





iQ Star by Fläkt Woods

Multi-service Chilled Beam Guide



The right cooling at the right time. Purposeful and energy efficient.

The modern office is dynamic. With laptops and mobiles we can work where we want and carry out our tasks wherever it's convenient. Success in business today also calls for flexibility to meet new demands, where rearrangements of people, walls and furniture should be realized with a minimum of effort.



Astra and Stella are the new chilled beams from Fläkt Woods with the high quality required to easily adapt to new conditions. They are designed for the modern offices, with equal focus on the importance of a productive working climate and the need to care for the environment.

Attractive designs, smart functions, flexible construction and energy saving features make these chilled beams true iQ Stars.

Stella

and and a

Astra

A comfortable indoor climate is not only expected in a modern working environment – it will also increase productivity and profitability. Fläkt Woods has complete solutions for any type of building.





iQ Star Stella

Functions and accessories for all your needs

Serial connection

For an easy installation that doesn't require any ductwork between the beams, it is possible to connect Stella in series.

Create your design Not only is Stella available with any equipment you need, you also have the opportunity to customize its design.

Energy control The new flexible nozzle arrangement guarantees high indoor air quality and energy efficiency. A quiet solution even when high air flow is needed.

Flexibility

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Flexibility is increased by the numerous accessories available for iQ Star.

Flow Pattern Control The unique Flow Pattern Control (FPC) can direct the airflow up to 45 degrees through integrated vanes. Different directions can be set at sections of 300 mm in the beam.

> **Lighting** Stella is available with direct or indirect lighting.

Speakers Can be ordered as an accessory.

Sprinklers Can be ordered as an accessory.

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THE LOCAL DRAFT, MICH.



Chilled Beam iQ Star Stella

The iQ Star STELLA is a multiservice chilled beam system for ventilation, cooling and heating, fulfilling most needs for indoor climate. The chilled beam is designed to deliver exceptional cooling performance, while effective mixing with the air in the room gives a good level of comfort and low air speeds in the occupied zone. Stella is intended for ceiling mounting and can be equipped with a number of functions to provide a complete, multifunctional chilled beam.

The following functions are available for Stella: direct and indirect lighting, control equipment, Energy Control, Flow Pattern Control (FPC), high air flow and heating functions. It also provides space for sprinkler piping, wiring, loudspeakers, presence detectors, etc. and up to three units can be connected in series. These various functions are described in separate parts in the catalogue.

Product Facts

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- Freehanging Chilled Beam iQ Star STELLA
- Very flexible multiservice Chilled Beam
- Equipped with Energy Control

Available Functions

- Sprinkler
- Speaker
- FPC
- High air flow
- Controls
- Lighting
- Energy Control
- Heating

50% energy saving with iQ Star

		Basic beam CAV/ Traditional ductwork/ utilasation rate = 50%		iQ Star beam VAV Oversized ductwork/ utilasation rate = 50%	
Load	Cost sharing	MWh	€	MWh	€
Domestic hot water	Facility	25,8	1 097	25,8	1 097
Heating, spaces	Facility	171,5	7 289	148,9	6 330
Heating, AC system	Facility	48,3	2 052	33,8	1 437
HVAC, cooling electricity	Facility	32,9	2 800	35,6	3 027
HVAC, fans	Facility	69,7	5 927	28,9	2 457
HVAC, other electricity	Facility	2,6	223	2,6	223
Equipment electricity	Facility	18,2	1 549	18,2	1 549
Lighting electricity	Facility	9,1	777	9,1	777
Equipment electricity	User	58,4	4 967	58,4	4 967
Lighting electricity	User	85,8	7 294	85,8	7 294
Electricity total		277	23 537	239	20 294
Heating		246	10 438	209	8 863
Total		523	33 975	447	29 157

Building energy consumption, building located in Stockholm, Sweden

Basic information

Geometry model area: 4392,5 m² Geometry model volume: 14 313,7998 m³ Heating energy: 42,5 EUR/MWh (VAT not incl.)

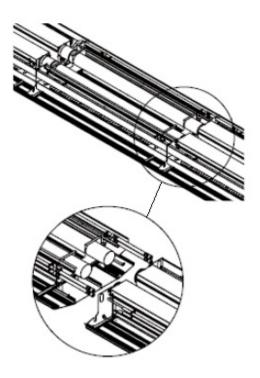
Electric energy: 85 EUR/MWh (VAT not incl.)

Serial connection of Stella

As a standard solution the Chilled Beams can be connected with a Ø125 mm circular duct, that is included in delivery. The copper tubes are Ø22 mm and connected with flexible hoses between the sections. The chilled beams are connected in parallel on the water side. All flexible hoses are of the type push on, which means shorter time of installation. It is possible to install up to three chilled beams in series. When installing Chilled Beams in series the side panels must be removed and the Chilled Beams placed in line on a flat surface.

Dummy section

For installations where an inactive part is necessary, a dummy section can be ordered as an accessory. The dummy section can be placed either as the first, middle or last section in the series. It is possible to order the dummy prepared for serial connection of the air and it will then have a mounted circular duct. The water side can also be prepared with Ø22 mm Cu-pipes with flexible hoses for docking onto the next chilled beam or dummy section in the series.



Flexible solutions for your changing needs

The modern office is dynamic. Fast decisions in organisational changes call for a modern ventilation system that is easy to adjust to the rearrangement of people, walls and furniture and to meet the just in time need. Flexibility is an important factor for optimized indoor air quality.

Open plan office - 50% occupancy

Airflow	1,0 dm³/s, m²
Cooling	23°C/25°C
Heating	21°C/21°C
Heat loads	Mo–Fr 08–16
– people	0,55 people/m ²
- lighting	12,5 W/m ²
- equipment	8,0 W/m ²

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Office energy saving mode - 0% occupancy

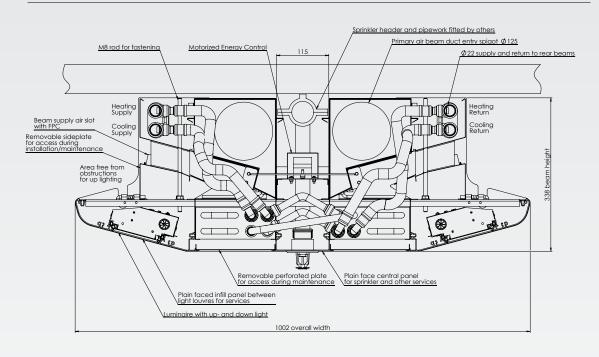
Airflow Cooling	0,6 dm³/s, m² 24°C/26°C
0	20°C/20°C
Heating	20 6/20 6
Heat loads	
– people	O people/m ²
– lighting	OW/m ²
– equipment	O W/m²

Open plan office - 100% occupancy

Airflow	2,0 dm ³ /s, m ²
Cooling	23°C/25°C
Heating	21°C/21°C
Heat loads	Mo–Fr 08–16
– people	O,11 people/m ²
– lighting	12,5 W/m ²
– equipment	16,0 W/m²

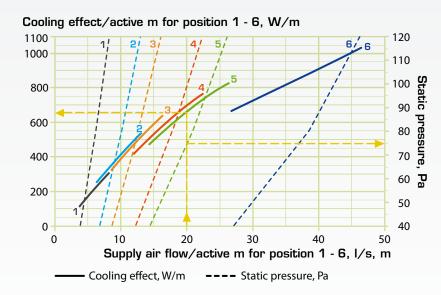
Office - 100% occupancy





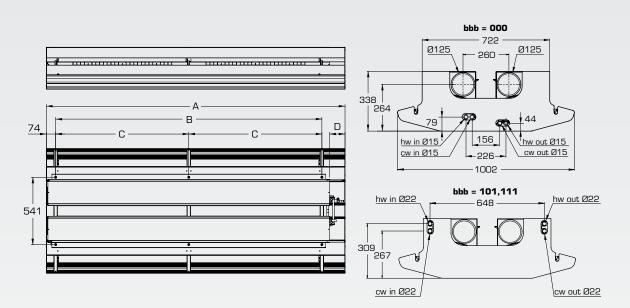
iQ Star Stella chilled beam - cross-section

Quick selection iQ Star Stella chilled beam



The diagram shows the approximate cooling effect P_{tot} in W with water flow qw = 0.1 l/s, temperature difference between room air and supply air $\Delta t = 8^{\circ}$ C, pressure drop 70 Pa on the air side and max. sound pressure level $L_{A10} = 30$ dB(A).

iQ Star Stella chilled beam



Dimensions

Size	А	в	с	D
180	1798	1546	-	116
240	2398	2138	1069	124
300	2998	2730	1365	132

Weight

Weight per meter of chilled beam	kg/m
Beam dry weight	42.0
Beam water filled, cooling	43.4
Beam water filled, cooling and heating	43.8



iQ Star Astra

Functions and accessories for all your needs

Very flexible

Astra is available in a wide range of executions – from basic to multifunctional

> **Sprinklers** Can be ordered as an accessory

Flow Pattern Control

The unique Flow Pattern Control (FPC) can direct the airflow up to 45 degrees through integrated vanes. Different directions can be set at sections of 300 mm in the beam.

Boost Combining Astra with a separate Boost function increases the versatility and makes Demand Controlled Ventilation possible.

Lighting Astra is available with direct lighting.

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Flexibility Flexibility is increased by the numerous accessories available for iQ Star.

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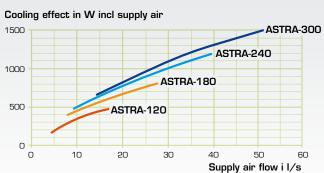
<u>Astra</u>

Chilled Beam iQ Star Astra

The chilled beam iQ Star ASTRA is an integrated system for ventilation, cooling and heating, fulfilling most needs for indoor climate. The chilled beam iQ Star ASTRA is very flexible and available as a basic model, but can also be equipped with a number of functions to provide a multifunctional chilled beam. The following functions are available for iQ Star ASTRA: Boost, heating, Comfort Control, Flow Pattern Control (FPC), high air flow, control equipment, lighting and provision for a sprinkler system. These various functions are described in separate parts in the catalogue.

iQ Star ASTRA has a covered upper side and is intended for flushmounting in false ceilings and has dimensions adapted to a false ceiling module of 600 mm.

Quick selection iQ Star Astra chilled beam



The diagram shows the approximate cooling effect P_{tot} in W with water flow qw = 0.1 l/s, temperature difference between room air and supply air $\Delta t = 8^{\circ}$ C, pressure drop 70 Pa on the air side and max. sound pressure level L_{a10} = 30 dB(A).

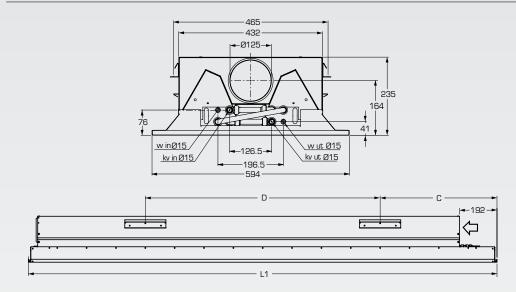
Product Facts

- iQ Star ASTRA chilled beam for flushmounting in false ceilings
- Very flexible available in a wide range of executions from basic to multifunctional
- Adapted for standard 600 mm false ceiling module
- Fastening brackets for rapid and simple installation lift up snap in place

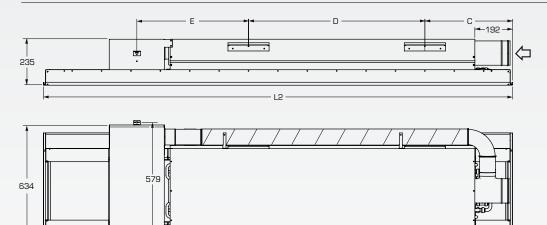
Available Functions

- FPC
- High air flow
- Controls
- Lighting
- Comfort control
- Heating
- Sprinkler
- Boost

iQ Star Astra chilled beam



iQ Star Astra chilled beam with Boost function IQAZ-22



Dimensions

Size	L1	L2	с	D	Е
IQIE-120-1-c-dd-ee	1194	1794	297	600	420
IQIE-180-1-c-dd-ee	1794	2394	447	900	570
IQIE-240-1-c-dd-ee	2394	2994	597	1200	720
IQIE-300-1-c-dd-ee	2994	3594	747	1500	870
IQIE-120-2-c-dd-ee	1794		897	600	
IQIE-180-2-c-dd-ee	2394		1047	900	
IQIE-240-2-c-dd-ee	2994		1197	1200	
IQIE-300-2-c-dd-ee	3594		1347	1500	

Weight

Weight per meter of chilled beam	kg/m
Beam dry weight	22.3
Beam water filled, cooling	23.2
Beam water filled, cooling and heating	23.7

User-friendly controller for optimal performance

ENERGY SRVING NODE

FlaktWoods

STRA-14 Room Controller

The STRA-14 room controller is specifically developed for Astra and Stella. It is pre-programmed for chilled beam applications and contains a wide range of control functions for flexibility, comfort and energy efficiency. The user-friendly room controller enables fast and easy access for change of set-points and control parameters. For optional integration with building management systems, STRA-14 has Modbus communication as standard. C

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MODE

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NORMAL

MODE

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Stella | Energy Saving Mode – Normal mode – Boost mode Astra | Stand-by mode – Normal mode



Occupancy sensor

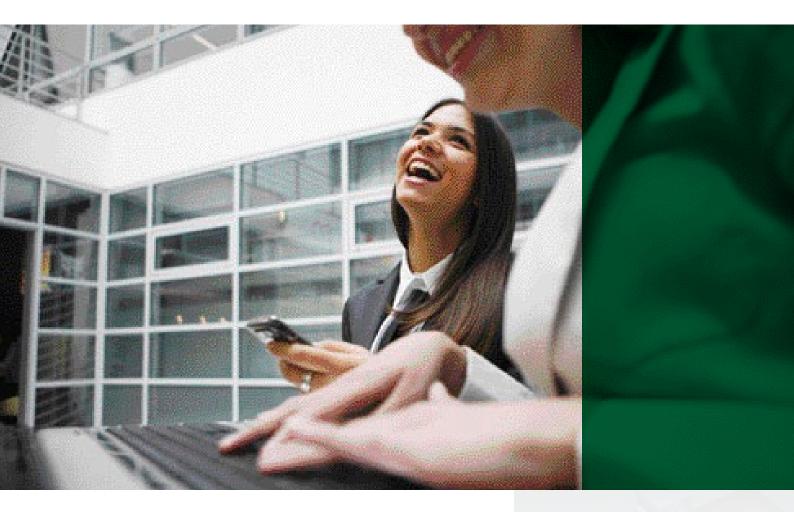
For rooms with variations in occupancy, the optional occupancy sensor enables a control strategy where the controller when the room is unoccupied is in Stand-by (Astra: increased neutral zone for heating and cooling) or Energy Saving Mode (Stella: reduced air flow and increased neutral zone for heating and cooling. When the occupancy sensor is activated by presence in the room, the controller shifts to Normal mode and controls heating and cooling for comfort. When required, a short press on the operator button on STRA will shift the controller to Boost mode increasing the air flow to the room.

StellaEnergy Saving Mode – Normal mode- Boost Mode (by pressing the operator button)AstraStand-by mode – Normal mode- Boost Mode (by pressing the operator button)

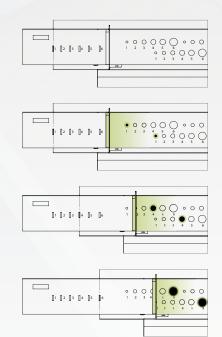
CO, sensor

Experience has shown that the level of CO_2 in a room is a reliable indicator of the indoor air quality. A high level of CO_2 in a room indicates that the ventilation rate is insufficient to obtain an adequate indoor quality. This is a common situation in rooms with large variations or peaks in load. Therefore STRA-14 can be equipped with an optional CO_2 -sensor and thereby offer a control function where the controller shifts to Boost mode (ASTRA and STELLA) if the level of CO_2 exceeds the set point value.

Stella | Energy Saving Mode (requires an occupancy sensor) – Normal mode – Boost mode **Astra** | Stand-by mode (requires an occupancy sensor) – Normal mode – Boost mode



The patented Energy Control function allows the air flow to be adjusted easily to provide a comfortable indoor climate. The new function also permits a choice of air flow patterns (two-way, one-way and intermediate setting). For even greater flexibility there is also a Motorized Energy Control (MEC) option. This option provides demand controlled ventilation, and in normal operation the beam is set to the chosen nozzle configuration. At times of heavy demand (increased supply air demand) the chilled beam is switched to Boost mode by a temperature sensor or CO_2 sensor. If a presence detector or pushbutton is installed in the room the beam can also be programmed to switch to Energy Saving Mode (ESM) when the premises are empty. This reduces the supply air flow to a minimum.





ENERGY CONTRO

Energy Control

Energy Control, EC, is a patent-pending function that allows the desired air flow to be adjusted easily in steps. This enables the chilled beam to be set for two-way, oneway or intermediate air distribution. The nozzle pattern is designed to permit optimum use of air to maximise the cooling/heating performance at every setting.

EC consists of a nozzle track on each side of the chilled beam (left and right). The control track has six positions, with position 1 being the energy saving, low-flow position, while settings 2–5 are air flow settings for normal use and setting 6 is a boost setting for periods when especially high air flow rates are required. The desired setting is chosen by sliding the rail until the metal edge behind it is centred in the rectangular slot. The examples show the positions for setting 1, setting 4 and setting 6.

Motorized Energy Control, MEC

Adding MEC to Stella gives the chilled beam a unique degree of flexibility. A linear motor (two- or threeposition) installed between the ducts is connected by a link to the nozzle tracks. Fläkt Woods' controller now enables the chilled beam to actively respond to changes in the room, signalled by a pushbutton, temperature sensor, presence

detector or carbon dioxide sensor (NOTE! only with three-position version). If it is only necessary to control one side of the chilled beam, one of the nozzle tracks can be disengaged from the motor.

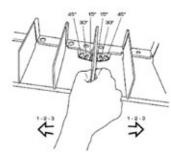




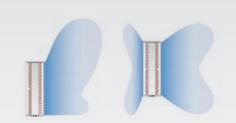
Chilled Beams with FPC (Flow Pattern Control)

Our IQ Chilled Beam range is totally unique with its FPC (Flow Pattern Control) function that provides high flexibility in new buildings or refurbishments. The combination of FPC and comfort control gives the IQ beam its unique characteristics.

The IQ Chilled Beams have the unique Flow Pattern Control (FPC) where the airflow can be directed up to 45 degrees through integrated vanes. When increased air flow is required, the vanes can be adjusted into different directions, in order to increase the comfort.



- Easy-to-adjust air vanes 0° - 15° - 30° - 45°
- Adjustable air vanes in the outlet
- Optimized for minimal noise and pressure drop
- Sections of 30 cm



Highest possible efficiency can be maintained by adjusting the comfort control and air vanes! A combination of different angles on one side is possible.



When increased air flow is required, the flow pattern can be adapted to maintain optimal comfort in the room!

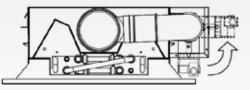
OOST FUNCTIO

Boost Function (for iQ Star Astra)

Combining a chilled beam with a separate Boost function increases the versatility of the product and makes Demand Controlled Ventilation possible. This can be applied to areas where the need for fresh air changes frequently, such as conference rooms, cafeterias or similar premises where greater air flow rates are required. Integrating the Boost function into the chilled beam increases ceiling space and allows a single unit to manage multiple tasks. It also reduces installation costs, since there are fewer products to install. The Boost function is integrated in such a way that the fresh air supply to the Boost unit does not interfere with the performance of the chilled beam.

Boost function is available for the ASTRA chilled beam. Air flow is adjusted automatically depending on demand. The function works in combination with room control STRA-14.

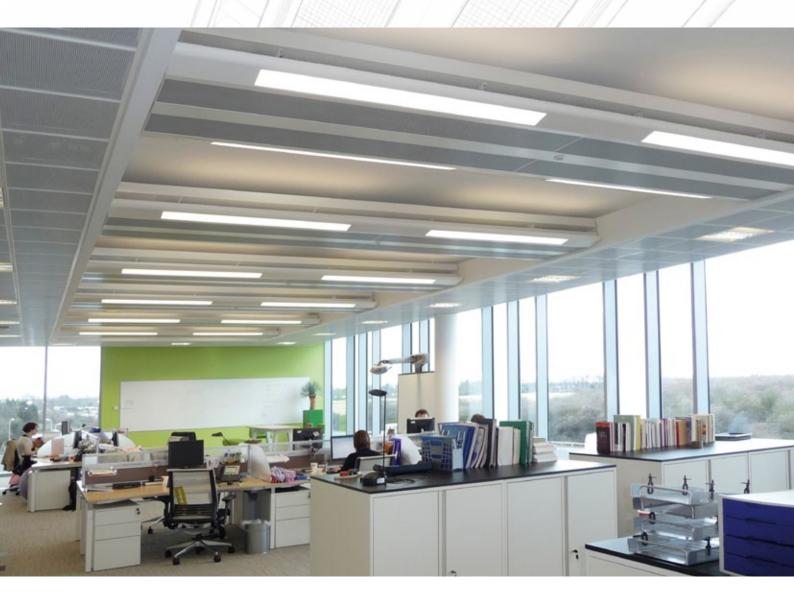
The Boost function is located immediately behind the active part of the chilled beam and is supplied by a separate duct (spiro duct, Ø80) that is supplied complete with T-piece and damper motor. This allows a single connection on the air supply side using spiro duct, Ø125.



The damper motor is located in a bypass duct that runs to the Boost function. When delivered, the damper motor is tilted down in the vertical position. During installation it can be rotated into the desired position and fixed there, see picture above.

Design your own customized Stella

Design is important for the indoor environment. Stella has a modern standard design, but offers the opportunity to create a unique design depending on room use and personal taste. Design and colour – you decide!

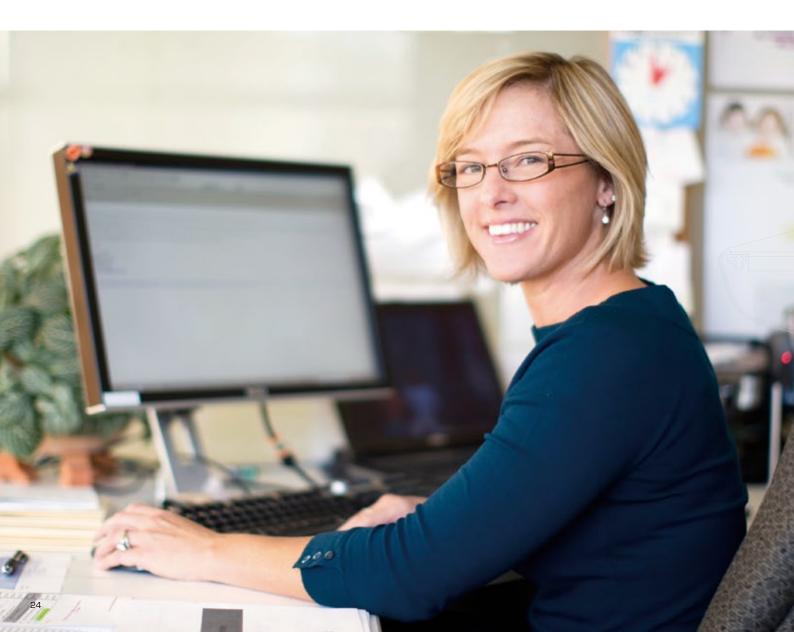






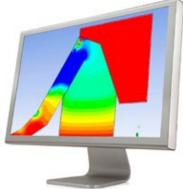
Research & Development

Fläkt Woods has one of Europe's most extensive laboratories for testing ventilation products. This enables us to continually test new and existing products. In the Technical Centre of Jönköping site research and laboratory testing is performed in all the main fields of air handling; - applied aerodynamics, acoustics, heat and mass transfer. Simulation of different climate conditions around the globe is executed for testing of product performance under real conditions. The laboratory halls covers a total area of ca 2000 m².

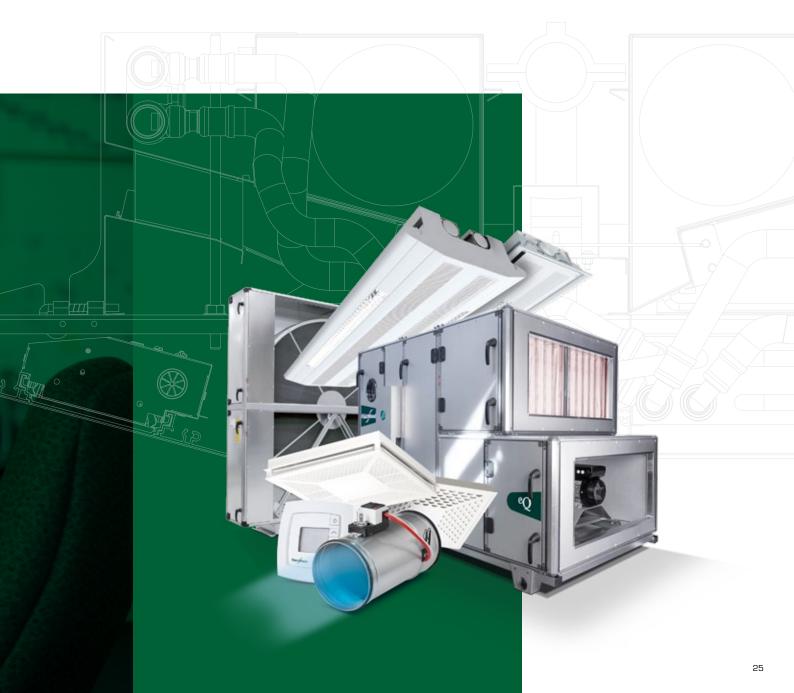


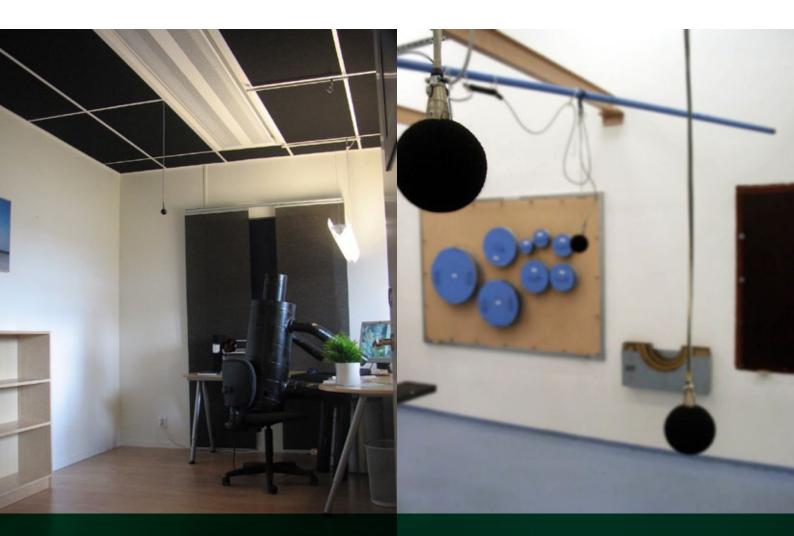
The laboratory facilities comprises test equipment for testing of complete products as well as components used in the air handling system.

Room comfort together with particle and gas concentration is studied in a number of rooms built up with the demands of standards for test purpose. Rooms are designed to simulate real life environments such as offices or conference rooms. Four of these rooms are connected to a complete air handling system including air handling unit duct system terminal units and supply/exhaust devices. The CFD calculation tool (Computer Fluid Dynamics) is used to optimize interior design, coil selection and total beam efficiency in order to maximize performance with a minimum of energy consumption.



Stationary test rigs are available for performing tests according to International, European and important national standards, ISO, EN AMCA, etc.





System laboratory

The system lab is equipped with the latest technology. Here we are able to monitor a complete ventilation system with a BMS system from SCADA. The system lab supplies four rooms with different air distribution types. The rooms can be modified to fit certain fullscale tests.

FACTS

Complete ventilation system controlled by BMS system

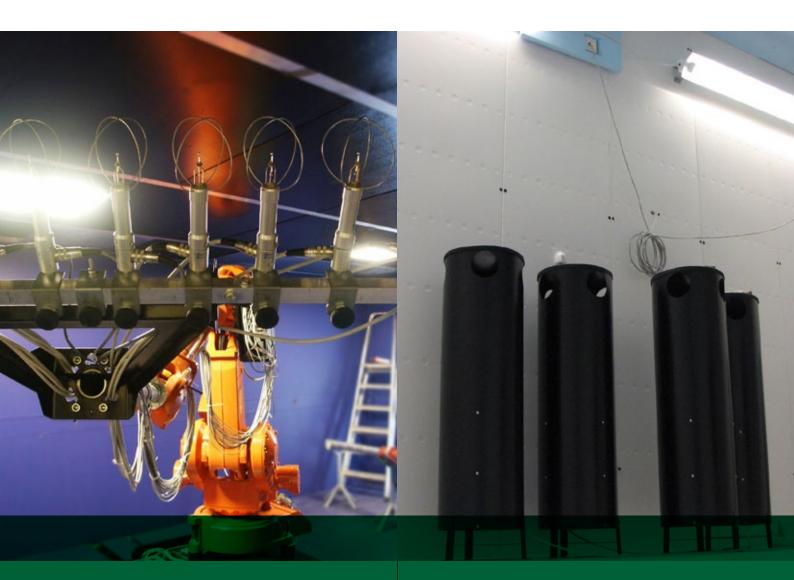
- VAV
- CAV
- Chilled beams
- Diffusers
- Displacement diffusers

Acoustic laboratory

The acoustic laboratory consists of two reverberation chambers. Sound generation can be measured on both passive and active components. From the high precision microphones a frequency spectrum can be determined and the sound power calculated. In addition insertion loss can be determined using an external sound source.

FACTS La

Large room	
 Dimensions 	8,0x5,6x4,7 m
 Room Absorption 	4 dB
• Air flow	0–1200 l/s
Small room	
 Dimensions 	4,6x3,5x3,0 m
 Room Absorption 	4 dB
• Air flow	0–1200 l/s
Test standards	ISO 3741/ISO 7235



Comfort laboratory

The comfort laboratory measures comfort values of our ATD and DCC range, temperature, velocity, turbulence, capacities, throw length and flow pattern. The temperature and velocity is measured in many positions with a robot and then visualized in the computer (3D). All value is monitored in real time. The room has double wall to control the temperature and keep it constant. This size of the room can be modified according customer request and perform full-scale tests (FAT:s). Internal heat loads are generated with "dummies" and/or electric heated floor, windows and façades are simulated by adjusting wall temperature. Visualisation of the flow pattern is done with a smoke test.

FACTS

- Dimensions 6,0x9,0x3,0m
- Air flow 0-1000 l/s
- Water flow 0-0.8 l/s
- Test standards EN 15116, ISO 7726, EN 7730

CB Cube

This test room is built for measuring the capacity of chilled beams and similar equipment specific for R&D work. It is measuring according to EN 15116. It has water panels in walls, floor and in the ceiling, the water can be alternated between heating and cooling to be able to test summer and winter cases. Twelve cylinder pieces of sheet metal "dummies" are used to simulate heat loads.

FACTS

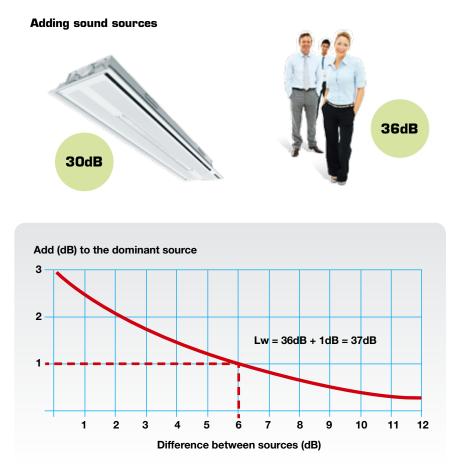
- Dimensions 4,0x5,0x3,0m
- Water panels in floor, walls and ceiling, both hot and cold
- Air flow 0-200 l/s
- Water flow 0-0,5 l/s
- Test standards EN 15116

Noise in air conditioning systems

An even, pleasant noise level, temperature and air rate are the most important requirements for a good indoor climate. Most of the climate problems that may occur indoors can be resolved by means of a correctly dimensioned climate system. To achieve this, careful planning work has to be done, and the technical noise calculations are an important part of this.

Apart from fans and units, dampers and other devices are the loudest sources of noise in an air conditioning system. The noise of the fans can spread to the premises via the building carcass, for example, or via the actual duct system. This means the noise attenuation measures need to be implemented. In the supply air system – and in the exhaust air system as well – silencers often have to be placed at fans and dampers.

For a device, the need for a reduction in noise can only be met by changing the device type, size, etc.

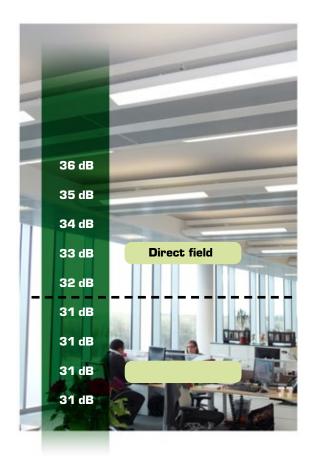


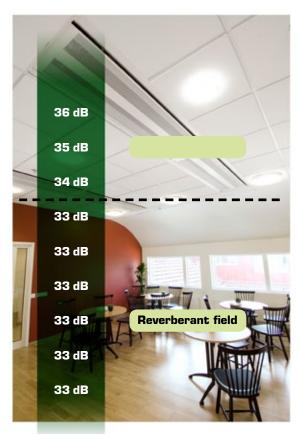
Attenuation in the room

The attenuation in a room is dependent on the interior fittings and the number of people in the room, among other things. This is why it is difficult to provide anything other than guideline values for different room types. However, the following typical values can be used, albeit with caution:

Room type	Room attenuation, dB	Remarks
Modular office	4	_
Open plan office	12	With fitted carpets and
Conference room	10	ceiling absorbent board
School hall	11	
Care room	4	
Small machine room	4	
Large machine room	8	

These attenuation values apply in what is known as the reverberant field, which in practice means that you are at least one metre from the device. The more absorption the longer direct field.





Fläkt Woods – the system specialists

With our broad range of products and century-old experience, one thing is obvious to us; You have to look at the big picture. It is by carefully combining products into systems, utilizing smart controls, one can achieve the best energy solutions.

A carefully designed system can achieve more than the sum of the integral parts. High-performing components are an obvious starting point. But it is by combining products into a system, utilizing smart controls, one can achieve the best energy solutions. This strategy requires that the systems and individual components are designed together. It takes thorough knowledge of the individual products impact on each other and the ultimate combined effect to reach perfection. Fläkt Woods develop and produce components as well as design systems. That's why we can combine the parts into harmonic overall solutions.

e³ - Fläkt Woods integrated advantages

Following the Kyoto protocol the European Union has set a target to reduce energy consumption. For buildings the target is set at a 22% reduction by 2010. It's called the EPBD directive. To address the requirements of the EPBD directive, Fläkt Woods has poured a lot of effort into creating the e³ Concept. Our solution is a broad approach leaving no stone unturned to achieve optimum results. High-performing components provide a good start, but it is by combining products into an integrated system, utilizing smart controls, that one can achieve the best energy solutions.

an integrated system, utilizing smart controls, that one can achieve the best end to highlight products and systems that deliver savings



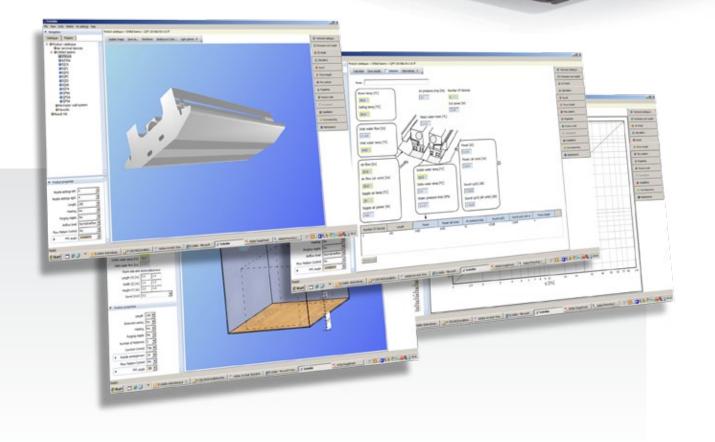


New product selection tool for chilled beams and diffusers

ExSelAir is Fläkt Woods' new web based product selection tool for calculation and documentation. The tool shows all products, functions and features visually, which makes it very easy to use. **www.flaktwoods.com/exselair**

ExSelAir contains:

- 3D presentation of all products
- 3D presentations of the flow patterns in selected rooms
- A calculation and dimensioning tool
- Installation and maintenance manuals



We Bring Air to Life

Fläkt Woods is a global leader in air management. We specialise in the design and manufacture of a wide range of air climate and air movement solutions. And our collective experience is unrivalled.

Our constant aim is to provide systems that precisely deliver required function and performance, as well as maximise energy efficiency.

Solutions for all your air climate and air movement needs

Fläkt Woods is providing solutions for ventilation and air climate for buildings as well as fan solutions for Industry and Infrastructure.

Air Handling Units (AHUs)

Modular, compact and small AHU units. Designed to ensure optimisation of indoor air quality, operational performance and service life.

Air Terminal Devices and Ducts

Supply and exhaust diffusers and valves for installation on walls, ceiling or floor are all included in our large range and fit all types of applications.

Chilled Beams

Active induction beams for ventilation, cooling and heating, and passive convection beams for cooling. For suspended or flush-mounted ceiling installation – and multi-service configuration. With unique Comfort Control and Flow Pattern Control features.

Residential ventilation

A complete range of products for residential ventilation. Consists of ventilation units, exhaust air fans and cooker hoods designed to optimise indoor comfort and save energy.

Energy recovery

Dessicant-based product and systems that recover energy, increase ventilation and control humidity.

Fans

Advanced axial, centrifugal and boxed fans for general and specialist applications. Comprehensive range including high temperature and ATEX compliant options. Engineered for energy efficiency and minimised life cycle cost.

Chillers

Air-cooled and water-cooled chillers with cooling capacity up to 1800kW. Designed to minimise annual energy consumption in all types of buildings.

Controls and drives

Variable speed drives and control systems, all tested to ensure total compatibility with our products. Specialist team can advise on energy saving and overall system integration.

Acoustical Products

A complete line of sound attenuating products, including rectangular and round silencers, Media Free silencers custom silencers and acoustic enclosure panels.

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See global website for international sales offices www.flaktwoods.com

