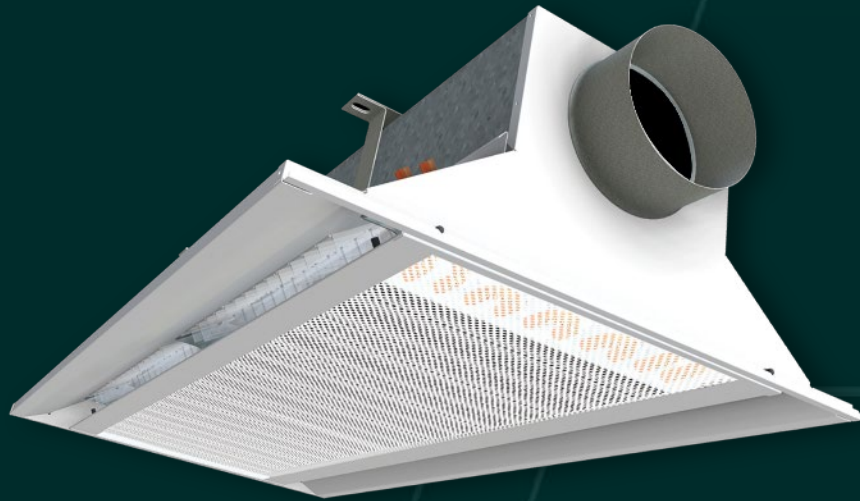




CHILLED BEAM TRAINING PART I

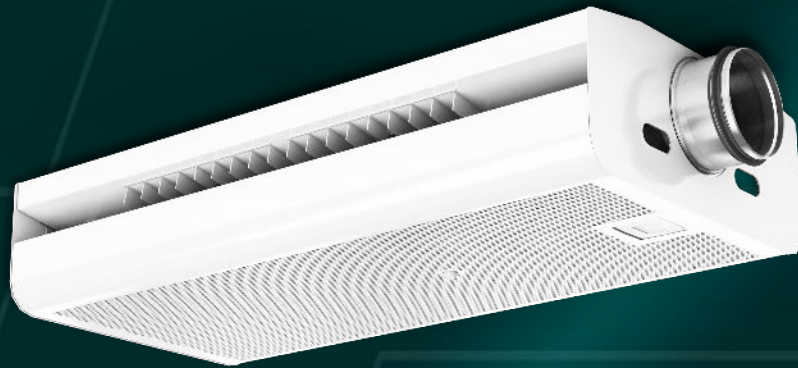
Chilled Beams Training Topics

- 1) Why chilled beams?
- 2) How chilled beams work
- 3) Product range and function
- 4) FläktGroup SEMCO vs. competitors
- 5) Tools to sell chilled beams
- 6) Chilled beams in the marketplace
- 7) Unique selling points





WHY CHILLED BEAMS?



The Five Components of Good Indoor Air Quality

1. **Temperature control**
low temperature gradient
2. **Humidity control**
3. **Even air dissemination**
no pockets of concentrated air
4. **Low noise levels**
no fans are used
5. **Fresh air**
active chilled beams bring in clean, dehumidified and conditioned air.

On average we spend **90%**
of our lives **indoors.**





Comfort

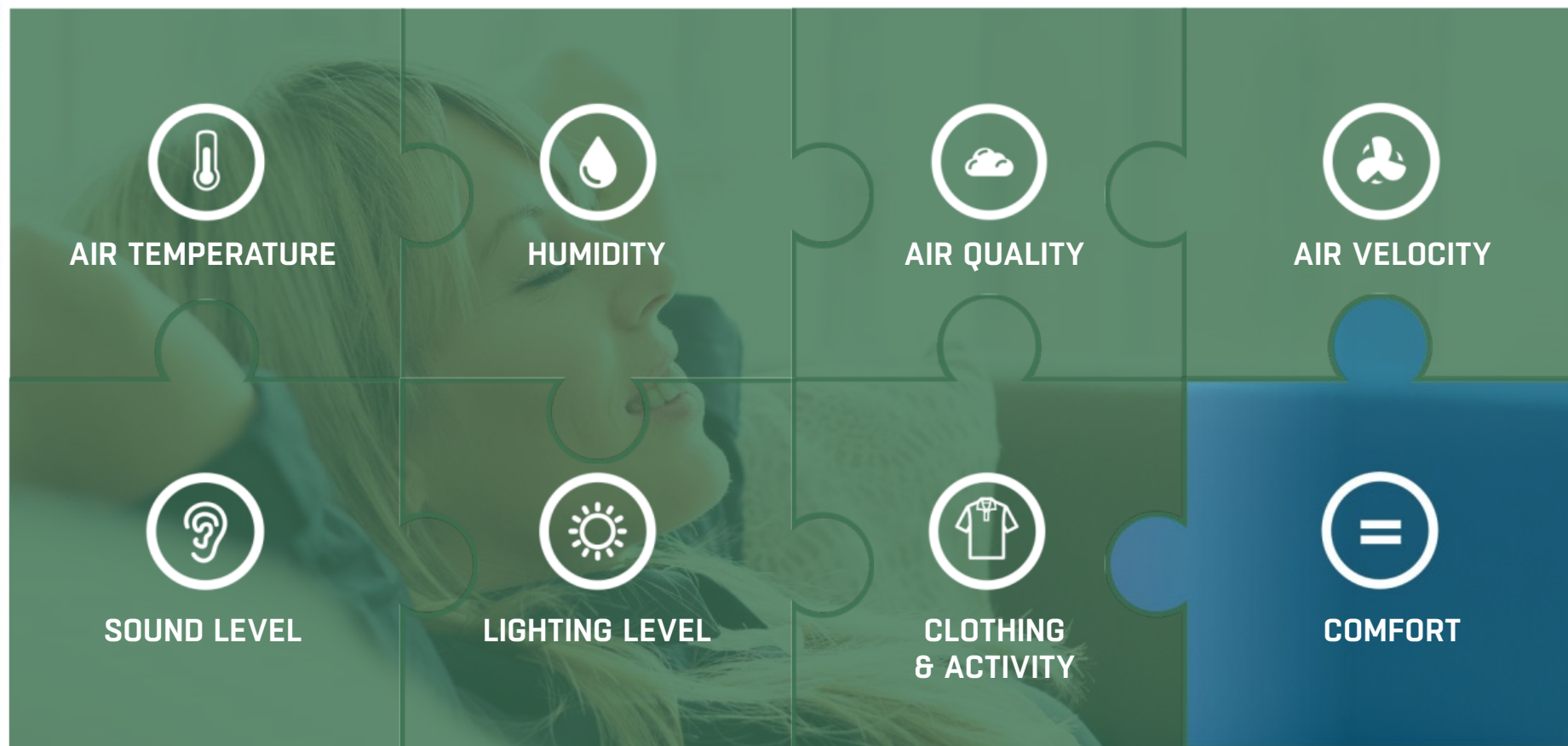


Increased Productivity



Better Health

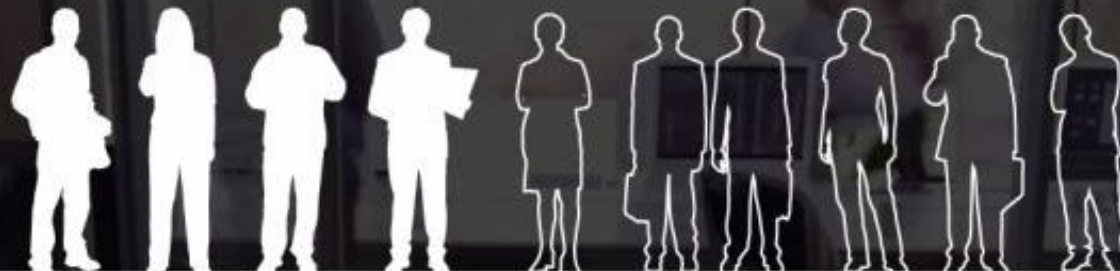
What Makes an Indoor Environment Comfortable?



Offices are normally ventilated for:



But, typically, occupancy averages only:



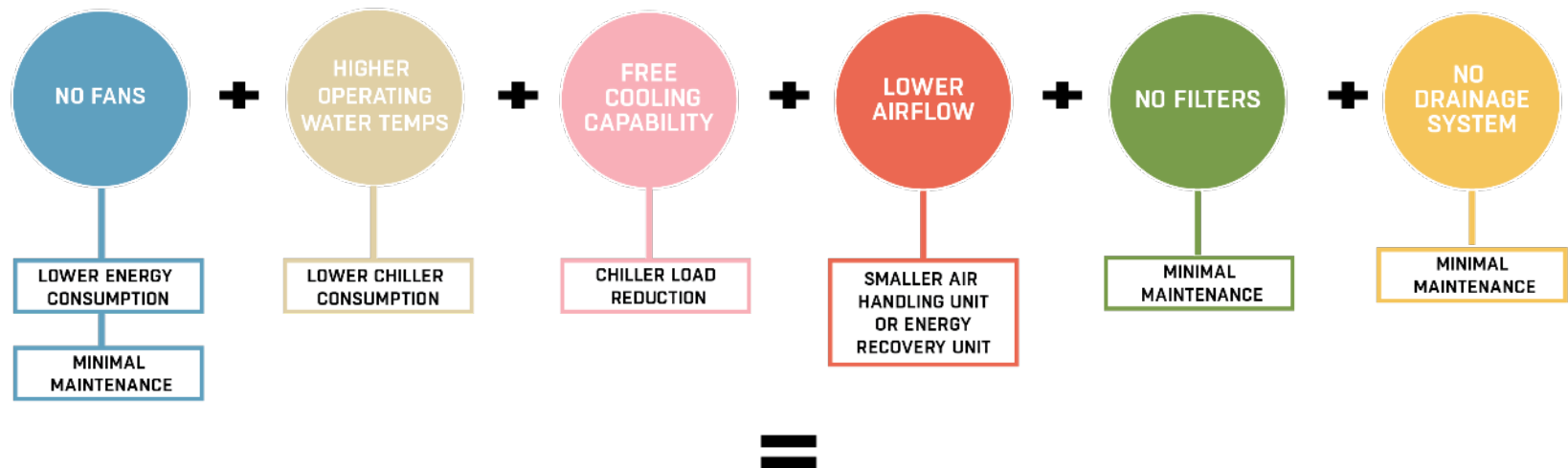
Why Chilled Beams?

To optimize buildings.

- **Adding chilled beams helps buildings earn certifications**
LEED, U.S. Green Building Council, BREEAM
- **Increase property value**
Low annual energy consumption rates
- **Optimize ventilation**
Heat loads can be varied based on occupancy level, time of day or season
- **Flexibility**
Building and office layouts can easily change



ECONOMICAL IMPACT OF CHILLED BEAMS



REDUCTION OF OPERATING, MAINTENANCE & INVESTMENT COSTS

Economical

- With functions like energy control, flow pattern control and adding a Pi actuator, airflows and temperatures are tailored to the needs of a specific zone, so energy is not wasted.
- Chilled beams do not have fans, filters, or a drainage system, keeping maintenance costs to a minimum.
- Lower chiller consumption
- The absence of fans = lower energy consumption.

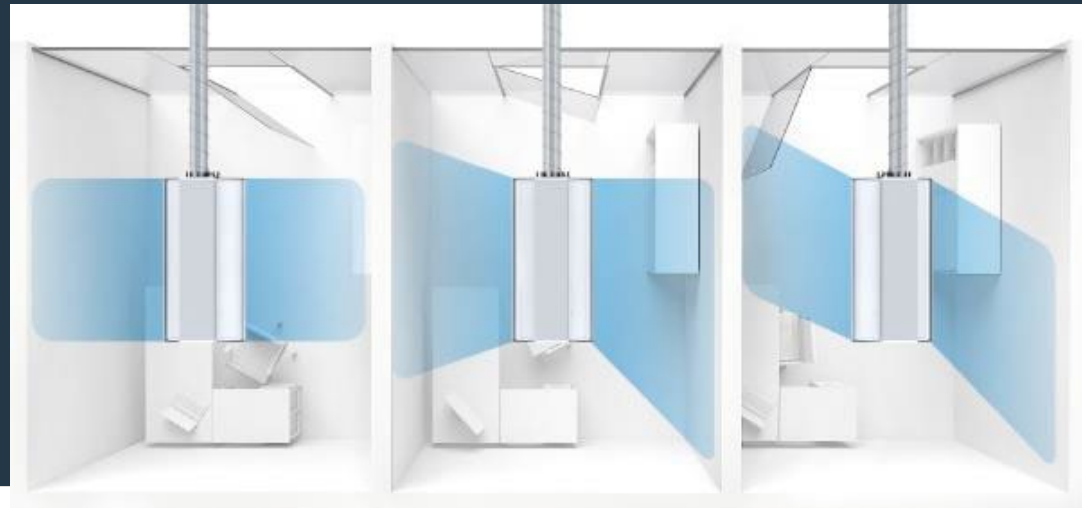
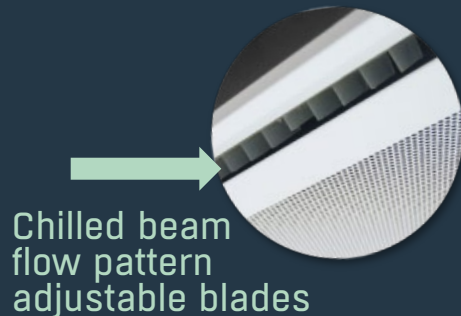
Environmental

- Ventilation is optimized to the variation of heat loads depending on occupancy level, time of day or season
- Low noise levels



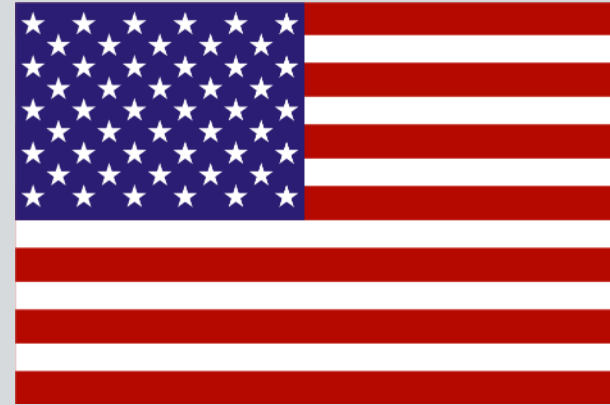
High Flexibility

- FläktGroup SEMCO's chilled beam line is extremely flexible. Flow patterns can easily be manipulated, on site, by configuring plastic blades in a new flow pattern without the use of tools.
- Air nozzles can also easily be adjusted to meet specific needs.
- Temperature levels can be easily tailored to a zone's occupancy levels and temperature needs.





SWEDEN



USA





What are the 5 components of good indoor air quality?

Temperature, humidity, velocity, noise AND

a Condensation

b Fresh Air

c Heat

d Cold Air

Answer: b, Fresh Air

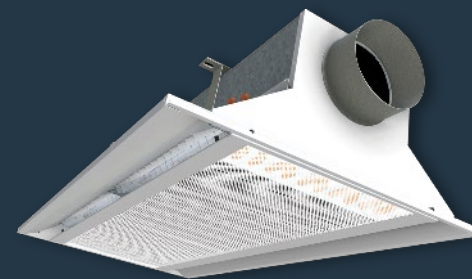


HOW CHILLED BEAMS WORK

There are two classifications of chilled beams:

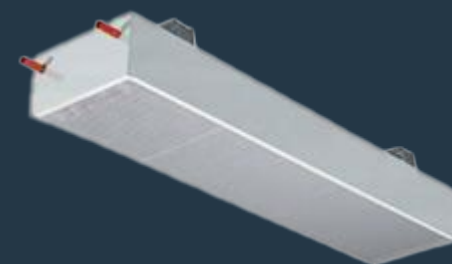
ACTIVE

- Air is supplied directly to the beam
- Active beams are classified as either traditional or induction



PASSIVE

- Air is not supplied directly to the beam but is instead pulled through the beam by gravitational pull and air buoyancy.



The background is a light blue gradient with a pattern of thin, white, intersecting lines that create a sense of depth and movement. Scattered throughout the background are several white circles of varying sizes, some of which are connected by thin white lines, resembling a network or a constellation.

ACTIVE BEAMS

ACTIVE: INDUCTION BEAMS

JUNO IQHC



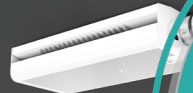
APPLICATIONS: OFFICES, SCHOOLS
MAIN ADVANTAGES: HIGH COOLING CAPACITY
INDUCTION TYPE: ENERGY CONTROL, PI ACTUATOR
INSTALLATION TYPE: RECESSED OR EXPOSED
FLOW PATTERN CONTROL: YES

LYRA II IQCC



APPLICATIONS: OFFICES, SCHOOLS
MAIN ADVANTAGES: COMPACT, HIGH CAPACITY
INDUCTION TYPE: ENERGY CONTROL, PI ACTUATOR
INSTALLATION TYPE: RECESSED OR EXPOSED
FLOW PATTERN CONTROL: YES

NOVA II IQFI



APPLICATIONS: OFFICES
MAIN ADVANTAGES: EXPOSED BEAM
INDUCTION TYPE: ENERGY CONTROL, PI ACTUATOR
INSTALLATION TYPE: EXPOSED, FREE HANG
FLOW PATTERN CONTROL: YES

AURORA IQSA



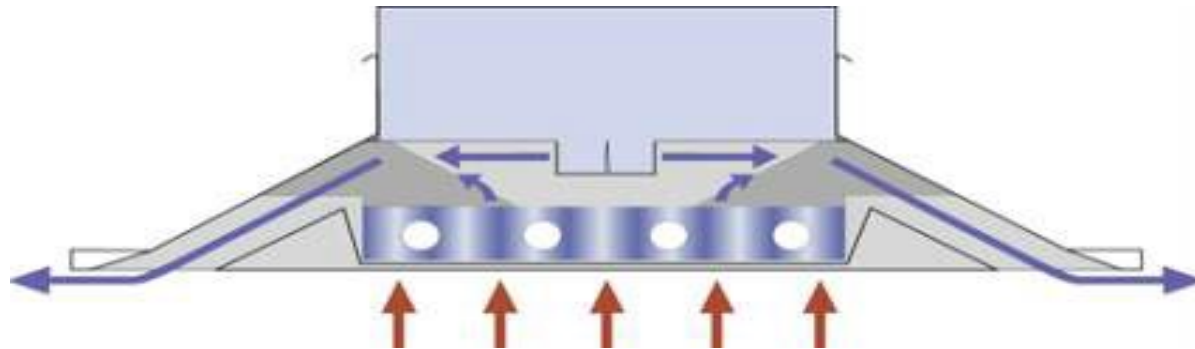
APPLICATIONS: OFFICES, SCHOOLS
MAIN ADVANTAGES: HIGH COOLING CAPACITY
INDUCTION TYPE: ENERGY CONTROL, PI ACTUATOR
INSTALLATION TYPE: NARROW, EXPOSED
FLOW PATTERN CONTROL: YES

ORION II IQHA

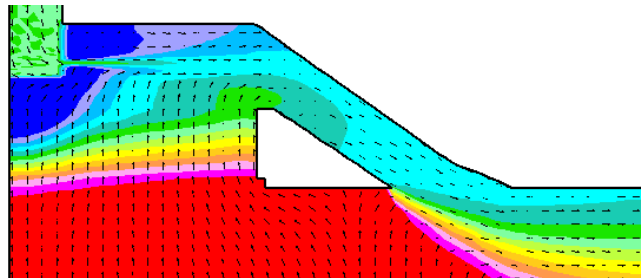


APPLICATIONS: HOTELS, HOSPITALS, OFFICES
MAIN ADVANTAGES: LOW NOISE LEVELS, PI ACTUATOR
INDUCTION TYPE: ENERGY CONTROL
INSTALLATION TYPE: BULKHEAD MOUNT
FLOW PATTERN CONTROL: NO

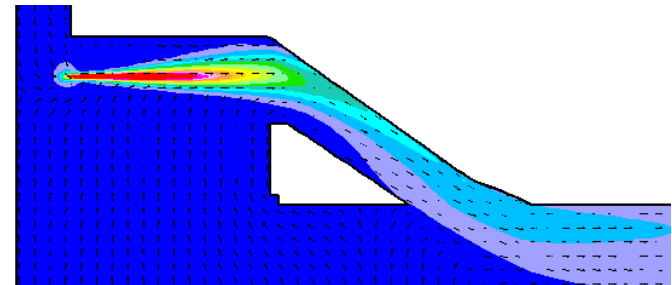
How Active Chilled Beams Work



Temperature profile

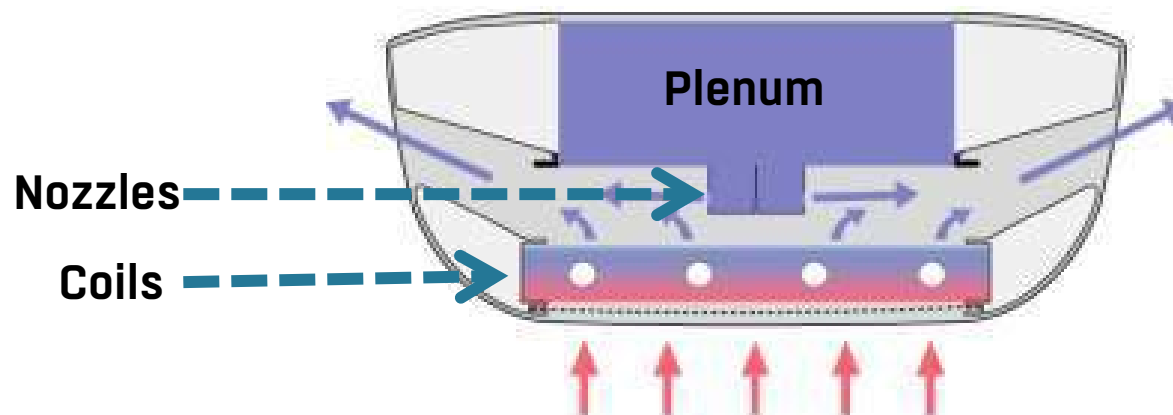
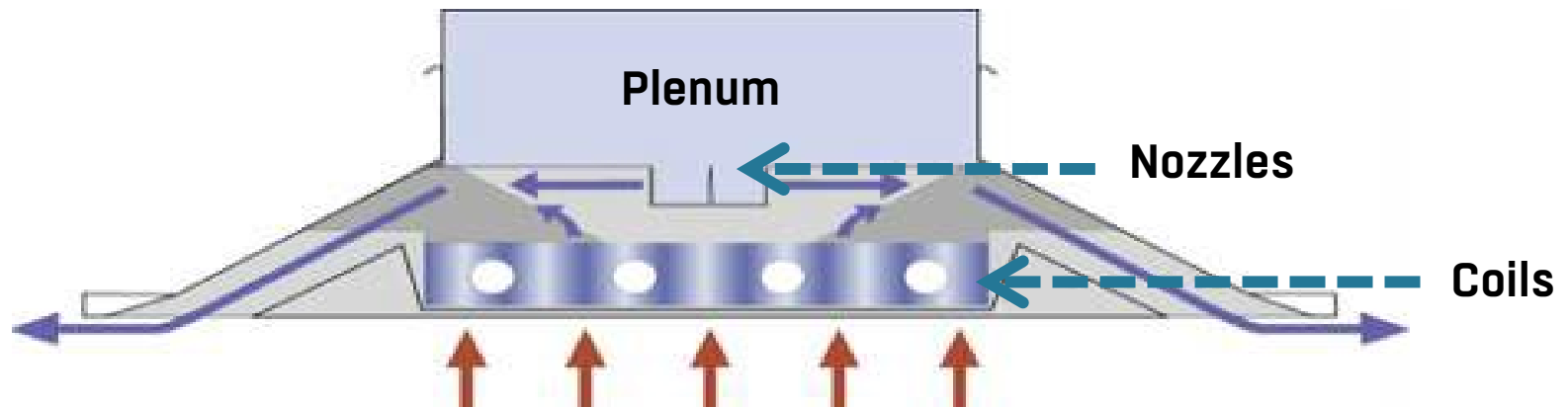


Velocity profile

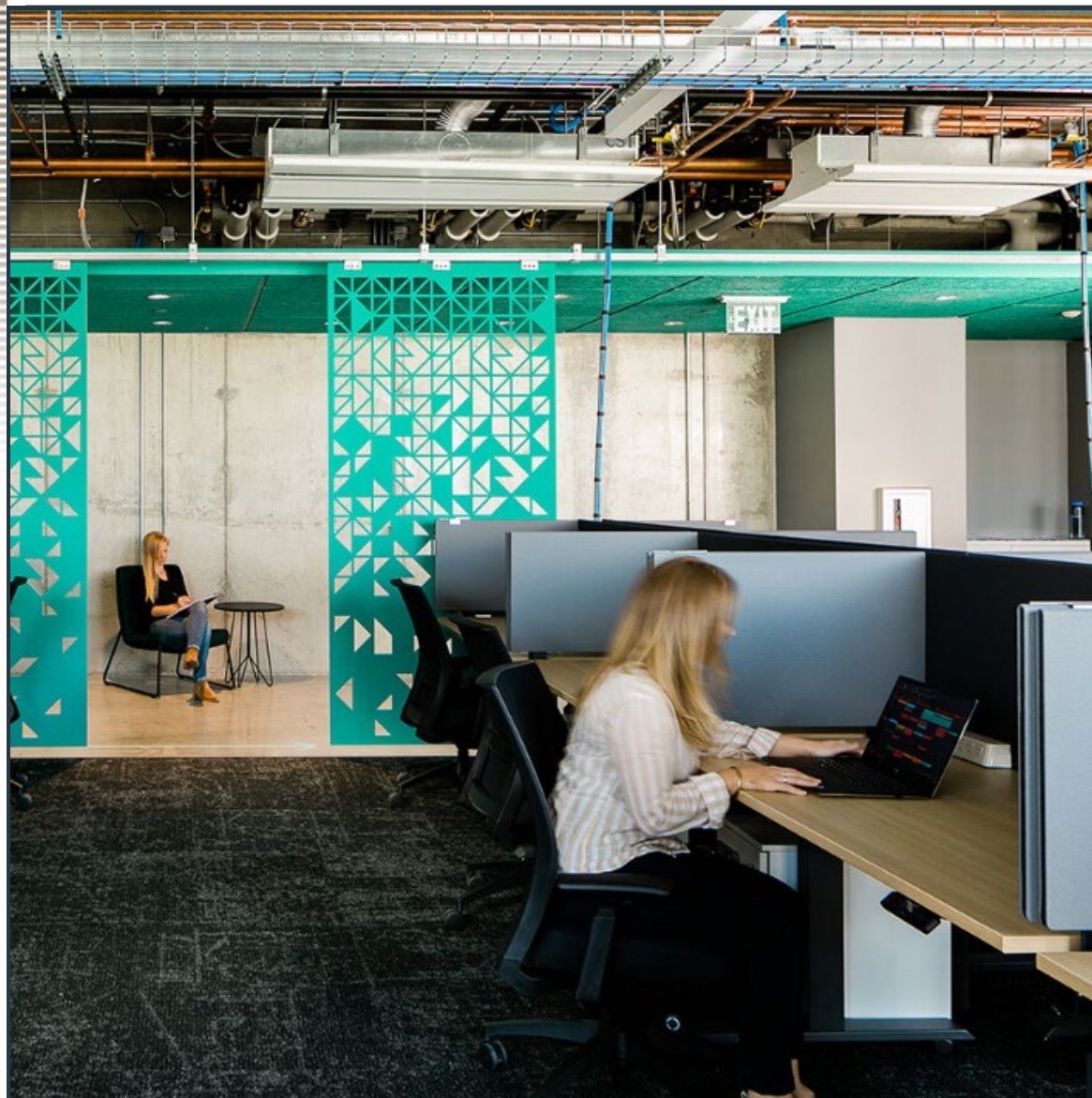


How Active, Induction Chilled Beams Work

An induction beam mounted in a plaster ceiling



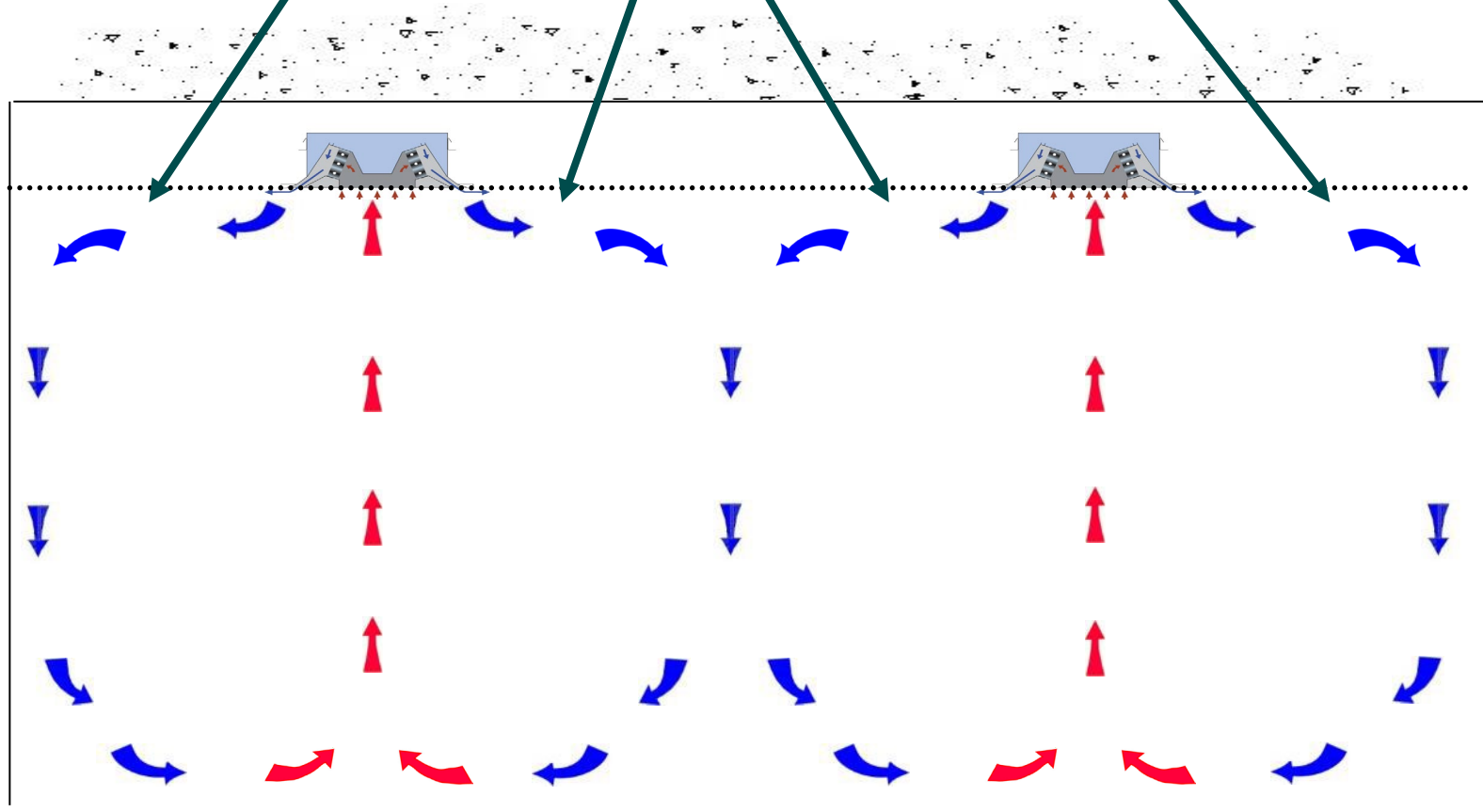
An induction beam for
exposed installation



What is the Coanda effect?

The Coanda effect is achieved by directing airflow tight to the ceiling, allowing greater throw distance and less noticeable drafts than diffusers aimed down into the occupied zone.

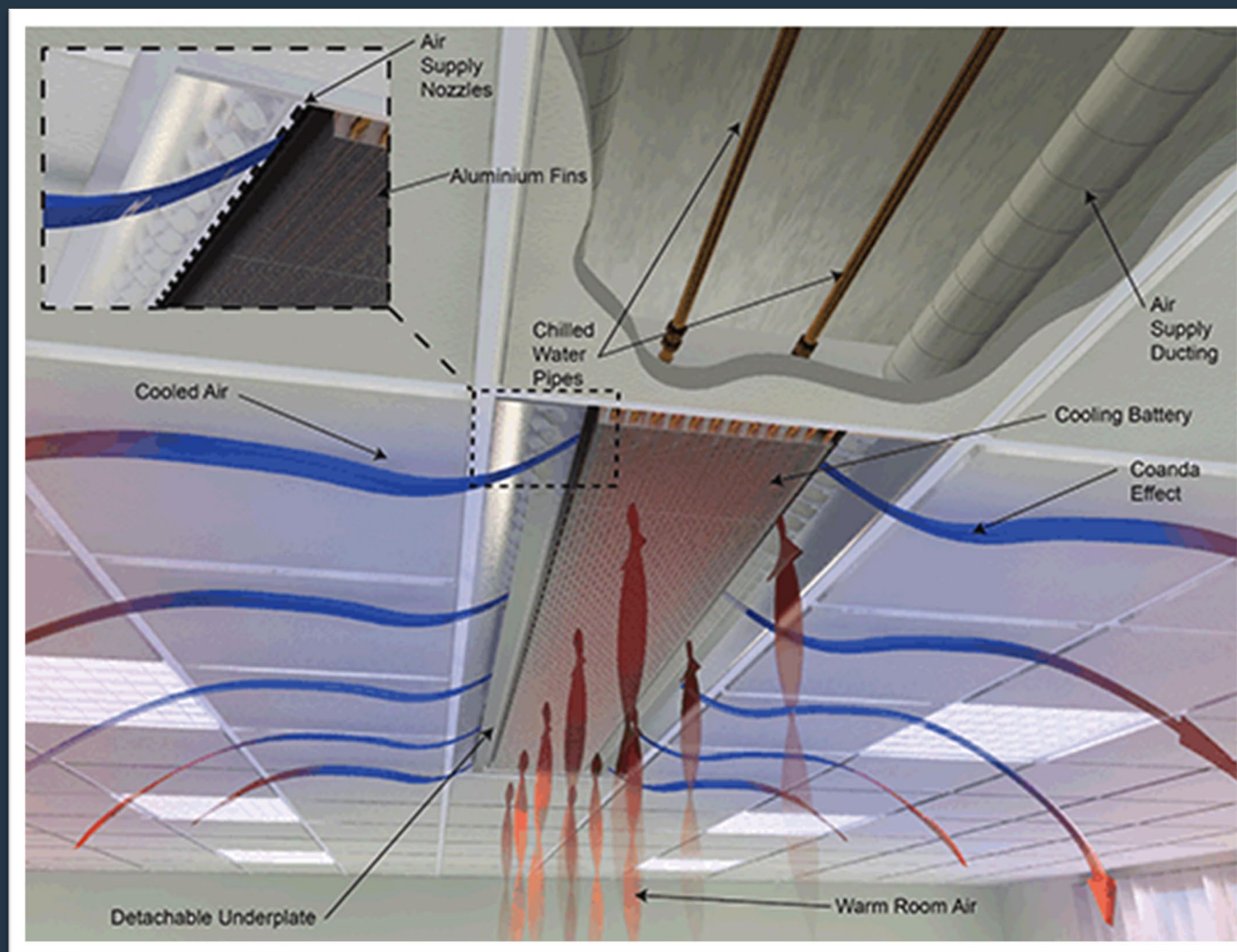
Coanda Effect holds the air against the ceiling

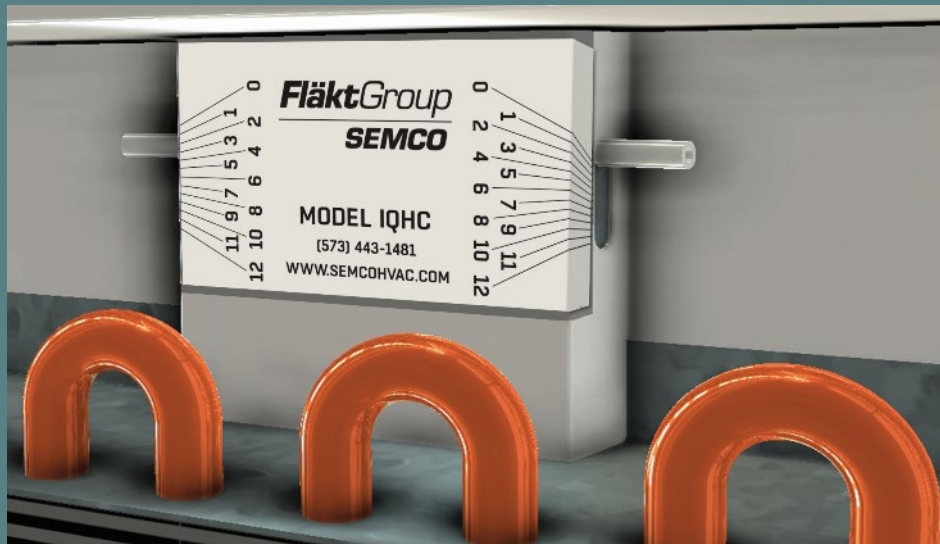


Flush Mounted Induction Beams

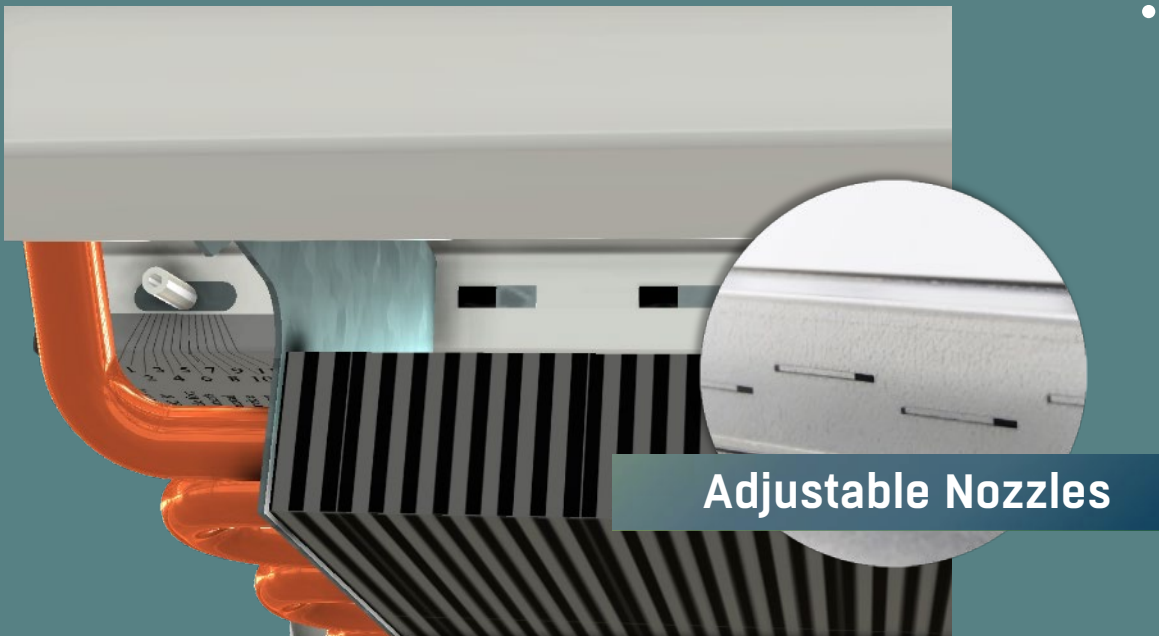


Induction Beams: Heating





- Energy control is performed by adjusting the width of the air nozzles along the control rails in the supply air channel.
- This can easily be done during the balancing process or any other time, by swinging down the lid. No tools are necessary.



Adjustable Nozzles

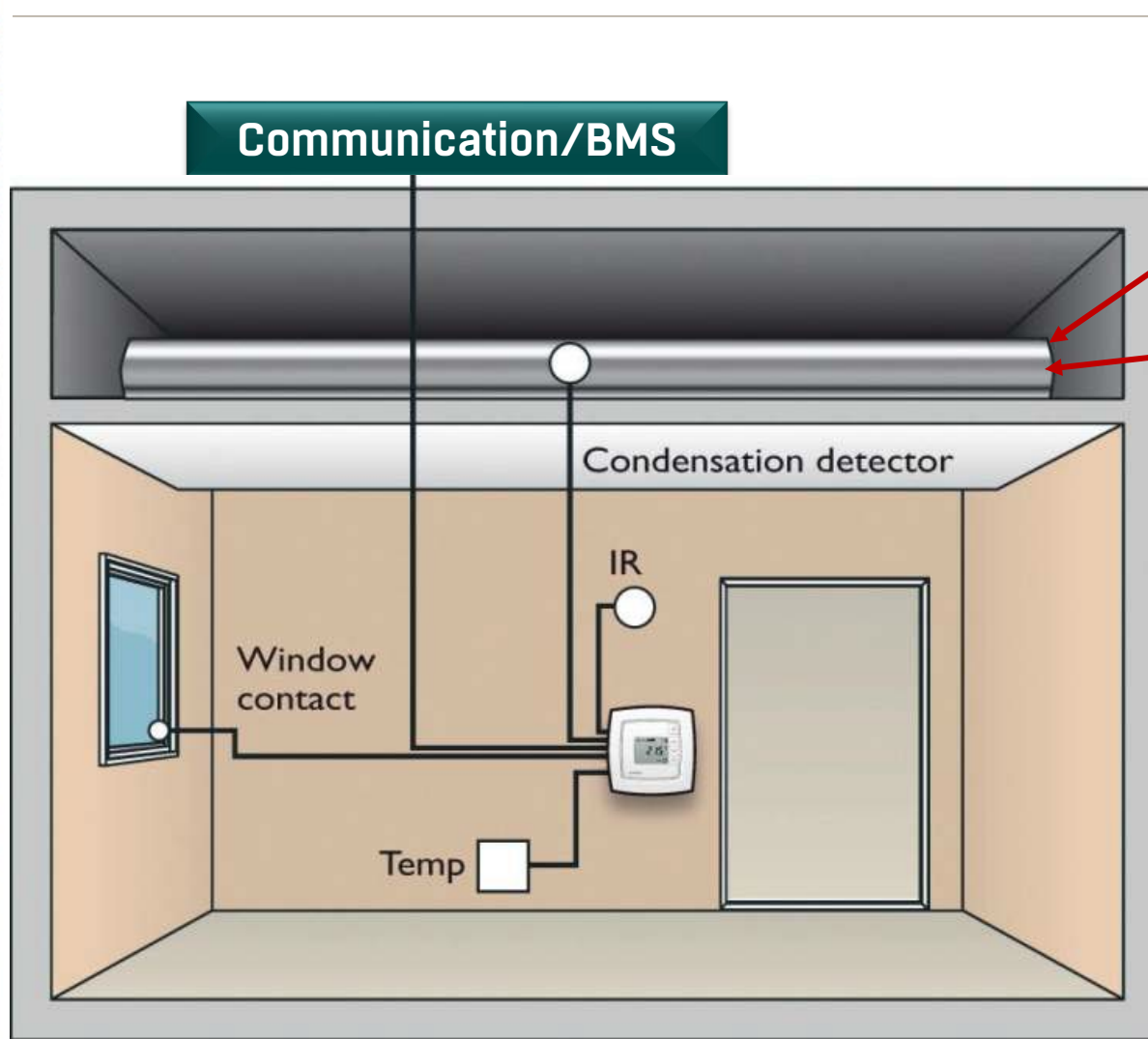
- Optional demand-controlled ventilation device for LYRA II IQCC, NOVA II IQFI, and Orion II IQHA.
- It adapts quickly to changes in occupancy, zone conditions, and upstream pressure.
- When combined with the STRA-24 room controller, the Pi has five operating modes: off, standby, unoccupied, occupied, and boost.
- Adjusts nozzles to allow only the ventilation necessary to suit current zone occupancy levels, ensuring comfort.
- Equipped with a CO₂ sensor, temperature sensor, and occupancy sensor.



Pi Actuator

- Unlike competitor's pressure independent controls, which can only be used with larger static pressure regain duct systems, the Pi actuator allows the beam to be pressure independent and work with **any duct system** regardless of pressure.
- Can easily be transferred to other beams.
- Makes beams more flexible and easier to incorporate into engineering designs.





Inputs:

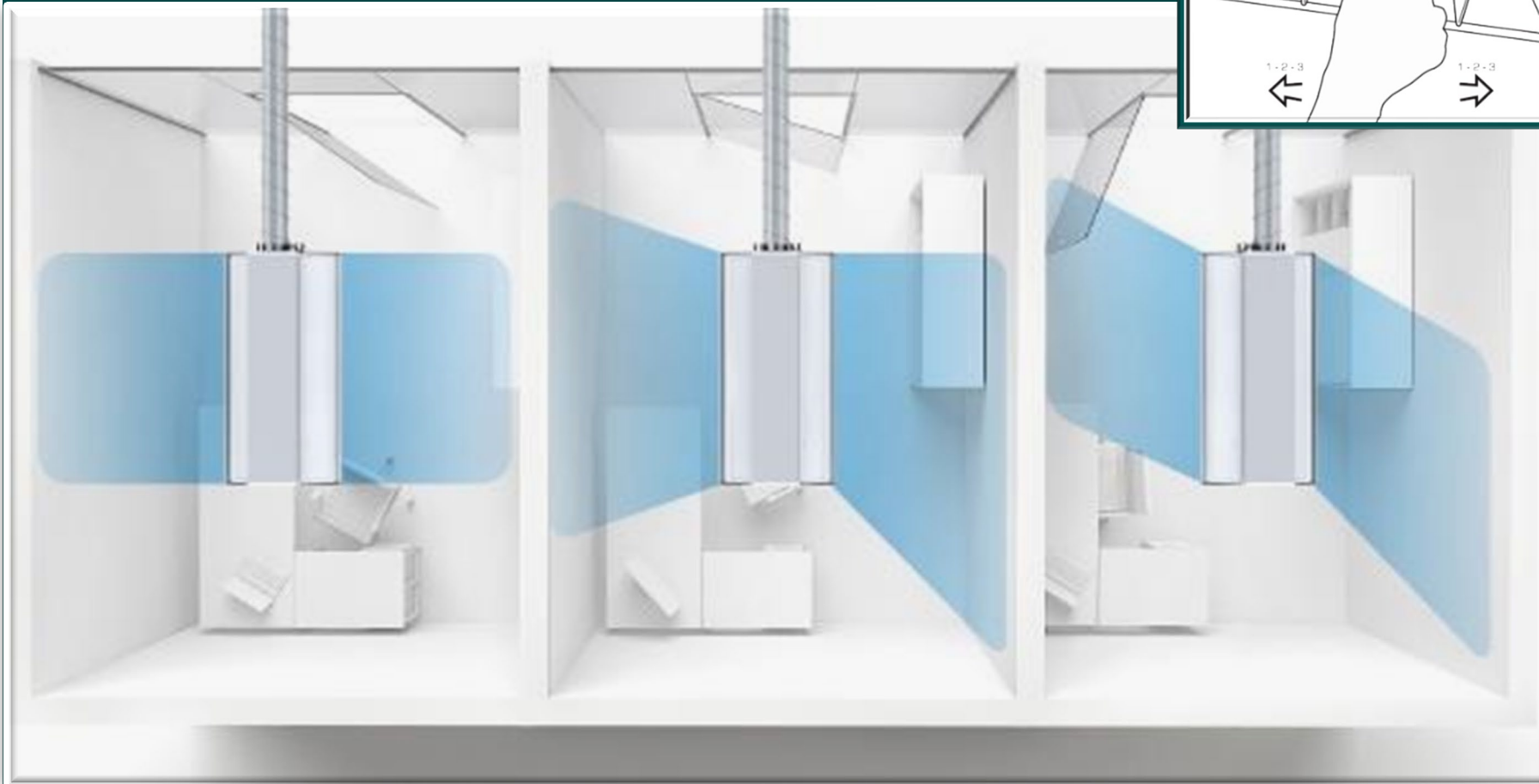
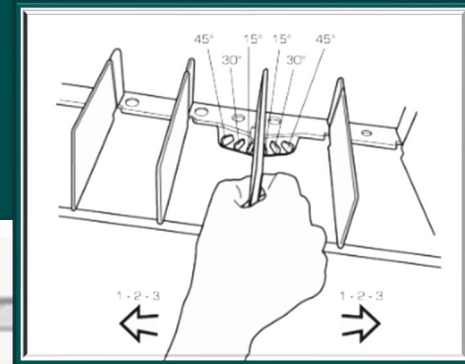
- Condensation sensor or humidity sensor
- Window sensor
- Room or exhaust temperature

Outputs:

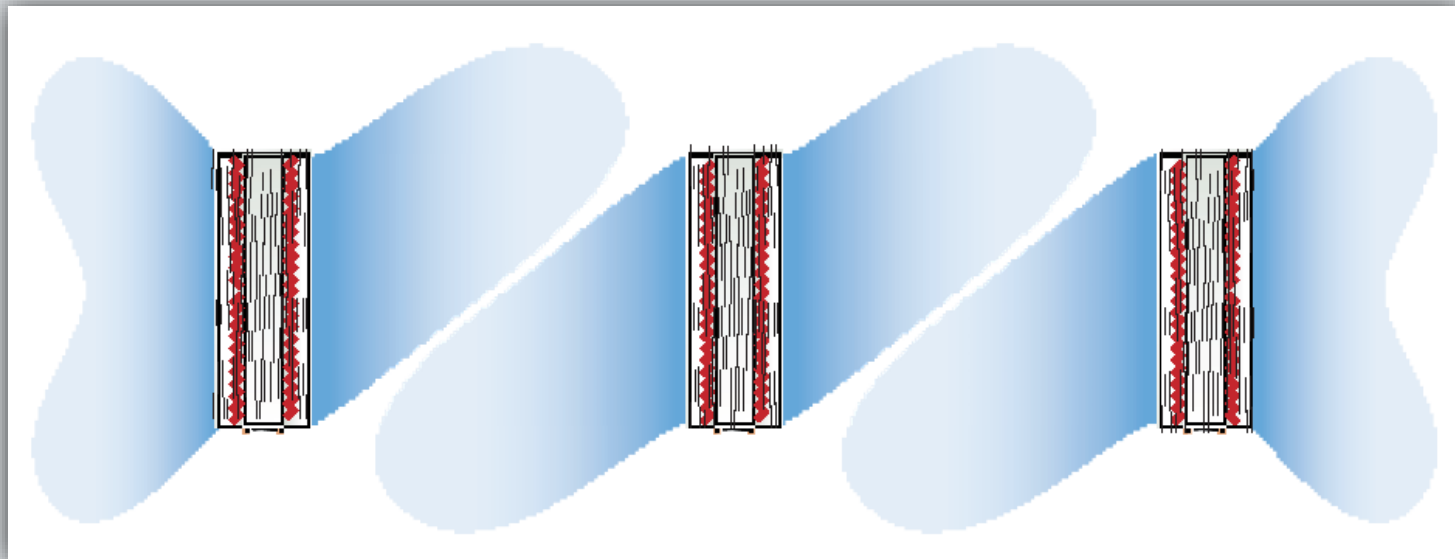
- Signal ON/OFF for the 2 way valve
- Signal 0-10V for the variable air volume (NOVA II chilled beams)

Flow Pattern Control (FPC)

Flow pattern control is the configuration of plastic blades located inside the diffusion system. The configuration of blades determines how far and in what direction the air throw will go. The configurations can be set without tools and should optimize air diffusion.

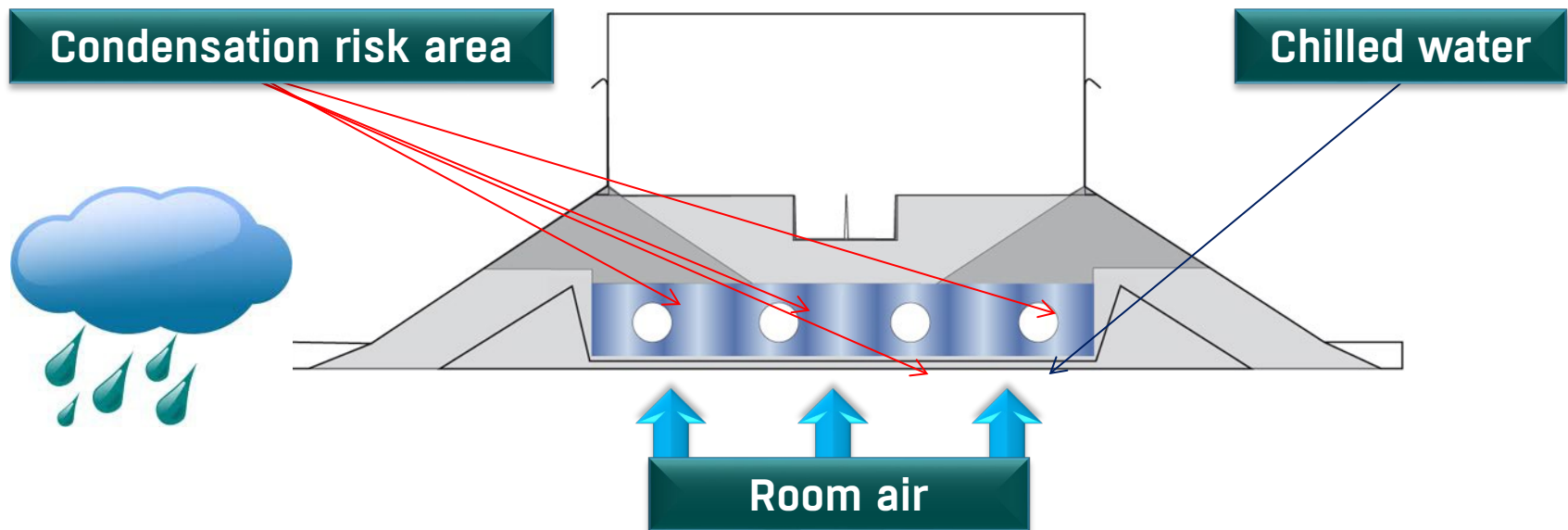


- Here is an example of how the NOVA II IQFI's flow pattern can be adjusted.
- The built-in blades can be adjusted to 0°, 15°, 30°, or 45° angles, changing the flow direction.
- A combination of flow pattern control and energy control gives FläktGroup SEMCO beams high flexibility.



The Condensation Principle

- Condensation occurs when room air meets a chilled beam's water coil, and the surface of the water coil has a temperature lower than the room's dew point.
- The dew point depends on the hygrometry and the temperature in the room.
- Condensation is always a concern when using chilled beams.



Avoiding Condensation

- The Neuton™ pump module is an active condensation control system.
- Equipped with smart sensors and controls to respond to occupied, unoccupied and low load conditions by varying water flow and/or temperature as needed to accommodate changes in load conditions.
- The Neuton's hot and cold-water control valves only release enough water of each temperature to maintain the desired beam temperature and avoid condensation.



Induction Chilled Beams: Juno IQHC



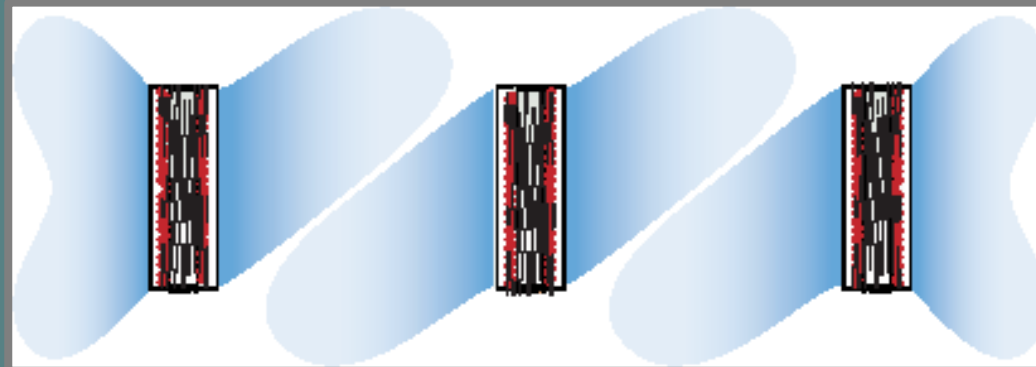
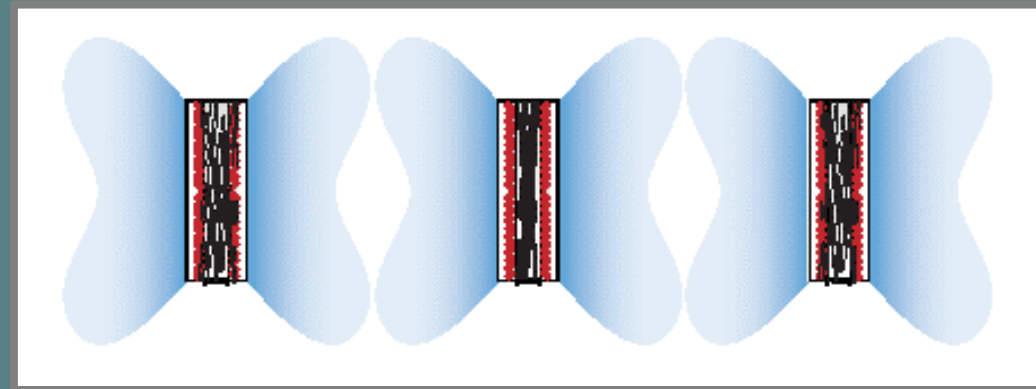
THE JUNO IQHC

High-capacity cooling
chilled beam.

- Highest industry cooling capacity
- Flow pattern control & energy control
- Can be flush mounted or exposed
- Coanda safety control option
- Flexible, universal air and water connection
- Cooling or heating & cooling
- Perfect for office, school and hotel applications



- Airflow can be symmetric or dissymmetric.
- Full-time control, that can be changed at any time.
- Blades are set at opposing 30° angles to avoid a collision of airstreams.





The LYRA II IQCC

A cassette chilled beam,
with 4-way throw capability..

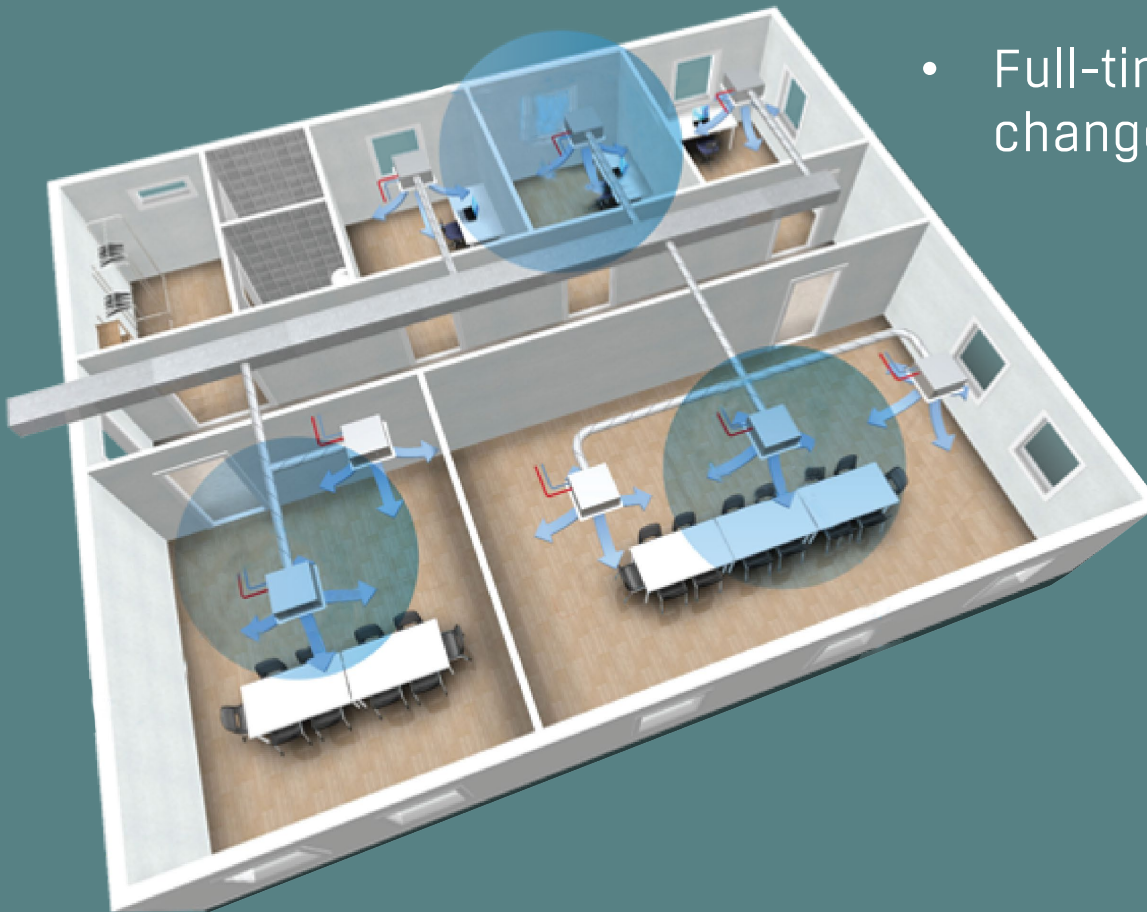
LYRA II IQCC Features

- Very low noise levels – less than a 20 dB sound level for a single cassette installation.
- For normal flow and high flow
- Flow pattern control & energy control
- Can be recessed or exposed
- Coanda safety control
- Pi actuator option
- Cooling or heating & cooling
- Perfect for office & school applications



LYRA II 4-Way Throw Airflow Patterns

- Airflow can be symmetric or dissymmetric.
- Full-time control, that can be changed at any time.





The NOVA II IQFI

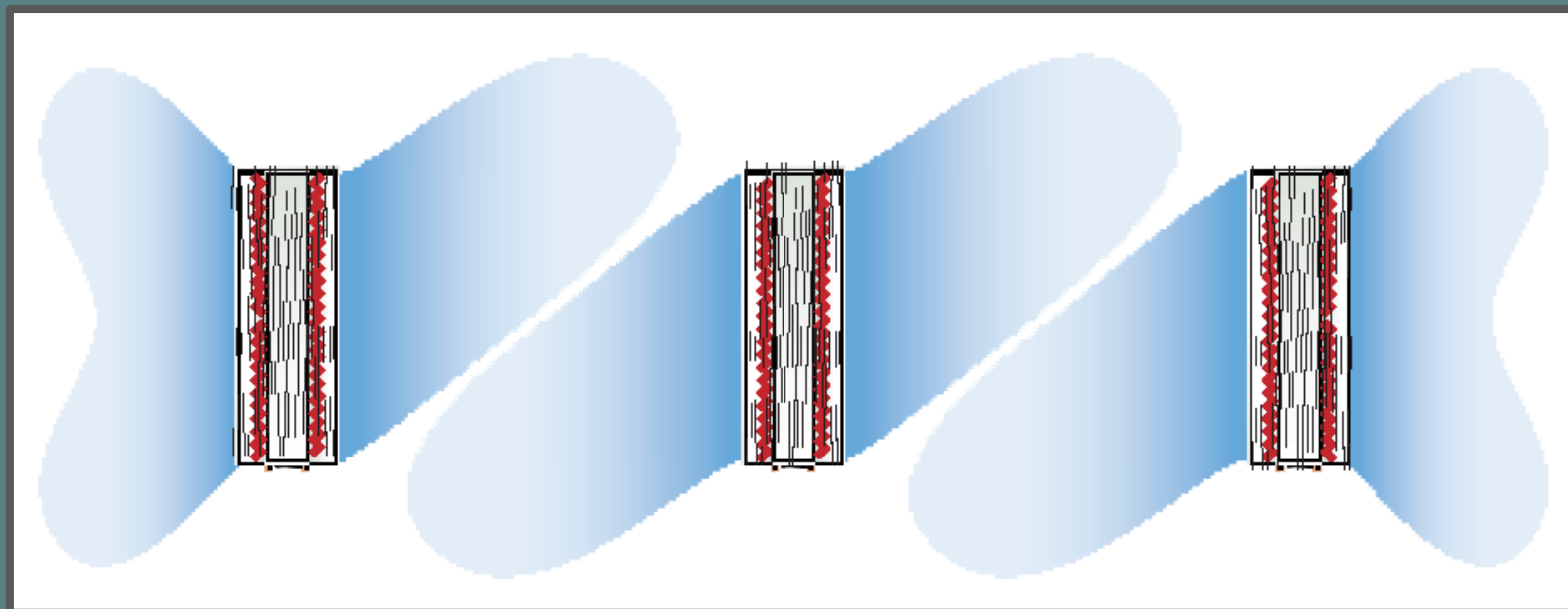
Exposed chilled beam

NOVA II IQFI Features

- Available with a round or square shaped profile.
- Aesthetically pleasing
- Flow pattern control & energy control
- Exposed; free hanging, ceiling mount
- Pi actuator option
- Cooling or heating & cooling
- Perfect for office & school applications



- Airflow can be symmetric or dissymmetric.
- Energy control can be changed at any time.

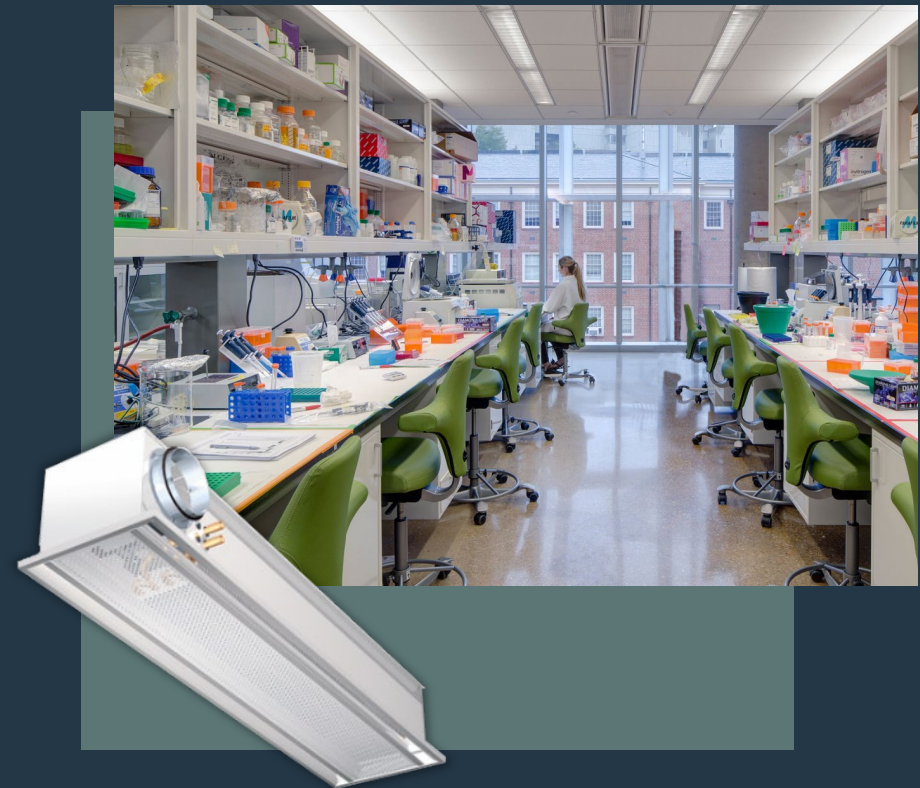


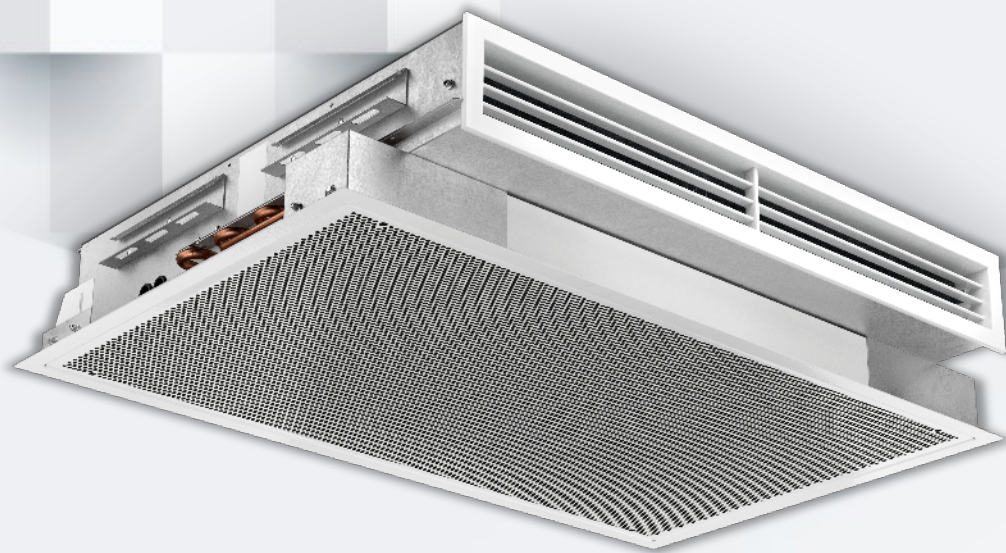


THE AURORA IQSA

Narrow chilled beam

- Energy control
- Ceiling mount — suited for a standard narrow ceiling space
- Cooling or heating & cooling
- Perfect for office & school applications





THE ORION II IQHA

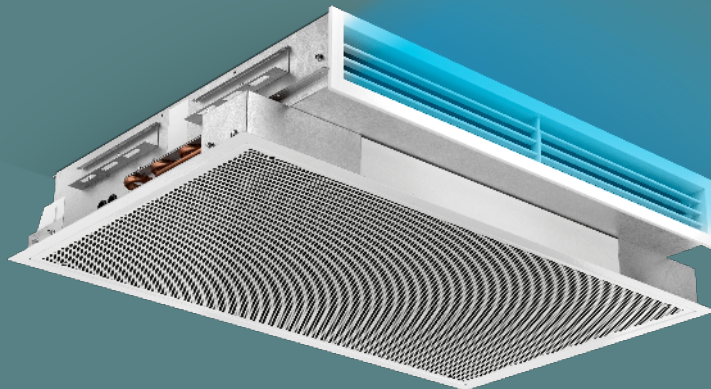
Bulkhead chilled beam

ORION II IQHA Features

- Very low noise levels, less than 20dB of sound pressure
- Energy control
- Bulkhead mount
- Cooling or heating & cooling
- Pi actuator option
- Perfect for hotels and hospital rooms



- 36 adjustable primary airflow nozzle settings
- Energy control can be changed at any time.

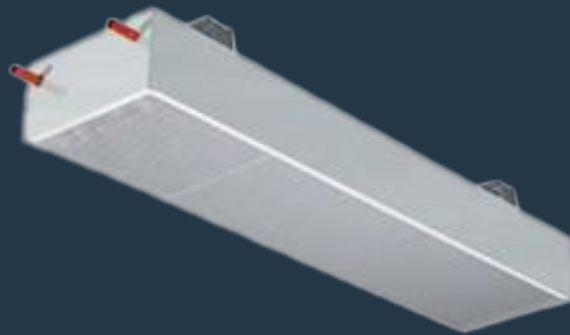




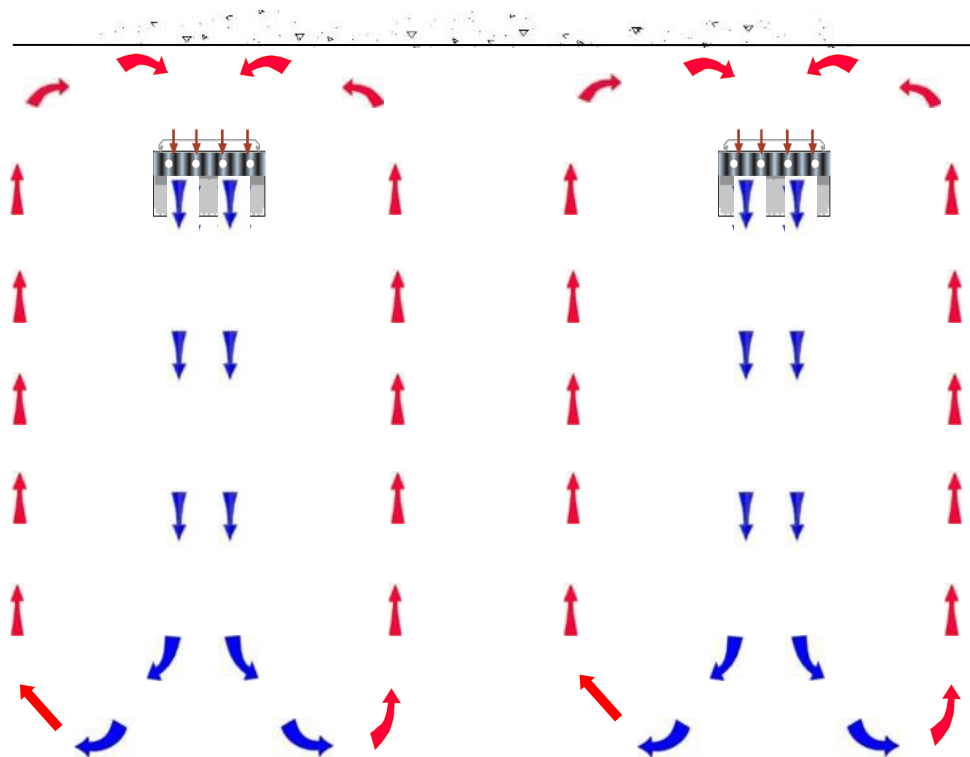
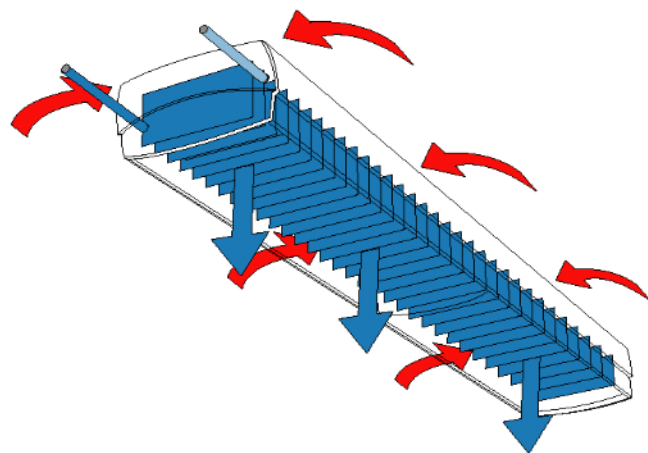
PASSIVE BEAMS

What is a Passive Chilled Beam?

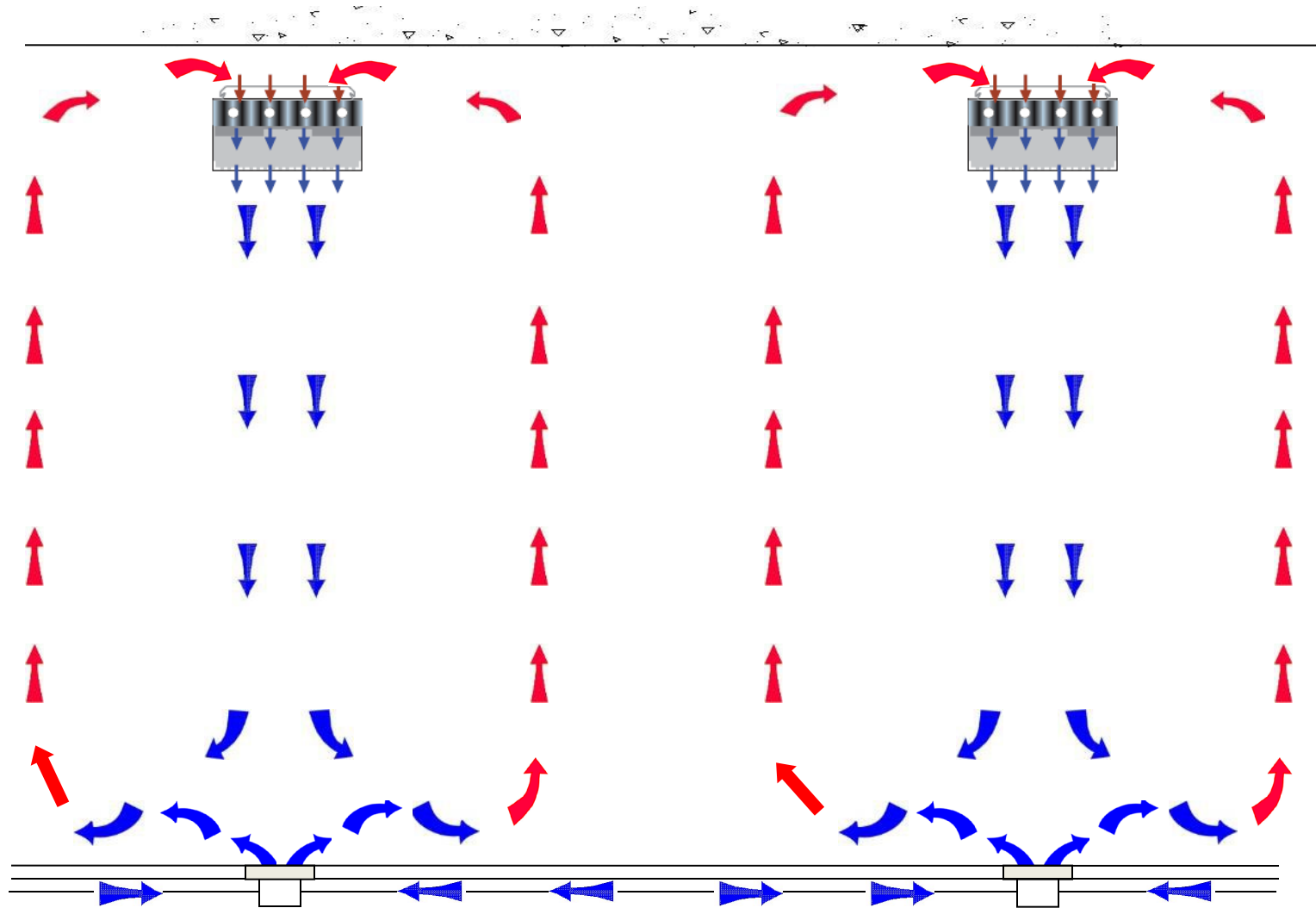
Air is not supplied directly to the beam,
but is instead pulled through the beam
by gravitational pull and air buoyancy.



How Passive Chilled Beams Work



How Passive Chilled Beams Work





“
Active beams are
broken down into
two subgroups,
traditional AND
”

a Not as Active

b Invection

c Convection

d Induction

Answer: d, Induction



SELLING TOOLS



Sign In



Products



Selection Tools

Product Catalogue / Chilled Beams /

IQ STAR ORION II Chilled beam (IQHA)



IQ STAR ORION II Chilled beam (IQHA)
IQHA-100-1-01-03-1

Calculate

Export

Print

Properties

Length: 100
Coil function: Cooling
Coil: Cooling left
PI Function: With
Flexible hoses: Without
Grille: Adjustable horizontal

ADVANCED PRODUCT PROPERTIES

Horizontal deflection: 0
Vertical deflection: 0

Parameters

Number of units: 1
Air pressure drop: 0.25 inWG
Air flow: 2.8, 32.3, 61.2 cfm
Air flow (all units): 2.8, 32.3, 61.2 cfm
Air temp: 60, 60, 60 °F
Inlet water temp: 60 °F
Inlet water flow: 0.5 gpm
Ceiling temp: 75 °F
Room temp: 74 °F
Relative humidity: 50 %

RESULT VISUALIZATION DESCRIPTION DOCUMENTS ACCESSORIES (1)

RESULT	DESCRIPTION	DOCUMENTS	ACCESSORIES (1)
Power	481 1692 2230	btu/h	
Coil power	437 1175 1247	btu/h	
Supply air power	44 517 982	btu/h	
Power (all units)	481 1692 2230	btu/h	
Sound Lp10A dBA	< 20 < 20 25	dB(A)	
Air flow	2.8 32.2 61.2	cfm	
Air flow (all units)	2.8 32.2 61.2	cfm	
Total air pressure drop	0.25 0.25 0.25	inWG	
Outlet water temp	61.5 64 64.2	°F	
Throw length L02	5.2 13.6 20.5	ft	
Water pressure drop	1.7 1.7 1.7	ftWG	

ADDITIONAL RESULT

VO Vmin Vmax

How to select a chilled beam – determining design and space parameters

Selection of thermal environment:

- Room air temperature in winter
- Room air temperature in summer

Selection of the indoor air quality level and flow rate:

- Fresh air requirement per person
- Select relative humidity for the space
- Primary air temperature:
 - Temperate climate and air moisture
 - Hot and humid climate: and air moisture

Calculation of required cooling and heating capacity:

- Heat loads (summer), sensible only
- Heat losses (winter)

Selection of chilled beam type:

- Active chilled beam, exposed or flush mounted
- Passive chilled beam (FläktGroup SEMCO currently doesn't offer a passive option).



Selecting the Correct Chilled Beam

Selection of inlet water temperature to avoid condensation:

- 1°F higher than the dew point in the room
- Room condition
- Dew point
- Mini inlet water temp

Selection of water temperature difference and/or water flow rate:

- Temperature difference water flow rate (securing turbulent flow inside the pipe)

Select model of Chilled Beam

Select total and active length of Chilled Beam





General Chilled Beam Unique Selling Points

- **Time saving** - easy to select and specify in FläktGroup SELECT
- **Energy savings** - reduced chiller consumption load and electrical consumption, use of free-cooling
- **Ease of layout design** - with high cooling capacity, adjustable induction and air diffusion
- **High indoor air climate comfort** - silent units and low air velocity in the room

JUNO IQHC:

- **Cooling capacity** - highest in the industry
- **FläktGroup SELECT** - quick and easy selection
- **Universal beam** - flexible air and water connections

AURORA IQSA:

- **Ease of layout design** - narrow beam
- **High indoor air climate comfort** - adjustable energy control
- **Customizable** - custom paint option



- **NOVA II IQFI:**
- **Energy savings** – demand control ventilation with Pi actuator option
- **Flexible** – broad application area
- **FläktGroup SELECT** – quick and easy selection
- **LYRA II IQCC:**
- **Ease of layout design** - compact cassette beam
- **High indoor air climate comfort** – silent unit
- **PLUS** all the benefits of the **NOVA II**
- **ORION II IQHA:**
- **Bulkhead mount** – perfect for hotel and hospital rooms
- **Flexible** – Pi actuator option
- **Quiet** – very low noise levels



Thank you for your attention!

