



heatXchange

Issue 18

The Güntner Customer Magazine



Yoghurt and curd products
Green Directives
lower operational costs

Güntner Know-how
Lightning protection –
a cost-saving investment

Biogas plant
State-of-the-art technology
in rural Germany



The devil is in the detail.

But the big picture has to be right!

Dear Readers,

The topics of energy efficiency and CO₂ emissions are practically omnipresent, and obviously also affect refrigeration and air-conditioning technology.

Six different climate change scenarios were presented at the 4th Climate Conference 2007 (IPPC). An average temperature rise of at least 2 Kelvin over the coming decades was forecast with every scenario (even with those with a moderate CO₂ emissions increase). In 2007, the Federal German Government has therefore set itself some very ambitious nationwide objectives. Among other goals, the Government committed to reducing CO₂ emissions by 40 % by 2020 (compared to the emissions in 1990).

Refrigeration engineering's share of annual power requirements in Germany is an incredible 15 %. It is therefore quite clear that we could very well make a contribution in our industry to reducing CO₂ emissions with efficient systems and equipment. With the incorporation of savings potential it is no longer only individual components, such as the top consumer, the compressor, that are considered – optimization options for refrigeration/air-conditioning systems are now also sought (see article on German Refrigeration Award on pages 6 and 7). Manufacturers can draw on decades of development experience when dealing with the individual components. To some degree noteworthy savings potential can only be achieved with difficulty, and for the most part also involve increased investment costs. But when considering the overall service life costs, with which the investment costs in the refrigeration and air-conditioning systems area only amount to 15 – 30 %, beneficial higher investment costs can be easily justified by a reduction in overall costs, and also have a positive effect on CO₂ emissions.

Savings potential that is at least as high if not higher, can, I believe, be found in the energy-conscious control of refrigeration and air-conditioning systems that are precisely adjusted to the framework conditions of the set-up location and the user's requirements. An integrated coupling of the energy fluxes in the building area, on the factory premises, in the city district and even across and beyond this can now produce major savings. Our sights must always be set on the "big picture", even if a bit more planning and development are required at the outset.

Naturally we know that there are always numerous aspects to be considered with refrigeration and air-conditioning systems. Deliberations on the refrigeration/air-conditioning system should always be front and foremost here. You won't get far when trying to decide if the focus should be on energy efficiency or system safety (see article on lightning and over-voltage protection on pages 8 and 9), if you only consider one component and disregard the interaction of all individual areas.

With the rising energy costs of the near future to say the least, you will then have both ecological and financial benefits to boost your success.

Time is of the essence. Together we can, perhaps, stop things from getting too hot for us!

A handwritten signature in black ink that reads "Peter Roth". The signature is fluid and cursive.

Peter Roth
Head of Basic Research, R&D Department



1 A professional lightning and over-voltage protection ensures long-term safety of the investments – not only for controls technology.

2 At the Danone factory in Moscow, considerable energy savings are realized with a free-cooling concept.



3 At the biogas plant in Trechwitz, a compact and highly efficient ORC machine generates electricity.



4 In Prague, GVHX condensers ensure reliable server cooling.

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1st place for optimum energy operating point

The German Refrigeration Award is a competition run since 2008 by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety in cooperation with the non-profit consultancy firm, co2online, and the Kälte study group. The three best concepts in three categories each are awarded a prize by a jury of experts.

For his ground breaking energy-saving development, the Energy Balance Function (EBF), Peter Roth, Head of the Basic Development department at Güntner AG & Co. KG was awarded first place in the "Refrigeration or air-conditioning special applications" category.

The award winner comments: "We are the first heat exchanger manufacturer to have had any kind of controller at all for condensing pressure control in their standard range. This was the GDR Controller, our first 'green product'. Here in our company we have always focussed accordingly and kept the energy efficiency topic clearly in our sights. It was actually the GDR that brought me to the idea for the Energy Balance Function (EBF). The GDR already had the ambient temperature-dependent set point shifting* function, which the Güntner Motor Management (GMM) will also feature. As customers then approached us about this, I became curious and got busy with the function's physical background. This led to the question of how energy savings could be further



Left to right: State Secretary Jürgen Becker; Roland Handschuh (Güntner); award winner Peter Roth (Güntner)
Photo: Ingo Heine

optimized with appropriate fan control. And the result is the EBF."

Previous standard function: Ambient temperature-dependent set point shifting

With the previous ambient temperature-dependent set point shifting standard function the condensers are controlled from a fixed limit value of the condensation temperature. With the new algorithm, the Energy Balance Function, the joint power consumption of the compressor and the condenser fans is minimised.

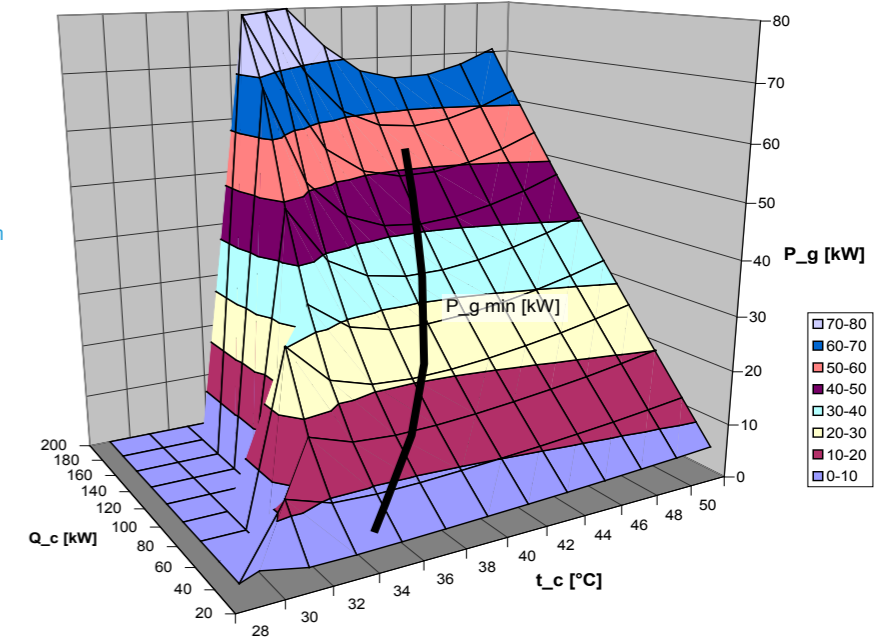
In refrigeration and air-conditioning technology, it applies as an accepted fact that in a refrigerating or air-conditioning circuit, the compressor is the component with the highest energy

* Ambient temperature-dependent set point shifting has already been provided by Güntner for several years for controlling condenser and drycooler fans. You will find a detailed description of this function in heatXchange 16 on page 17.

<http://www.guentner.eu/company/news/customer-magazine-heatxchange>

consumption. If you assume full load operation of the system under observation, there is no objection to be made against this assumption. But what happens in the refrigeration circuit if we assume partial load operation, as is frequently the case in the real world?

Total power consumption of a refrigeration system depending on the condensation temperature and the current condensing capacity.



Practical situation in refrigeration systems

An energy-conscious system operator tries to operate their refrigeration or air-conditioning system at the lowest possible condensation temperature. They therefore set their set point on the condensation pressure controller to +25 °C, for example. Theoretically, therefore, the condensation pressure set point then cannot be reached on a warm summer's day with air temperatures above +25 °C. As a result, the fans run at full speed all the time. This status is absolutely right and helpful if the system has to handle a high load. But if the system is in a lower load state, because, for example, most of the consumer units are switched off, but a few cooling units still have to run, the compressor load is significantly reduced. Only now can the energy-unfriendly case occur, whereby low power consumption on the compressor opposes high power consumption on the condenser fans at full speed.

With systems whose condensation set point is too high, which, unfortunately, is frequently the case, the condensation temperature would be set below the set point. The standard condensation control now takes effect

and reduces the speed of the fans until the set point is reached. An apparently plausible situation, partial load and reduced fan speed, which however, conceals the fact that the system is basically being operated with pressures that are too high, and therefore the compressor's power consumption is too high – a condition that could be avoided with the correct control.

The new control algorithm: Energy Balance Function

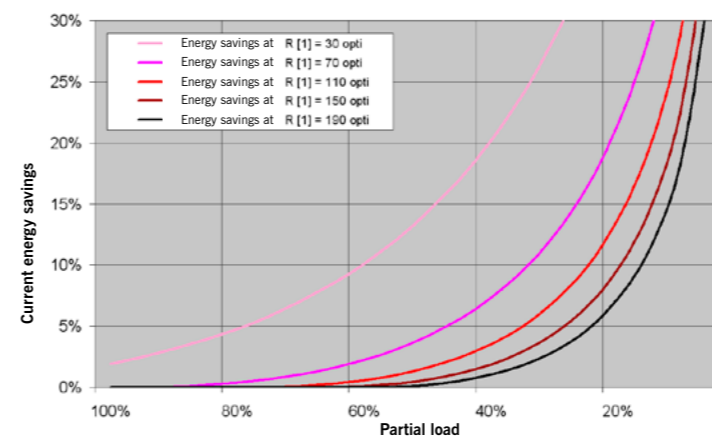
The new Energy Balance Function control function is designed to determine the optimum energy operating point for different framework conditions. In short, you could say that the EBF enables specific partial load states to be allocated to the optimum energy fan speed while incorporating the energy ratio of the condenser. The most important influence factors are the refrigerant used, the energy ratio, the configuration conditions of the system, the compressor's level of effectiveness and the current operating status data of the condenser. Compared with the standard control, the energy saving at the respective operating point could be up to 30 %.

High energy-saving potential

Peter Roth comments further: "This can save a lot of energy. Depending on the partial load behaviour, this energy saving can be between 7 and 30 %. If this innovation was used with all refrigeration and air-conditioning systems in Germany, we could save 300,000 tons of CO₂."

The award also has prize-money of EUR 10,000. The money will be invested in further developing the algorithm, so in addition to condenser fan control, drycooler fan control will also be possible in the future. At the moment it is still a theoretical model, but down the line this algorithm will be indispensable for the practical handling and controlling of energy consumption with condenser and drycooler fans. The Energy Balance Function will be integrated into the Güntner Motor Management (GMM).

You will also find a detailed description of what a generally applicable mathematical model for describing this task might look like and the information that can be derived from it at: <http://www.guentner.eu/company/news/guentner-press-center/>



Energy saving with optimized condenser control compared with standard control

R134a; $t_0 = -10\text{ °C}$;
 $t_{LE} = 25\text{ °C}$;
 $t_{c,min} = 25\text{ °C}$

Güntner goes green

The air-conditioning in Güntner's new server room, which was completed at the end of last year, uses our own highly energy-efficient equipment. Since the company's continual growth had already exhausted the capacity of their existing infrastructure, it had become necessary to set up a completely new data centre at the company's headquarters in Fürstfeldbruck.

Alongside the new installations it was also planned to expand the existing capacity for emergency power supplies and air conditioning to meet Güntner's growing demands.

The capacity of the existing server room urgently needed to be expanded. To be well prepared for the future, the company set up a completely new and larger server room in the converted basement of the administration building, but air-conditioning the new room was beyond the capacity of the existing air-cooling system. In implementing the new cooling concept, Güntner paid particular attention to finding a solution that was as energy-saving as possible: yet another reason to use our own products...

Newly-built basement server and utility rooms

Since the company did not wish to spoil the look of the existing administration building façade, the necessary refrigeration plant, pumps, piping, measuring devices, control and automation equipment, switch cabinets, etc. were distributed between different parts of the building.

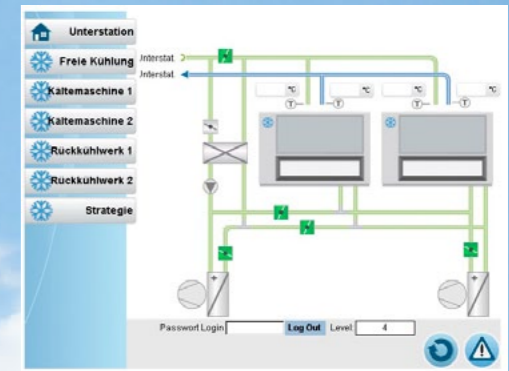
For example, a new reinforced concrete basement utility room was constructed to house the pumps and storage tanks. The drycoolers selected from Güntner's GFW series were placed on the roof of the production facility, with the refrigeration plant on a new steel platform inside the facility. The pipes connecting the production facility to the administration building were installed underground.

Cold water storage tank as backup

The cooling system for the server room is now protected in two ways: The cooling circuit is operated using R134a, and, in case that the system should ever fail, waste heat from the servers can be dissipated in an orderly fashion via two cold water storage tanks. Other safety equipment includes an automatic gas fire extinguishing system, UPS systems to cover possible power failures, and redundant provision of the cooling systems' principal components.

Energy-efficient control system

To maximise its energy efficiency, the entire installation is controlled automatically, naturally also using Güntner's own products. Here the choice of equipment focused on its facilities for monitoring the systems' energy data, plus transparent functions and operating procedures. The quiet, energy-efficient EC fans are therefore operated using Güntner's GMM EC motor management system. Energy-related system data is passed to the higher-level control unit via Modbus. There the data is evaluated and visualised in the higher-level



web-based operating system, thus facilitating impeccable energy management.

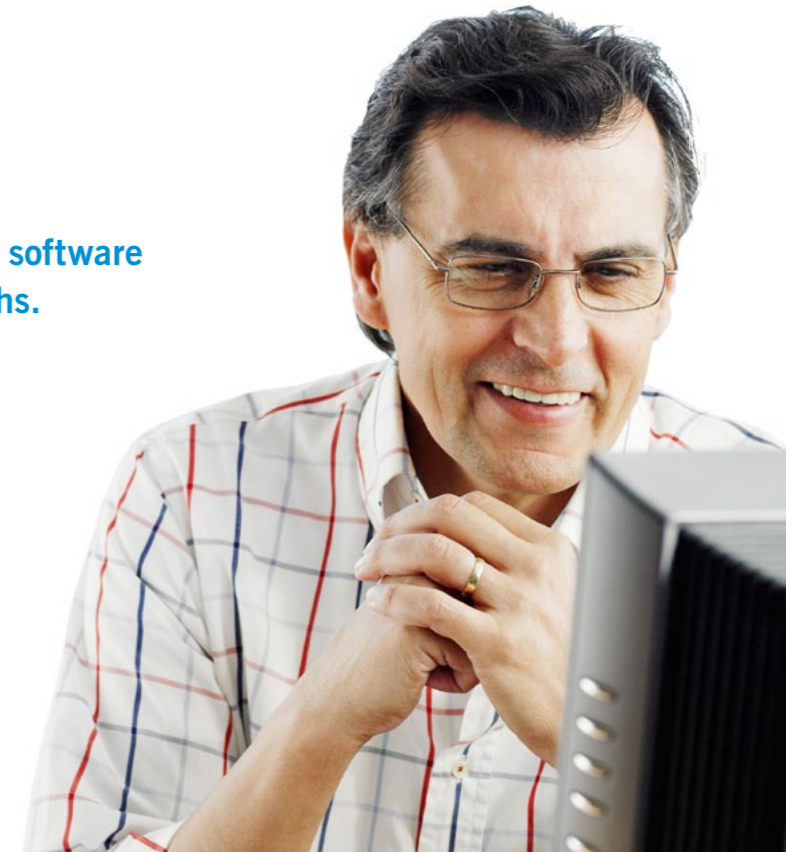
The system automatically switches to free cooling in winter if the outdoor temperature drops to 10 °C or lower. This further reduces operating costs and protects the environment. At a later date, it is also planned to use the waste heat to heat the production building.

The installed drycoolers are from Güntner's GFW series.

Latest features in the GPC

An update of the configuration options in our software was busily worked on over the last few months. With the latest changes we are now offering you an even wider configuration spectrum.

Read here what's changed or been reimplemented.



Oil coolers now available

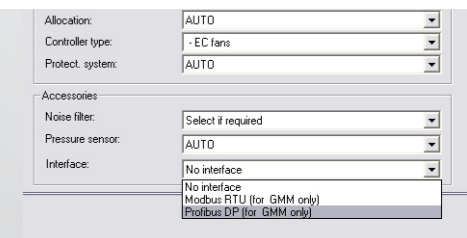
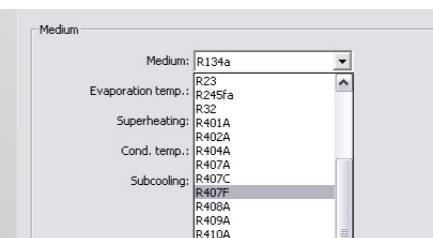
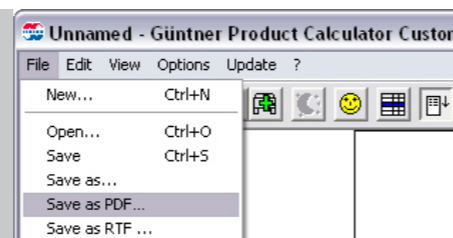
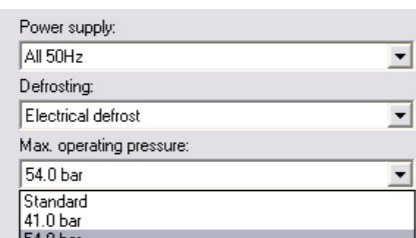
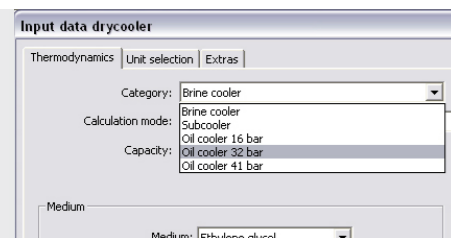
54 bar units for the CXGDF and CXGHF CO₂ evaporators

Configurations as a PDF file

Revision of the NH₃ condenser series

New R407F and R32 refrigerants

Profibus DP interface for EC fans with GMM



Oil coolers can now be selected in the "Drycooler" category in the pressure levels 16 bar, 32 bar and 41 bar.

Twist strips as tube components are also available. Twist strips are very often a cost-effective option to significantly increase the heat exchange on the tube inside. The configuration of this tube variant increases the pressure loss with its more turbulent flow. This is, indeed, already incorporated in the GPC with its configuration.

All unit types are now available in a 54 bar version with the CXGDF and CXGHF series.

In the GPC, a new selection filter, with which you can specify the maximum permissible operating pressure the unit must at least have, can now be used for choosing the right unit.

This filter is only shown when units in the selected series are available with different permissible operating pressures.

Configurations can now be saved and sent directly as PDF files. Two new menu commands are provided in the file menu.

- Save as PDF ...
- Send as PDF ...

As this is a unit and platform-independent file format, you can be sure that your configuration will arrive safely at the customer, and it can be opened by the operating system on any computer.

The AGVH and AGVV series have been changed over to stainless steel core tubes.

The data on performance, weight, etc. has been both updated in the GPC and in the revised version of the data sheet.

You also have direct access via the GPC to product documentation, such as the data sheet, the operating instructions and other such documents.

The R407F refrigerant is, according to the manufacturer, Honeywell, especially well suited for normal and deep-freeze applications in supermarkets. In the deep-freeze area in particular it can be used as a substitute for R404A (GWP 1824).

The R32 refrigerant (difluoromethane, CH₂F₂) is also now available. It is introduced as a future refrigerant for air-conditioning equipment with GWP 650.

The Profibus DP interface is now also available in the control panel dialogue box.

The Profibus provides an additional transmission protocol, and therefore the bandwidth for connecting to higher level control technology.

In addition to the Modbus RTU, the Profibus DP now also enables the transmission and additional analysis of all data recorded in higher level systems.

Download your Güntner Product Calculator (GPC) for free: www.guentner.eu

Source: DEHN+SÖHNE, Neumarkt



Lightning protection – a cost-saving investment

While energy efficiency and cost-saving are fully par for the course when planning new buildings, lightning and over-voltage protection are frequently neglected. These precautionary measures are, however, of fundamental importance for protecting refrigeration and air-conditioning equipment set up outdoors.

Everyone is talking about the more evident cost factors, such as energy efficiency with the components for refrigeration and air-conditioning systems, etc., but lightning and over-voltage protection appears to be a happily neglected topic. The considerations here for the possible long-term risks and the costs connected with them are very important from a financial point of view alone. Everyone, no doubt, becomes somewhat uneasy when they think about the costs that might be incurred, if, for example, the complete control of a refrigeration or air-conditioning system fails, or because leaks occur after a direct lightning strike – let alone possible personal injury.

Different regional dangers

The danger of lightning strikes is by no means the same everywhere – it is actually extremely different from region to region. Siemens maintains a lightning information service called BLIDS, which records lightning strikes across Germany and other European countries, and provides the data collected to various institutions. In March 2012 BLIDS published a new atlas, which shows how high the lightning danger is in individual regions.

The frequency of lightning strikes shows a clear north-south incline: While in Mecklenburg Western-Pomerania or Schleswig-Holstein there was sometimes no lightning for years, in the Central Erz Mountains, for example, there can be over 6 strikes per square kilometre.

So when it comes down to effectively protecting a new building or property from the dangers of lightning strikes, be it a production hall or an entire building complex with housing area, shopping facilities, and of course

refrigeration and air-conditioning technology, it is always advisable to contact a specialist company.

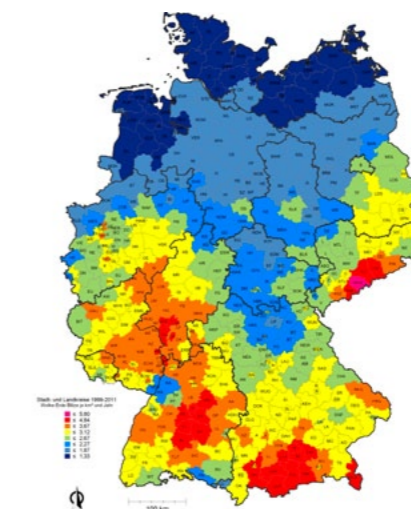
Safety with competent advice

In addition to the special geographical features, the professionals also know all about legal situations, e.g. the relevant standards, such as the four parts of the DIN EN 62305 (VDE 0185-305) lightning protection standard or DIN VDE 0100-534 or 540, which must be taken into consideration when selecting and using materials for lightning and over-voltage protection. They have specialized software to make the required risk assessments, which then form the basis for classification in the necessary protection classes and for implementing the resulting protective measures.

Assessing damage risks

Lightning protection planning is primarily about assessing damage risks. Standardized risk analyses are performed to assess a building's hazard potential, and to be able to implement specific measures for risk reduction. The result provides a selection of economically beneficial protective measures, which are harmonized with the respective building.

The property to be assessed is first considered without any protective measures for the risk analysis of direct and indirect lightning strikes. Dangers, which could emerge as the result of direct and indirect lightning strikes



Lightning strike frequency differs from Region to region (Source: Siemens Blitzschutzdienst)

on the building complex or on supply lines, are identified as “R” damage risk, which represents a dimension for a possible annual loss. The main focus of attention here, of course, is possible personal injury. Classification is then made, according to the risk situation, in the corresponding protective classes.

Protective classes and protective measures

These protective classes for lightning protection systems are defined in Part 3 of the VDE 0185-305 Lightning Protection Standard. They provide a set of construction rules, whereby, for example, mesh apertures, shielding angle and rolling sphere radii for lightning current arresters, distances from outgoing feeders and ring conductors or minimum lengths for earth conductors are defined in acc. with the respective danger levels. The effectiveness of the measures diminishes from protective class I to protective class IV.

The measures include earth termination systems, arrestors, discharge devices, lightning protection potential equalisation with over-voltage protection devices, a lightning protection zone concept with subdivision into different zones and further measures, which are each classified in a sub-categorization of the individual protection concepts.

When you realise the complexity of these specifications, if not long before, you then realise that it is always safer to rely on a specialist to deal with the important topic of lightning protection.

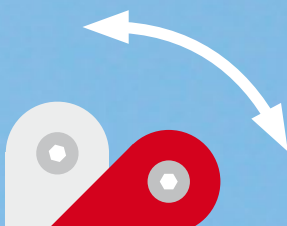
Sources:
- Siemens lightning information service (www.blids.de)
- Graduate Engineer (UAS) Michael Hess, Thomas Seitz (Dehn + Söhne GmbH & Co. KG, 92306 Neumarkt); "Lightning and Over-voltage Protection"; tab 10/2011

Green Directives lower operational costs

Free cooling at Danone factory

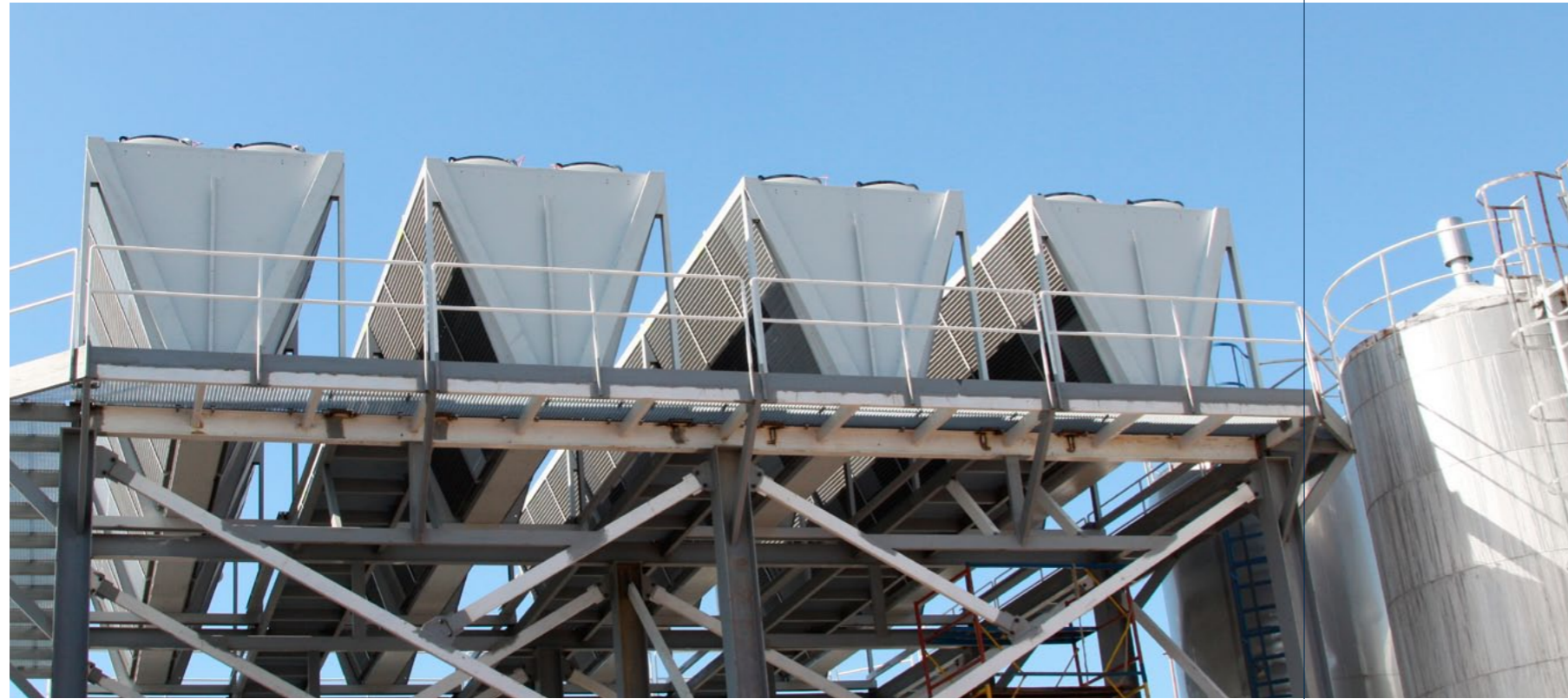
In a factory for dairy products in the greater Moscow area, Danone-Unimilk has been producing yoghurt and curd products since the year 2000. The plant was enlarged in 2011 and a new refrigerating concept with free cooling and perfectly harmonized energy-efficient control was introduced. Danone-Unimilk opted for this solution, focussing on its strategic target of sustainably reducing energy consumption and carbon footprint.

Since the start of production in the year 2000, the production was continually enlarged. In the last year, the refrigerating plant was refurbished, as the existing system was no longer able to fulfil the requirements. In 2011 it was decided to invest in more efficient cooling equipment that can supply chilled water required for the production processes in the factory during winter time. For this purpose four Güntner GFD drycoolers with a total capacity of 6 MW were selected for free cooling. Of course, the system as such was required to run as energy-efficient and steady as possible.



Transportation by crane without cross beams due to movable crane lugs

The four GFD drycoolers were placed on a steel substructure at 8 m total height.



Maximum capacity, minimum footprint

The greatest challenge faced during the planning phase was the limited space for the installation area of the drycoolers. In order to ensure a sufficient air supply also in the winter when there are large amounts of snow, the units were placed on a steel substructure on the roof of a production hall at 8 m total height.

Different operating modes in summer and winter

During the summer, the refrigerating capacity needed is so high that the water is being chilled with an ammonia refrigerating plant with three chillers. The total power consumption of the refrigerating plant is approximately 1550 kW. During maximum operation, the plant offers an efficiency factor of $5500 \text{ kW} : 1550 \text{ kW} = 3.55$.

In order to maintain an operating mode that is as energy-efficient as possible, it was decided to use a drycooler system with propylene glycol (40 %) during the winter, as especially during the four coldest months, the ambient temperature is so low that the system can be operated in free cooling mode. In the case of free cooling mode, the overall power consumption is at 360 kW, here 800 m³ fluid are circulated in the drycoolers. This means that with a total capacity of 6 MW, the efficiency factor is at $6000 \text{ kW} : 360 \text{ kW} = 16.6$.

So, the lower the ambient temperature, the less energy is needed for the production of chilled water. With an ambient temperature of -3 °C, the refrigeration system for the chilled

water production is in a kind of transitional phase; the free cooling system is reinforced with a chiller of the ammonia plant. In this case, one of the chillers of the ammonia plant that also can be used for chilled water production via plate heat exchangers, is added to complement the capacity of the drycoolers. When the ambient temperature sinks even lower, the power consumption can again be lowered considerably by controlling the pump capacity and by using a PID control (Proportional-Integral-Differential control; forms part of the Guntner Motor Management GMM sincon) that controls the fan speed in a stepless mode. At temperatures below -30 °C, the fans stop completely. In this free cooling mode, the operation of the system is the most efficient with an efficiency factor of $5500 \text{ kW} : 150 \text{ kW} = 36.7$.

The Guntner Motor Management GMM sincon ensures perfectly controlled operation.



Precise control by Guntner

However, guaranteeing the large volume of chilled water while keeping energy consumption as low as possible was only part of the challenge. Of course, the chilled water had to be cooled down to the required temperature of 2 °C as precisely as possible. In order to achieve this, precision temperature sensors by Siemens were used; the AC fans of the GFD drycoolers are controlled in stepless mode with the newest version of the GMM sincon. With the profibus integrated in the GMM sincon, external data logging and signalling is equally possible without any problem. In order to harmonise the adjustment of these components as much as possible, the commissioning of the control panels was realized by a member of staff of Guntner Controls on site together with the local Danone Controls expert. Even the tiniest details were closely looked at to guarantee smooth operation. This also included the communication to the superordinated control system in which the communicated data are analysed.

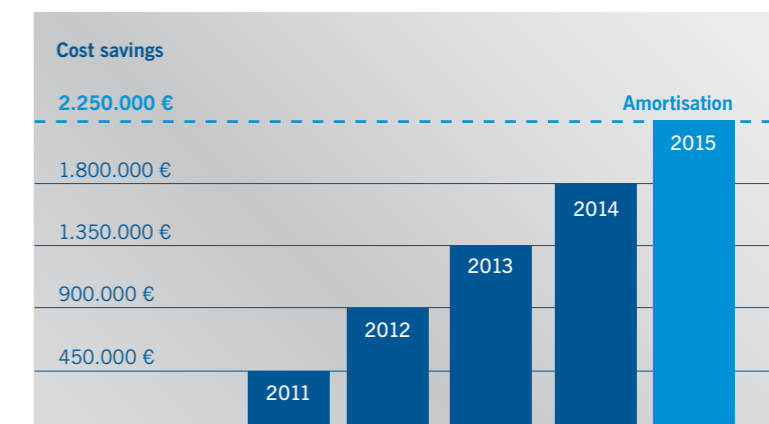
Free cooling – big energy savings

The free cooling concept has proven itself to be very efficient in this project. Of course, the efficiency of the system mainly depends on the ambient temperature. Even after a very short operating time, the numbers are very promising: Preliminary figures show that during the winter season 2011/2012, the energy savings were between 500,000 and 1,000,000 kW/h. This means for the month of January alone cost savings of about 1.5 million Roubles (approx. 40,000 Euros). With this level of

savings, the new system will amortise itself within five years.

This project was the first one in Russia using the system of free cooling for the production of chilled water used in production processes of a dairy plant. With the experiences gained in this project, it may be concluded that this kind of system is especially proper for dairy plants in northern regions in which the average monthly temperature is at least -7 °C or lower during four months in winter.

The plant in the greater Moscow area now has a new refrigerating concept for the production of chilled water.



The free cooling system will amortise itself within five years.

State-of-the-art technology in rural Germany

If you think that exceptional things take place only in exceptional locations, think again. In the village of Trechwitz, a rural area not far from the city of Potsdam in Germany, one of the most modern biogas plants in Europe is in operation because of the vast energy potential from manure.

The successful development of these modern biogas plants started a few years ago, when the local farmers Hergen Wessels and his son Timo Wessels wanted to have a biogas plant for their own farm and realized that there was no technology designed to fit their plans. Therefore, they started to develop their own concept adapted specifically to their farm. The success that followed led Hergen Wessels and his son Timo to organize a group of companies to develop, operate and maintain biogas plants. At present, there are approx. 80 employees working in the different areas.

The first plant completed by these companies was in 2008, at Timo Wessels' farm.

The plant in Trechwitz was built to capitalize on the manure and slurry generated by a number of agricultural operations in and around the village. Among these operations are Wessels' own cow barns in Damsdorf, a riding stable in Trechwitz and a chicken farm in Damsdorf. Another cow barn will be added on the site of the biogas plant itself, holding 120 cattle. When the biogas plant started operating in January 2012, corn and

sugar beets were used in addition to manure and slurry. Facility Manager Radko Doldzhev explains: "By now, we operate the plant completely without additional plant mass. Every day, we process 45 tons of manure and slurry. The logging of the supplied material is done automatically: the trucks drive up to the remote-controlled weighing machine and the data is immediately logged in the computer. We generate about 500 kilowatt-hours of power per hour. Since the plant has a total capacity of 800 kilowatt-hours, there is still potential to generate more electricity."

The biogas plant in Trechwitz is being operated with manure and slurry.



From left to right: Facility manager Radko Doldzhev, Gerd Knospe (etalon), Rob Emrich (ElectraTherm) in front of the Green Machine

ElectraTherm Inc.

The company ElectraTherm Inc., headquartered in Reno, Nevada, was founded in 2005 and is a leader in small-scale waste heat recovery. www.electratherm.com

etalon GmbH

The company Etalon GmbH, headquartered in Potsdam, has been helping clients since 1997 to find the perfect energy saving solution for their ventures. This includes investment in innovation, energy management and the optimization of building technology. www.etalon-energie.de

Power generation using an ORC plant

So, what is so special about this biogas plant? After all, there are already hundreds of them throughout Europe.

From the beginning, Timo Wessels put a strong focus on operating the plant with maximum energy efficiency. In cooperation with the company etalon GmbH from Potsdam, specialists in detecting and realizing energy saving potential, and the company ElectraTherm from Reno, Nevada, they put into operation a whole new concept of an ORC plant.

ORC stands for **Organic Rankine Cycle** and denotes a procedure to drive steam turbines with a working fluid other than steam. This process is used to generate electricity with the help of combined heat and power generation, e. g. in biogas plants.

New technology by ElectraTherm

ElectraTherm has developed a compact ORC machine called the Green Machine that is able to generate electricity from low-temperature waste heat by using an organic working fluid. In order to achieve this, patented and patent-pending technology is used.

Rob Emrich, Vice President of Sales at ElectraTherm, says: "We put about seven years of development work into this machine, and we are quite proud of it. The small-scale ORC market is still fairly new and this project is an excellent demonstration of our proven technology. This plant is only the fifth in all of Europe that is equipped with a Green Machine to date."

On top of the machine room, there are two drycoolers of the GFH series; a unit with one fan serving as oil-mixture cooler and a unit with four fans serving as emergency cooler. Before the Green Machine was installed, the entire waste heat of the motor was dissipated into the ambient air by the GFH drycooler with four fans. Since the installation of the Green Machine that uses the waste heat to generate electrical energy, this emergency cooler is only used during maintenance work on the block heating station.

A special condenser for the energy industry

The working fluid used in the ORC process of the Green Machine is being cooled by a condenser of the Güntner series GVD which has been developed especially for the needs of the energy industry. This V-shape coil condenser has a very small footprint compared to its power density and can be adapted to any application due to its modular design. There are eight basic models with a high flexibility of fin and tube geometries and a large variety of heat exchanger coils allowing for the design of the optimally suited unit. Additionally, the units are delivered ready for operation, so that no installation of individual components on site is necessary. And despite their impressive size, the units are suited for transportation by truck.

The plant was designed for an output of 800 kW. Especially when operating at full load, there is the potential to install a district heating system to cover the needs of part of the village.

The already existing plant in Damsdorf, consisting of three block heating stations with a total capacity of 1.9 MW, is part of such a district heating system. In total, 26 houses, a local school with a gym and a local storage building are heated with energy generated by this plant.



Unit on the left: The Güntner GFH drycooler serves as oil-mixture cooler; unit on the right: The Güntner GFH drycooler serves as emergency cooler that can be used e. g. during maintenance work on the block heating station.



The Güntner condenser GVD, specifically developed for the energy industry, cools the working fluid used in the ORC process.



Safe server cooling with GVHX

Telefonica O2, a renowned service provider in the area of information and communication technology, uses Güntner GVHX condensers with especially silent EC fans in order to cool their servers in the Nagano Centre in Prague.

Telefónica O2 Czech Republic operates a data centre in the office complex Nagano in Prague's district Žižkov. This data centre is one of the largest in the whole of the Czech Republic. Since starting its services in 2002, the capacity of the centre has been enlarged in several steps.

Of course, data and operational safety are the most important things when operating a data centre. Should the servers fail, even for a very short period of time, the damage would be devastating. Therefore, operational reliability has the highest priority when it comes to cooling server rooms.

Improving energy efficiency

In the spring of 2011, O2 Telefónica decided to replace the meanwhile outdated chilled water system with a direct expansion (DX) refrigerating plant in order to improve on energy efficiency. The project was realized in cooperation with the companies ALTRON a.s. and LAKA CZ s.r.o. ALTRON a.s. is the largest Czech and globally active non-IT supplier who – excepting IT hardware – offer everything regarding the IT like air conditioning, humidifiers, extinguishing systems, emergency power supply etc. In a later stage of the project, they served as general contractor. LAKA CZ s.r.o. is one of the leading companies in IT cooling in the Czech Republic using technology of the German manufacturer Stulz GmbH.

In two halls with a total of 2000 m² surface, 29 DX precision air conditioning systems with 105 kW refrigerating capacity each and another four air conditioning systems with 50 kW each (for the cooling of the emergency power supply) were installed. All systems have two circuits so totally, 66 condensers were installed on the roof – 58 pcs. of 64 kW condensing capacity 64 kW and 8 pcs. of 31 kW. In order to keep the energy consumption of the systems low, they are designed for a temperature difference of 10.5 K, the smaller systems even for only 8 K.

Best solution: microox® units

The operational reliability of the units was one of the factors that made O2 Telefónica decide to use the Güntner GVHX condensers.



Another important reason was one of the main characteristics of the new microox® technology: Given that the heat exchanger coils are made completely of aluminium, the total weight of the units is considerably lower than the weight of comparable units with the renowned finoox® technology that mostly uses copper tubes and aluminium fins. The lower weight was decisive for the structural analysis of the building on which the condensers were to be placed.

Another plus of this series – a plus it shares with the other condenser and drycooler series – is the possibility to use the especially energy-efficient and silent EC fans. In this case, the fans are operated at their optimum using a Güntner GSW continuous control. Given the requirements regarding the energy efficiency, the continuous control and the sound pressure level – the office complex is located near apartment buildings – the decision was immediately made in the beginning to use EC fans with energy efficiency class A. The condensers have a sound pressure level of 32 dB(A)/10 m, the smaller ones of only 31 dB(A)/10 m.

Refurbishing in several steps

The replacement of the old with the new systems was realized without disturbing the operability of the data centre. For this reason, it was done in several steps. It goes without saying that delivery reliability and on-time delivery were of the utmost importance.

Since autumn 2011, the new plant is in operation. The old units were integrated into the system as free-cooling heat exchange coils and therefore maintain free-cooling operation during the winter.

Roland Handschuh joins the executive board of the Refrigeration Research Council



This year's annual general meeting of the FKT (Refrigeration Research Council, www.fkt.com) was held on 29 February 2012 in Altenstadt. As scheduled, the meeting elected

a new executive board for the Refrigeration Research Council, which for the next two years will include Güntner's Roland Handschuh. The executive board monitors the advisory board, which in turn decides about the execution of research projects.

The advisory board suggests institutes that should be approached for individual projects and examines the resultant proposals, and the executive board then confirms who should be awarded the contract. A number of research projects are in hand at the present time, notably "Energy efficiency tool", "Water in CO₂ refrigerants" and "Operating requirements for refrigeration plants with flammable refrigerant".

Training with merit

It is well known that there is a shortage of specialists for refrigeration and air conditioning technology. Güntner take their responsibilities as one of the sector's technology leaders very seriously, with an annual investment in young people's education and training – from internships, apprenticeships, advanced training right down to dual-study and sandwich courses.

Güntner's apprentices are given intensive support throughout their training to make sure they have the best possible chance of a good result.

This shared commitment pays off:

This year, our apprentice Carina Hartmann completed her business administration course with the highest marks in that subject. With self-discipline, hard work and

tenacity she achieved an average score of 1.1 (excellent), for which she was awarded the State Prize at the passing-out ceremony on Monday 05.03.2012 at Sparkasse Fürstentfeldbruck.

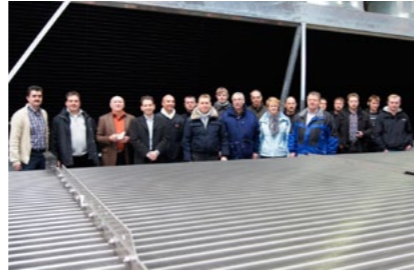
The same level of commitment also paid off at the academic end of the scale:

At the end of last year, BA student Michael Freiherr successfully completed his engineering course at the European Academy of Refrigeration and Air Conditioning Technology (ESaK). He compiled his degree dissertation, entitled "Design, construction and testing of an experimental set-up for measuring the performance of moistened heat-exchanger surfaces", while studying in the USA. A number of trade journals expressed lively interest in the grade dissertation, and Michael Freiherr was able to publish his results in the technical journal for refrigeration and air-conditioning technology, KI.

He was later also involved as one of the initiators of the ESaK semester project for 2008

Guild welcomed at Güntner

At the beginning of February, the Munich & Upper Bavaria Guild for Refrigeration and Air-conditioning Technology paid a visit to Güntner. Guild members met for an intensive two-day course at the company's



headquarters in Fürstentfeldbruck in order to discuss "current implementation of standards in refrigeration".

The event was launched with a welcoming address from the managing director, Robert Gerle. This was followed by a tour of the factory, which enabled the participants to gain an impression of heat exchanger production at Güntner and Jäggi.

The course then continued with a series of technical and informative talks. Gerhard Schrempf, from consultants KISC, explained the fundamentals and formulations of the new Machinery Directive. Other topics discussed included the requirements for risk assessments laid down in the DIN EN 12100 standard for refrigeration equipment.

The second day of the course concentrated on "Explosion protection and refrigerants" and "Introduction to VDI 6022". The participants, who included many of Güntner's customers, were very enthusiastic about the event and the wealth of useful information about refrigeration and air-conditioning they had gained. They then dispersed contentedly to their homes, secure in the knowledge that they are fully up-to date with European legislation.

on the experimental refrigeration system CryoCram. At the celebrations marking the first three years of sandwich course programmes in Hesse, Michael Freiherr received the third prize in the "Cooperative Education Hesse Award" for his work.



The speaker Professor Steffens presents Michael Freiherr with his € 500 prize from the "Cooperative Education Hesse Award".

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**“Minimal weight,
maximum capacity!”**

*Maximilian Haberlik
Sales Manager Wholesale*



Dear Readers,

Since its market launch at the Chillventa 2010, this new generation of condensers GVHX/GVVX with microox® technology has successfully been taken into operation more than 3000 times.

Short delivery times, reduced refrigerant charge and high operational reliability are only some of the benefits that make the GVHX/GVVX so unique. Especially if you search energy-efficient solutions, the GVHX/GVVX is a good choice. In combination with a Güntner controller and EC fans you receive a condenser system which leaves nothing to be desired.

*Maximilian Haberlik
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GVVX

GVHX

The benefits of the GVHX at a glance:

- Excellent price/performance ratio
- Reduced refrigerant charge
- Power range 8 – 310 kW
- For all standard refrigerants up to 41 bar
- Optimised casing design for transport and storage
- Aluminium heat exchanger with high corrosion resistance
- Excellent energy efficiency classification
- Easy integration into facility management
- Low operating costs with Güntner Motor Management with EC fans
- Reduced unit weight with aluminium heat exchanger