

# Indoor swimming pool air conditioning

Private swimming pool | Hotel swimming pool | Saline swimming pool  
Sport swimming pool | Recreational bath | Sauna area | Heat recovery from waste water



**menerga**  
a systemair company

# Menerga: Minimal EnergyApplication

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Complex buildings accommodate a large number of different room types and special architectural features. Menerga remains on top of things and finds the perfect solution for any project. With over 40,000 installations and systems world-wide, we cover almost every type of building. When searching for the best solution, we jointly analyse the conditions at the location. In this manner, we and our partners have jointly implemented countless projects, which have received many awards for energy efficiency. We are proud of this. But what we really like about this is the knowledge about jointly developed solutions, which allow operators

and investors to save money – day after day, month after month, and year after year. The investment costs are amortised within a very short period.

We will be happy to produce reference lists for the building types in which you are interested. And in the event that you surprise us with a totally new project, we will find the right solution for any requirements. With our eyes sharpened by countless special projects, e.g. the "ALMA" telescope facility in the Atacama desert, or the "Princess Elisabeth Station" at the South Pole, we will be happy to accept the challenge.



## Experts at your service Technical Customer Service

Experts at your service, anytime, anywhere. With a comprehensive range of services and an extensive service network throughout Europe, the Menerga Technical Service guarantees the most economical and advanced services over the entire life cycle of your system, from the day of commissioning onwards.

More than 120 service technicians at various service centres, and 40 service engineers at the Menerga locations, provide a professional all-inclusive service, with the objective of achieving high availability of the systems and a maximum of efficiency. The range of services

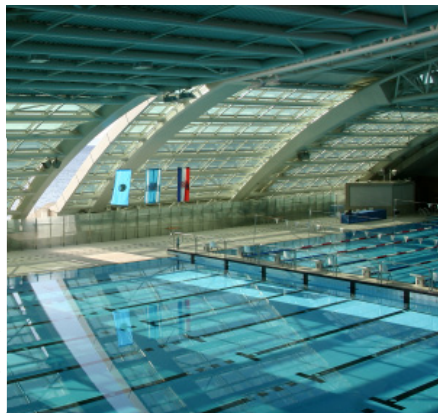
offered by the Menerga Technical Service covers everything from the test run at the factory and on-site commissioning, through periodic servicing, repairs, remote maintenance and remote diagnosis by means of direct dial-up options, to the refurbishment and optimisation of the systems.

We supply you with the right service concept, customer-specific and application-specific. In the event of an emergency, you can reach us 24 hours a day on the following telephone number:  
**+49 208 9981-199**



# Core competencies

## Our areas of application



© City of Rijeka

### INDOOR SWIMMING POOL AIR CONDITIONING

Private swimming pools, public swimming pool halls, adventure pools, sports pools, saline baths, hotel pools, school pools, therapeutic pools and many more.  
Last not least: heat recovery from waste water.

The air conditioning of swimming pool halls is one of the most challenging areas for air conditioning. Here we started 35 years ago, this is where we grew up, and we are now market leaders and innovation pioneers. Our special competency lies in the high heat recovery efficiency lowering operating costs, while robust system design overcomes adverse conditions.



### COMFORT AIR CONDITIONING

Low-energy buildings, offices, museums, sports facilities, schools, clinics, hotels, banks, historical buildings and many more.

With comfort air conditioning, the focus is on people. Our technology is based on the respective requirements of a project, but simultaneously always looks for the most efficient method with the lowest consumption of energy. For example, we cool with water in order to save electrical energy, or make use of sorption-based air conditioning, with which you can carry out dehumidification by means of heat, e.g. from solar thermal energy or process waste heat. It is even possible to store excess solar heat for an indefinite period without any losses for the purposes of dehumidification.



### PROCESS AIR CONDITIONING AND CHILLED WATER

Air conditioning of data centres, industrial drying, process cooling, air conditioning for warehouses, cold water generation and much more.  
Last not least: heat recovery from waste water.

The process air conditioning system must ensure that defined air conditions prevail in a defined situation. Menerga systems guarantee reliable drying, cooling or heating. In the field of chilled water, our systems reliably provide the desired water conditions. In this sector, too, saving energy through the use of intelligent technology is our top priority.



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### SPECIAL SOLUTIONS

Research projects, special applications

Challenges and unusual projects are the milestones of Menerga's company history. Since the foundation of our company, we have designed solutions for each individual customer. We enjoy taking on challenging projects, knowing that these are the projects that bring valuable experience, and which also improve the filter class of our "standard" systems.



# Indoor Swimming Pool Air Conditioning

## REQUIREMENTS: PRECISION TECHNOLOGY ROUND-THE-CLOCK

The air conditioning of an indoor swimming pool hall fulfils two main tasks:

- 1<sup>st</sup> The creation of an ideal pleasant climate for sportsmen and women and wellness fans.
- 2<sup>nd</sup> The continuous dehumidification of the air in the swimming pool hall in order to protect the structure of the building against damage from moisture over the long term.

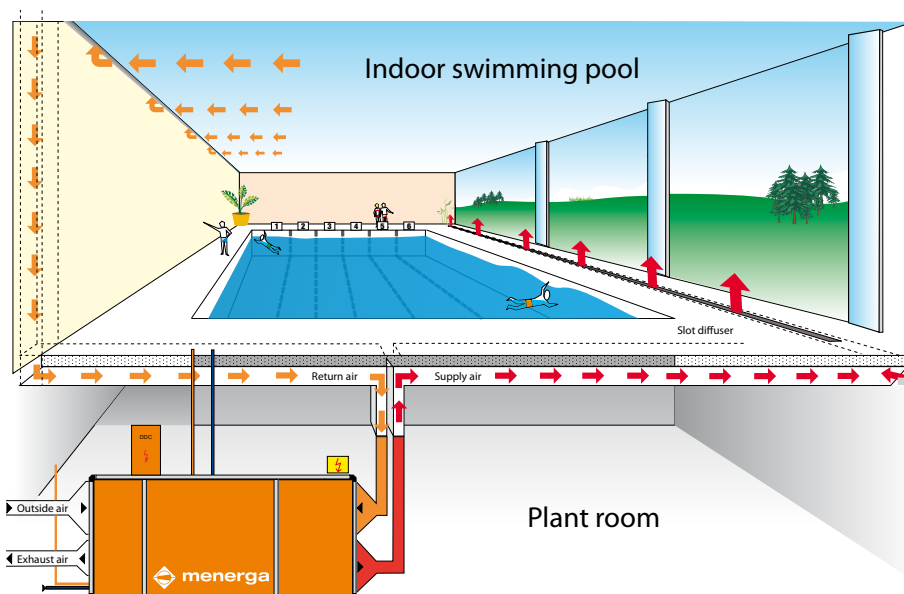
Irrespective of the intensity of use of the swimming pool hall, the high level of water evaporation requires 24-hour operation of the air conditioning system, ideally regulated by an intelligently designed and controlled system.

Indoor swimming pool air conditioning is considered to be an extremely demanding discipline, a discipline in which Menerga is the market and innovation leader. Our systems ensure the customised and fully

automatic aeration, dehumidification and heating of the rooms, always within the most economical operating point. For intelligent air distribution we offer slot diffusers, which keep large window fronts mist-free. And we set our sights not only on the swimming pool hall itself: with our systems you also create the ideal climate in neighbouring areas such as the restaurant, sports area or changing rooms. Rely on our expertise!

### Menerga KLIMA-PLUS:

Menerga systems are developed and manufactured to have long service lives and for operation with the lowest possible operating costs. We at Menerga always think things through – that one famous step further – and focus on your project and all its special requirements. You yourself profit from this doubly. This is because anyone who decides on efficient, first-class technology not only saves on operating costs, but also benefits in terms of environmentalism and independence.







# Relevant values

AT THE END OF THE DAY IT IS THE COSTS THAT COUNT!

Swimming pool halls are usually operated at an air temperature between 30°C and 34°C in order to provide the lightly clad bathers with a comfortable environment. For this reason, the swimming pool hall air is almost always warmer than the outside air. Usually, ventilation of the swimming pool hall means a continuous loss of energy. A good heat recovery system and regulation in line with requirements pay off within a very short time. Fact is: the most important aspect with respect to the costs of a swimming pool is not the investment costs, but the operating costs. Anyone who makes an intelligent choice may save over the long term

while operating a totally reliable air conditioning system. Menerga systems are designed to be energy-efficient from the ground up and equipped with an intelligent control system which always selects the optimum operating mode automatically in line with requirements. Every day the systems save not only energy, but also valuable resources. Due to their high level of efficiency, they are ideal for use in swimming pool halls in accordance with the passive building standard. All Menerga systems are manufactured to be robust and durable and guarantee long and trouble-free operation.

## Your advantages:

- ▶ Intelligent, innovative and highly efficient systems and concepts
- ▶ Robust equipment design with corrosion-free heat exchangers made of polypropylene
- ▶ Very low operating costs
- ▶ Utilisation of renewable energy sources
- ▶ Integrated control system
- ▶ Compact, space-saving integrated units
- ▶ All systems tested in factory trial runs
- ▶ Ready for installation delivery
- ▶ Excellent maintenance concepts
- ▶ Representatives throughout Europe



# Good Climate in Private Swimming Pools

## REQUIREMENTS

Private swimming pools generally have short periods of activity and very long "resting" phases. During the activity period, the hall is usually used by only a few people. In other words: the conditioning of the swimming pool hall air focuses on dehumidification and ensuring that the desired temperature is constantly maintained. With this level of use, a continuous addition of fresh air is often not required - a fact that keeps the operating costs very low, particularly in the colder months.

A central air conditioning unit has many advantages compared to floor-standing solutions, for example. A floor-standing unit dehumidifies the swimming pool hall air through the use of a refrigerating

machine to cool the air down to the dew point and condensing the water out of the air. The dehumidified air then has to be reheated in a heating coil in order to ensure a constant temperature level in the swimming pool hall. A central air conditioning unit with a high level of heat recovery reduces these heating costs significantly, with up to 80% of the heat being recovered from the swimming pool hall return air.

Central air conditioning units also allows the admixing of outside air in the summer months or even free ventilation. The swimming pool hall climate is improved as a result and again operating costs can be saved.

A central air conditioning unit is usually installed in a plant room outside the actual swimming pool hall and therefore does not disrupt the swimming pleasure neither visually nor acoustically. Intelligent air distribution through the use of slot diffusers keeps window fronts mist-free.

A private swimming pool should always be planned individually. If the heating in a residential building is provided by a domestic heat pump (low-energy), the energy of the heat pump can also be used for the swimming pool air conditioning. Similarly, the utilisation of excess heat to heat the fresh water for the swimming pool is also possible.



## Examples from Practice



© T. Philipp

Unit type: **ThermoCond**

### PRIVATE SWIMMING POOL IN SOUTH GERMANY

The private swimming pool appears to float above the roofs of the town.



© fnoxx

Unit type: **ThermoCond**

### PRIVATE SWIMMING POOL

Private swimming pool hall with spacious wellness area



© T. Philipp

Unit type: **ThermoCond**

### PRIVATE SWIMMING POOL

A sumptuous wellness domicile with a luxurious ambience.

# Technology Hits

## MENERGA FITS!

The multi-functional compact systems of the ThermoCond 19, 23 and 29 series have been specially designed for use in private swimming pools. The systems are equipped with corrosion-free heat exchangers made of polypropylene. In contrast to the ThermoCond series for public swimming halls, the 19, 23 and 29 series operate for most of the day with very high energy efficiency levels in recirculation mode. The heat recovery efficiency is up to 80%. All installations are complete systems with intelligent controls which adapt themselves fully automatically to the conditions. ThermoCond 29 is also equipped with an integrated heat pump.

Menerga systems use every resource available. Excess heat from the air conditioning system can, for example, be

used to heat the fresh water for the swimming pool via a pool water condenser.

Depending on the equipment, the integration of an existing domestic heat pump in the building is also possible. This is connected to the heating coil of the air conditioning unit. In most cases the low flow temperatures of the domestic heat pump of around 35°C are not sufficient for heating the swimming pool hall, which is why the heating coil is incorporated upstream of the air condenser. In combination, the two systems heat the supply air very efficiently to the required temperature level. The domestic heat pump can be operated with an optimum COP at unchanged low flow temperatures.

## For example:

### PRIVATE SWIMMING POOL IN SOUTH GERMANY

The owners could not imagine having a simple rectangular structure as a swimming pool hall – which is why they asked for a simple, minimalist work of art to be created. The swimming pool is surrounded on three sides by glass facades, which enable unique integration into the environment. The pool area is accessible from below, directly from the adjoining residential building. The materials used were almost exclusively natural.

For air conditioning purposes, a Menerga ThermoCond 29 with summer bypass is used for free cooling and three-stage heat recovery. The necessary dehumidification capacity was not the decisive factor in the design, but the airflow rate required to ensure that the glass facades remain mist-free. The air conditioning unit provides free cooling in the summer – a relevant aspect, since the swimming pool hall is heated very strongly by the

large glass fronts. The free cooling method of the system adds cool outside air from the shady side of the building and thereby lowers the indoor temperature at low cost. The integrated heat pump also ensures energy-efficient operation of the swimming pool hall. The return air is dehumidified, while the evaporation heat that is obtained is increased to a higher temperature level in order to heat the supply air or the water.

## System types

ThermoCond 19	p. 6
ThermoCond 23	p. 6
ThermoCond 29	p. 6

Please refer to our latest catalogue for more details.





Photo: Anže Čokl / Bohinj Park Hotel\*\*\*\*\* / Unit type: ThermoCond

# Good Climate in Hotel or Therapy Pools

## REQUIREMENTS

For the German Hotel and Restaurant Association DEHOGA, a hotel swimming pool is a precondition for achieving the classification of a five-star hotel. But for smaller hotels with less "stellar ambitions", a swimming pool is also an important item of equipment for satisfied guests.

In itself, the swimming pool is of course not a guarantee of satisfaction. Because if instead of the desired "wellness oasis" the guest finds a musty, dark swimming area with cold water to bathe in, he or she will certainly not decide to stay at this hotel again. A good climate in a hotel swimming pool is an important criterion for retaining customers and can have a significant influence on the occupancy

rate of the rooms. Because news of a good climate gets around – but unfortunately, so does news of a bad one! This is why you should opt for a solution which - through its energy-efficient mode of operation, e.g. recirculation mode that adapts to requirements - saves costs while at the same time ensuring perfect air conditions.

Of equal importance are swimming pools used for therapy purposes in care and health centres. These form the basis of special course offers and increase the attractiveness of the entire facility. Depending on the level of occupancy of the pool, a constant proportion of air from the outside is required in addition to the

dehumidification of the swimming pool hall air in order to transport stale air out of the room. Here the focus is not only on comfort, but also the performance of the personnel and bathers. Humid, cold or stale air would reduce the success of the therapy - and the satisfaction of the paying patients.

Clever operators invest in sophisticated technology in both the hotel and the therapy pools - technology which creates a perfect climate, for example on very hot days in the summer. The investment costs pay off in two ways: through lower operating costs and satisfied customers.



## Examples from Practice



© Klaus Bauer

Unit type: **ThermoCond**

### **HOTEL EDELWEISS, WAGRIN**

Sports and wellness paradise at the 4-star hotel in Salzburger Land, the first swimming pool hall constructed in line with the passive building regulations in Austria.



Unit type: **Trisolair, ThermoCond**

### **HOTEL DOLLENBERG**

Exclusive 5-star superior hotel of the "Relais & Chateau" group at an altitude of 650 m on Dollenberg in the Black Forest.



© Europa-Park

Unit type: **ThermoCond**

### **HOTEL BELL ROCK IN EUROPA-PARC, RUST**

4-star superior adventure hotel in the Europa-Park, the biggest theme park in the German speaking area.

# Technology Hits

## MENERGA FITS!

Who says that hotel swimming pools are uncontrollable consumers of energy? The first hotel swimming pool in Europe built in line with the Passive Building Standard was constructed in 2010 at the Edelweiss Hotel in Wagrain/Austria – and it was of course equipped with a Menerga system!

Although in smaller hotels and nursing homes the level of use is significantly lower in comparison to a recreational bath, a system which through the addition of a proportion of air from the outside and a bypass installation should nevertheless be selected to provide good air conditioning and guarantee an ideal climate in the summer months. Suitable systems are those of the ThermoCond 38 and ThermoCond 39 series. ThermoCond 39 is equipped with a power-adjustable heat pump. The systems of the ThermoCond 38 series work with a very efficient counterflow heat exchanger with a counterflow share of more than 80%. These systems

are particularly suitable where the waste heat of a combined heat and power system can be used. Through the use of the fresh water heater in the ThermoCond 38, it is possible to recover unused heat contained in the waste heat to increase the temperature of the fresh water (see also page 10). Both series achieve very high heat recovery efficiency levels which keep the operating costs down. When the pool is not being used, they dehumidify the air in an energy-efficient manner in recirculation mode and mix in the required proportion of air from the outside in line with requirements during the activity phases. The systems start with an air volume flow of 2,500 m³/h.

Adjacent areas such as changing rooms, massage or fitness rooms are air-conditioned with systems of the Dosolair, Trisolair or Resolair series (see also the Comfort Air-conditioning brochure).






## For example:

### 4-STAR HOTEL EDELWEISS IN WAGRIN

Hotel Edelweiss in Salzburger Land offers a cosy four-star level of comfort, excellent cuisine and a cordial atmosphere with Salzburg hospitality. The family owners have always placed great emphasis on the sustainable handling of resources. This was continued with the redesign of the spa area. Consequently, the first swimming pool planned and designed in line with the Passive Building Standard was constructed in Austria. All structural components conform to this highest standard of energy-efficient construction. The dominant building material is wood as a renewable domestic material. The timber-built spa area requires only 25% of the energy of a comparable spa area. When the building technology was planned, it was decided to use two highly efficient ThermoCond systems. One of the systems is also used for

recovering heat from the return air from the sauna. The Ronacher ZT firm of architects, which was responsible for the planning, received the Energy Globe Award Salzburg for this project.

## System types

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	<b>ThermoCond 39</b>	<b>p. 7</b>
	<b>Trisolair</b>	<b>p. 8</b>
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	<b>Resolair</b>	<b>p. 11</b>



Please refer to our latest catalogue for more details.



# Good Climate in Saline Swimming Pools

## REQUIREMENTS

Saline swimming pools are becoming increasingly popular in thermal baths, recreational baths and private swimming pools. The high salt content of the water and air improves the oxygen intake by the body, has an antibacterial effect and is therefore said to alleviate a large number of ailments. The salt-laden air possesses strong negative ionisation, as a result of which it is very healthy for the human body as a bracing climate. But the aggressive constituents of the air demand particular requirements from almost all of the materials – also with respect to the air-conditioning technology used.

If you are planning to use saline in a swimming pool, it is essential to inform all of the parties involved of this at the earliest possible stage, as this requires separate consideration of the entire project and the materials to be installed. For example, a special anti-corrosive protection coat of the ventilator units is necessary.

Also in a saline swimming pool, the air-conditioning technology operates 24 hours a day, partly in order to reliably transport away the salt-laden return air and prevent the precipitation of the salt on the ceiling or glass fronts. It is there-

fore advisable to use air-conditioning technology with the highest possible level of heat recovery in a saline swimming pool, and if it is also available for public use to additionally provide an adjustment of the power in line with requirements.



## Examples from Practice

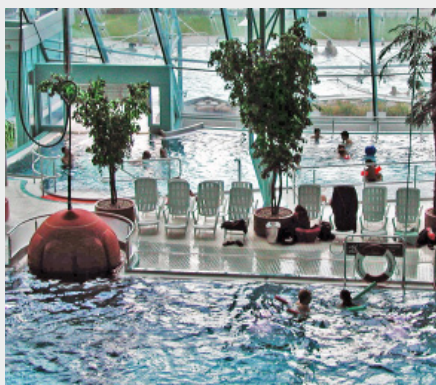


© Helmuth Rier

Unit type: **ThermoCond**

### TERME DI MERANO, MERANO

An elegant and architecturally very attractive natural oasis at the heart of the City of Merano.



Unit type: **ThermoCond, Adsolair, Resolair**

### AGRIPPA SWIMMING POOL, COLOGNE

In the middle of Cologne city centre, the swimming pool attracts sportsmen, wellness friends and families.



Unit type: **ThermoCond, Adsolair, Resolair**

### SAAROW THERME, BAD SAAROW

The thermal saline pool with underwater geysers, flow channels and much more is considered to be one of the most attractive in Germany.

# Technology Hits

## MENERGA FITS!

The ThermoCond 38 series is particularly suitable for use in larger saline swimming pools. At the heart of the system is a counterflow plate heat exchanger consisting of corrosion-free polypropylene, and all other components with additional corrosion protection when used in a saline swimming pool. This series is particularly suitable, as it achieves very high levels of efficiency of up to 95% even though no integrated compression refrigeration system is used. In smaller private swimming pools the ThermoCond 19 series is used, which is also designed without a mechanical cooling system.

In order to further reduce the operating costs in a public swimming pool hall, the Menerga fresh water heater can be used as an optional addition to units of the ThermoCond 38 series. This enables the use of the heat energy contained in the

return air which cannot be recovered via the recuperative heat recovery system of the air conditioning system. The use of the fresh water heater minimises this ventilation heat loss by using the energy contained in the return air to warm up the make-up water of the pool. Direct use for the 28°C pool water is not possible without a heat pump owing to the small difference in temperature, which is why the Menerga system uses the energy to heat up the fresh water which is added to the pool water as required. The temperature of the fresh water is normally 10 to 15°C. However the water can be heated up to a temperature of 28°C with the use of the fresh water heater by using the waste heat alone without a heat pump.

## For example:

### TERME DI MERANO, MERANO

With the thermal bath in Merano, interior designer and architect Matteo Thun has created a "natural oasis in the heart of the city", which stands out due to its modern architecture, but nevertheless harmonises well with the cityscape of Merano. The glass architecture provides the visitor with a clear view of the surrounding mountain ranges. Clear lines in the architecture, the use of natural stones and timbers for the construction, as well as the use of regional products, are witness to an understanding of and respect for nature.

Indoors, 25 different pools, including a saline pool with underwater music, attract the 350,000 annual guests to enjoy a wonderful wellness experience. State-of-the-art environmental technology is

used in the thermal bath itself in order to save energy - and above all water. These measures make it possible to achieve considerable annual savings in terms of operating costs.

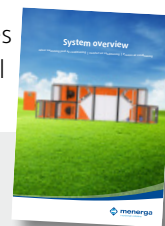
In total, three ThermoCond systems are used at the Terme di Merano, which also reliably air-condition the saline pool area. The high level of heat recovery efficiency of the systems reduces the costs for heating the thermal bath as well.

## System types

ThermoCond 19 p. 7

ThermoCond 38 p. 7

Please refer to our latest catalogue for more details.







# Good Climate in Sports Pools

## REQUIREMENTS

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In many sports pools, not only the water area takes up large parts of the swimming pool hall, but also grandstands and seats for spectators. In addition to the swimming pool hall itself, there are large changing room and shower areas, usually a restaurant and large entrance areas.

The swimming pool hall itself requires efficient and reliable air conditioning. Only if the moist swimming pool hall air is continually dehumidified is a comfortable climate for the spectators in the grandstand also guaranteed. Spectators will not return if they break out in a sweat owing to the high air humidity after 10 minutes during a swimming event. In order not to endanger the

health of the athletes, draughts should be avoided in the swimming pool hall and changing areas.

Sports pools in which competitions are held are usually of a larger size than ordinary sports and recreational baths. Competition stadiums with 50-metre pools are the standard for national and international events. With the high volumes of air present in the swimming pool hall, the air-conditioning technology must also be of an appropriate size in order to guarantee a consistently good climate. The higher the volume, the more important is the efficiency of the fan motors used. The operating cost factor plays an important role in sports pools, as

the operators of the facility are usually local authorities or the state. The modernisation of obsolescent air-conditioning technology often offers a considerable reduction in operating costs. New buildings which are planned and constructed from the beginning in line with passive building criteria, for example, can achieve energy savings of well over 50% compared to standard designs. In the planning of a sports swimming pool, future demands should also be taken into account at planning stage.



## Examples from Practice



© Stadt Rijeka

Unit type: **ThermoCond, AquaCond**

### KANTRIDA RIJEKA, CROATIA

Olympic swimming stadium with a completely opening roof structure.



Unit type: **ThermoCond, Resolair**

### NATIONAL ZWEMZENTRUM DE

**TONGELREEP, NETHERLANDS** The largest swimming centre in Europe serves amongst other things for hosting national competitions



© Bildagentur Zolles

Unit type: **ThermoCond, Adsolair, Dosolair**

### MUNICIPAL SWIMMING POOL HALL VIENNA,

**AUSTRIA** Since it was reopened in 2011, Vienna's largest swimming pool hall and the most up-to-date swimming pool hall in Austria.

# Technology Hits

## MENERGA FITS!

For the air conditioning of large swimming pool halls, systems from the ThermoCond 38 series are ideal. They are equipped with a highly efficient counterflow plate heat exchanger consisting of polypropylene and achieve recovery efficiency levels of more than 95% with minimal pressure losses.

ThermoCond 38 is a further refinement of the systems used in the passive building swimming pools of Lippe-Bad Lünen and Bambados. The overall efficiency of the system can be further improved through the use of the optional fresh water heater (see also page 10). ThermoCond 38 is available as an individual system with an air volume flow of up to 31,000 m³/h. With multi-axis concepts, large swimming sports arenas can also be air-conditioned without difficulty. Depending on

the equipment of the swimming pool, comfort air conditioning units of the Dosolair, Adconair, Adsolair or Resolair series can be used to air condition the areas adjacent to the swimming pool hall. Planned within the overall concept, the systems complement one another excellently and create a good climate with the lowest operating costs. Information on this can also be found in our Comfort Air-conditioning brochure.

In shower areas, the use of AquaCond devices recovers lost energy from warm waste water from the showers - an investment which pays for itself within a very short time (see also page 15).

## For example:

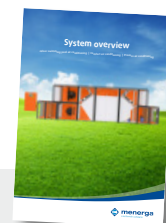
### KANTRIDA RIJEKA, CROATIA

The Kantrida swimming pool complex in Rijeka consists of two large Olympic competition pools, a teaching pool as well as a children's pool and a pool for diving competitions and underwater diving schools. One particular feature of the complex is that the roof can be completely opened. In the planning process for the plant technology, the focus was mainly on very high levels of energy efficiency. The supply of heat and electricity was therefore provided by means of a combined heat and power generation system, mainly from the complex's own combined heat and power station. Furthermore, each swimming pool hall is dehumidified, ventilated and heated by a total of three ThermoCond air conditioning units in order to create a pleasant indoor climate and avoid damage from moisture. Those responsible for the project therefore made exclusive use of highly efficient air conditioning systems with a heat recovery

efficiency level of up to 90%. In addition, the waste water from the pool water replacement system, showers and filter flushing system is used as an alternative source of energy for the production of hot water. In the project in Rijeka, thermal energy is not wasted neither in the exhaust air nor the waste water.

## System types

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ThermoCond 39	p. 7
Adsolair	p. 10
Resolair	p. 11
Adconair	p. 13
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Please refer to our latest catalogue for more details.



# Good Climate in Recreational Baths

## REQUIREMENTS

The cost-effectiveness of a recreational swimming pool depends on the number of visitors and daily utilisation levels. If the visitor does not feel comfortable, he or she will not return or will only stay for a short period of time. The term "pleasant climate" therefore takes on economic significance. And in recreational pools in particular, the climate in adjacent areas such as changing rooms, wellness and rest areas, restaurants or the entrance hall has to be reliably controlled.

The aspect of the cost efficiency of the climate is of major significance in the case of recreational baths. As in all other types of swimming pool, the cost of energy for air conditioning is particularly high in

comparison to other operating costs of the pool. Continuous dehumidification of the pool round-the-clock has to be ensured. The degree of dehumidification varies between the active and "resting" phases of the pool and is increased when, in addition to the standard swimming area, numerous attractions such as slides or water mushrooms increase evaporation in the swimming pool hall.

Intelligent air-conditioning technology with a very good dehumidification capacity and high levels of heat recovery helps to offset the continuous increase in energy costs. Modern technology can help, with e.g. a reduction in the volume flow rate in line with requirements,

where the capacity of the system is adapted to the number of the people present in the swimming pool hall. The higher investment costs pay for themselves by a major reduction in operating costs within a very short time.



## Examples from Practice

© Bädergesellschaft Lünen mbH



Unit type: **ThermoCond, Dosolair**

### LIPPE-BAD IN LÜNEN

First public passive building swimming pool hall in Europe



Unit type: **ThermoCond**

### KOKPUNKTEN IN VASTERÅS/SWEDEN

Sweden's first Actionbad: a unique experience with self-designed attractions on eight floors



© Weissenhäuser Strand

Unit type: **ThermoCond, Adsolair, Resolair**

### WEISSENHÄUSER BEACH, WANGELS

Holiday and leisure park with adventure playground on the Baltic Sea.

# Technology Hits

## MENERGA FITS!

Modern recreational baths can be an oasis of fun and wellness while being operated at the same time in a highly energy-efficient manner. The best example of this is the two passive building swimming pools in Lippe-Bad Lünen and Bambados in Bamberg, the first passive building swimming pools in Germany, which are of course air-conditioned with Menerga systems.

The two passive building swimming pools are equipped with previous versions of the ThermoCond 38 series. Through the implementation of the two projects, this series was made ready for the market and is now available as an energy-efficient system for all new constructions and refurbishments. ThermoCond 38 with counter-flow plate heat exchanger achieves the highest levels of heat recovery efficiency of up to more than 95%. The optional

fresh water heater of the ThermoCond 38 series (see also page 10) also helps to increase the overall level of efficiency of the system by using the heat energy contained in the return air which cannot be recovered for air conditioning to heat the fresh water for the swimming pool.

Other systems which are also suitable for use in the recreational bath are the systems of the ThermoCond 39 series. With their integrated heat pump they can achieve higher dehumidification capacities with the same nominal flow rate.

For all of the adjacent rooms, the comfort air conditioning units of the Dosolair, Adconair, Adsolair or Resolair series are used. In shower areas, AquaCond devices recover energy from warm waste water from the showers.

## For example:

### PASSIVE HOUSE SWIMMING POOL LIPPE-BAD LÜNEN

With the Lippe-Bad in Lünen, Menerga has equipped the first public passive building indoor swimming pool hall in Europe with ventilation and air-conditioning technology. The pool, which was constructed by the Lünen Bathing Society, was opened at the end of 2011 after a three-year construction and planning phase and is to use 50% less energy than a "normal" new construction.

Four specially adapted ThermoCond comfort air conditioning units with a total volume flow of 50,400 m<sup>3</sup>/h dehumidify, ventilate and heat five areas of the pool with a total water surface of 800 m<sup>2</sup>. The wet rooms, changing rooms and foyer are conditioned by two Dosolair systems with two-stage heat recovery and a nominal flow rate of 10,000 m<sup>3</sup>/h each. In order to satisfy the high demands of the passive building standard, the swimming pool air conditioning units have, amongst

other things, particularly efficient heat exchangers and the ability to variably reduce the air volume flows. Overall, the Lippe-Bad is able to save up to €193,000 a year in energy costs through the implementation of the passive building standard.



## System types

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Please refer to our latest catalogue for more details.



# Good Climate in the Sauna Area

## REQUIREMENTS

Saunas are the latest trend – no wonder that increasing numbers of recreational bathers and private individuals are deciding in favour of constructing a sauna area. The visitor is usually willing to pay a considerably higher entrance fee for the deeper relaxation and recreational levels offered by a sauna than for a visit to a normal recreational bath. It is unusual for the higher entrance fee to result solely from the need to maintain a balance between supply and demand; the higher price is usually required because of the significantly higher energy costs when operating a sauna. In the winter months in particular, the heat of a sauna is balm for the soul in the icy winter landscape – but a nightmare regarding energy costs.

For the operation of public sauna facilities there are a number of directives, for example that there must be a fivefold exchange of air in the sauna. In most cases, energy is irrevocably lost via the return air of the sauna. In the case of a commercially used system it is therefore expedient to make use of the heat which is led outside for other purposes. It is possible to use the heat for adjacent rooms or for connecting to the water system. The ventilation technology can be equipped with a timer control which, for example, activates intermittent ventilation when water is poured over heated rocks. However, a better option is adaptation of the air-conditioning technology to the requirements of the actual number

of people present. This guarantees that the visitors to the sauna can continue to relax in a good climate even if significantly more people are present when the water is poured over the hot rocks than experience has shown to be appropriate.

Intelligent air-conditioning technology pays for itself in a sauna particularly quickly due to the high energy costs. The controlled ventilation in conjunction with efficient heat recovery enables significant savings to be made with respect to the operating costs of the whole complex.



## Examples from Practice



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Unit type: **ThermoCond, Adsolair**

### LAKE CONSTANCE THERMAL SPA CONSTANCE

State-of-the-art pool with sauna wing, thermal and outdoor swimming pool over an area of 3,000 m<sup>2</sup>



© Portillio Wolkenstein

Unit type: **ThermoCond**

### HOTEL CHALET PORTILLIO WOLKENSTEIN, ITALY

Elegant 4-star hotel in the Dolomites.



Unit type: **ThermoCond, Adsolair**

### WESTBAD IN MUNICH

Under the large glass dome, the family and recreational bath offers relaxation and unadulterated bathing fun.

# Technology Hits

## MENERGA FITS!

In the sauna area, one factor is particularly relevant with respect to ventilation: the heat recovery. The outside air has to be heated up from normal temperatures to 60 to 90°C, and the warmer the outside air entering the sauna through the heat exchangers integrated into the air-conditioning technology, the lower the energy costs for further heating. The two systems which are particularly suitable for this area are Resolair and Adconair. Both systems achieve heat recovery levels of more than 90%. Only 10% of the heat energy has to be supplied from elsewhere. The two systems work according to different principles. Adconair is equipped with a recuperative heat recovery system which guides the fresh supply air and the return air along separate routes. The heat recovery of the Resolair is based on regenerative heat recovery, in which the

supply air and return air are passed alternately into accumulators, in which the heat is then transferred. Resolair systems therefore enable moisture recovery, which can be valuable in steam baths or saunas with high moisture levels.

Depending on the use of additives in the water poured over the hot rocks, the systems have to be equipped with additional corrosion protection.

In almost all sauna areas there are diving pools which refresh the visitors to the sauna with specially cooled iced water. Energy is also required to produce this cooling effect. The energy requirement can be reduced by using AquaCond systems for efficient "cold" recovery.

## For example:




### LAKE CONSTANCE THERMAL SPA CONSTANCE

The Lake Constance Thermal Spa in Constance is a symbiosis of a good climate and successful architecture: The state-of-the-art adventure pool with an area of approximately 8,000 m<sup>2</sup> is located in the immediate vicinity of Lake Constance and stands out with its special visual connection between the lake and the spa complex. With respect to environmental protection, the Lake Constance thermal spa sets a magnificent example with its minimal energy consumption and very low CO<sub>2</sub> emissions. The energy concept of the spa makes consistent use of factors such as heat recovery and the use of natural resources in combination with combined heat and power generation. An approach which not only protects the environment, but also considerably lowers the operating costs. With the overall energy concept it has been possible to save around 37% of the energy and operating

costs in comparison to structures which are operated conventionally. Furthermore, the CO<sub>2</sub> emissions have been reduced by approximately 40%.

Besides the ThermoCond systems in the swimming pool area, Adsolair devices in the catering areas and customer-specific systems in the rest rooms and foyer, as well as in the changing rooms and shower areas, also contribute towards this. Heat recovery in the sauna area is also carried out.

## System types

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Please refer to our latest catalogue for more details.





# Heat recovery from waste water

## REQUIREMENTS

In every public swimming pool – whether a sports arena or adventure pool – large quantities of waste water are continuously produced in the shower areas and as a result of the legally required replacement of the pool water. The thermal energy of the waste water is not used in most cases and is irretrievably lost in the drains. A large amount of energy then has to be used to replace the water or prepare the fresh water. In the shower area in particular, the high temperature of the waste water means that heat recovery is expedient in order not to waste energy unnecessarily and make use of all options for reducing the operating costs.

The heat energy recovered from the waste water from the showers and pools is used to reduce the energy consumption for heating the fresh water used for replenishment. That way the energy consumption can be reduced by up to 90%!

But waste water is nevertheless waste water – during the operation of a waste water heat recovery system it is therefore almost unavoidable that dirt will accumulate in the heat exchangers. This reduces the efficiency of the system and causes malfunctions. It therefore makes sense to integrate regular, fully automated cleaning.

The same principle also functions in reverse of course: If a high amount of energy has to be used to cool water, "cold" recovery from the waste water is possible. This is highly cost-efficient, above all in the case of plunge and ice pools in the sauna area.



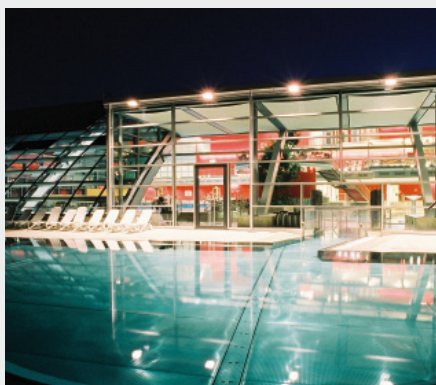
## Examples from Practice



Unit type: **ThermoCond, AquaCond, Dosolair, Adsolair, Resolair**

### LASKO THERMAL BATHS, SLOVENIA

Wellness Park with 2,200 m<sup>2</sup> of water area.



Unit type: **ThermoCond, AquaCond**

### CAMBOMARE, KEMPTEN

Bathing fun and a sauna world in Kempten in Allgäu.



Unit type: **ThermoCond, AquaCond**

### MINERAL SWIMMING POOL IN LEUZE

At the Leuze mineral swimming pool, two highly carbonated mineral springs and a mineral source are used.

# Technology Hits

## MENERGA FITS!

Systems from the AquaCond series enable the transfer of heat energy from waste water to fresh water. Their use is ideal wherever waste water has to be continuously replaced by warm fresh water, e.g. when fresh water is fed into the pool water or in the shower areas.

AquaCond systems are intelligently designed compact systems. The combination of recuperator and heat pump means that only approx. 10% of the energy is required that is needed by a conventional heating system. AquaCond 44 is equipped with an automatic heat exchanger cleaning system. At regular intervals, cleaning pellets are squeezed through the waste water channels by reversing the direction of flow. The cleaning pellets loosen any dirt deposits that have accrued in the piping system, so that blockages of the pipework by dirt

deposits are consistently avoided. The surfaces which are always clean as a result ensure that the exchange of heat is constantly high.

AquaCond systems can also be used for "cooling recovery", for example in the case of plunge pools.

As with all systems produced by Menerga, AquaCond systems are equipped with an integrated controls system which guarantees the most economical mode of operation at all times.

## For example:

### LASKO THERMAL BATHS, SLOVENIA


The "Lasko Wellness Park" opened in 2008 in Slovenia. With a water area of 2,200 m<sup>2</sup> it is a tourist and architectural gem in the town of Lasko, which has been known for its thermal springs since 1818. With a moving dome over the entire indoor area and the 1,300 people who the Wellness Park can accommodate, high demands are placed on the air-conditioning technology. Adjacent to the complex there is a hotel complex with 188 rooms in the 4-star category with its own congress and seminar area.

A total of 18 Menerga systems have been installed in the Lasko thermal baths. In addition to Resolair, Adsolair, Dosolair and several ThermoCond systems, a type 44 AquaCond system recovers energy from waste water. For its overall energy efficiency levels,

amongst other things, the Lasko thermal baths have been awarded the EU Flower, which is a well-known symbol of environmental friendliness.

And not only the environmental compatibility stands out: In 2011 the thermal baths in Lasko were awarded the title of best thermal centre for the fourth time in succession in the category of medium-sized thermal baths. A good climate draws attention to itself in this way as well.

## System types

 **AquaCond**

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Please refer to our latest catalogue for more details.



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