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HL-X-VENT™
sustainable ventilation

HL-X-VENT™ ADVANCED AIR HANDLING FOR LABORATORY AND INDUSTRIAL APPLICATIONS

HL-X-VENT™

is an advanced and efficient ventilation solution for draft-free work-spaces in laboratory and industrial applications.

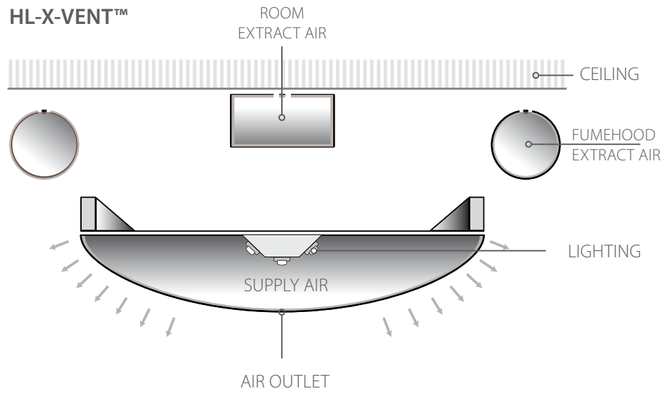
The use of optimal air guiding designs and applied thermo-dynamic principles provides the highest possible ventilation performance with lowest power consumption.
In combination with the **HL-X-LIGHT™** lighting solution, HL-X-VENT™ is a game changer in terms of sustainability, comfort and cost savings. It is one of the core elements of the HL-X-LAB™ integrated laboratory infrastructure system.

THERMAL LOADS / CAPACITY
Handling of thermal loads up to 350 W/m2

AIR EXCHANGE RATES
Up to 25 / h

AIR HANDLING
Adjustable air volumes, with plug-&-play of air extraction points

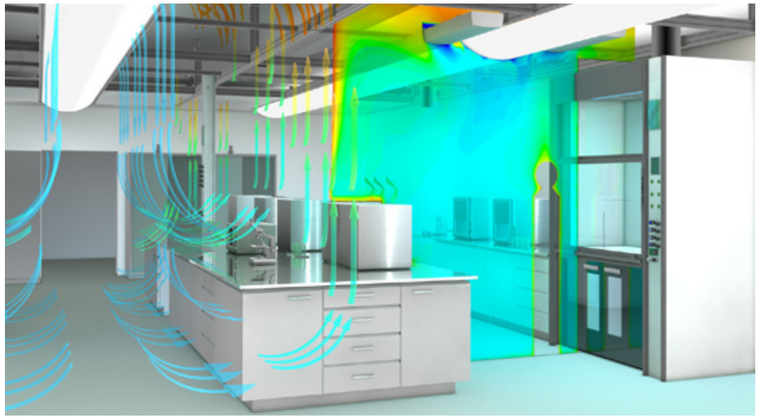
COMFORT
Directed air curtain with very low speed



RANGE OF APPLICATION
- Open-Space Laboratories
- Special labs (BSL/ GMO/ cleanroom)
- room-in-room-solutions (cubicals)
- industrial tasks with demand for guided, low speed airflow
- offices

THE PRINCIPLE

A special material in the air outlet streamlines the supply air into a low speed air curtain that provides fresh air in a revolutionary way.
Micro-induction and buyoancy are the driving forces for creating air-rolls rotating in opposite directions, dividing the space into two independent halves and transporting heat in most efficient way.
The systems geometry and the positionings of air outlet and air extraction units creates a highly consistent and layered room climate with highest safety, comfort and air extraction performance.



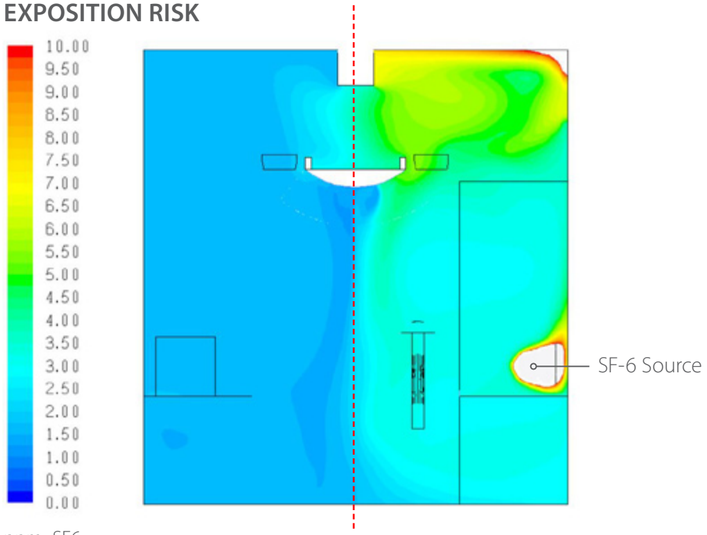
THE BENEFITS

• Safety	Control of critical emissions Less cross contamination Safe integration of fume hoods Very short recovery times
• Performance	Air extraction up to 350 W/m2 with lowest specific volume flow rate
• Comfort	Ventilation system with lowest draft risk Uniform workspace temperatures
• Economy	Saving energy and costs up to 30 % due to efficient handling of thermal loads
• Modularity	Adaptable to different lab types and room sizes Can be integrated into room-in-room modules
• Flexibility	Easy adaptable to new workloads at any time Easy integration of extraction points with no down time while lab operation
• Sustainability	Reducing emissions and costs Longlasting, reusable and fully recycable materials

SAFETY

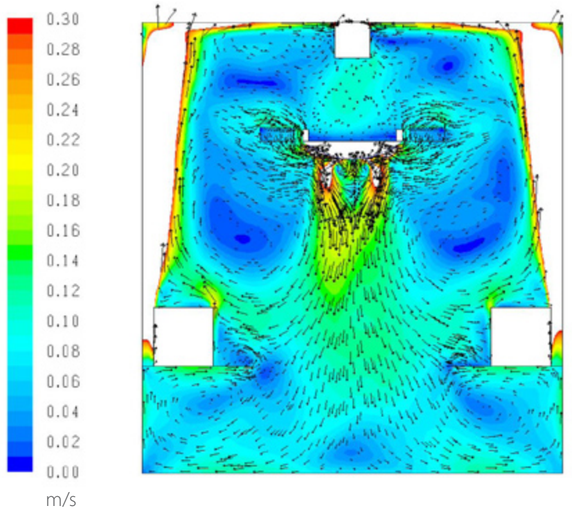
THE HL-X-VENT™ technology provides a highly safe ventilation system taking in account users, fume hoods and machines. Its components, in particular the air outlet and fume hood unit work perfectly together as a result of advanced thermodynamic research and iterated validation processes under live operation conditions.
The crucial aspect of exposition to critical emissions is solved with excellence and ensures user and equipment safety on highest level in comparison to other ventilation systems.

EXPOSITION RISK



Standard ventilation, exposition = **3.54ppm** (average, by dilution)
HL-X-VENT ventilation, exposition = **2.37ppm** (on head-level)

CONTAMINATION / RECOVERY TIME

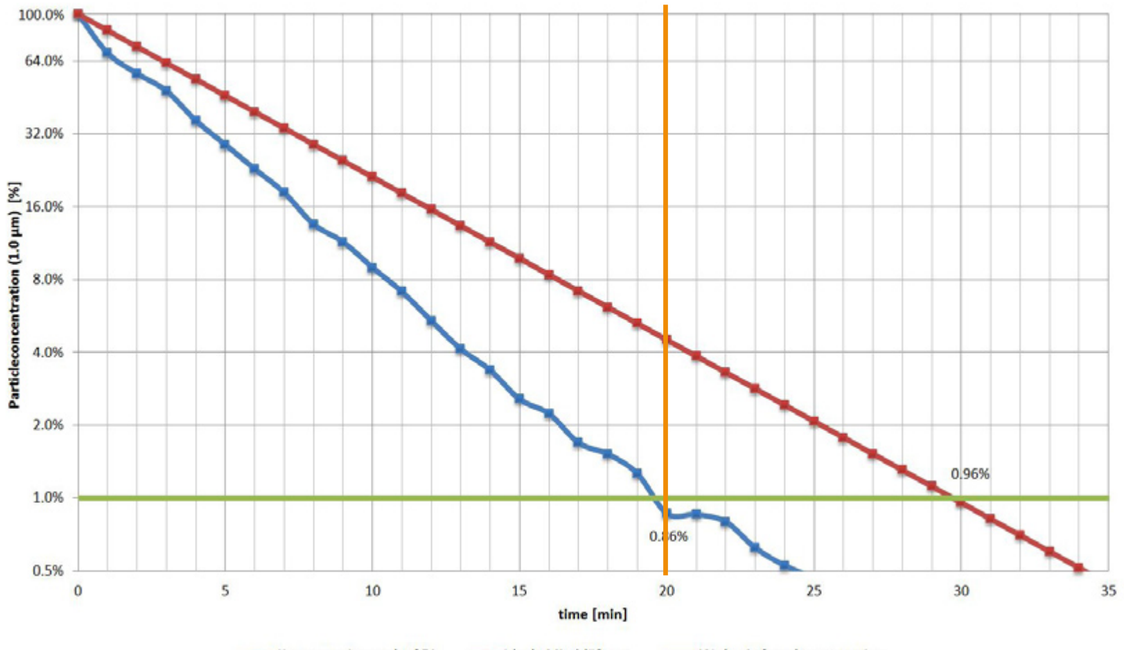


Due to the air-rolls rotating in opposite directions the room is divided into two independent halves what provides less cross-contamination and short recovery times.

SAFETY // RECOVERY TIME

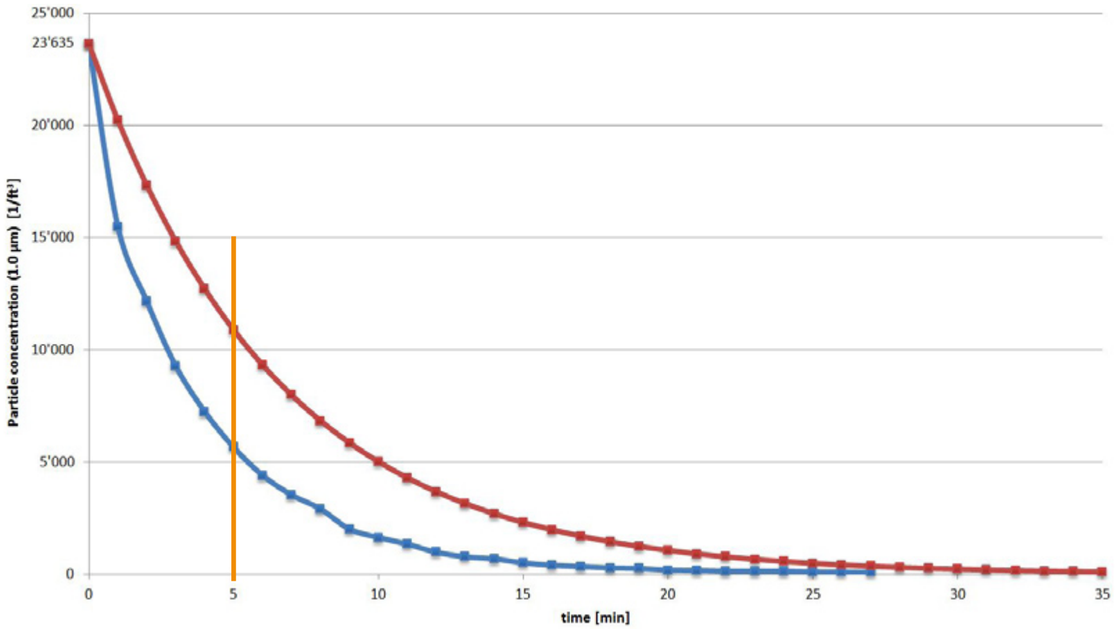
THE HL-X-VENT™ ***TEXT ?.....***

RECOVERY TIME EVALUATION



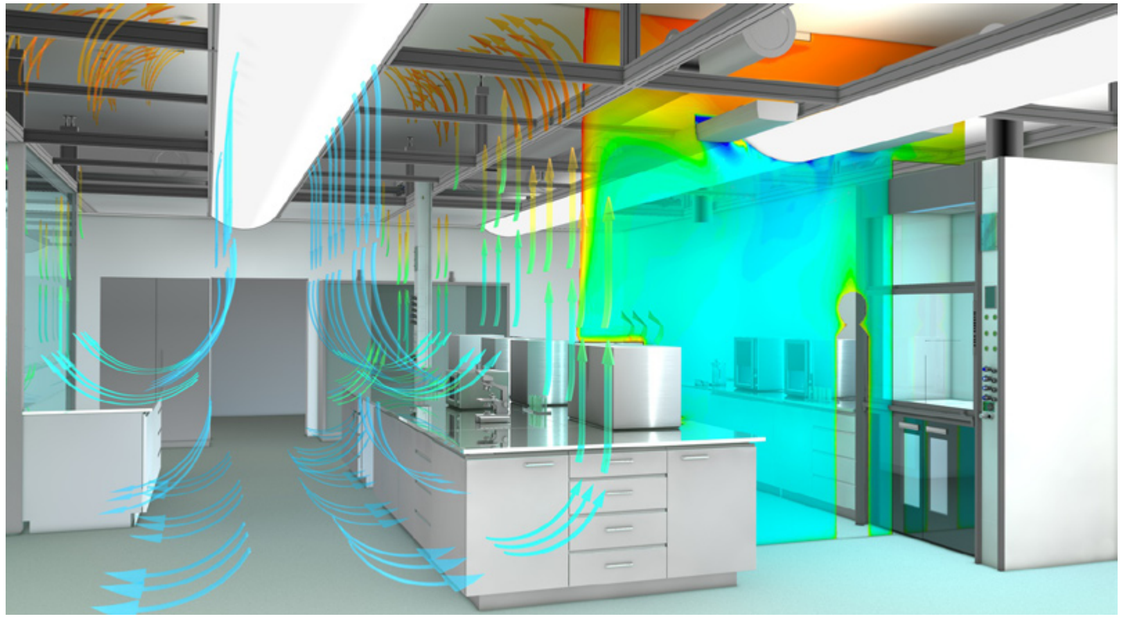
TEXT .....RECOVERY TIME EVALUATION

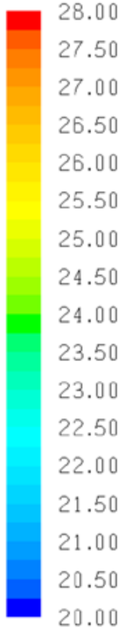
COMPARISON OF RECOVERY TIME

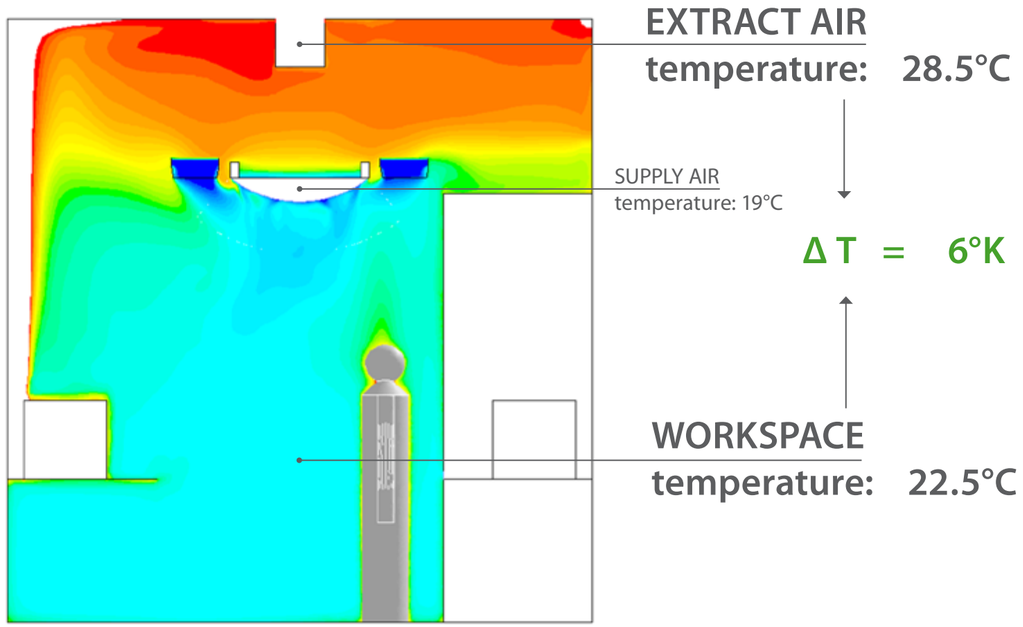


HL-X-VENT™ has a proven short recovery time thats up to 30% shorter than standard ventilation. In live condition measurements it ensures after 5 seconds (image above) a particle concentration of around 6.000 ppm in comparison to today`s standard mixing ventilation with a value of 12.000 ppm

EFFICIENCY







HL-X-VENT™ enables the extraction of thermal loads with highest efficieny.
TEXT TEXT TEXT....

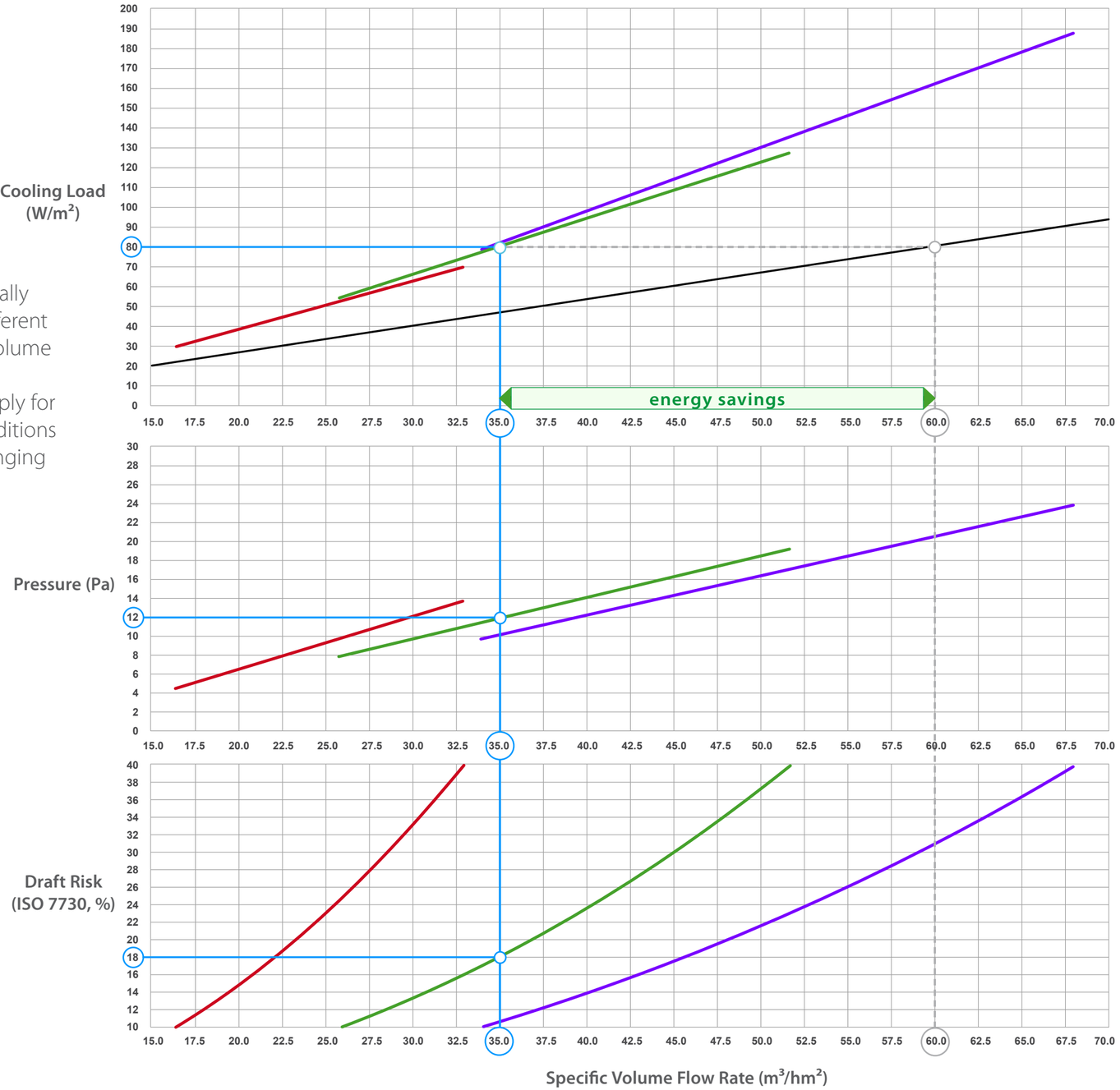
PERFORMANCE

ΔT = 4K

HL-X-VENT™ provides specifically designed air outlet shapes for different applications, cooling loads and volume flow rates.
This enables a taylormade air supply for various laboratory types and conditions as well as easy adaptation to changing workflows.

The following graphics present the optimal solution for various cooling loads and can be used with the connected parameters as a planning tool for individual ventilation layout design.

Choose from given temperature spreads on the following pages (4/ 6 / 8K) the one preferred to your application and the fitting HL-X-VENT ™ perforation design is displayed at the crossing point according to the required cooling load or specific volume flow rate.



dT-pz = 4K

Perforation A
Perforation B
Perforation C
Ideal Mixing Ventilation

The temperature spread of 4K refers to the difference between the occupied area (workspace) and supply air temperature.

An example for the application of the diagram ist given (horizontal und vertical blue lines):

For a cooling load of **80 W/m²**

perforation B (green) is recommended.

The specific air flow rate is 35 m³/hm²,

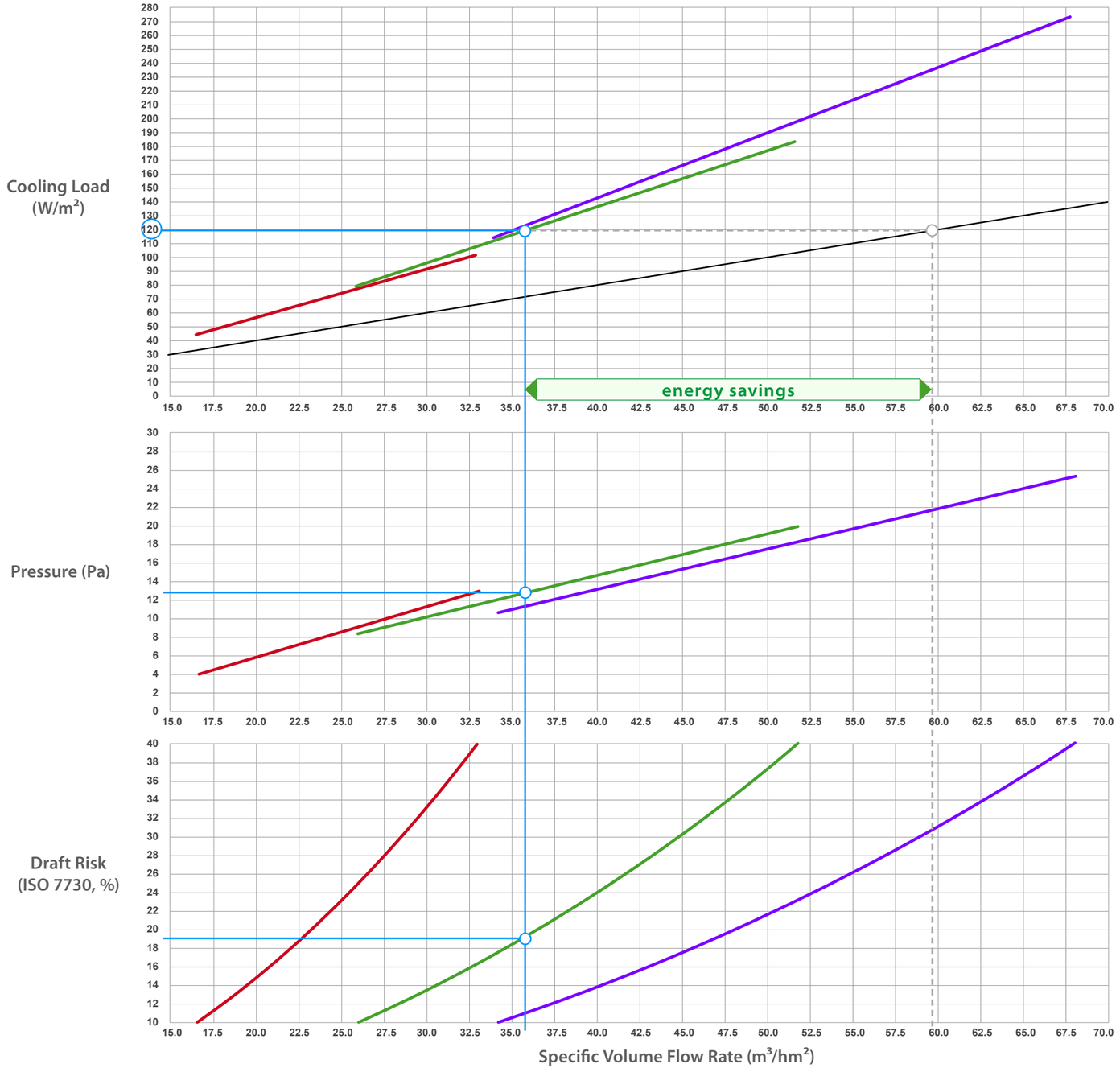
the diffusor pressure is about 12 Pa

and the mean draft risk beneath the diffusor is 18 %.

A floor area of 3,5 m² per running meter of the diffusor length is assumed.
The black line in the upper diagram refers to ideal mixing ventilation and is added for comparison. It indicates the superior performance of HL-X-VENT™.

PERFORMANCE

ΔT = 6K



dT-pz = 6K

- Perforation A
- Perforation B
- Perforation C
- Ideal Mixing Ventilation

The temperature spread of 6K refers to the difference between the occupied area (workspace) and supply air temperature.

An example for the application of the diagram ist given (horizontal und vertical blue lines):

For a cooling load of **120 W/m²**

perforation B is recommended.

The specific air flow rate is 35.8 m³/hm²,

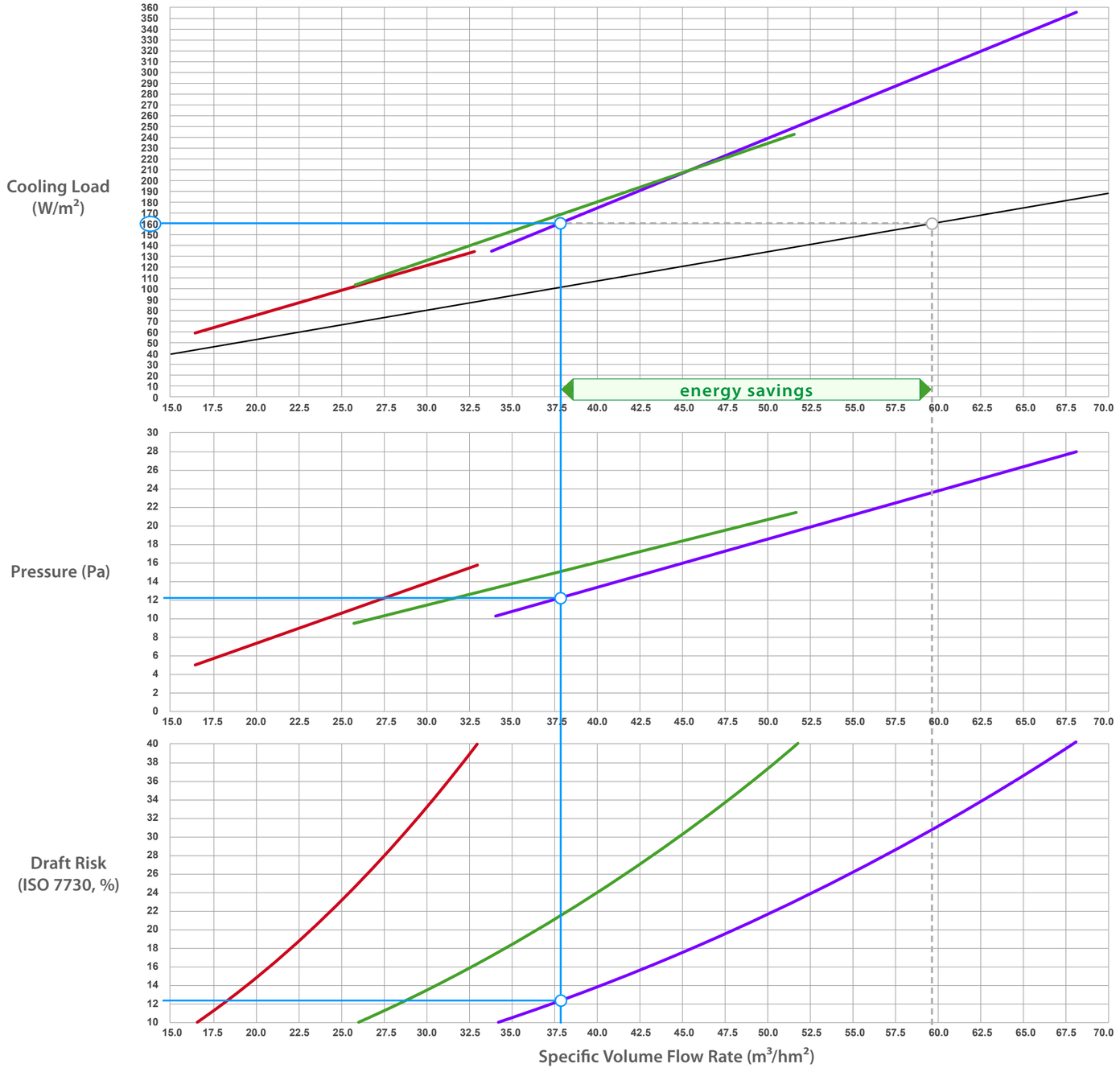
the diffusor pressure is about 12.8 Pa,

the mean draft risk beneath the diffusor is 19 %.

A floor area of 3,5 m² per running meter of the diffusor length is assumed.
The black line in the upper diagram refers to ideal mixing ventilation and is added for comparison. It indicates the superior performance of HL-X-VENT™.

PERFORMANCE

ΔT = 8K



dT-pz = 8K

Perforation A
Perforation B
Perforation C
Ideal Mixing Ventilation

The temperature spread of 8K refers to the difference between the occupied area (workspace) and supply air temperature.

An example for the application of the diagram ist given (horizontal und vertical blue lines):

For a cooling load of **160 W/m²**

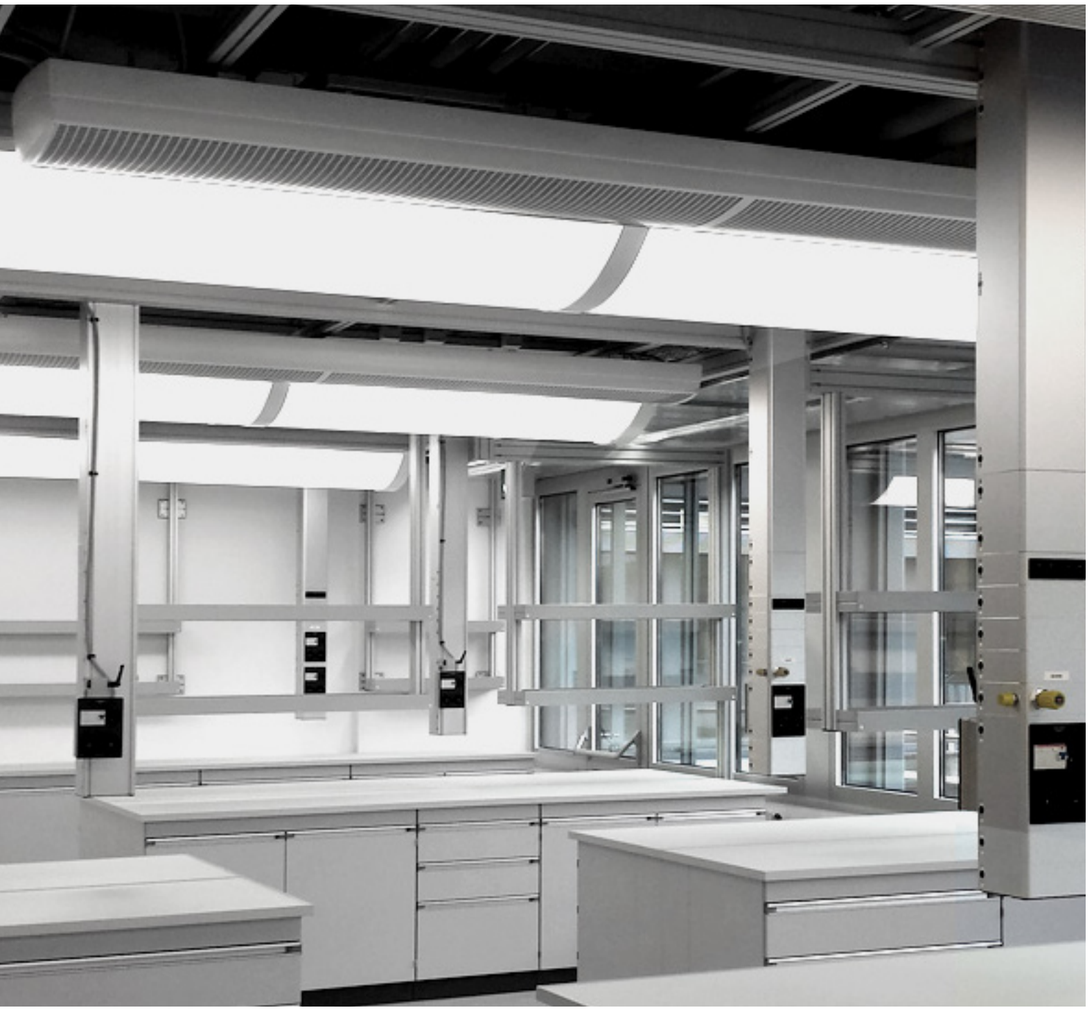
perforation C is recommended.

The specific air flow rate is 38 m³/hm²,

the diffusor pressure is about 12.2 Pa,

the mean draft risk beneath the diffusor is 12.4 %.

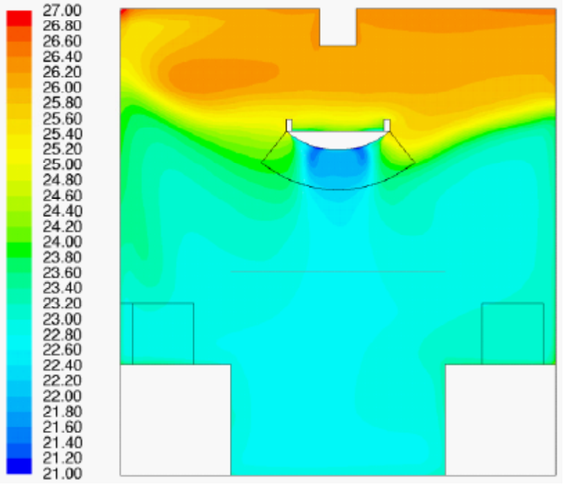
A floor area of 3,5 m² per running meter of the diffusor length is assumed.
The black line in the upper diagram refers to ideal mixing ventilation and is added for comparison. It indicates the superior performance of HL-X-VENT™.



COMFORT

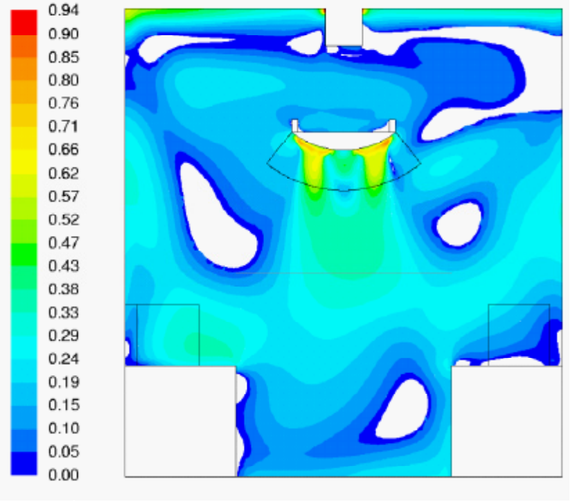
The comfort, provided by HL-X-VENT™ is of unique high quality.
Users benefit in the working space from uniform temperatures as well as lowest air speed.
In terms of draft that means a draft risk factor about 30% with an air speed between **0.05 and 0.3 m per second**.

WORKSPACE TEMPERATURES



Temp ^{0}C

DRAFT RISK FACTOR (v – 0,05)^{0,6223}



m/s

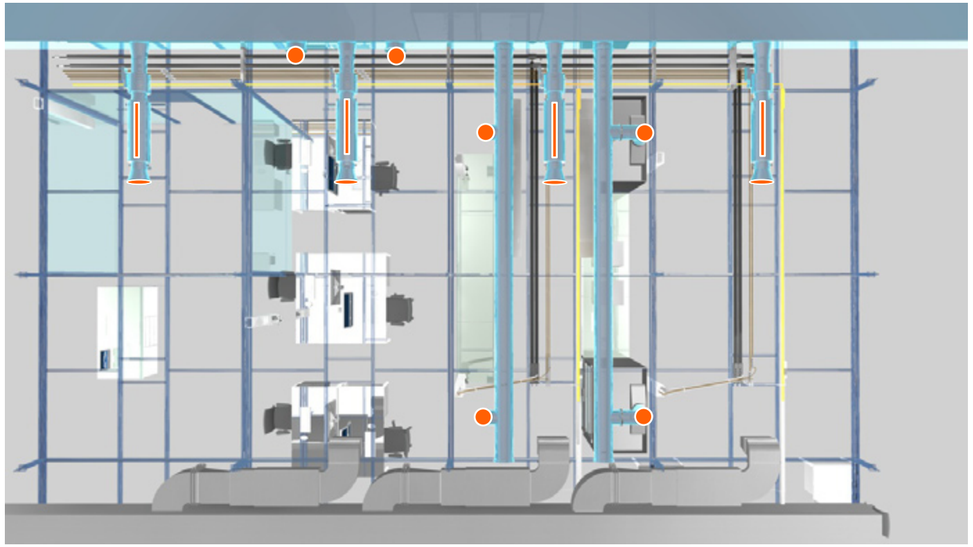
The white spots in the image show areas with an air speed of v < 0,05 m/s, that means no draft risk factor at all.

UNIQUE COMFORT BENEFITS

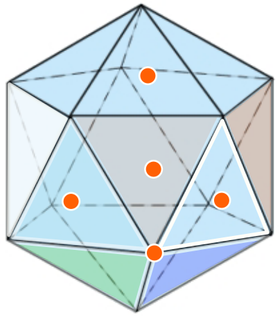
- Uniform temperatures
- Low speed air curtain
- Minimal draft risk

FLEXIBILITY

The HL-X-VENT™ system is versatile, modular and adaptive.
The seamless interoperation with additional ventilation components like cooling baffels provides extra performance for handling highest thermal loads.
The multidimensional design for extracting air at almost any point in the laboratory is unique and supports users when changing workflows with easy adaptation.
Due to the basic design machines and fumehoods can be added or removed to the system by plug`n play and without laboratory downtimes.



THE PROOVED ALL-IN-ONE VENTILATION ● possible air extraction points



MULTIDIMENSIONAL AIR EXTRACTION

- Room Air extraction
- Fume Hood Air extraction
- Machine Air extraction
- Point Air extraction (Alsidents)
- Room-in-Room Air extraction

SUSTAINABILITY

The result of the HL-X-VENT™ efficient handling of thermal loads is saved energy up to 30 %.

In a laboratory environment where a dominating part of energy consumption is required for air quality, HL-X-VENT™ makes a vast contribution for saving ressources, energy and costs.

The design of HL-X-VENT™ is made for easy maintanance and easy adaptation to changing workflows.

Longlasting, reusable and fully recycable materials complete our statement for a sustainable, technically higly evolved laboratory ventilation.

HL-X-VENT™ is the guarantee for a sustainable laboratory with efficient and safe air handling and high comfort.