

» AIR TREATMENT

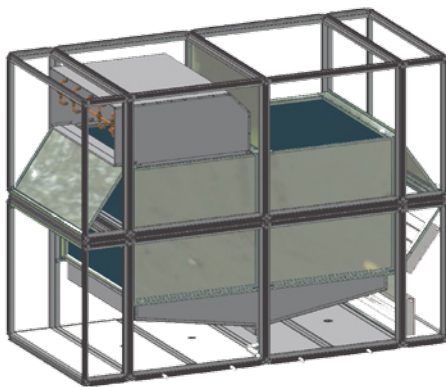
CAIRplus SX » ECOTWIN cool

# CAIRplus<sup>®</sup> SX » ECOTWIN cool

» DOUBLE-PLATE HEAT EXCHANGER WITH ADIABATIC COOLING



# Energy-efficient air handling for highest demands



The reduction of greenhouse gases enjoys a high political priority. The strategical objectives of the European Union extend to 2020 and comprise the following:

- to reduce emissions of greenhouse gases by 20%
- to increase share of renewable energy sources by 20%
- to enhance the energetic efficiency by 20%

Energy-efficient building technology is one of the key factors in achieving these goals. FläktGroup is following these challenges and offers customized solutions to keep energy consumption at a minimum.

Double-plate heat exchangers with an efficiency factor to reach 80% enable energy-saving heating operation. The extension using adiabatic cooling of return air substantially reduces demand for cooling energy during cooling operation.

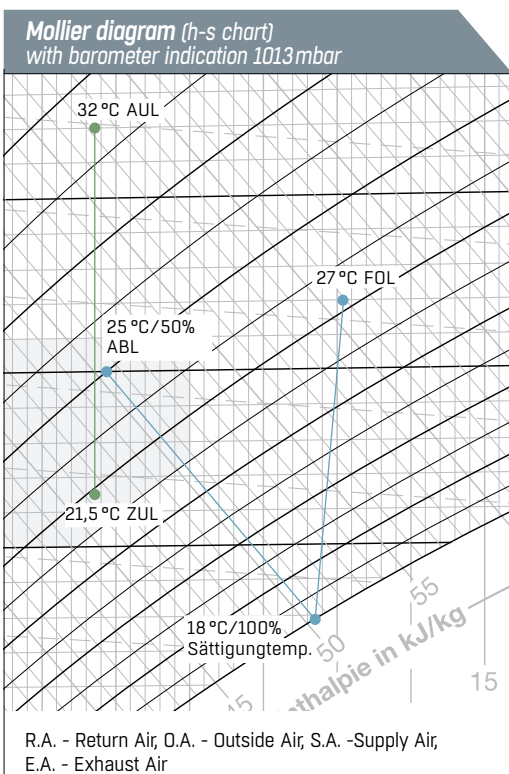
## Operating mode

Adiabatic method is used to humidify and cool return air up to the saturation point. This cooled air can now absorb heat from the ambient air and in such a way reduce its temperature.

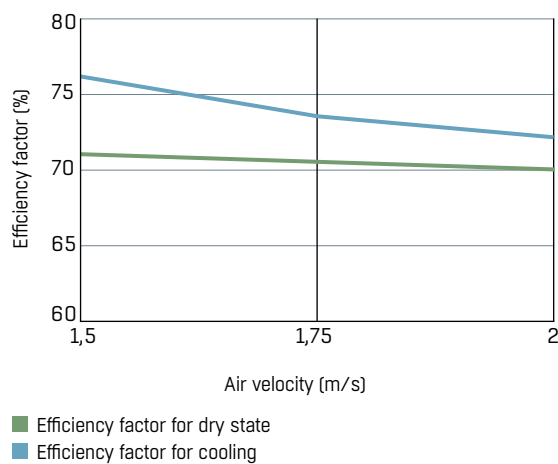
Humidification is performed by nozzles in the intake cross section of the plate heat exchanger. This method enables uniform droplet distribution over the entire cross section of the heat exchanger. Additional evaporation on the heat exchanger plates increases the overall efficiency of the system.

With water line pressure of 3-5 bar it is already possible to reach a sufficiently small droplet range. Thus, a booster pump is not necessary.

Efficiency factor of adiabatic cooling is based on the saturation temperature of the return air. With return air condition of 25°C and 50% relative humidity the saturation temperature amounts to 18°C. Outside air is cooled from 32°C to be supplied at 21.5°C with an efficiency factor of 75%.



### Cooling efficiency factory ECOTWIN cool



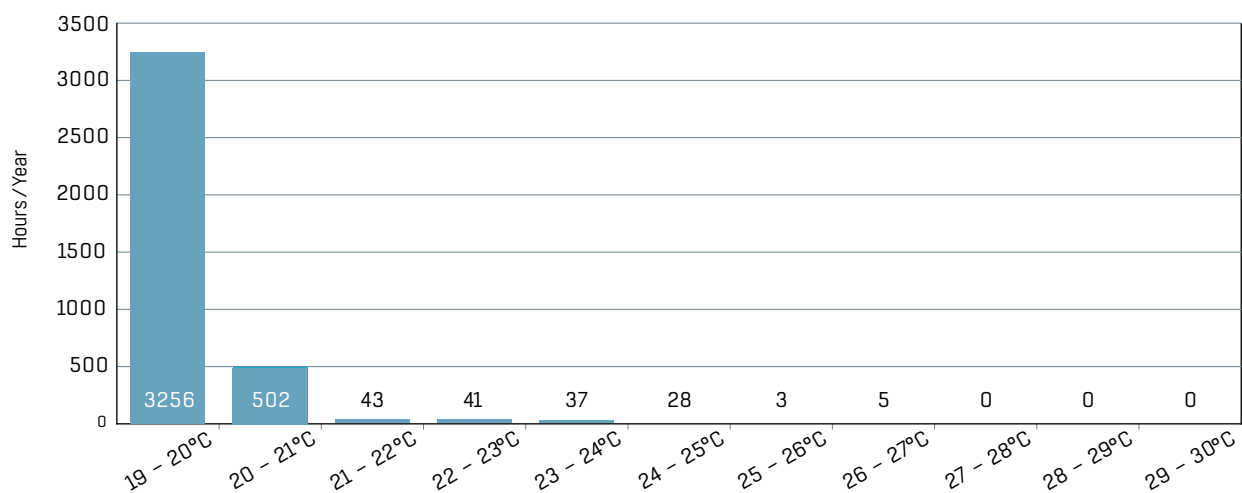
## Cooling efficiency factor

**Efficiency factor for cooling primarily depends on the flow velocity in the unit cross section. Thanks to additional evaporation on the plates this factor exceeds the one for heat recovery.**

Adiabatic humidification does not create any additional pressure drop in the unit and therefore operates at highest energy-efficiency levels.

The advantage of adiabatic cooling is ensured by the significant reduction of operating costs attributed to compressor-based refrigeration units. Savings reaching as high as 65% can be considered as realistic. Besides, the refrigerating machine can have smaller dimensions. Attention should be paid to the fact that dehumidification of outside air can only be performed with a downstream cooling coil. If supply air temperature exceeding e.g. 20°C for some hours during the year is acceptable, it can be done without aftercooling stage at all.

### ECOTWIN cool without additional mechanically generated cooling: Frequency of supply air temperatures in the city of Mannheim



This example refers to the city of Mannheim as location and assumes 7-days a week operation.  
Supply air temperature of 22°C is only exceeded for 114 hours.



# CAIR<sup>plus</sup>® WITH ECOTWIN *cool* CAPACITY REGULATION

For capacity regulation and reduction of water consumption the nozzles can be cycled.  
Fluctuations in the supply air temperature do not occur, if the capacity is reduced to 70%.

Nozzle cycle			
On	Off	Capacity	Consumption
100 sec.	0 sec.	100%	100%
30 sec.	15 sec.	93%	67%
30 sec.	30 sec.	85%	50%
15 sec.	30 sec.	70%	33%
0 sec.	100 sec.	0%	0%



Double softening



Reverse-osmosis unit

## Water quality

As a result of evaporation the concentration of limescale in water increases. Lime deposits and forms a crust on the heat exchanger surfaces. To avoid this, water treatment is urgently required. To determine what type of water treatment is needed, depends in the first place on the conductivity of fresh water. Water softening is sufficient with conductivity up to approx. 500  $\mu\text{S}/\text{cm}$ . Higher conductivity makes additional demineralization in a reverse-osmosis unit necessary.

# CAIRplus<sup>®</sup>-Air Handling Unit with Integrated Energy Recovery

## Key features

- Adiabatic cooling with directly sprayed double-plate heat exchanger
- High cooling capacity thanks to additional evaporation on the plate surface
- Saves around 65% of cooling energy input
- Enables use of smaller refrigeration systems
- Does not lead to additional pressure drop
- High efficiency factors reaching 75% as related to saturation temperature
- Without recirculating water which ensures hygienic operation
- No pump is required, the system operates at 3 to 5 bar water flow pressure

### Application examples

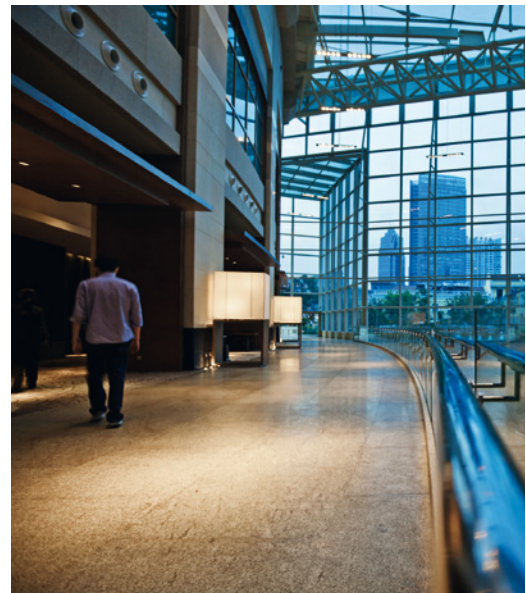
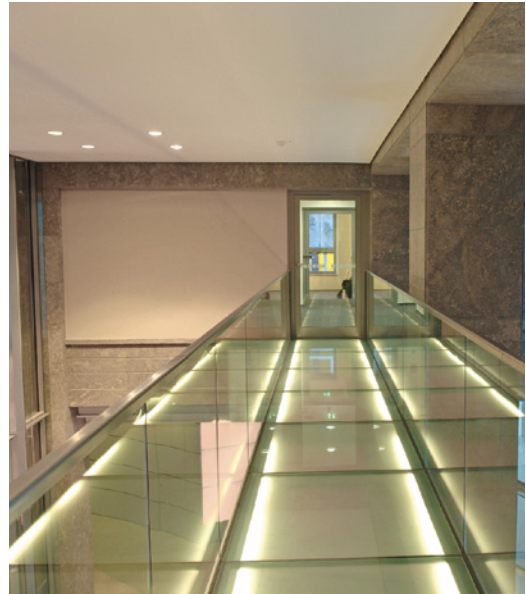
- Office buildings
- Supermarkets
- Hotels
- Industrial facilities

### Range of application

- Required water quality
- Up to approx. 500  $\mu\text{S}/\text{cm}$  using softened water
- With increased salt content using permeation technology based on reverse osmosis
- Dehumidification is performed by the downstream cooling coil
- Available for unit model height xxx.128
- Max. air flow rate 23,000  $\text{m}^3/\text{h}$

### Other data and important features

- System is recommended by VDI 3803 standard
- Plate heat exchanger is performed with epoxy resin coating and is additionally insulated





# Service and maintenance for peace of mind

## **Our commitment to you**

### Our services at a glance

- Own heat exchanger production
- Use of certified products and components
- Use of components from well-known component manufacturers
- Short delivery times for spare parts
- Commissioning of new facilities
- Periodic servicing
- Maintenance
- Factory trial run
- Upgrading and optimisation of old facilities
- Maintenance agreements

- Initial installation
- Maintenance and servicing
- Assembly services
- Spare parts
- Customer service
- Consulting
- Refurbishing
- Training







## Specification and Installation

Whether you choose to have FläktGroup, or another supplier's equipment installed, we will be by your side to ensure installation and commissioning is completed efficiently and effectively.

## Evaluation and Recommendation

FläktGroup service experts will visit site and evaluate your existing equipment. We can offer recommendations how to achieve the best from your existing equipment, enhancing efficiency and longevity.

## First Fix Strategy

If you have a problem or an issue we will work with you to fix the problem on site the first time our engineers visit. We will be by your side to ensure your equipment is functioning and achieving the best output in the most efficient manner achievable.

## Development and Replacement

We will build a relationship with you and learn your needs. We will then be able to use our knowledge of existing and developing systems to be able to advise when the best choice is a replacement system. Our engineering and manufacturing teams keep our engineers informed of technological advancements, so when it is time to upgrade and replace your equipment, we will be the perfect partner to help you through the benefits and gains from new, more efficient equipment.

## Contract levels to suit all requirements

We provide an excellent choice of planned maintenance options along with essential emergency cover to give you peace of mind.

## EXCELLENCE IN SOLUTIONS

WWW.FLAKTGROUP.COM

CAIRplus SX » ECOTWIN cool

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 | Air Conditioning & Heating  
Controls | Service

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or contact one of our offices

