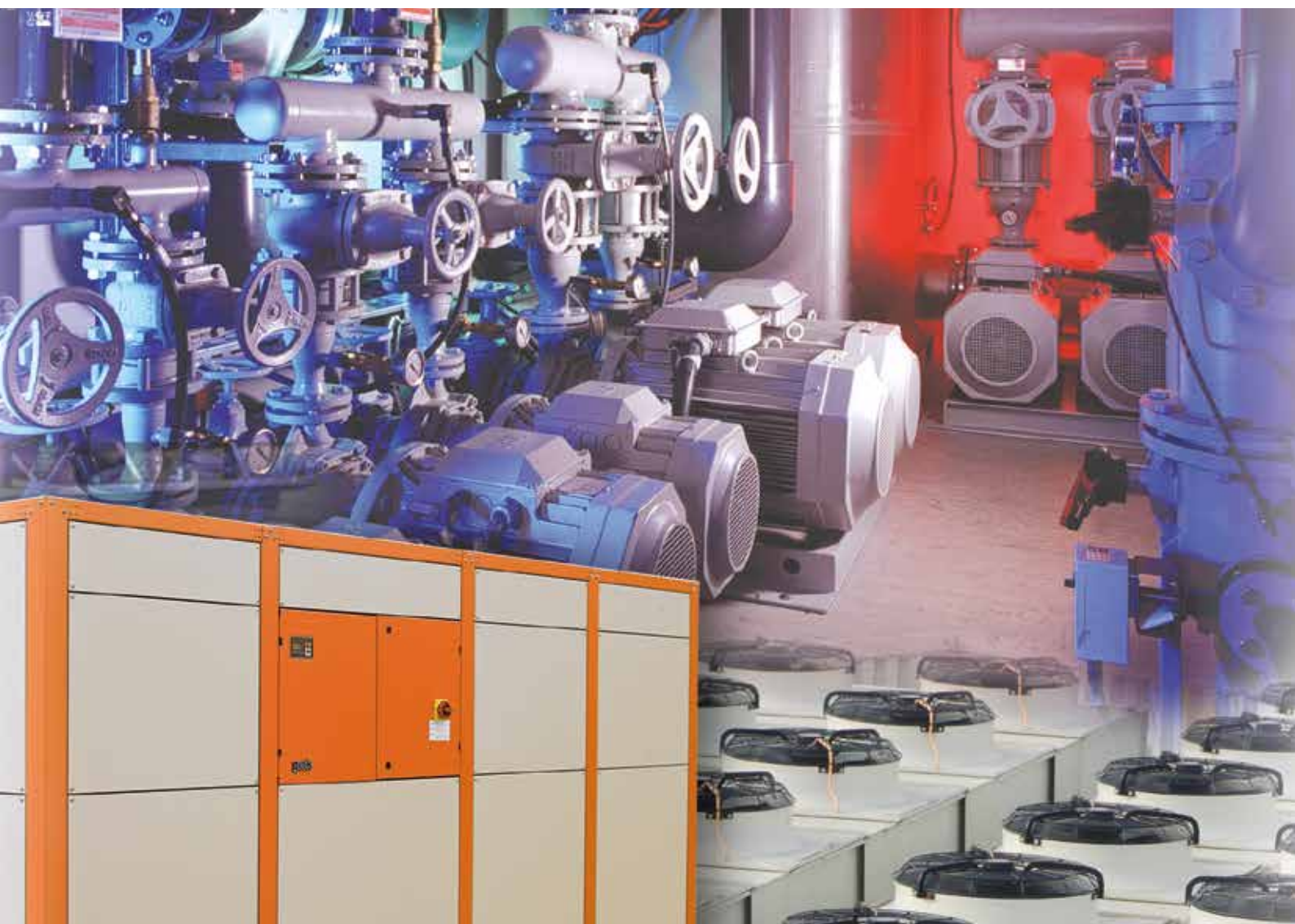


Perfect Cooling

Chiller

Centralised cooling plants

Energy management



For over 40 years – Perfect cooling and temperature control

For over 40 years the **technotrans solutions GmbH** has been manufacturing high-quality temperature control and cooling equipment and supplying this equipment worldwide.

Today more than 400 employees design, produce and install complete process solutions for heating and cooling in customer specific designs.

More than 33 sales and service locations worldwide represent the global character of our work and guarantee our permanent success.

In addition to a huge product range of

serial products we also offer tailor-made solutions for challenging applications. These individually designed units are available for a temperature range between -40°C and $+400^{\circ}\text{C}$, and are developed and produced in Meinerzhagen according to the customers' demands.

As one-stop manufacturer of compact units, cooling plants and temperature control units, up to water treatment and heat recovery systems and complete container systems, the **technotrans solutions GmbH** is a competent and innovative partner.

Headquarters
in Meinerzhagen,
Germany





One of our production halls

Expertise in cooling plants

The units of the **technotrans solutions GmbH** are essential all over the world. They are used by the plastics industry in Europe, international automotive groups or world-renowned sweets manufacturers, for cooling of metal processing and in chemical plants worldwide. The high reputation of the **technotrans solutions GmbH** is owed to units being individually designed and built for specific customer requirements.



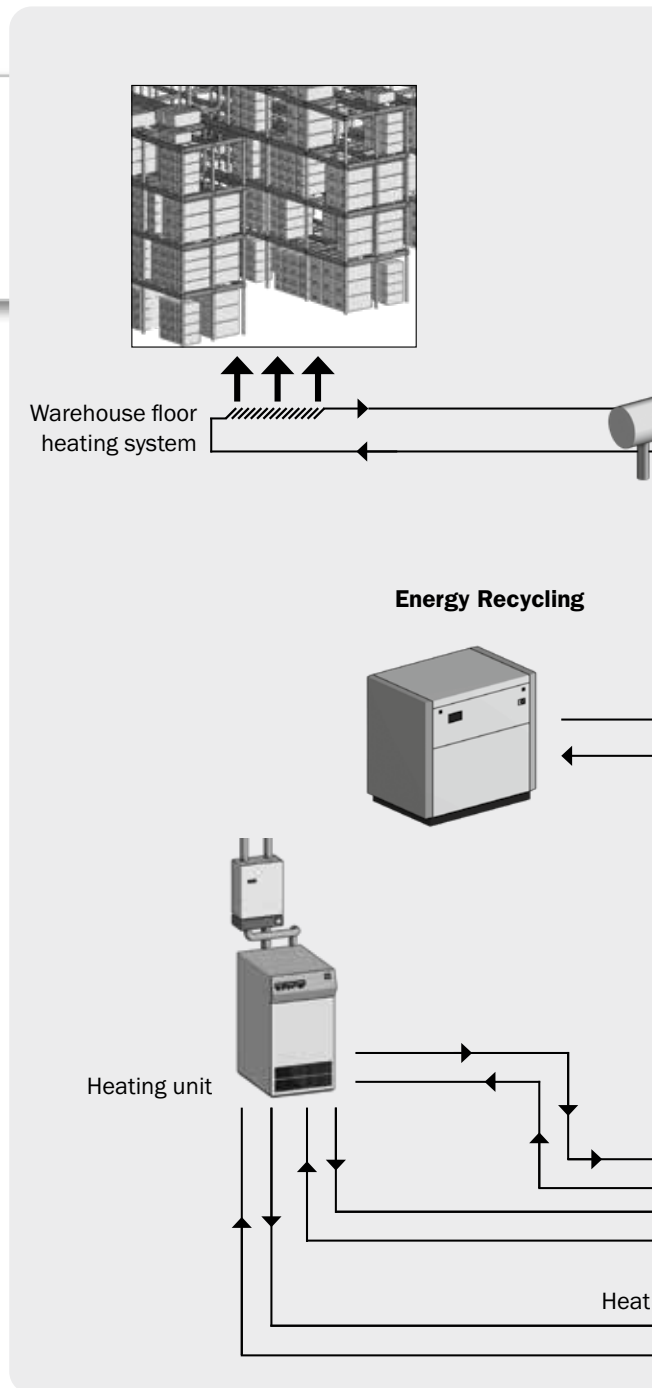
U-bundle heat exchanger



Minimising costs through energy efficiency

Without exception, all industrial manufacturing processes involve the in- and output of energy, which has to be supplied or taken away in the form of heat. The heat energy to be released is given off into the environment in the form of heat by the use of cooling plants. Heat recovery systems allow the heat to be converted into heat energy. Optimised combined systems minimise the energy consumption of the cooling plants and utilise energy by means of heat recovery at the same time.

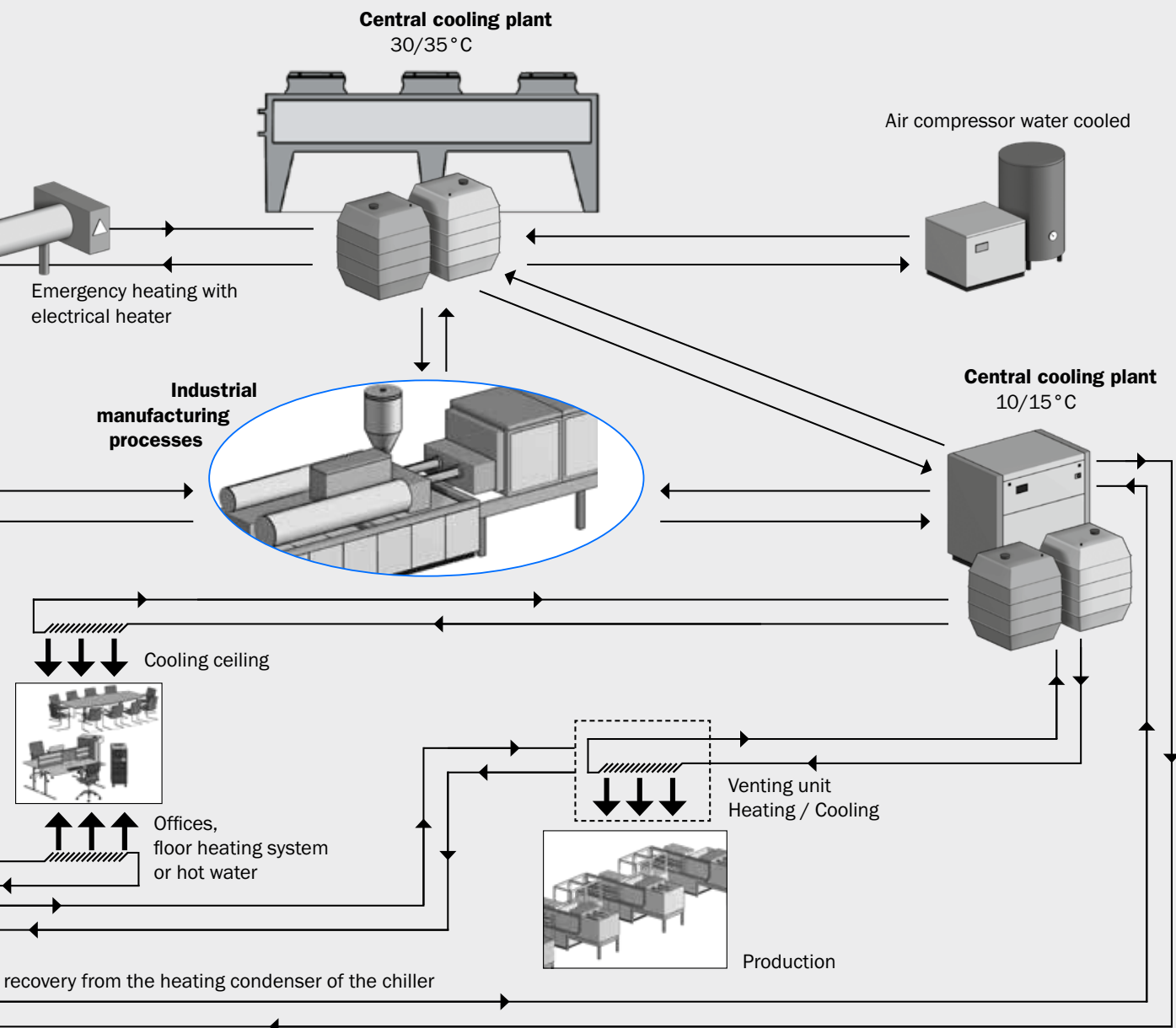
The adjacent schematic diagram shows that cold water can be produced by several cooling systems, that clearly differ with view to investigation and operation costs. Depending on the application the most suitable cooling system can be chosen. Primarily the expected operating costs have to be taken into consideration.



Energy efficiency for the optimum cooling plant

The **technotrans solutions GmbH** follows the principle that the optimum cooling plant for the specific application can only be found by analysis. This analysis is included in our expertise in energy efficiency and is used as a primary factor for a decision on the investment.

Energy flow diagram – optimised cooling of a production process



In most cases only a combined system can offer the best solution, i.e. a centrally controlled combination of different cooling units in connection with heat recovery, capacity control of chillers and relief of the primary heating.

With its unique product range, the **technotrans solutions GmbH** plans combined systems with lowest operating costs for production. That means to you, that the **technotrans solutions GmbH** provides the complete guarantee for correct calculation and planning and installs its systems on a

turnkey basis. The **technotrans solutions GmbH** produces combined systems and heat recovery systems for more than 40 years now. Not only do the systems installed to date save several hundred million kilowatts of heating energy, they also save a similar quantity of electrical energy – hereby the amount saved is even larger due to the reduced operating costs. Apart from the advantage for the operator, the **technotrans solutions GmbH** also renders an extraordinary contribution to protect the environment.

TEC cooling plants for free

This is an unconditional promise. A cooling plant can be acquired at no cost. The reason is that the investment costs for a new plant are amortised by the saved operating costs. Capital-free plant leasing makes plant contracting with liquid funds possible. (This offer is valid for Germany and the countries of the European Union).

TEC project study – optimising energy consumption

For minimal operating costs:

- Calculation of the optimised combined systems (cooling and heating systems) for injection moulding factories
- Exceeding the heat from the production machines under consideration of
 - the best process reliability
 - high product quality
 - shortest cycle time

Selection criteria:

- Production plant and products
 - = **cooling power requirement**
 - = **lowest necessary water temperature**
- Economic efficiency of the cooling plant
 - = **operating costs**
- Energy management of the total production
 - = **potential of heat recovery**

Project Study

Customer:
Company Mustermann

Project:
Replacement

Cooling Capacity: **200 kW**

Quotation No.: **923xxx**

In this project study the following cooling systems have been compared:

- chiller with refrigerant R22 available on site
- new chiller with refrigerant R134a in split-design and hermeticool-function

Perfect Cooling and Temperature Control





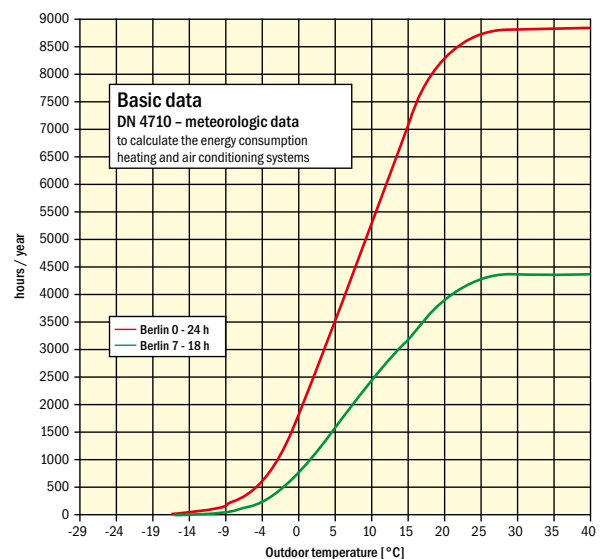




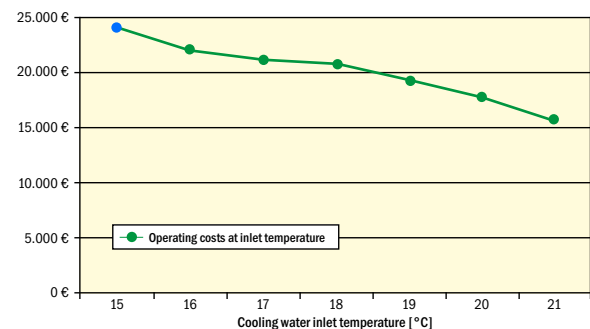
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The **technotrans solutions GmbH** uses outdoor temperature to reduce the operating costs



Influence of the cold water temperature

By means of a detailed project study the **technotrans solutions GmbH** calculates the most efficient and cost-saving solution



Project study example 1:

Single circuit cooling plant with an process temperature about 15 °C for the mould cooling and hydraulic cooling at 235 kW cooling capacity.

Before optimization:

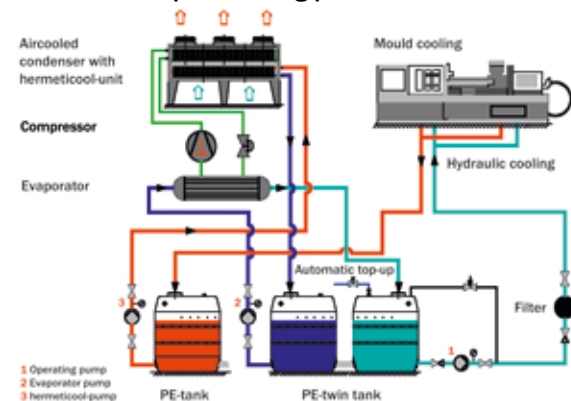
Single-circuit cooling plant with conventional chiller

After optimization:

Energy optimised single-circuit cooling plant with hermeticool

- Freecooling up to approx. 5,200 h/a
- Energy savings up to 240,628 kWh/a = 48 %
- Energy cost savings up to 20,167 €
- CO₂-savings up to 168,440 kg

Industrial compact cooling plant with hermeticool



Project study example 2:

Double circuit cooling plant in split design: Mould circuit 15 °C with 87 kW cooling capacity and hydraulic circuit 30 °C with 148 kW cooling capacity

Before optimization:

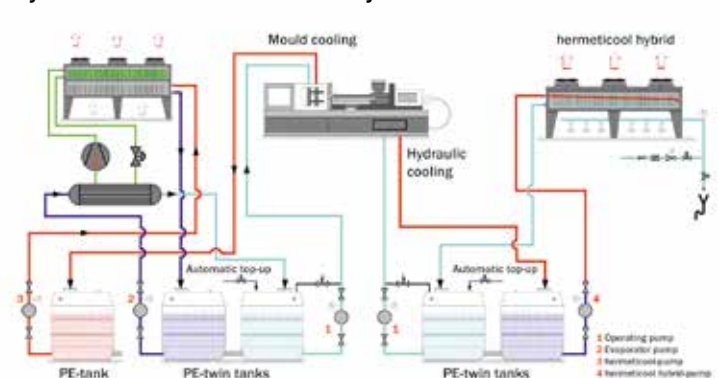
Conventional design: mould circuit with chiller/
Hydraulic circuit with cooling tower

After optimization:

Innovative design: mould circuit with chiller and hermeticool / hydraulic circuit with hermeticool hybrid

- Energy savings up to 237,608 kWh/a = 46 %
- Energy cost savings up to 18,510 €
- CO₂-savings up to 166,115 kg
- Savings of 1,800 m³ water per year

Mould circuit: air-cooled chiller with hermeticool Hydraulic circuit: hermeticool hybrid



The centralised cooling plant

The project team of the **technotrans solutions GmbH** consists of cooling and control specialists as well as engineers in process technology who have many years of experience at production level. This experience leads to the high technical standard in centralised the **technotrans solutions GmbH** cooling plants and combined systems. The water chiller is the most important module in a centralised cooling plant. But only the optimal dimensioning of all components leads to a perfect function. There are many options in the choice of the system. **We** prefer a closed circuit, with tanks made of stainless steel or plastic, with manifolds made from stainless steel and with factory piping made of PVC or PE. In order to reduce costs, we recommend a combination of several cooling systems to be controlled by a central computer and the Software Central Energy Management System.

Quality is our strongest argument

As a rule, a central cooling plant is responsible for the overall production operation. Our engineers of the **technotrans solutions GmbH** therefore emphasize on correct dimensioning when designing a cooling plant for a production. This, in combination with the use of high-quality, long-life and maintenance-friendly components will achieve the highest possible reliability of the plant. A combined system exactly tailored to a specific operation will achieve the required reduction of operating costs by means of the lowest possible energy consumption.

Central cooling plant
with water treatment





Electrical cabinet

The engineers of the **technotrans solutions GmbH** plan and design complete control boards under consideration of specific requirements and site standards. These systems are built by our qualified personnel and afterwards installed on site. The product range covers small operator panels, simple control cabinets up to large control systems.

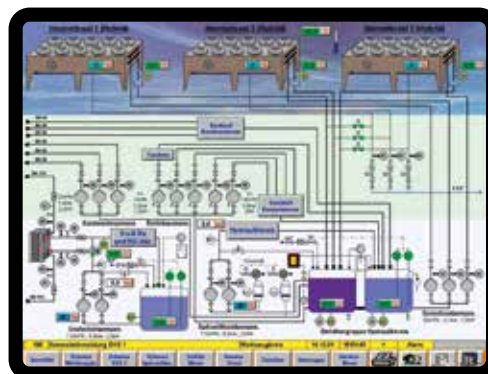
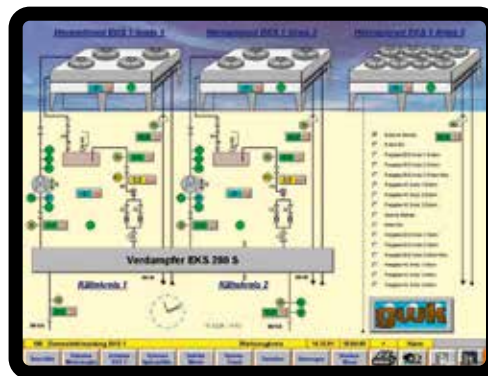


Process visualisation

During industrial processes a number of individual parameters have to be measured and calculated. They include physical parameters such as temperature, pressure, flow rate and power consumption. The following data is visualised by the control system:

- Operation parameters such as temperature, flow rate and pressure, power supplied to the production, operation hours of components and power consumption. The recording and processing of these data allows a **centralised energy management**.
- Storage of measuring data.
- Indication of stored data by characteristics or tables.

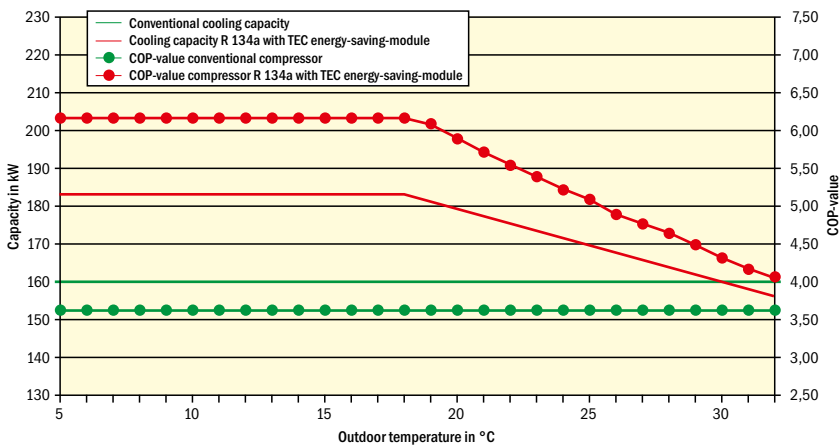
As a matter of fact communication with a superior network is also possible. The process visualisation is based on the WinCC software system by Siemens, adjusted to the unit of the **technotrans solutions GmbH** systems which thereby allow an individual screen design.



SKL and SKL C – TEC-energy-saving module



TEC-energy-saving module



Energy consumption at a production period of 7,200 h/a:		With hermeticcool-function (combined unit):	
Conventional solution:	317,355 kWh	Conventional solution:	86,374 kWh
TEC-energy-saving-module:	216,865 kWh	TEC-energy-saving-module:	60,177 kWh
Energy-saving potential:	31.7 %		
averaged COP-value with energy saving module:	5.15		

Water cooled chillers for industrial use

Energy-saving industrial water chillers have the task of drawing off heat from a process. This is done by targeted cooling with cold water at suitable points so as to simultaneously increase production and improve quality.

Except for the low-temperature range, chillers are operated with R 134a, a chlorine-free refrigerant. By choosing this refrigerant, the pressure conditions in the cooling circuit are clearly lower than in systems that use other products.



As a result, the installed components are exposed to less stress, clearly less wear and the COP value is higher. Higher COP values mean lower operating costs.

chillers of the SKL series are cold water aggregates with externally set-up condensers. These chillers are equipped with screw condensers; the power regulation of the capacity to be dissipated is continuous. Since shell and tube evaporators manufactured by the **technotrans solutions GmbH** are used, these machines are especially suitable for industrial cooling processes. The energy-saving module, in combination with an electronic expansion valve allows realization of a continuous condenser regulation. With this type of operation, the ongoing operating costs are reduced by approx. 25% compared to common cooling units.

Water-cooled cooling units are preferably used when cooling water at a higher temperature level is inexpensively available. With correct dimensioning of exchanger surfaces on evaporators and condensers, the output figures of the machines are further optimised.

TEC-energy-saving module



Use of electronic expansion valves reduces operating costs.

Advantages:

- Fast reaction time
- Even overheating regulation
- Variable implementation



Cooling tower in use around the world



Cooling towers from the **technotrans solutions GmbH** are used to carry off heat from production plants with higher temperature levels and work acc. to the principle of evaporation. Cooling towers are a part of a central cooling plant supplied on a turn-key basis which can be controlled by a fully programmable microprocessor.

To prevent pollution of the consumer by contaminated water from the cooling tower circuit, the cooling circuits of consumers and cooling tower are separated by an installed plate heat exchanger. As a rule, water treatment and water purification are part of our supply and service program.



The GVK series of all-plastic cooling towers

Covering a range of capacities from 50 kW to 1200 kW, all-plastic cooling towers of the **technotrans solutions GmbH** resist the most extreme climatic conditions, because all the parts are produced from durable plastics. The interior parts are produced from high-quality, high-impact plastics and are integrated into a housing made of glass-fibre reinforced plastic. Axial fans with pole-changing motors are matched to the capacity and operate at a reduced noise level. In addition, sound absorbers are optionally available in case of special requirements for noise emission.



The stainless steel cooling tower of the GHKV series

The cooling tower pack is made from a plastic honeycomb structure with a high heat exchange capacity and high mechanical loading capacity. The housing is constructed from stainless steel, forming a completely installed unit together with the water basin. Low pressure high capacity fans with a high level of efficiency and a low noise level force the cooling air through the fill-pack. Water return from the process is distributed equally by polypropylene hollow cone spray nozzles.



Clean process water with KU-plants

KU-plant as closed cooling circuit for industrial cooling with direct connection to the pump and tank group of a cooling tower

Water is an excellent cooling medium. KU-plants from the **technotrans solutions GmbH** utilise the cooling energy provided by water to carry away heat from production machines in the most trouble-free and cost effective way possible.

Fresh water from a well, from rivers and from other surface reservoirs is always saturated with oxygen and includes a large number of minerals and suspended particles which can block up the cooling channels in production units through corrosion or by producing deposits.

KU-plants from the **technotrans solutions GmbH** do not allow such problems to arise. A plate-type heat exchanger made of stainless steel separates the clean closed circuit that is used to cool the production from the

natural fresh water circuit that is contaminated with all kinds of impurities.

Cooling tower water loaded with concentrated solids and particles should not be passed through the cooling channels of production machines. Here too, KU-plants provide clean working.

A microprocessor controller working in combination with a continuously operating motorised valve provides precise temperature management regardless of the temperature of the fresh water available. Consumption of fresh water is minimised and expensive water treatment is not required.

The operating pump works continuously at the same pressure and thus ensures consistent flow conditions. Automatic water feeding prevents the water level dropping too low. Providing a standby pump that is switched in automatically and also emergency cooling via the fresh water feed increases safety in operation.

KU-plants are an ideal tool to reduce maintenance costs, since all the production machines remain clean and ready for operation.



The use of KU-plants provides a closed cooling circuit and reduces maintenance costs





Energy saving hermeticool cooling plants

hermeticool units can be used wherever the cooling water temperature is at least 5K above air temperature. The function of the system hermeticool is to transport heated water to the external free cooler where the heat is transferred to the ambient air by means of direct heat exchange.



Double-circuit cooling plant with energy saving hermeticool-technology

Common free coolers must be filled and operated with a water-glycol mixture in order to prevent freezing in case of a plant standstill in winter. In order to not contaminate the consumers with glycol and thus limiting heat transfer, a heat exchanger must be installed to separate the circuits. This is not necessary when using hermeticool units from the **technotrans solutions GmbH**, which are operated all year without glycol. Constructive details and an integrated safety system prevent freezing even without additional heating. Compared to glycol operated free coolers this system achieves considerable savings in operating costs.



Free cooling with hermeticool hybrid

freecooler are space saving and energy efficient cooling systems. The hermeticool hybrid circuit, often known as adiabatic free-cooler, is a closed circuit cooling system. The position of the unit is usually on the roof of the production building. At low night temperature the hermeticool is most efficient. The integrated hybrid function also permits the reliable function at high day time temperatures.

hermeticool hybrid

- works in a closed cooling water circuit
- functions cleanly, maintenance-free and without water loss
- is the ideal replacement for open evaporation cooling towers and prevents disadvantages of pollution, salt and oxygen enrichment
- works according to the air cooling principle
- lowers the temperature of the cooling air down to dew point
- this type of system provides cooling water of a temperature below outside temperature
- is available at power levels of 50 kW to 6 MW nominal cooling capacity



Tailor-made compact chillers for special production processes

Chillers need to be adapted to the specific requirements of the application to ensure an exact temperature regulation and a reliable operation.

Explosion-proof compact chillers

In many processes simple cooling with industrial water is not adequate. Individual process-controlled temperature management requires the use of chillers directly in the production plant, especially if materials that are a fire hazard are being produced or processed. Explosion proofed chillers are offered as standard by the **technotrans solutions GmbH** and can be equipped with a wide variety of options.



Chiller in Ex-design



Compact chiller with two individually controllable cooling circuits



Explosion-proof chillers for the Ex-zones 1 and 2 are part of the standard range of technotrans solutions GmbH



Low temperature chillers

In chemical processes reactions are initiated and monitored according to temperature and pressure. Using a wide variety of machine components, chillers can be produced in modular form with one or more temperature circuits over a total temperature range from -60°C up to $+220^{\circ}\text{C}$. Machines of this type basically have micro-processor controllers which regulate the timing sequence and the temperature of the process. We recommend discussions with our process engineers to ensure correct sizing.



Low temperature chiller with integrated heating circuit

Energy recycling and heat recovery

Energy recycling

Every industrial production requires energy in order to make products. Often, electrical or primary energy is induced as heat, used for operation and must then be dissipated, converted or destroyed.

Our process engineers the **technotrans solutions GmbH** analyse and calculate production processes and the overall thermal periphery with the objective of lowering the necessary energy by means of energy recycling, of reducing the energy requirement at the individual stations, of converting energy or using it several times and dissipating it sensibly.

The result is considerable energy saving, which results in cost-cutting and contributes to preserving the environment.

Heat pumps

Heat pumps are cooling machines which are primarily regulated by the cold water temperature and are mainly used to draw off heat from production units. In winter this heat is pumped to a higher temperature through the compressor and made usable for heating purposes. In the summer the heat is drawn off into the outside air by means of externally-located condensers. Heat pumps of the **technotrans solutions GmbH** are filled with R 134a refrigerant and can produce hot water of temperatures of up to 60 °C.

In order to heat service water all year round, a desuperheater is placed before the heating condenser to heat the service water up to a maximum of 70 °C. Desuperheaters are an extremely useful option for each

water chiller. Heat pumps in combination with air extraction and ventilation units can be used in summer to provide cooling by extracting the heat from large rooms and halls to provide cold air at specific points to cool production equipment such as blown film units, and to support the hall heating in winter by passing hot air directly from the heating condenser into the air ducts.





The heat pumps from the technotrans solutions GmbH have the task of cooling production machines and saving heating energy. They help the environment and reduce annual operating costs for their users.

The use of the air heaters from the technotrans solutions GmbH means that the heat from production machines provides heating energy at no cost.

Air heaters

Air heaters of the **technotrans solutions GmbH** consist of copper tubes with metal fins which give off the heat from production machines into the circulated ambient air. These aggregates convert heat energy without utilizing additional primary energy. In a direct circuit the heat produced in the process is pumped directly to the air heater, for example the heat given off by a hydraulic circuit.

By comparison, in an indirect circuit the heat is given off first by a heat exchanger into the heat transfer medium in the heat exchanger circuit. This is in principle much the same as in a central heating system.

Air heaters of the **technotrans solutions GmbH** are of two types: of open construction with an axial fan for the heating of large rooms and halls, and a more presentable form with a nice housing and a radial fan for use in office or apartment.

Centralised cooling plants in containers save space and money

A complete centralised cooling plant, including the required peripherals, can be set up in the absolute shortest possible time at the subsequent place of installation and is immediately ready for use by means of prefabrication and installation in a container. This way, the otherwise high investments for an operating building, the costs for installation and start-up of the plant are reduced.

Container cooling plants almost have no limitations in terms of their capacity and variety of possible combinations. They are supplemented by peripheral systems such as water treatment and water preparation systems or compressed air compressors. If the production operations are re-located, then the container can be moved as well without any difficulty. Generally it is not necessary to obtain a special construction permit.

The decisive factor for the selection of a container cooling system are of course the future operating costs. A series of different cooling systems and the combined systems composed of these units are primarily available:

- Chiller
- Heat pump systems for heat recovery
- Cooling tower combined with a KU system as a closed, clean cooling circuit
- Air heaters for direct recovery of heat
- hermeticool-units
- hermeticool hybrid-units



A containerised cooling plant can be set up in the absolute shortest possible time and is immediately ready for use



Containerised cooling plants are designed acc. to the individual demands



All containers for installation of the cooling plants are tailor made, tuned to specific needs and requirements. The walls are insulated in terms of sound and heat; openings for pipe connections and electrical supply are provided.

The roof of the container is prepared to receive exterior aggregates. Since container cooling systems are set up outside, they do not cause building costs or result in losing valuable production space.



Containerised pump and tank group

Clean water is also part of it

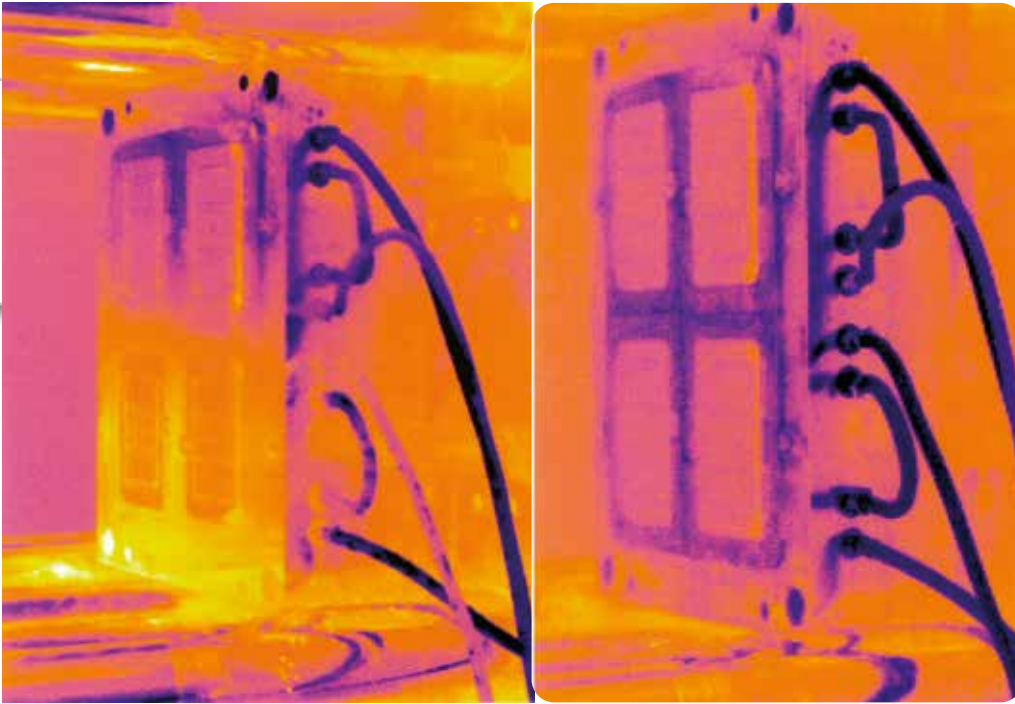
Due to its good heat transfer properties and high specific heat, water is extremely suitable as a heat transfer medium. On the other hand, a large number of substances is dissolved in water and this can cause unwanted side-effects in a cooling system, such as deposits. Water can take up and release oxygen and thereby cause corrosion. We want you to use only water that will cause you no problems. Our laboratory will prepare an analysis based on a sample of water. The water analysis is the basis of a recommendation for the water preparation required and to determine how the water should be treated.

Water preparation means in every case the production of treated water which is suitable for use in cooling units. In this connection water softening units of different sizes are applied.

For maintenance of the water we recommend our after-sales service and the completely automatic water treatment, type active. We can deliver test equipment, cleaning equipment and the necessary chemicals for your own maintenance personnel.



Double water softening unit to remove the minerals that form lime scale and dosing station for inhibitors to prevent corrosion, integrated into a container unit



*Infrared image of an injection mould.
Left: Inhomogeneous increase of temperature due to the use of contaminated heating/cooling channels
Right: Homogeneous temperature distribution after flushing the mould and conditioning the water*





One-stop turnkey plants



Our tasks include the complete planning of a cooling plant including all the peripheral equipment and instruments. Above all, the planning of the entire piping system for a specific and consistent supply of all consumers rounds off our package of services.

On request we can produce for you complete layouts for cooling water, material supply, power supply and compressed air lines. Our installation teams are experienced in the laying of piping systems made of steel, copper, stainless steel, PVC, polyethylene and polypropylene. On the basis of our detailed plans you can also have the work carried out by installation companies which you prefer.

The connection between the cooling plant, heat recovery system and the existing heating unit is made through hydraulic switching systems. The **technotrans solutions GmbH** makes use of all current serial and analogue interfaces for data transfer between the production machines and the cooling system or the cooling system and the heating unit or to communicate with a process controller.



service – worldwide and round-the-clock

Honest and committed - in personal discussions



Working together with the customer, the **technotrans solutions GmbH** identifies the individual project and product requirements.

The constructive exchange of ideas has proven itself even after the completion of a project or the installation of the system components.

Give us a call. A member of our **technotrans solutions GmbH** team will be happy to advise you.

Telephone: +49 2354 7060-0

Reliable service - before and after commissioning

**TECHNICAL
CUSTOMER SERVICE**




- Preventive maintenance
- Leak test for cooling systems
- Interface analysis
- Repairs

**PROCESS
OPTIMISATION**




- Sampling on the customer's premises or in our technology centre
- Performance measurement on the mould
- Optimisation of mould temperature control

**24 / 7
HOTLINE**



- Commissioning
- Spare parts service
- Technical helpline

**THERMAL
OPTIMISATION**



- Thermal mould layout
- Temperature profile measurement on the moulded part
- Thermal analysis
- Optimisation of cycle times

**IN-HOUSE
SERVICE INSPECTION**



- Mould cleaning
- System cleaning
- Technical training
- Performance measurement

**PROJECT
STUDIES**



- Energy expertise
- Layout of the optimum combined system
- Concepts for the utilisation of waste heat
- Calculation of cost-efficiency



On-site when you need us.

The **technotrans solutions GmbH** deploys its own service teams wherever systems and machines need to be installed, maintained and repaired.

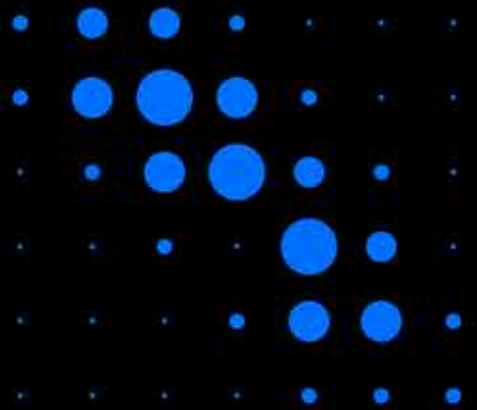
Worldwide.

References





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