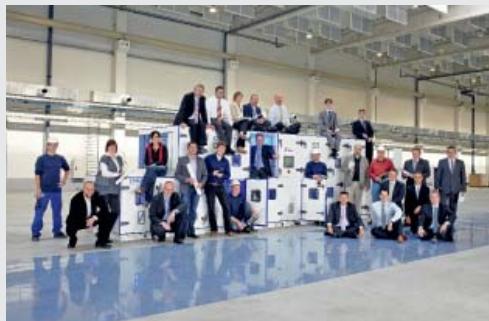
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