

## AIR IS HEALTH! AIR IS LIFE!

Air quality is of great significance to our health. The cleanness of the air and a proper microclimate play a crucial role in in-patient care and the protection of the attending personnel.

Ventilation systems act as a barrier to the development and spreading of microorganisms in the working environment, while simultaneously ensuring temperature and humidity control. These systems are fully automated and come with a remote control.

The systems possess certifications to the following standard:VDI 6022, VDI 3803, and DIN EN 1946-4, which ensure that the units provide excellent levels of hygiene and air cleanness.

TANGRA is a leader in the design of air conditioning and ventilation systems. We possess own production plants, a specialized HVAC laboratory, a research and development department and well-trained personnel in the field of design, production and installation of air conditioning and ventilation equipment.

Air handling units TANGRAAHU-HYG have been designed to operate in a clean and non-hazardous environment.

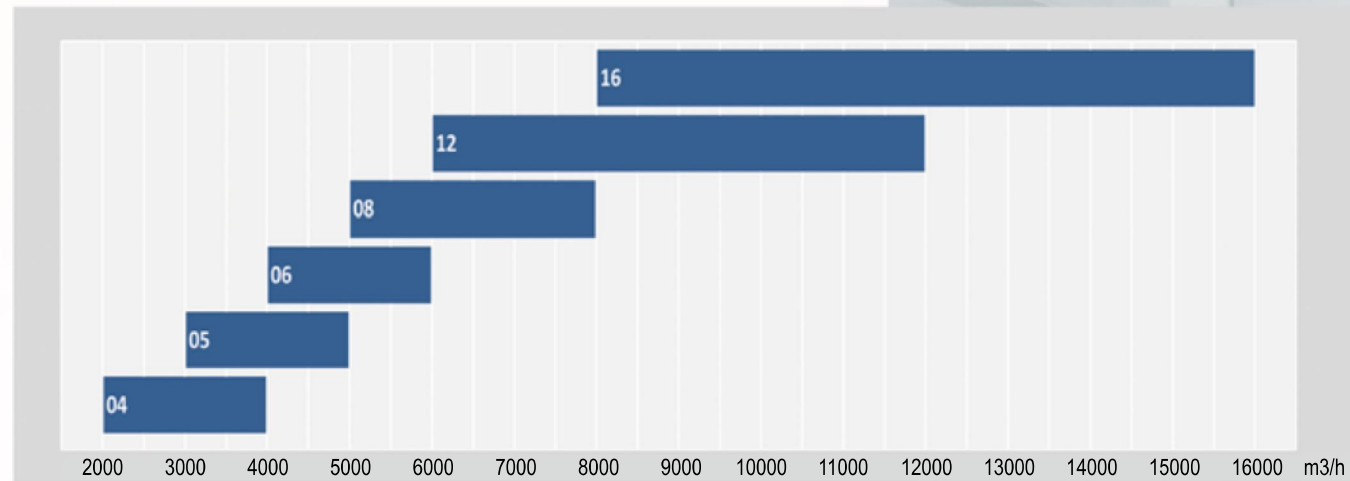
They tend to be installed in ventilation and air conditioning systems for clean rooms (e.g. ER, ICU, operating theaters, high dependency rooms, sanatoriums), but are also used in facilities within the optical data storage, electronic components, pharmaceuticals and food and beverage industries.





# Construction

## PRODUCT RANGE



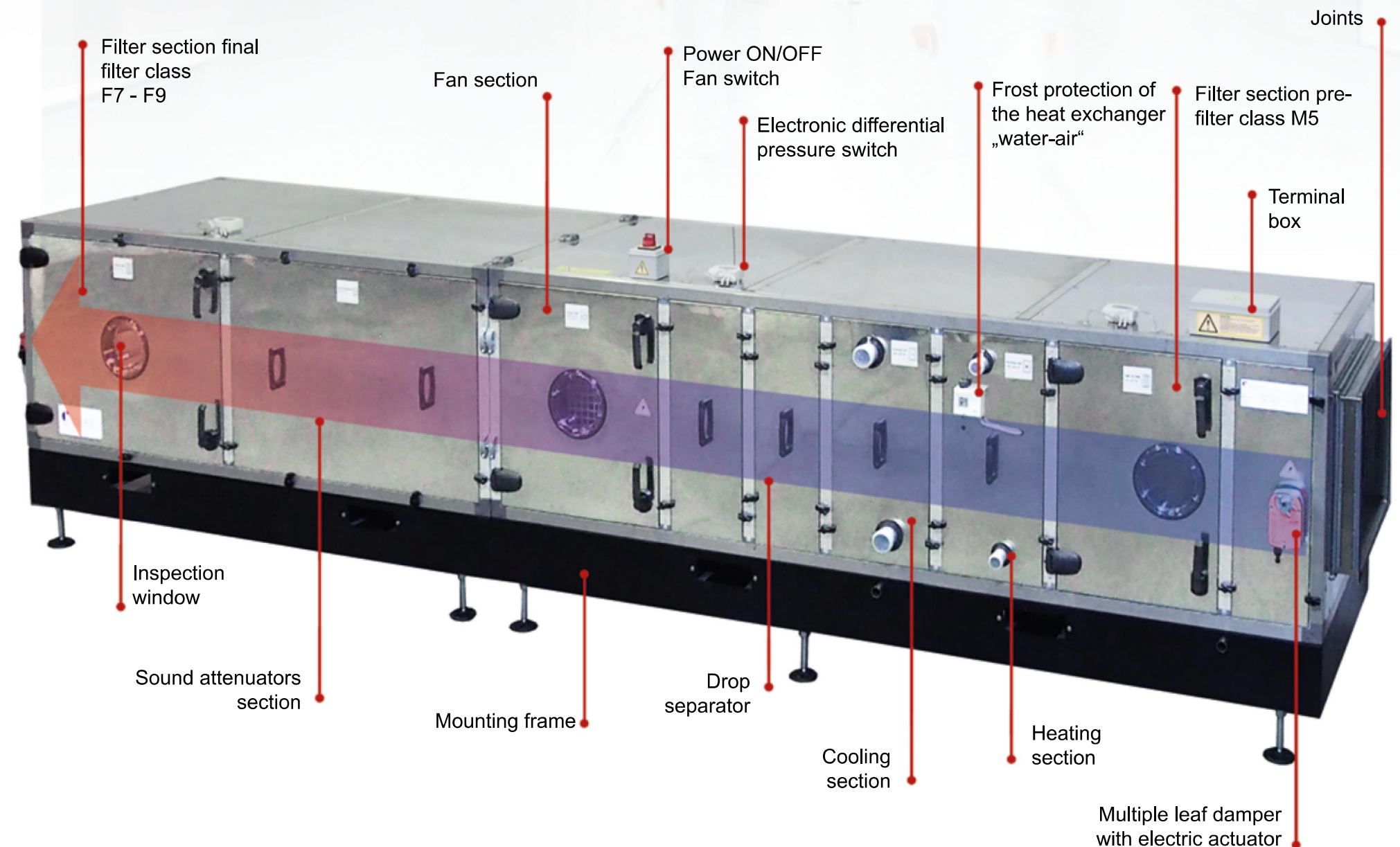
TANGRA air handling units are manufactured in modules allowing easy assembly, installation and commissioning. The product range offers six dimension types from 2 000 up to 16 000 m³/h at pressure levels up to 1 700 Pa.

### Technical characteristics in accordance with DIN EN 1886:

- Casing Deflection - Class D1
- Thermal Transmittance - Class T2/T3 (M)
- Thermal bridging - TB1 (M)
- Casing Leakage - Class L3 (M)
- Filter Leakage - Class F8 (M)

### Hygiene requirements in accordance with VDI 6022, VDI 3803:

- All internal surfaces are perfectly flat
- Bottom panels are with drainage made of stainless steel AISI 304
- All of the sections are provided with doors or removable panels for easy cleaning.
- All the components can be easily disassembled
- Interior lighting is provided



## CONSTRUCTION

The basic construction of the unit consists of special aluminum profiles and aluminum jointing corners. The panels are of the "sandwich" type, consisting of an outer and inner cover with an integrated inner thermal and sound insulation. The covers can be made of galvanized sheet metals with powder coating or of stainless steel.

The thickness of the panels is 40 and 60 mm. The hygiene air handling units TANGRA AHU-HYG units meet DIN EN 1886 requirements for class T3 and T2 thermal transmittance.



## HEAT EXCHANGER SECTION

➤ **Heat exchanger system with intermediate heat transfer** In this application, two heat exchangers «water-air» are placed within the fresh and exhaust air section. The heat exchangers are connected via a pipe system where a pump helps transport/circulate water / propylene glycol constantly.

This type of heat exchanger is used when both streams have to be completely isolated from each other or due to special installation requirements. Heat exchangers are made of copper pipes and aluminum lamellas.

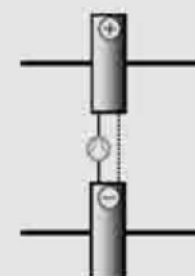


➤ **Plate heat exchanger** A compact unit which enables the heating/cooling of fresh air by using energy generated by the exhaust air. Both air flows are fully separate.

The plate heat exchangers used in hygiene air handling units TANGRA are made of aluminum lamellas and panels of stainless steel. A bypass switch is also available for defrosting purposes during the winter, while giving the option of «free cooling» during the spring or fall/autumn. .



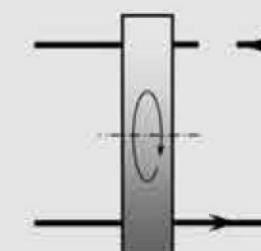
➤ **Rotary regenerative heat exchanger** The wheel of this unit rotates, thereby ensuring heat exchange between the outgoing hot air and incoming cold fresh air. A partial return of moisture from the discharged air is possible.



E = 35 + 50 %



E = 50 + 65 %



E = 65 + 80 %

## MULTIPLE LEAF DAMPER

The relief dampers can be operated manually or automatically through the use of an actuator directly connected to the temperature sensor. This way the water section is safe from potential freezing.



## FILTER SECTION

The filters within air handling units TANGRA may be cassette or pocket ones, of filtration class G4 and F9. The filters are mounted by conducting guides and a locking mechanism, which allows for their easy removal if necessary.





# Components

## COOLING SECTION

Water cooling section - heat exchanger "water-air" made by copper tubes with aluminum lamellas (spacing between lamellas 2,3 mm). A condensation tray of stainless steel is built in below it. The section can be of four, six or eight rows.



## HEATING SECTION

Water heat exchanger built of copper tubes with aluminum lamellas (minimum spacing between lamellas 2.2 mm). The section can be made of two or four rows and is equipped with a temperature sensor for frost protection. The use of an electric heating section is also available.

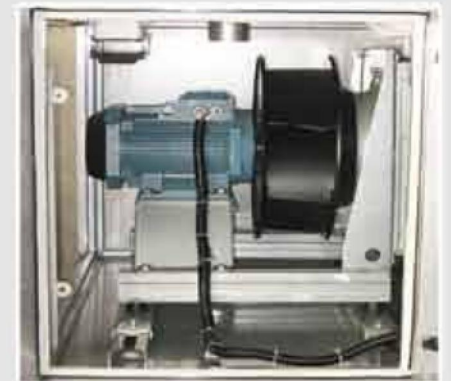


## FAN SECTION

All fans are statically and dynamically balanced.  
Power supply: 400V / 50Hz.  
Two types of fans are used:

- Centrifugal plug fan:
  - High performance
  - Smooth flow and pressure regulation through the inverter control;
  - Good acoustic/noise performance
- Centrifugal fan with double inlet/suction and backward curved impellers.
  - High performance;
  - Mounted on the vibration-absorbing frame.
  - Attached to the structure with a joint.

**Note:** A safety grille can be found in the fan section.



## DROP SEPARATOR

Designed to capture and bring out condensation drops from the cooling section. Made of stainless profiles and mounted over the condensation tray of the cooling section.



## SOUND ATTENUATORS SECTION

Parallel to the air flow, sound-attenuating baffles are incorporated. They are made of plates of compressed mineral wool with fiberglass protection. If necessary, individual baffles can be removed quickly and easily through an appropriately verified lid.



## Additional elements:

- **Hood for outdoor installation** - additional cover for rainwater drainage.
- **Mounting frame** - made of aluminum angles and profiles of galvanized steel with a height of 100 mm. Mounting frames are mounted under each unit section of the air handling unit. In double deck air handling units a mounting frame for the top unit is not provided. For easy transportation and installation, holes for lifting (manual or mechanized via forklift trucks) are provided.
- **Inspection window** - can be mounted on each section. The visual inspection is the first step to maintaining high levels of hygiene in the unit. Where units are installed outdoors a lid to protect the inspection window from direct sunlight is provided.
- **Interior light** - enables visual inspection.
- **Adjustable mounting legs** - enable the unit to be adjusted or lifted above ground for easy cleaning underneath.





# Control

Air-conditioning and ventilation installations are rarely used to maximum capacity. Based on momentary needs, the variation in the amount of air treated can lead to the optimization of energy used. This can be achieved through the use of frequency inverters and programmable controllers.



## Frequency Inverter

The frequency inverter enables the rotation speed of three-phase electric motors to be regulated smoothly, which gives the opportunity to reduce operating costs by 25%. Protection class IP20 or IP66, with power variance between 0.37 and 11 kW. Option to connect the inverters to the central control units of the building. Easy installation and use.

## Freely Programmable Controller

The freely programmable controller gives you the opportunity to adjust and control various air parameters, such as keeping steady temperature and pressure levels at the exhaust of the unit, humidity levels etc. .

The controllers can be operated remotely through the following options:

- LCD Display,
- Touch screen Display,
- Internet - remote access from any PC, allowing real time monitoring and control,
- BMS – Building Management System connection.

This type of controllers allows the modeling of real-time timetables. The simple and easy to understand graphics displayed are also very user-friendly. There is also the option to program the controllers for different access levels –personnel, servicing and manufacturer.



Programmable controller



LCD displays

Safety during servicing and cleaning is ensured through the presence of manual overriding switches. Contamination levels of the primary and final filters are monitored by precise differential pressure switches.

## Important standards and recommendations relating to ventilation systems in hospitals:

- **EPBD Energy Performance Building Directive** - European directive which requires all EU countries to enhance their building regulations and to introduce energy certification schemes for buildings in line with the Europe 2020 program.
- **EN 13779 (BDS 13779)** - Ventilation for non-residential buildings. This standard provides guidance especially for designers, building owners and users, on ventilation, air-conditioning and room-conditioning systems in order to achieve a comfortable and healthy indoor environment in all seasons with acceptable installation and running costs.
- **EN 13053 (BDS 13053)** - Assessing the ventilation air handling units, Rating and performance of components and sections. This European Standard specifies requirements and testing for ratings and performance of air handling units as a whole. It also specifies requirements, classification, and testing of specific components and sections of air handling units.
- **DIN EN 1886** - Mechanical performance and measurements of ventilation and air conditioning air handling units. This standard specifies the mechanical performance of an air handling unit as a whole, to be utilised by all involved in ventilation and air conditioning manufacturing, design, installation and maintenance.
- **EN 15251** - Ventilation and microclimate parameters for design and evaluating the energy efficiency of buildings. This European Standard specifies the indoor environmental parameters which have an impact on the energy performance of buildings.
- **DIN EN 1946-4** – This standard looks at the ventilation of buildings and rooms for hospital treatment and health care.
- **VDI 6022** - Hygienic requirements for ventilation and air conditioning systems and air handling units.
- **VDI 3803** - Air conditioning systems - construction and technical requirements.



## Standard VDI 6022, part 1 and 3

The standard specifies hygiene requirements for air conditioning and ventilation air handling units regarding:

- Planning
- Design
- Function
- Service
- Maintenance

### General requirements:

- All materials have to comply with hygiene requirements and be able to prevent the formation of microorganisms.
- "Sandwich" panel construction.
- Low condensation.

- Flat internal surfaces.
- Easy cleaning.
- The floor panel must be made of stainless steel.
- All sections and elements should be easily accessible and equipped with light and inspection windows (if necessary).
- Continuous drainage capability.
- Fans should be able to be cleaned.
- Materials used for congestion should not absorb moisture, excrete odor and create conditions for the formation of microorganisms.
- Controls that regulate production, transport and storage of each air handling unit, according to hygiene requirements.