



HEAT DISSIPATION UNITS WITH FREE COOLING

Reliable, energy-efficient solutions that protect your investment.

Free Line



ABOUT US

HANSA Klimasysteme GmbH has been based in Strücklingen, in the municipality of Saterland, since 1961; Saterland is known for its Sater Frisian language, the smallest linguistic enclave in Germany. Our products speak for themselves.

For decades, we have been synonymous with technically sophisticated, high-quality air-conditioning systems. As a family-owned and managed company since 1971, we stand for continuity, stability, and long-term reliability.

The company

Ever since the company was founded, we have earned a reputation throughout Germany and far beyond for manufacturing ventilation units for schools, sports halls, swimming pools and hospitals, as well as for industrial and process engineering applications. Building on this expertise, we offer a comprehensive portfolio of air-handling units for a wide range of applications.

Our units are engineered to deliver high quality, functionality, reliability and energy-efficient operation. The actual energy performance depends on the specific unit configuration and the correspond-

ing technical documentation. Throughout our product development, we have secured numerous intellectual property rights through the European Patent Office, reflecting the innovative nature of our technologies.

As a member of the German AHU Manufacturers Association (RLT-Herstellerverband e.V.), we design and manufacture our units in strict accordance with the AHU guidelines, ensuring the highest standards of quality, operational safety, and regulatory compliance for both our customers and the operators of our equipment.

The team

We invest in the continuous development of our employees and train the next generation of skilled professionals. The HANSA team comprises experienced specialists in the field of ventilation unit manufacturing, with expertise spanning refrigeration technology, control engineering, and automation.

Our units are designed and manufactured in accordance with the quality management requirements of DIN EN ISO 9001:2015.

Our sales team consists of experienced experts who are committed to finding the right solution for you.

Our philosophy

Our goal is to meet our customers' climate control requirements as effectively as possible while helping to protect the environment. To achieve this, we offer systems that can be tailored to our customers' specific operating conditions using flexible manufacturing processes and state-of-the-art components while minimizing energy consumption. As the energy requirements of both the overall system and its individual modules can be reduced without compromising performance, both investment and energy costs are reduced.

been independently assessed. Product-related emissions have been calculated using market-based secondary emission factors. We have purchased carbon credits to offset the unavoidable greenhouse gas emissions resulting from our operational and product-related activities. This simultaneously achieves positive social and environmental effects. In accordance with the EmpCo EU Directive, the results of the sustainability assessment are presented transparently as a sustainability overview on our publicly accessible ImpactBoard web portal.

The carbonfootprint of our company, our production processes and the product-related emissions – from raw material extraction to the factory gate – has

Committed to climate protection – not just through our products



HANSA is a member of the AHU Manufacturers Association (Herstellerverband Raumlufttechnische Geräte e.V.).



APPLICATIONS

Heat dissipation / Full air-handling units

For cooling server rooms or, more generally, for dissipating process heat, the units in the Free Line series can be per-

fectedly adapted to a range of applications and are capable of performing the following functions:

- Ventilation
- Mixing
- Cooling (natural and mechanical refrigeration)
- Heating (optional)
- Humidification (optional)



Operating costs – an overview

Advantages of the Free Line concept for heat dissipation:

In a typical operating scenario, up to 80% of the operating time can be covered by free cooling (using outdoor air), i.e. only the control electronics and the fans are

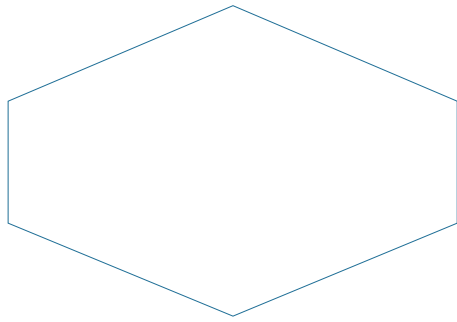
in operation, while the refrigeration compressor – the system's largest power consumer – remains inactive (see page 9).

Example:

The required heat dissipation capacity for a server room is 30 kW; the location is Frankfurt am Main. Achieving this with a recirculating air-cooling unit alone would consume approximately 82 000 kWh of electricity per year. At an electricity price of EUR 0.35/kWh, this results in

annual electricity costs of EUR 28 700. Our Free Line unit consumes approximately 20 000 kWh per year for the same cooling application while making partial use of free cooling. At an electricity price of EUR 0.35/kWh, the annual electricity cost is EUR 7 000.

Annual cost saving with a Free Line unit: EUR 21 700!



Protecting investments

An energy-efficient – and therefore cost-saving – operating principle is not the only reason to choose a HANSA Free Line heat dissipation unit.

Reliability and operational safety are equally important. HANSA heat dissipa-

tion units are durable and built to a high standard of quality. If a very high level of operational reliability is required, various redundancy configurations can be implemented using the standard DDC controller.

Communication and BMS integration

HANSA Free Line units can, of course, be integrated into your building man-

agement system (BMS) via all standard communication interfaces.



FEATURES

Function

Free Line heat dissipation units are equipped with a mechanical refrigeration system or a chilled water coil for integration into a central chilled water system, an optional supply air humidifier, a Direct Digital Control (DDC) system with an operator panel, and double louvre dampers for extract air and outdoor air, enabling the various operating modes to be implemented within a very compact unit.

Filter pressure drops and airflow rates are, of course, continuously monitored. In addition, analogue temperature and humidity sensors are installed in the

supply air, extract air and outdoor air streams to ensure optimum control. An optional heating coil can also be installed, with the corresponding fault signals integrated into the DDC system.

Units with a cooling capacity of 30 kW or more are equipped with two refrigeration circuits.

Depending on the project, Free Line units can also be fitted with HANSA inverter cooling '*etaCool*' to further optimise energy efficiency.

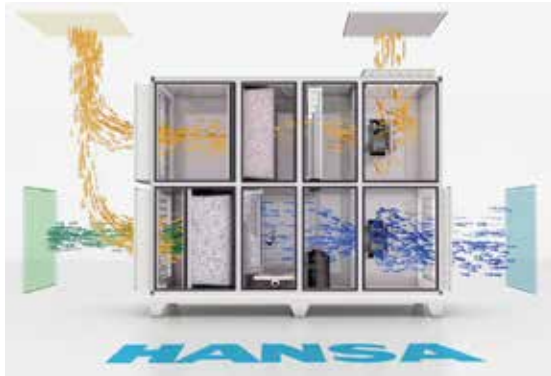
Customisation and quality

Free Line units are designed entirely using our AirCalc design software, which is certified by TÜV Süd. This enables us to manufacture highly customised units tailored to specific customer requirements. As a member of the relevant manufacturers' association, we also classify our

Free Line system solutions as complete machines in accordance with the EU Machinery Directive. Following a comprehensive conformity assessment, they are CE marked accordingly – for your safety and peace of mind. Naturally, our company is certified to DIN EN ISO 9001:2015.

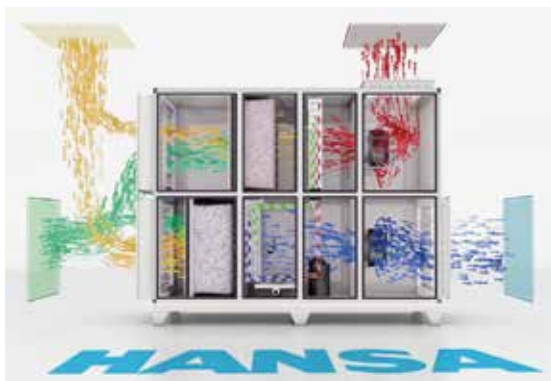


OPERATING MODES



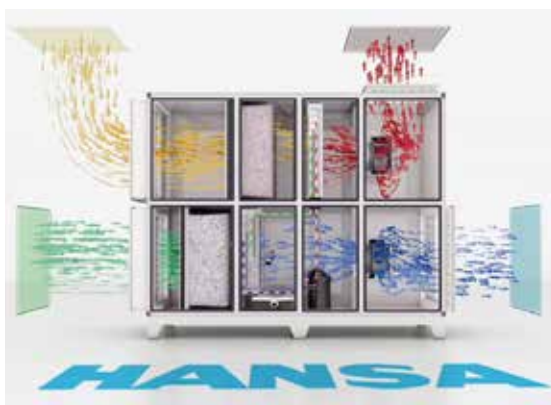
Operating mode 1

The outdoor air temperature is significantly lower than the extract air temperature, allowing the heat load to be dissipated using outdoor air (with extract air mixed in if the supply air temperature would otherwise fall below the minimum setpoint), without the need for the mechanical refrigeration system.



Operating mode 2

The mechanical refrigeration system is activated as soon as the maximum supply air temperature is exceeded. If necessary, the dehumidified air is rehumidified (optional module required).



Operating mode 3

When the outdoor air temperature is higher than the extract air temperature, recirculation mode with an active mechanical refrigeration system is the most economical solution. The condenser is cooled by outdoor air; in addition, outdoor air can be mixed into the supply air to meet the requirements for occupied spaces.

ENERGY-SAVING POTENTIAL

Operating conditions on the Mollier h-x diagram

The figure on the right shows the distribution of operating modes and their share of the annual operating hours on the Mollier h-x diagram. The outdoor air conditions are based on a weather data histogram for Frankfurt am Main.

Free cooling can be used in **Zone 1**. By mixing in return air, the desired supply air temperature can always be achieved without the need for humidification, dehumidification or mechanical refrigeration. This is the most economical operating mode, accounting for 40.7% of the year (3 570 hours).

Zone 2 represents 3 459 operating hours per year, corresponding to 39.5% of the annual operating time. Significant energy savings can be achieved in this operating mode because cooling is provided using outdoor air, without the need for mechanical refrigeration. A sufficient amount of return air is mixed with the cooler outdoor air to achieve the required supply air temperature. At the same time, the exhaust air volume is reduced by the same proportion, allowing the fan speed to be reduced and, consequently, lowering energy consumption. Depending on the humidity of the outdoor air, a small amount of additional humidification may be required.

In **Zone 3**, the outdoor air temperature exceeds the permitted supply air temperature and must therefore be reduced to the required level by thermal post-treatment (the first stage of the mechanical refrigeration system). As the outdoor air temperature is still lower than the extract air temperature, slightly cooling the outdoor air is more economical than operating in recirculation mode at full cooling capacity.

Zone 3.1 on the left-hand side of the Mollier h-x diagram represents a special operating condition. Depending on the moisture content of the outdoor air, a small amount of

additional humidification may be required. **Zone 4** places no requirements on humidity; however, a higher cooling capacity is required. The second stage of the mechanical refrigeration system must be activated to achieve the required supply air temperature.

Outdoor air conditions within **Zone 5** have a higher energy content than the extract air. It is therefore preferable to avoid outdoor air operation and instead maintain the required indoor climate under recirculation mode.

In the right-hand **Zone 5.1**, operating in outdoor air mode could require the air to be dehumidified extensively in order to achieve the permitted room temperature. This in turn would require a high cooling capacity and correspondingly larger cooling units (the capacity of all units would need to be approximately doubled, which would also double the connected electrical load). Finally, the airflow rate would also have to be doubled to provide the required cooling capacity.

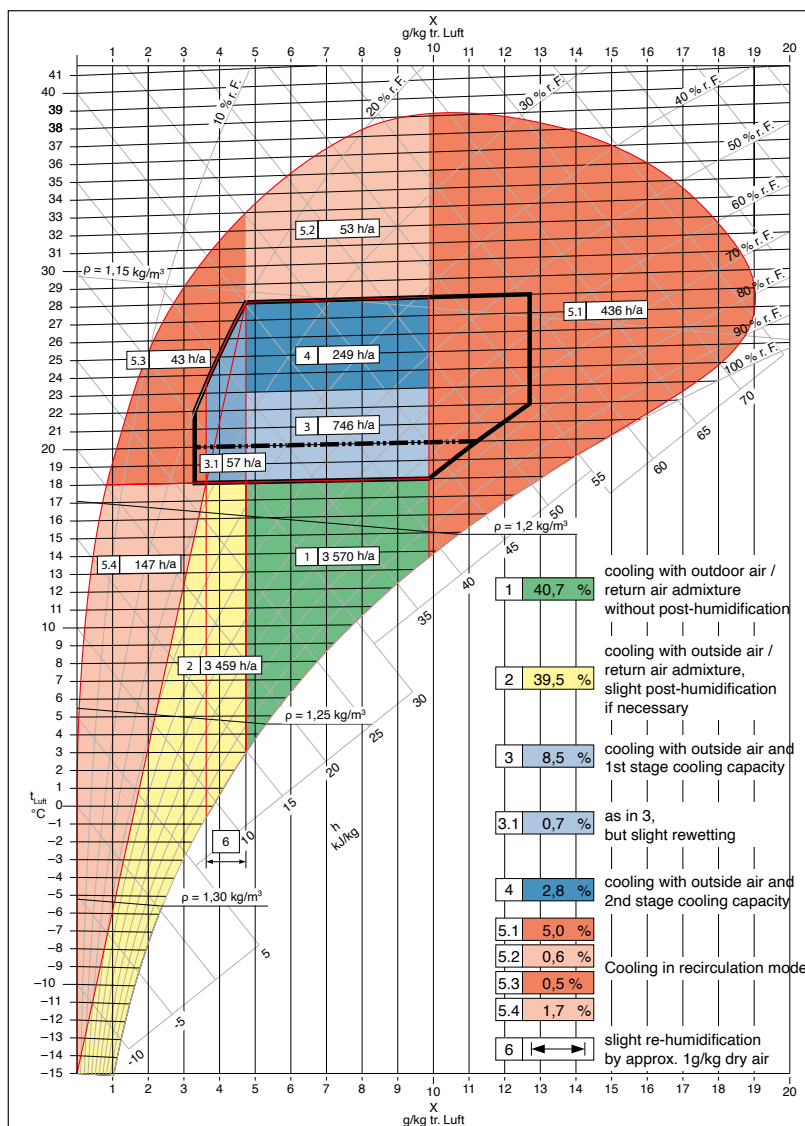
In the upper part of **Zone 5.2**, the outdoor air temperature is higher than the indoor air temperature; it is therefore more economical to recirculate the lower-temperature extract air back into the room after appropriate thermal treatment rather than operate the system in outdoor air mode. Here, too, operating in outdoor air mode would increase the required cooling capacity dramatically, despite the fact that – as shown in the Mollier h-x diagram – these conditions occur during only a few operating hours per year.

In **Zone 5.3**, a high humidification capacity would be required in outdoor air mode to achieve the permitted supply air conditions. This would result in a substantial increase in the connected electrical load (by approximately a factor of four). When designing the air-handling unit, the humidification section would have to be enlarged.

The narrow **Zone 6** represents the operating hours during which only a low level of humidification is required. This low demand results from the optimisation of all operating modes used to achieve the required room conditions. Throughout recirculation mode, dry cooling is employed, so no dehumidification takes place and the room humidity remains constant. The humidification system has only a low con-

nected electrical load. Regardless of its connected load, it need not be taken into account when determining the total connected load, as its operation never coincides with that of the second stage of the mechanical refrigeration system. If a minimum fresh air rate is required, this requirement can also be met at all times. The independently controlled dampers located on the air intake side allow virtually any operating mode to be implemented and can be adjusted, controlled and optimised to suit virtually any airflow configuration and operating requirement.

This means that the Free Line unit operates for more than 7 000 hours per year (over 80% of the year) without the need for the mechanical refrigeration system.



The operating-mode zones are highlighted in colour on the Mollier h-x diagram and labelled with both their zone designation and the corresponding number of operating hours per year.

REFERENCES

Joint Control Centre Oldenburg

The Joint Control Centre in Oldenburg is equipped with numerous HANSA ventilation and air-handling units. Two compact heat dissipation units protect the technical equipment.



Altana AG, Wesel

The ALTANA Group develops and manufactures high-quality, innovative speciality chemicals. HANSA supplied and installed two compact heat dissipation units, including Saia Burgess DDC controls.



Oldenburg State Theatre

The Oldenburg State Theatre employs around 450 people and operates four venues. In addition to other HANSA ventilation and air-handling units, a compact heat dissipation unit was also installed.



Energieversorgung Offenbach AG

As an energy supplier and waste management company, EVO is a driving force for Offenbach and the surrounding region. The server rooms are cooled by 22 networked Slim Line Q 15 units.



Ringier Print AG

Ringier AG is an innovative, digitalised and diversified Swiss media company operating in Europe, Asia and Africa. Two weatherproof, compact heat dissipation units, each equipped with Saia Burgess DDC controls, ensure reliable operation.



DolWin3 converter station

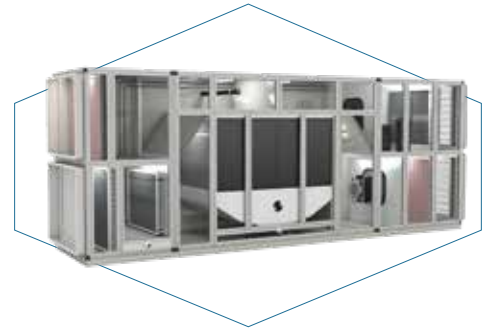
HANSA supplied and installed the air-conditioning and cooling systems for the converter station. Four supply air units, each with an air volume of 80 000 m³/h, and six extract air units, each with an air volume of 33 500 m³/h, are installed in the reactor hall. Each of the two valve halls is air-conditioned by two Free Line units, each with an air volume of 70 000 m³/h.



MORE PRODUCTS

Blue Line

Highly customisable ventilation and full air-handling units with central heat recovery, designed for energy-efficient operation. All standard heat recovery systems can be integrated, including plate heat exchangers, rotary heat exchangers, run-around coil systems and Accublock.



Slim Line

Highly efficient, compact units manufactured in large quantities for cooling spaces with high thermal loads. Compared with recirculation or split-system units, these units can deliver significant energy savings in specific applications. Actual savings depend on the individual operating conditions.



ReCool Line

Recirculating air cooling units for removing excess heat from spaces with high thermal loads – whatever the operating conditions. Put your trust in HANSA, the climate specialist, and choose the recirculating air cooling unit that best meets your requirements.



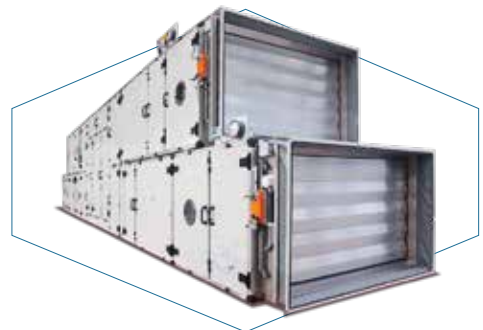
Pool Line

Swimming pool dehumidifiers are designed to provide comfort, protect the building, and operate efficiently. Their durable, energy-efficient design helps to reduce operating costs while meeting the specific requirements of each project.



Blue Line Hy

Germ-free, clean air is an essential requirement in hygiene-sensitive environments. Our Blue Line Hy air-handling units condition the air to meet specific application requirements.



Compact Line

The modular design of this product range enables cost-effective manufacturing while providing maximum flexibility and versatility. The units are designed to meet high quality standards while ensuring cost-effective operation.



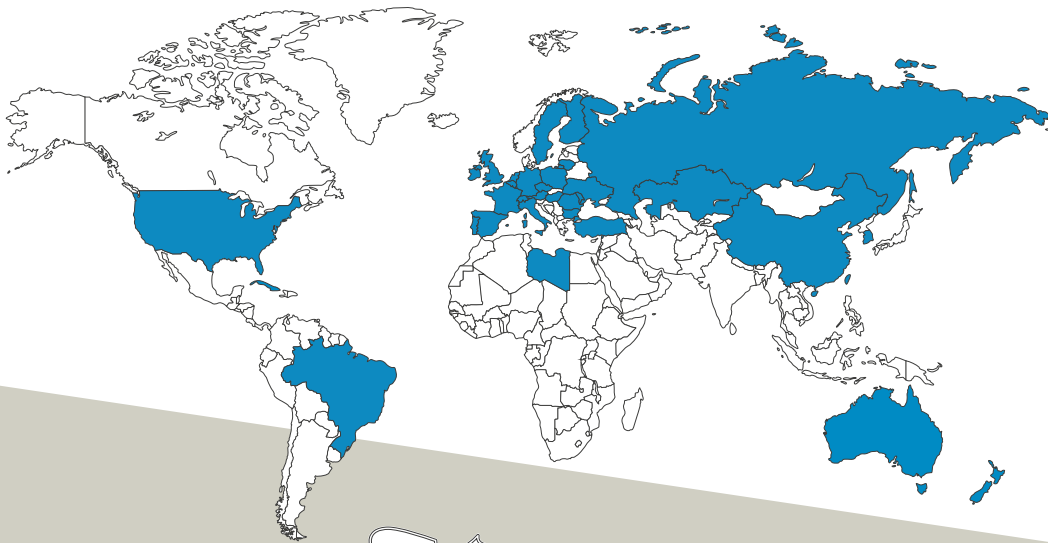
Specialised units

Our specialist product range includes the LF-HY (food hygiene) and Hygro Line (recirculating-air dehumidification) series. More detailed information about all our products is available on our website.





Our units around the world





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