

# CLEAN + EFFICIENT

» SPECIALISED SOLUTIONS FOR THE HIGH DEMANDS  
OF PHARMACEUTICAL APPLICATIONS



**With experience from over 500 installations in pharmaceutical facilities worldwide, FläktGroup is the ideal partner for new builds, extensions or refurbishments.** Our extensive GMP\* compliant product portfolio provides solutions to the stringent demands of the pharmaceutical industry, whether it is clean room environments, laboratories, manufacturing facilities, offices or warehouses. Our systems meet several demands whilst achieving the highest standards of energy recovery and efficiency to ensure the lowest life cycle costs for the entire building.

*\*GMP: Good  
Manufacturing  
Practice*



*HVAC Solutions*

*Service & Controls*

*Decentral Air  
Conditioning*



*Hygienic building components*

*Environmental control*

*Air filtration*

*Customisation*

*Life safety*

# EXCELLENT, PROOFED PHARMA SOLUTIONS

*Energy efficiency*

*GMP compliant*

*ISO conforming*

*Hazard control*

**FläktGroup is not only an highly experienced systems integrator.**

We also produce most of the components and products ourselves. That puts us in the unique position where our systematic demands can be closely met by component features. The development, integration and service is always done with the functionality and needs of the entire system in mind.

WE ARE YOUR  
**ONE-STOP**  
**SOLUTION PROVIDER**  
**WITH A PASSION FOR**  
**ATTENTION TO DETAIL**  
FOR ALL YOUR  
CLEAN AND CRITICAL  
ENVIRONMENTS



**For any process, whether human, mechanical or chemical, the condition of the surrounding air is vital.**

Not only does the air have to be clean, but it also has to be the correct temperature, correct humidity, be odourless, and contain the correct amount of fresh air. It has to be introduced into the space so that there is very little noise and very little draught. For clean rooms surfaces need to be accurately controlled to maintain velocities, patterns or pressure cascades.

FläktGroup not only has the most comprehensive product portfolio in the market – we develop and manufacture our own systems to take all of the above factors into consideration.



# WE BUILD TO ENSURE **PERFECT AIR CONDITIONS** IN EVERY WAY



**Air Handling Units**



**Ultrasound VAV**



**Chillers**



**Systems for documentation and control**



# YOUR **BENEFITS**

## **LESS COORDINATION AND INTERFACES**

- We are your system provider and one stop supplier
- We have a deep in-house value chain available
- We provide global reach combined with local knowledge
- We use high quality components, such as heat recovery elements, designed and manufactured by FläktGroup

## **HIGH QUALITY YOU CAN RELY ON**

- We deliver products from our own high-end manufacturing inside of Europe
- We have many years of experience

## **YOUR ONE-STOP CLEAN ROOM SPECIALIST**

- We are your single source for the complete clean room build (shell and space itself)
- We bring air from the outside into the clean room exactly at your requirements with all the necessary air treatment processes

## **WHAT YOU NEED IS WHAT YOU GET**

- We adapt the products to your requirements

## **LOW LIFE CYCLE COSTS**

- We use the most efficient HVAC solutions



# WE FOCUS ON YOUR NEEDS

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*"Safety and hygiene are my top priority. Simple cleaning reduces the risk of possible contamination."*

*Hygiene controller*

*"I need an efficient planning process with reliable data & technical support."*

*Building planner*



*"A reliable system and low service costs are important for my work."*

*Operator/building manager*

*"For me, the investment must pay off. Low operating and service costs are crucial."*

*Investor/contractor*

*"A smooth project and a simple and efficient installation are crucial for my success."*

*Plant engineer/plumber*

*"I need a comfortable and hygienic working environment in which I can feel at home and at the same time be safe and efficient."*

*Scientist*

# First class products and components

## CLEAN ROOM COMPONENTS



### LAMINAR AIRFLOW CEILING

- Complete filtration of operating area with a function to mix supply air (from AHU) and recirculating air
- Easy installation, maintenance and disinfection
- Low initial pressure drop of HEPA filters
- Tailored dimensions with LED lighting and control unit



### CEILING AIR OUTLET

- For turbulent displacement flow
- Suitable for all types of suspended ceilings produced for clean rooms
- Vertical or horizontal inlet with a possible filter integration
- Round or rectangular duct connection
- Airtight closing flap ensures that HEPA filter can be exchanged without contamination of the clean room



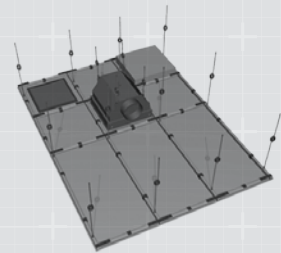
### ACTIVE PERSONNEL AIRLOCK

- Decontamination is performed by clearing off dust and dirt particles from bodies of cleanroom personnel
- Maximum efficiency through a high-velocity turbulent jet of clean air of 25 m/s
- Cleaning cycle with pressure control, door blocking and user control settings
- Filtration using a pre-filter and HEPA filter



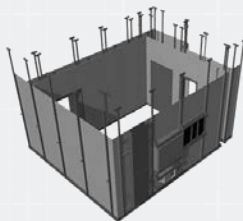
### FAN FILTER UNIT

- Sizes: 600x1200 mm & 1200x1200 mm
- Cooling coil and prefilter optional
- Constant airflow optional
- Fluid gel gasket on filters
- Validation probes



### CEILING

- Laminar-flow units, air outlets, fan-filter units and lighting can be integrated
- No release of particles
- Ease of installation, cleaning and sanitation
- Resistance to conventional disinfectants
- Joints between panels are sealed using permanently elastic sealant
- Accessible ceiling possible



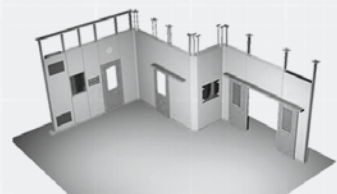
### SANDWICH PANELS

- Painted or stainless steel sheet facing, custom design colours, various cores with no release of particles
- Matching flush glazed glass panels for nonopening windows and each panel type with rounded connections to floor and ceiling



### DOORS AND WINDOWS

- Air tightness guarantees pressure stability
- Flush with wall partitions and facings
- Control system with signalling and interlocks
- Doors on hinges and sliding doors, including automatic function
- Single and double leaf models, pass-through boxes and optional X-ray protection



### FACINGS

- Inwall Click facings for clean rooms focus on minimizing the number of joints
- Panels maintain the rigidity and acoustic qualities within a clean room
- Easy and quick fixation to structural walls or construction by means of click profiles

# HVAC SYSTEMS

## AIR HANDLING UNITS

- Modular system with high flexibility of the component arrangement (one above the other, side by side, one behind the other, standing)
- Air volumes of 500–100.000m³/h
- Certifications (Eurovent & RLT equipment, hygiene VDI6022, DIN EN1946 part 4, ...)
- Aluminum frame construction AlMgSi 0.5 with/without thermal break
- Casing Characteristic EN1886 (M: T2/TB2; L1; D2; F9); Performance characteristics according to EN13053, based on DIN EN 13779



## CHILLERS

- Free-Cooling chillers with maximum efficiency for process applications with continuous cooling loads
- Cooling capacities from 35 kW to 1,3 MW



## EXHAUST FANS

- Aerodynamic efficiencies up to 77%
- High Efficiency impeller design
- Adjustable pitch impeller delivers precise performance
- Short or Long cased options provide installation flexibility



## FIRE & SMOKE SAFETY DAMPERS

- Fulfil requirements for various fire and leakage classes
- Built-in actuator or fuse link mechanism
- Easy installation
- Fire Safety Control System (ISyteq FICO) available for monitoring and testing



## OPTIVENT® ULTRA, VAV

- Low noise level
- No safety distance to bends and T-pieces
- High accuracy in the whole airflow range and excellent resilience to dust
- No pressure drop and a broad manageable airflow range



# First class products and components

## DECENTRAL AIR CONDITIONING



### FAN COILS

- Highest comfort standards due to optimal room temperature control system
- Easy to clean and disinfect
- Cooling capacity 1,1–5,6 kW  
Heating capacity 1,1–10,8 kW
- Air volume 210–850 m³/h
- Sound power 24–60 db(A)



### HYGIENE CHILLED BEAMS

- Modern, flexible design
- Easy to clean without tools: coated coil for smooth surface
- Energy efficient
- Limited maintenance without moving parts and without condensate tray
- Easy installation



### AIR TERMINAL DEVICES

- Round or rectangular ceiling mounted nozzle diffusers
- Adjustable nozzles for setting different diffusion patterns
- Low noise level
- Suitable for both suspended and false ceiling built on site



### AIR CURTAINS

- Industrial and commercial versions
- Easy installation and carefree maintenance
- Electric, hot water or ambient heating
- Energy efficient
- Low noise



### UNIT HEATERS

- Affects a reduction in the air stratification
- Application-specific material properties
- Flexible selectable components
- ErP 2016 conform (Ecodesign Directive)
- Hygienic characteristics with the VS variant



### PRECISION AIR CONDITIONING

- Wide variety of versions, sizes and options
- Scalable output
- Energy efficiency design
- Redundancy and networking features inbuilt reducing operational risks



Standard/guideline		Class						
ISO 14644-1			8	7	6	5	4	3
GMP at rest			D	C		A+B		
GMP in operation		D	C	B		A		
Max amount of particles per m <sup>3</sup> (ISO 14644-1)	0,1 µ	Not defined			1.000.000	100.000	10.000	1.000
	0,2 µ	Not defined			237.000	23.700	3.370	237
	0,3 µ	Not defined			102.000	10.200	1.020	102
	0,5 µ	Not defined	3.520.000	352.000	35.200	3.520	352	35
	1 µ	Not defined	832.000	83.200	8.320	832	83	8
	5 µ	Not defined	29.300	2.930	293	29 (20 for GMP Class A)		
Recommended limits for microbial contamination (GMP in operation)	Air sample (CFU/m <sup>3</sup> )	200	100	10		< 1		
	Settle plates (Ø90 mm) (CFU/4 hours)	100	50	5		< 1		
	Contact plates (Ø55 mm) (CFU/plate)	50	25	5		< 1		
	Glove print 5 fingers (CFU/glove)	–	–	5		< 1		
Recommended shape of airflow		Turbulent displacement flow	Turbulent displacement flow	Turbulent displacement flow	Almost laminar airflow	Laminar airflow	Laminar airflow	Laminar airflow
Recommended airchanges/h			10–20	30–70	70–160	330–530	530–600	530–600
Recommended terminal filter class		E11/H13	H13	H13	H14	H14	U15	U16

#### General requirements on surfaces:

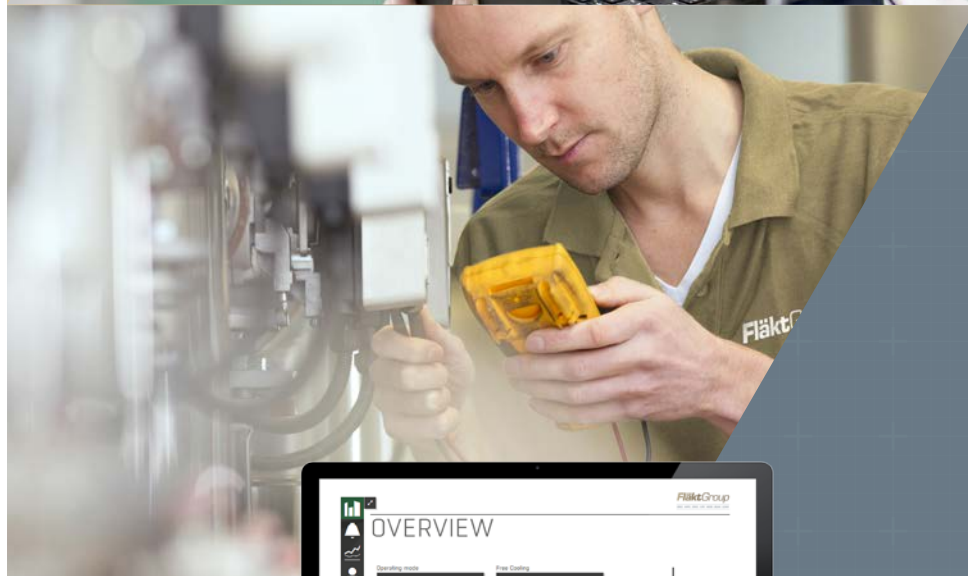
- Smooth, without cracks, no particles, easy to clean and disinfect, resistant to detergents and disinfectants and to the substances used during operation; as far as possible flush transitions between elements (also applies to windows and frames); no hidden or inaccessible voids.

#### That means:

- No edges, protrusions and niches in and on which dust can settle; avoid horizontal areas as far as possible; Floor/wall transition through the throat; other transitions have silicone or acrylic for cleanrooms ; Floor drains basically lockable; Avoiding wood as far as possible (germ growth); sufficient inspection openings; Consider hygienic design (poorly cleaned are, for example, Allen screws); Heating only via air conditioning; Sockets and computer connections airtight and with dust covers, etc.
- Product contacting surfaces are mainly made of stainless steel with max. roughness ≤ 0.8 µm.
- Between rooms of different GMP classes, a pressure difference of 15 pa must be ensured by the air conditioning system in order to avoid air flow from the impure to the purer area when the doors are open. The pressure level is controlled so that the supply air is kept constant and the exhaust air is controlled via volume flow controller so that the corresponding pressure difference is maintained.

# Service and support, close to you

## SERVICE AND CONTROLS



### DESIGN

- Tailor-made design

### INSTALLATION

- Safe, efficient installation
- Commissioning of the plant
- Training for operators
- Expert support from day one

### VALIDATION

- Validation according to international standards
- Proof of quality

### CONTROL AND BMS

- Alarm notification
- Parameter definition
- Individual procedure selection
- Active monitoring
- Performance check



# A local partner with global reach

All our research, development and testing activities, at our eight Centres of Excellence, are singularly focused to provide our customers with the best possible solution to their ventilation and indoor climate challenges. From new and innovative concepts, material choices and manufacturing processes to minimised running cost, easy commissioning and low maintenance we always strive to deliver the best for your application.



3600 talented employees



170 dedicated R&D Experts



65 countries worldwide



14 manufacturing sites

## EXCELLENCE IN SOLUTIONS

WWW.FLAKTGROUP.COM

PHARMA SOLUTIONS

FläktGroup is the European market leader for smart and energy efficient Indoor Air and Critical Air solutions to support every application area. We offer our customers innovative technologies, high quality and outstanding performance supported by more than a century of accumulated industry experience. The widest product range in the market, and strong market presence in 65 countries worldwide, guarantee that we are always by your side, ready to deliver Excellence in Solutions.

### PRODUCT FUNCTIONS BY FLÄKTGROUP

Air Treatment | Air Movement | Air Diffusion  
Air Distribution | Air Filtration | Air Management & ATD's  
Air Conditioning & Heating | Controls | Service

» Learn more on [www.flaktgroup.com](http://www.flaktgroup.com)  
or contact one of our offices

