

heatXchange

Customer magazine of the Güntner Group | 21st edition

CFD: Flow simulation
in practice

DUAL Compact – The new
air cooler with numerous benefits

V-SHAPE Compact with
adiabatic pre-cooling system





The technology you trust

Dear Reader,

The topics of energy efficiency and CO₂ emissions are virtually omnipresent, and of course they are also relevant for the refrigeration and air conditioning sector.

This sentence was written by my colleague Peter Roth. He used it as introductory phrase in his own editorial for the 18th edition of the heatXchange, and it remains as true and important as ever.

But today, almost exactly six years later, the impact of the prospective measures aiming at limiting the global warming then suggested by policymakers is not only omnipresent, but also palpable for each of us. Refrigerant mixtures with high Global Warming Potential are becoming scarce and expensive; in some cases, the production stop of these refrigerants has already been announced. In some EU countries, additional levies for these refrigerants are being discussed or are already in place. In addition, we will have to deal with the first actual bans on specific refrigerants in 2020. In short: Time has come to let action be the guiding principle!

Therefore, Güntner has looked ahead and been active for years in order to let you focus on your core business. Be it ErP-compliant units well before the ErP Directive became effective, or units using our latest tube geometries with low tube volume well before refrigerant charge limits were discussed in the context of the F-gas regulation, or our CO₂ air coolers with an operating pressure of up to 80 bar as a standard – it is a personal concern for us to always be able to offer you products which are way ahead of their time on a technical level and which set new standards. However, this requires not only a lot of experience, but also foresight and customer focus – values on which you can rely with Güntner now and in the future.

This is the standard we constantly bear in mind when we start developing our products. But it also goes without saying that we are not satisfied with just fulfilling the usual technical requirements. To pick a Güntner product always means to deploy Güntner quality with an additional benefit – the Güntner Plus. It is up to you to decide if we succeeded in this endeavour once again.

Therefore, you will find in this heatXchange edition some of the latest examples of our Güntner Plus: Our new DUAL Compact air coolers are especially easy to clean and the optionally integrated condensation water pump spares you the laying of the condensation drain within the cooling room (see pages 8/9). Our extended warranty for all Compact product lines speaks for itself (p. 30), and the V-SHAPE Compact offers you maximum capacity with a minimal footprint (see pages 6/7).

Yet to be able to continue developing our products with the necessary foresight, we invest in our own measurement laboratory for CO₂ and NH₃ units (see pages 10/11) to keep in touch with the latest trends, because we are convinced that this is the only way to succeed in remaining your reliable partner.

Here's to an informative read.

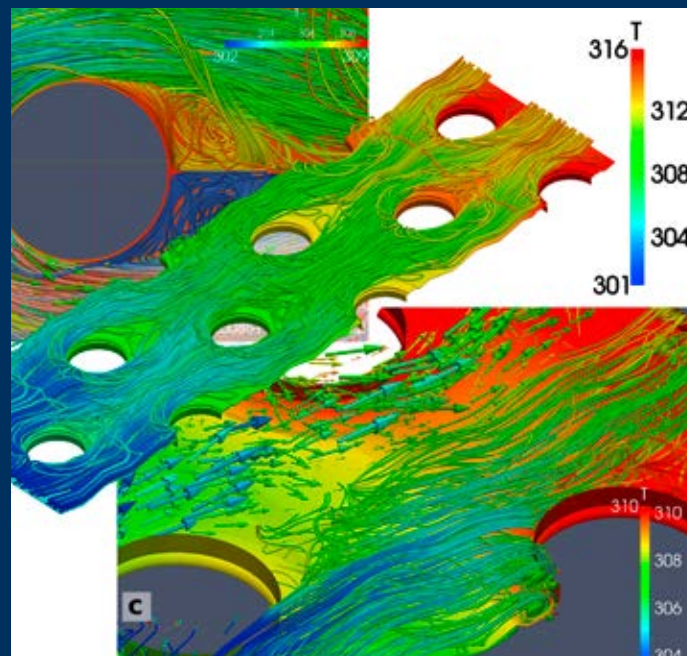
Michael Freiherr
Chief Technical Officer, Güntner GmbH & Co. KG



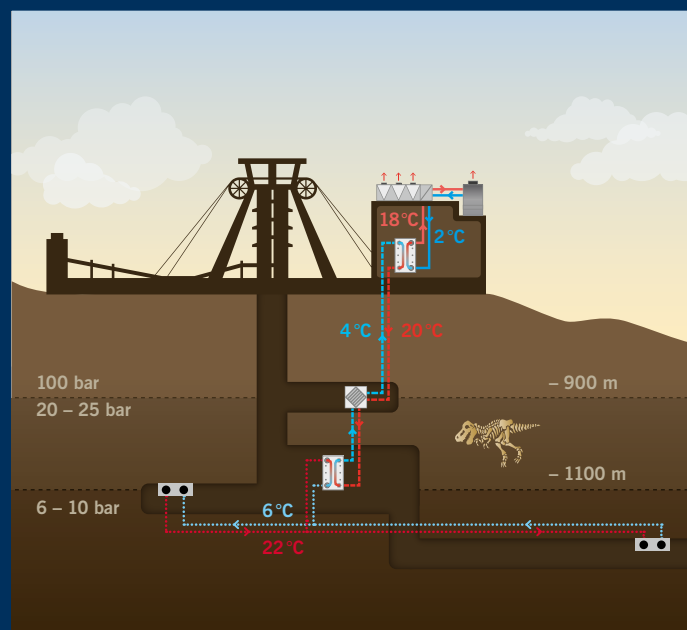
One of Europe's most modern logistics centres for fruit and vegetables operates Güntner air coolers and condensers.



The V-SHAPE Compact family with the adiabatic pre-cooling system HydroPad is in a class of its own.



Computational fluid dynamics is helpful not only for theoretical analysis but indeed provides practical customer benefit.



Durable and robust technology from thermowave allows the temperature in the tunnels below ground to be maintained reliably and permanently at below 28 °C.

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Latest news from the Güntner world

In a class of its own:

The V-SHAPE Compact with HydroPad

Since this summer, the units of the V-SHAPE Compact family have been available as fluid cooler, condenser and gas cooler. They round off the Guntner product portfolio of the V-SHAPE families at the lower end with regard to capacity. Each heat exchanger is specifically designed for the fluid HFC, CO₂ or water/glycol mixture. The core tube diameters and materials, in combination with the fin geometries, provide the best possible combination of maximum capacity and minimum tube volume. Operated with the optional adiabatic HydroPad pre-cooling system and the wide range of accessories, the V-SHAPE Compact leaves nothing to be desired in its performance category!

All this sounds great – but what does it actually mean for the user? For details, read the following interview with the Product Management Team: Michael Freiherr, Chief Technical Officer; Gerald Fischer, Product Manager for the Compact segment.

Editor: Mr Freiherr, to be honest: “In a class of its own” is clearly a self-confident claim, isn’t it?

Freiherr: This may well be true at first glance, but taking a closer look at the technical properties of the units, you will realise we actually do not exaggerate. It starts with the little design details that make life easier for the technician on the spot, and ends in a thermodynamic concept allowing our customers to find the suitable unit for virtually every application in less than no time. Hence, the new V-SHAPE Compact family is truly unparalleled in this class of units.

Fischer: That’s right. We are talking about the field of Compact units, meaning units that are designed for small and medium applications within Commercial Refrigeration, for example. And, from the capacity range and power density to technical properties like the retractable crane lugs, the simplified connection system, the invisible cable routing and, of course, the adiabatic pre-cooling system named HydroPad, everything works to perfection.

Editor: Speaking of “everything”: Which accessories are available?

Fischer: As I mentioned earlier, we are talking about the Compact range that offers the familiar Guntner Compact standard regarding technical accessories we defined together with our customers. And, as usual, research and development geared towards the expected applications.

Editor: From your point of view, what is the highlight of this product family?

Freiherr: There is no general answer to this question as there are different operating modes and different fluids. But I would say that this is exactly what makes this product family so special: It is the variety of possible applications. The focus during product development was, however, on heavily expanding the zone for transcritical CO₂ plants with our adiabatic CO₂ gas coolers. This was very challenging with regard to design and thermodynamics but the team came up with brilliant solutions. So the adiabatic system is my personal highlight!

Editor: Why is that?

Fischer: The HydroPad system itself already offers numerous benefits, no matter for which type of unit it is used. As it is a humidification pad, water treatment is generally not an issue. Simply connect the system to a fresh water pipe and you are done! It is precisely this simplicity that is a key aspect of this technology. It does practically not require any additional

knowledge to connect and operate the units. The water supply system is very easy to maintain and very easy to access for visual inspection. By the way, only fresh water is applied.

There is no recirculation, no vapour formation and no aerosol output. And, of course, the corresponding control is also an in-house development. One of its tasks is to make sure that the unit always operates in the most cost-effective operating mode and that the supply is drained regularly.

This option allows for operating all refrigerating installations more efficiently, thereby saving money. The unit capacity can also be increased using the humidification system; hence you can opt for smaller units requiring less set-up space.

Freiherr: We were, of course, also thinking about which market trends and requirements we want to meet during the design stage. What are the benefits for our customers, what is the everyday life of technicians in dealing with our units? The questions we asked ourselves covered everything from ordering to the disposal. And we were consistent when it came to implementation.

Editor: Let’s talk about customer benefits: You’ve mentioned the expanded zone for transcritical CO₂ plants before. What do you mean by that?

Freiherr: Until recently, transcritical CO₂ installations were interesting from an economic point of view only in moderate climate. The higher the average annual temperature of the location, the longer the transcritical operating times, and this of course has a negative effect on the plant’s efficiency. We are referring to what is generally known as the CO₂ equator whose border was previously north of the Mediterranean countries.

The HydroPad system though pushes these borders southwards to warmer regions as the subcritical operating times are significantly extended thanks to adiabatic pre-cooling.

Fischer: It depends on the respective location: Regions where high temperatures and low humidity prevail are particularly well suited. We calculated this as an example for the city of Madrid. We assumed here that a CO₂ booster system is operated transcritical from an ambient temperature of 23 °C. Operating a conventional dry cooler, transcritical operating times quickly add up to 1,920 h/a.

With the adiabatic pre-cooling system, these operating times can be reduced to 300 h/a, making the plant economically efficient!

Editor: Mr Freiherr, Mr Fischer, thank you for this interview!



As you can see, you see nothing

The new dual discharge air cooler DUAL Compact offers several benefits, but one special feature really stands out: the optional integrated condensation water pump.

With the option of an integrated condensation water pump, the drain line can be installed in the false ceiling. This does not only look better – it provides you with convincing advantages: This way, you can clean the units without having to remove the drain line and you can start cooling again much faster.

What's more, the DUAL Compact sets standards for the use in processing rooms: With their particularly draught-reduced design, the units ensure the subjectively and objectively best climate in those sensitive working areas, thus reducing the loss of working days to a minimum. And they are a joy to look at!

Elegant and versatile

The units of the latest air cooler generation generally offer many advantages for typical air cooler applications, from optimised versions for HFC and CO₂ – with an operating pressure of up to 80 bar as standard! – to fin patterns of 4 mm for normal temperatures and 7 mm for low-temperature applications.

The air is distributed throughout the room in a uniform way via both sides. Inspection and cleaning are very easy thanks to the sophisticated design. And the DUAL Compact has nothing to hide when it comes to its inner values: The heat exchangers are optimised for the respective refrigerant and refrigerant groups respectively and offer optimum capacity at lowest possible tube volumes.

Güntner hygiene standard

The units in Güntner hygiene design with smooth surfaces are not only easy to clean – their hygienic properties are confirmed by an HACCP certificate. This certificate also applies to the Coil Defender, a powder coating across the entire coil; this corrosion protection is optionally available for all air coolers of the Compact product line.

Typical applications



Rooms with
temperature of 0 °C



Order-picking areas



Corridors



Sales areas



Coil Defender – corrosion protection for Compact air coolers

By the way: The new DUAL Compact is also available with our new Coil Defender corrosion protection coating. See page 26 for information on this coating.

Own laboratory for capacity and air volume measurements

Since spring, Güntner has had another measurement laboratory at its location in Fürstenfeldbruck. This is what makes it so special: The measuring chamber is designed not only for CO₂ and NH₃; in addition to capacity measurements, the chamber also allows to carry out air volume measurements.

The chamber design is based closely on the requirements of EN 327/328 and provides us with reliable capacity measurements for a wide range of thermal boundary conditions for our CO₂ and NH₃ units. The design of the measuring system also allows to perform frosting and defrosting tests. And, of course, also a comprehensive safety system was installed.

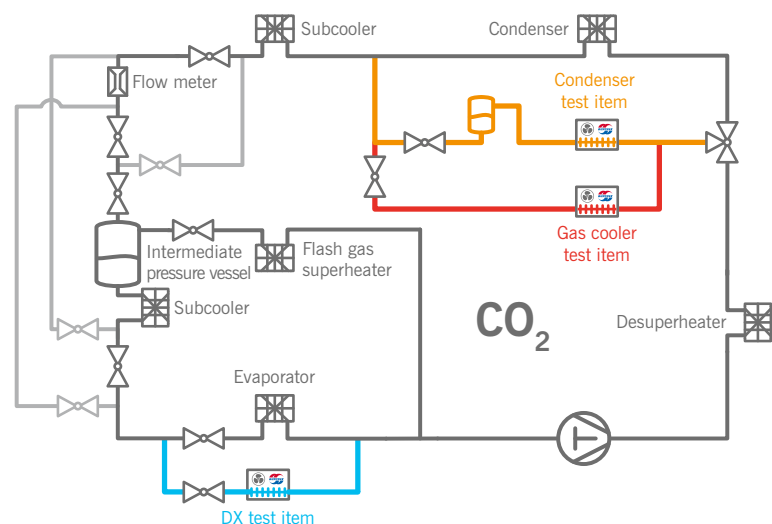
Design of the CO₂ test facility

It was decided to have a circuit with double expansion in the CO₂ plant so that the plant has three pressure stages. All test items dissipating heat (all gas coolers and condensers) can be integrated into the high pressure stage. This part of the facility is designed for operating pressures of up to 120 bar and features a Coriolis flow measurement to determine the refrigerant flow rate. If a test item is to be operated as condenser, a receiver that is mounted in the test chamber can be activated to ensure smooth and unobstructed drain of the refrigerant condensate, as is prescribed by the EN 327 standard. For measuring this unit as gas cooler, it is possible to circumvent the receiver. For CO₂ DX measurements, the liquid refrigerant can also be passed through the above-mentioned flow meter via the respective circuiting and valve switching. As usual, the refrigerant pressure is reduced by an electronic expansion valve, and the refrigerant is passed through a CO₂ DX test item installed in the chamber.

As not only the liquid refrigerant accumulates in the intermediate pressure vessel but also sometimes a significant amount of gaseous CO₂ refrigerant, the gaseous portion has to be expanded by a separate expansion valve and to be passed through the compressor.

It is characteristic for CO₂ that a small amount of the refrigerant becomes liquid during the expansion process of pure gas at the dewpoint curve. This liquid is evaporated by means of an

erant condensate, as is prescribed by the EN 327 standard. For measuring this unit as gas cooler, it is possible to circumvent the receiver. For CO₂ DX measurements, the liquid refrigerant can also be passed through the above-mentioned flow meter via the respective circuiting and valve switching. As usual, the refrigerant pressure is reduced by an electronic expansion valve, and the refrigerant is passed through a CO₂ DX test item installed in the chamber.

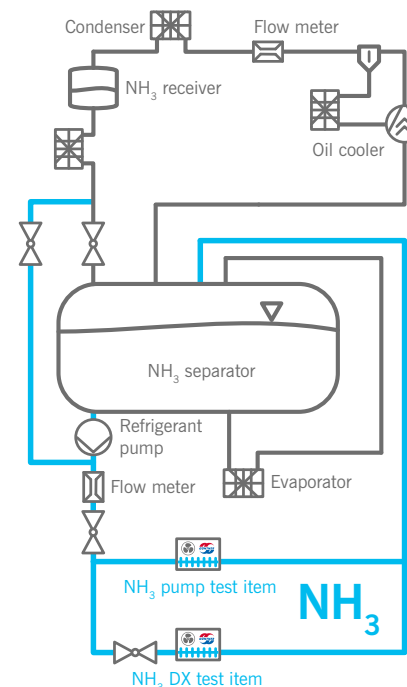


individually installed superheater heat exchanger to avoid in all circumstances liquid hammers at the combined compressor installation.

Design of the NH₃ test facility

Compared to the CO₂ installation, the ammonia circuit is less complex. This is due to the fact that it is exclusively NH₃ evaporators that are tested in this case. Regarding NH₃ evaporators, units for pump operation that currently form the vast majority of all NH₃ evaporators as well as current NH₃ DX evaporators can be tested.

For this reason, it was decided to have a simple NH₃ circuit with receiver and individual separator. As usual, the liquid is passed via pump through the lower part of the separator to the flooded test item to evaporate there. There is



Lab measuring chamber with CO₂ gas cooler installed as test item



another Coriolis meter in the pipe after the pump; its purpose is, together with a Coriolis meter located in the hot gas line, to determine the evaporator capacity as well as the current pump rate. By circumvention of the separator, also the direct expansion operation for NH₃ DX evaporators can be analysed and measured. An additional NH₃ hot gas connection in the chamber allows to realise and examine the defrost behaviour of an evaporator designed accordingly.

Glycol circuit and outdoor installation

The glycol circuit (50 vol. %) is designed for a temperature of up to -33 °C. The core piece of the glycol system is a buffer tank with a filling volume of 5 m³ ensuring temperature resistance in all refrigeration circuits. In all of the 6 pump circuits, flow rates can be measured via magnetic-inductive flow meters. This is very helpful for quickly setting a working point and for balancing individual installation sections. For all of the possible test scenarios, the remaining heat is dissipated to the buffer tank. Via sophisticated PLC-based control, the refrigerating installation that is not connected to the test item is used for cooling the buffer tank. This means an additional separate water chiller is not required.

Measurements in preparation for Eurovent certification of CO₂ units

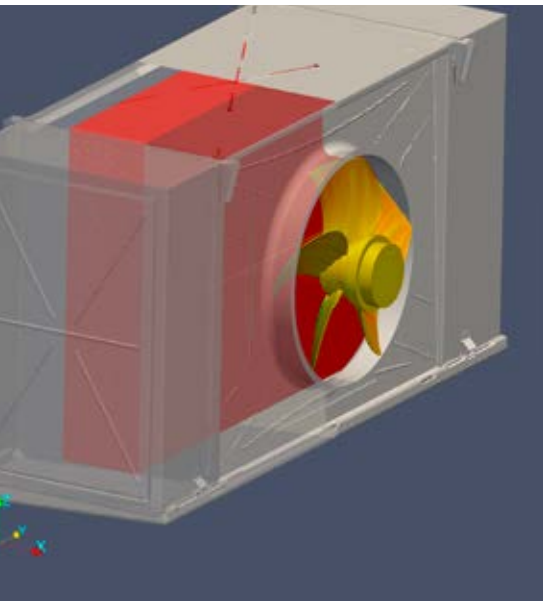
The measurements on the CO₂ units are carried out also in preparation for the extension of the Eurovent certification to these units. Independent laboratories capable of performing the appropriate measurements have been lacking to date. Such a laboratory is currently being established at TÜV Süd. CO₂ gas coolers and CO₂ direct evaporators as group of units are intended to be certified soon within the framework of the next Eurovent extension.



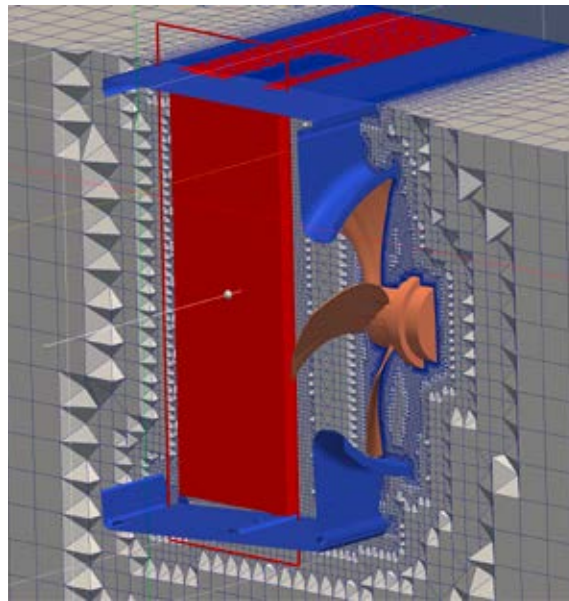
Control room with precise measurement recording with PLC access for setting the racks



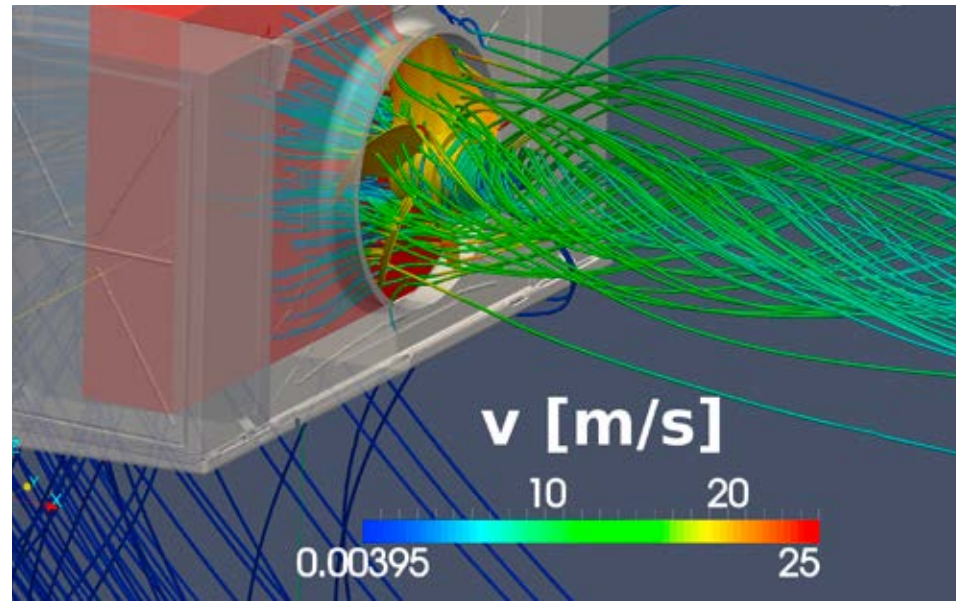
Machine room with CO₂ and NH₃ multi-compressor racks



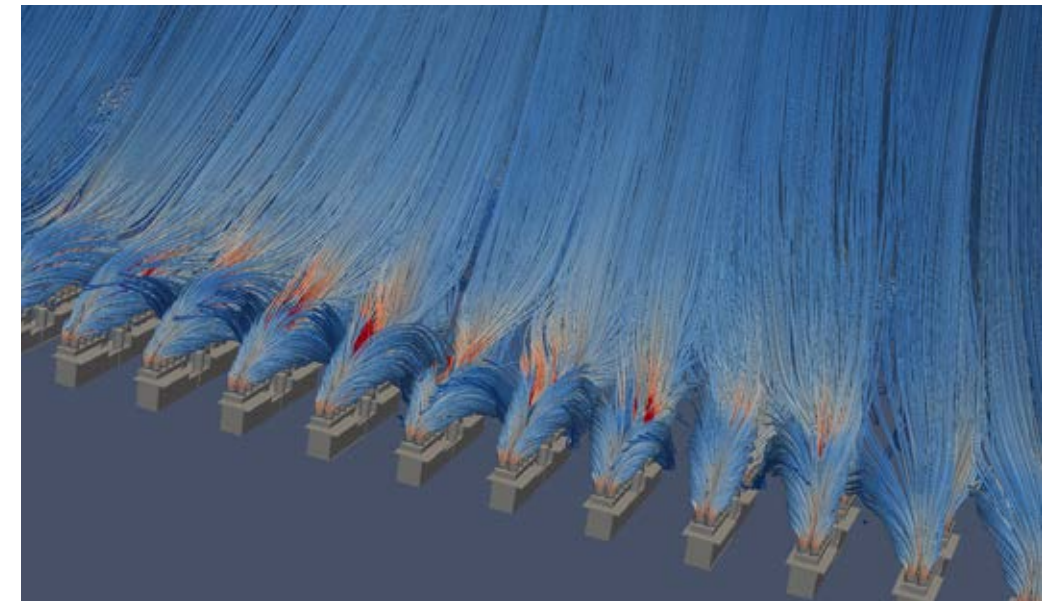
▲ Picture 1a: CAD drawing for a given problem (air flow through a cooler in a cold room)



▲ Picture 1b: Cross-section through the computational mesh to visualise the individual cells



▲ Picture 1c: Sample evaluation of the iteratively calculated results. Flow lines indicate the path of imaginary particles



▲ Picture 2: Flow lines of the heated air dissipated from the dry coolers of an installation with 100 flatbed units – coloured according to temperature

Numerical flow simulations – Operating principle and applications

During the past months, numerous articles on computational fluid dynamics (CFD) have been published in technical journals. What are the practical benefits of this method for the refrigeration and air conditioning sector?

Most work at present is still coming from the university environment. Rapid progress in the area of chip manufacturing, however, is now also allowing even CFD models with an increased need for computing capacity to be used efficiently for simpler tasks while providing high quality. The following contribution is to give an overview of the method and application examples from the field of refrigeration and air conditioning.

What is CFD?

Computational fluid dynamics sets out to describe fluid motions with the aid of computers. The concept of fluid dynamics is based largely on the Navier-Stokes equations (a mathematical

model of the flow of linear viscous Newtonian liquids and gases) and their variations.

How does it work?

First of all, a corresponding drawing is created for a given problem using a CAD program. Picture 1a shows an example of a cooler in a cold room. The entire area of relevance – in our example consisting of cold room, heat exchanger, casing and fan – is split into a number of small, individual cells (picture 1b). This step named “meshing” determines the points at which the calculation software calculates the individual simulation variables (pressure, velocity, temperature, etc.). Meshing therefore contributes significantly to the precision of the simulation

results and has to be matched to the problem at hand. Following on from the meshing step, additional parameters that are important for simulation are specified, such as the definition of boundary surfaces, the selection of solvers and the turbulence model and also the substance-specific fluid properties.

The points just mentioned – generally referred to as “preprocessing” – usually require as much time as the subsequent iterative solving of mathematical equations, which is the actual simulation. The scope and effort for the final preparation and evaluation of the simulation results (“postprocessing”) strongly depend on the actual task. Sometimes, individual numeric

This article is an outline of the technical publication by Dr Andreas Zürner on computational fluid dynamics. For the full article, please visit our website:

www.guentner.eu/know-how/technical-articles



values are sufficient, but a visual presentation, e.g. via flow lines or cross-sectional views (picture 1c), is usually more meaningful.

Possible applications in the refrigeration and air conditioning sector

The range of applications for CFD simulations is extremely diverse in the refrigeration and air conditioning industry. In addition to its use for the development of new products, it is also possible to specifically examine products that are already available on the market. Applications are of particular interest here: How does, for instance, the installation location of an air cooler affect its capacity?

Just to give an example: The flow in an evaporator mounted to the ceiling at different distances to the wall was calculated numerically. It was successfully demonstrated that an inadequate wall distance can lead to more significant capacity losses especially in direct evaporation mode. Good use was in turn made here of the fact that numeric simulations can be used as a comparatively fast and cost-effective means of examining a range of different variants.

CFD simulations also provide extremely helpful results in terms of answering fundamental questions. For example, it is also possible to

routinely examine pressure drops and heat transfers in finned heat exchangers in sufficient detail and to visualise strong turbulences and reverse flows.

Project simulation

In addition to the indirect benefit for the customer resulting from continuous improvement of the Güntner products via CFD, Güntner is able to offer its customers yet another exceptional service: project-related CFD simulations.

They enable us to evaluate customised heat exchangers already beforehand with regard to the air distribution across the finned coil, and larger installations with dozens of dry coolers could already be tested for possible capacity loss at different arrangements and ambient conditions respectively (wind, load, ambient temperature), see picture 2.



The Sibiu site: Non-stop production of Compact units

Production at Güntner Group's latest plant keeps going and going... To date, already 30,000 units have been manufactured at the two production lines.

The Sibiu/Hermannstadt plant is characterised by a high degree of automation. Thanks to the ongoing exchange of experience with other manufacturing facilities, this new production site has been a reliable supplier of top-quality evaporators, air coolers, condensers, dry coolers and gas coolers for Commercial Refrigeration.

The focus at both production lines is on the production of Compact units in well-proven Güntner quality. At production line 1, the units are manufactured virtually non-stop with a high level of automation; the single component parts are delivered just in time to the individual stations of the production line where they are processed by workmen.

More than 30,000 units have already been manufactured at the Sibiu plant since production started. The production takes advantage of the high degree of flexibility as it is possible to switch between the individual Compact series in a flexible way at line 1. At line 2, condensers and air coolers longer than 3 m are manufactured in the traditional way.

Anniversaries – We are proud of our age!

Decades of experience of the Güntner company in all refrigeration and air conditioning sectors know no borders – at least no geographic ones. This year, two Güntner sites and our sister company thermowave celebrate a company anniversary. We warmly congratulate all colleagues and wish them the very best of success also for the future!



25 years of thermowave plate heat exchangers

The renowned manufacturer of plate heat exchangers was founded in 1992 with the involvement of Güntner. Since then, plate heat exchangers for industrial and process applications have been developed, manufactured and distributed in the placid municipality of Berga at the foot of the Kyffhäuser hills in Saxony-Anhalt. The need for plate heat exchangers for industrial applications increased, and so did the Berga site; This is why a second production hall opened in 2008. The distribution network was expanded by new Sales offices in France, Poland, Russia and Singapore already in 2004.

20 years of Frost Frio in Brazil

The company Frost Frio was founded in 1997 and has been part of the Güntner company since 2008. The manufacturing location in Caxias do Sul is geared towards the supply of South American markets and manufactures a wide range of finned heat exchangers and other products for, above all, Industrial Refrigeration and Air Conditioning. In addition to evaporative condensers, air-cooled condensers and evaporators, also ice machines and liquid receivers are produced.



15 years of Güntner de México

15
MÉXICO
ANIVERSARIO

Güntner de México, the first location of the Güntner Group on the American continent, was inaugurated in 2002. As a production site for the American market, it has been the optimum complement to the Chicago Sales office that opened its doors in 2001 ever since. The manufacturing facility is strategically located in Monterrey in the northeast of Mexico, only a two-hour drive south of the U.S. American border. Due to the increasing demand for and thanks to the great success of the ECOSS evaporative condenser series introduced in 2014, the production area has been expanded already twice by a further production hall in each case.

Crisp and fresh fruit and vegetables 365 days a year

The new site of the fruit and vegetable production organisation OGA OGV Nordbaden eG in the industrial zone of Industriegebiet West in Bruchsal is one of the most modern fruit and vegetable logistics centres in Europe. Güntner air coolers and condensers have been used in the new logistics centre since spring 2015 to ensure that the high quality of the sensitive goods is maintained. In the storage rooms, the slight difference in temperature with the Güntner agri coolers ensures a low level of product dehumidification and fluid coolers with flooded evaporation guarantee optimum energy efficiency.

Providing top-quality produce in plentiful supply is the key requirement in the fruit and vegetable retail market. However, each variety of fruit and vegetable has its own individual humidity and temperature requirements and, when stored in a protective atmosphere, will keep fresh for a different amount of time. In addition to the fact that the solution needed to be environmentally friendly and energy efficient, the concept of being able to quickly change "product-specific" operating parameters for each cold storage chamber was of paramount importance in the planning phase for the new storage area of Bruchsal-based OGA OGV eG.

At the logistics location that opened its doors two years ago, the refrigerants CO₂, NH₃ and glycol are used. This is why a large number of Güntner units is installed there, and the components deployed are, from a technical point of view, very different but always state-of-the-art: CO₂ blast freezers and coolers, agri coolers as well as condensers. After all, a total area of 17,400 m² needs to be cooled in an energy-efficient way and in line with demand.

Natural refrigerants – what else!

Since one of the business principles of the cooperative that was established over 75 years ago is to ensure sustainable operations, the management board opted to use the natural, efficient and environmentally friendly refrigerants ammonia and CO₂. After all, 5,560 m² of the total surface area of the Bruchsal logistics centre measuring 17,400 m² needs to be cooled. The Landsberg-based company Frigotec GmbH Kälte- und Verfahrenstechnik, specialised in the construction of refrigerating plants for fruit and vegetables, delivered, installed and put into operation all the refrigeration, control and regulation equipment as well as the CA/ULO storage equipment for the entire logistics centre.



▲ The CO₂ system (to = -35 °C) works exclusively in the subcritical range and consists of a group of six compressors which each have a refrigerating capacity of 65 kW.



▲ The extensive tubing, the air socks of the CA/ULO pressure equalising system and the dry sprinkler system are located above the storage rooms.

The German engineering office Brunnenkant from Wiesloch was responsible for the planning, construction management and inspection and approval of the refrigerating plant.

To be able to store as many different types of produce at varying batch sizes as possible, the storage area was divided into 32 small and medium-sized cold rooms. These are cooled via a water/glycol circuit. Güntner air coolers are used in all cold rooms.

In order to achieve good room penetration, the Güntner air coolers in the 12 °C picking hall are equipped with additional jet nozzles.

Sprayed Güntner flatbed condensers

The non-usable heat, in particular in the storage months, is dissipated via six air-cooled Güntner AGVH ammonia condensers. OGA OGV eG opted for this solution because the condensers require only minimal maintenance and there are no extra costs for water or chemicals.

Interested in reading the full article with a detailed technical description? Go to: www.guentner.eu/know-how/references

OGA OGV Nordbaden eG Bruchsal

The cooperative distribution channel OGA OGV Nordbaden eG's range of produce includes asparagus, sweetcorn, strawberries, berries, stone fruits, apples and pears as well as a variety of vegetables and lettuces.

The produce is either stored fresh, picked and marketed or processed and frozen. The fruit and vegetables come predominantly from the northern Rhine valley between the Black Forest and the Vosges and the Rhine-Neckar region in south-west Germany but also from other German production areas. In addition to the mild climate and the fertile earth, the approx. 220 production businesses have developed extensive early harvesting techniques so that the cooperative has the first supply of fruit and vegetables from the new harvest for many crops.

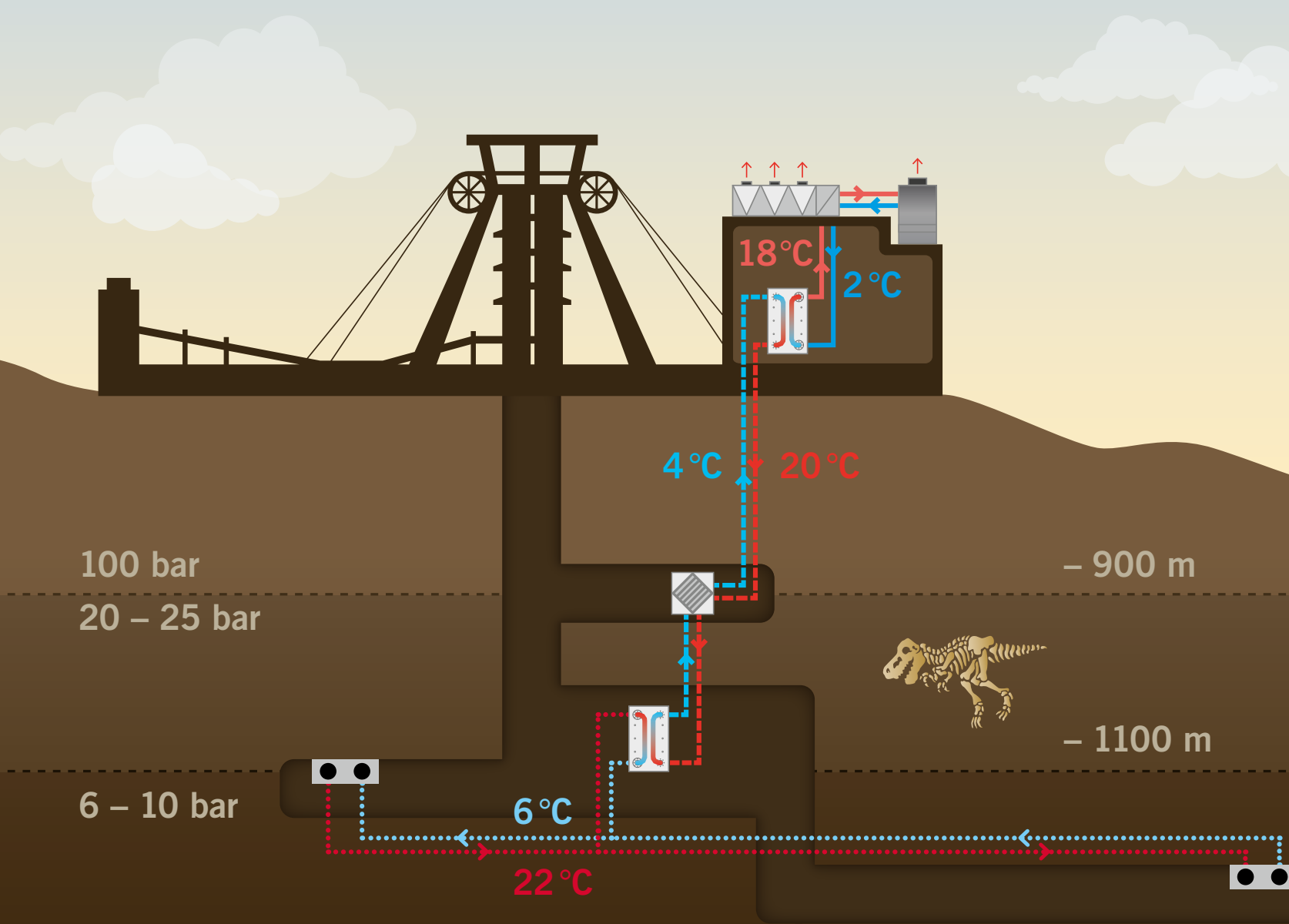
The fruit and vegetable logistics centre is certified in accordance with the International Food Standard (IFS), the QS Quality Scheme for Food and the EU Organic Products Regulation.



▲ A total condenser capacity of 3,100 kW is installed. The condensers are grouped together on the roof next to the photovoltaic system and are designed for a maximum ambient temperature of 36 °C.

Constant temperatures at a depth of around 1,100 m

Everything must be right underground. Durable and robust technology from thermowave allows the temperature in the tunnels below ground to be maintained reliably and permanently at below 28 °C. The thermowave products have already withstood a two-year test phase underground in a mine in a corrosive working environment with high humidity and have done so trouble-free and without being damaged.



The air underground in the mine at a depth of up to 1,200 meters is above 40 °C and very humid owing to the high salt content (80 % rel. humidity). Under such corrosive conditions, it is not only the technology installed deep below ground that is affected, rather also the health of the people working there. To make working conditions more tolerable, the air is cooled conventionally by means of water circulation, which extends from above ground to a depth of around 1,200 metres.

Water column with 100 bar

The high pressure in the system is reduced below ground conventionally over two stages before the cold water reaches the air coolers in the tunnels. A central pressure regulator in the shaft in the first stage reduces the pressure of the water column from around 100 to 20 – 25 bar, while local pressure regulators in the tunnels reduce the pressure again to approx. 6 – 10 bar.

The plate heat exchangers act as pressure regulators

This special technical challenge was reason enough for the engineers and technicians at

thermowave to find an economical alternative. The result is a solution that has convinced the operator in every respect after a two-year pilot phase. Instead of the local pressure regulators, custom-made models of thermowave plate heat exchangers of the type thermolineVario were integrated in the water circuit. As two-way apparatuses, they split the water circuit from the central pressure regulator to the terminal equipment into two circuits separated from one another and therefore act reliably like secondary pressure regulators.

As good as new after two years in operation

The thermowave thermolineVario plate heat exchangers still look as good as new even after a two-year pilot phase, even though they are installed in very dirty condensate and operate day and night at high pressure. This remarkable durability is enabled by the use of especially corrosion-resistant materials and a very stable construction: the frame components are specially coated, for example, and the solid bars as well as the plates are made of molybdenum steel (SMO 254) according to DIN 1.4547. The tightening bolts also have a special corrosion-resistant coating.

50 MW for mining

Above ground, planners and customers have long since been familiar with the use of thermowave products in the mining industry. For example, the company's plate heat exchangers are integrated in free cooling systems or used for sulphuric acid coolers in copper purification processes and also supplied for ammonia evaporators and condensers. Special materials, such as molybdenum steel (SMO 254) and titanium steel (Group 1), are used in heavy-duty conditions. thermowave plate heat exchangers with a capacity of more than 50 MW have meanwhile been installed in this industry sector.

For the full reference report on this topic, please visit:
www.thermowave.eu/know-how/references



▲ thermolineVario apparatuses in special design are operated in the water circuit.



▲ The thermowave thermolineVario plate heat exchangers are designed to be especially corrosion-resistant and can even withstand very unfavourable installation in the condensate without any restrictions.



▲ The greatest "adversary" to technology installed underground is the highly corrosive atmosphere with high humidity and corresponding formation of condensation.

For the full reference article on this subject, please go to:
www.thermowave.eu/know-how/references

Saving 50 million Swiss francs on energy costs in 20 years with free cooling

The Swisscom data centre in Bern-Wankdorf is one of the most efficient in Europe thanks to its use of innovative energy technology, using 90 percent less energy for cooling compared with conventionally equipped data centres. Some 84 percent of the energy is thus used for the IT infrastructure and only around four percent for cooling purposes as well as another four percent for ventilation. Swisscom relies on hybrid coolers from JAEGGI in all construction sections in its modular data centre.

The company has invested 60 million Swiss francs in the new building. While the innovative energy technology was some 4 million francs more expensive than a conventional concept, it is expected to deliver savings of 50 million francs on energy costs in 20 years. The company was honoured for its endeavours in 2015 by the Swiss Federal Office for Energy (BFE) with the Watt d'Or in the category of renewable energies.

In terms of project implementation, Swisscom exceeded the recommended guidelines of the "American Society of Heating, Refrigerating and Air Conditioning Engineers" (ASHRAE). The current ASHRAE 2011 recommendation (category A1) for maximum supply air temperatures in data centres is 27 °C. The IT infrastructure in the Swisscom data centre in Wankdorf was designed such that the maximum permitted temperature could be increased to 28 °C with temperatures of up to 32 °C also tolerated for a few hours.

PUE value of 1.22

The Swisscom data centre in Bern-Wankdorf in Switzerland has an efficiency value "Power-Usage-Effectiveness" (PUE) of 1.22 and is therefore significantly more efficient than the average European value of 1.9. This was made possible despite or even because of renouncing conventional refrigeration engineering/electromechanical refrigerating machines.

Each individual element was selected according to the requirement for sustainability and operating cost efficiency. In other words, not the price determined the investment in each case but the long-term savings potential. Swisscom relies consistently on free cooling with eight JAEGGI hybrid coolers of type HTK in order to keep the energy consumption as low as possible for the additional cooling required.

Evaporative cooling from 21 °C

The JAEGGI HTK hybrid cooler combines the function of an air-cooled dry cooler with a closed evaporative system. Depending on the required cooling capacity, free cooling is supported only additionally through evaporation of water from around 21 °C. Evaporated water draws energy from the environment and uses it to cool the medium flowing through the coolers.

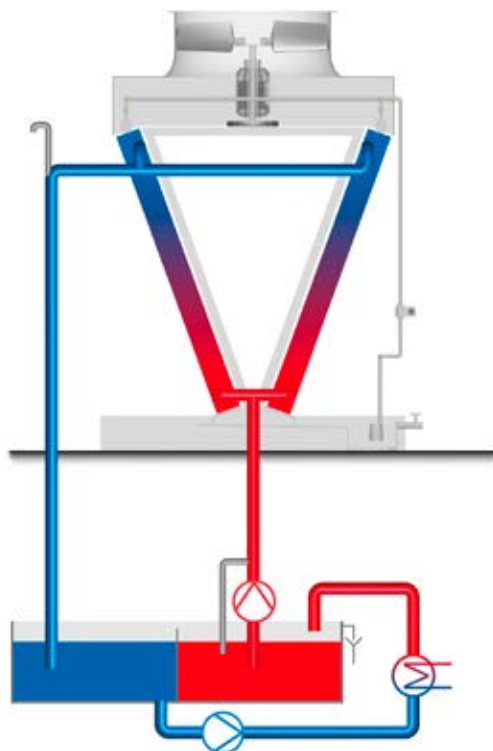
Until wetting is activated, continuous operation of the fans is sufficient for energy dissipation. Wetting is activated automatically by the unit's own *HYBRIMATIC* controller depending on the required cooling capacity. The integrated control and regulation system establishes the energy-related minimum between fan output and required cooling capacity. Rainwater stored in a container with a capacity of approx. 2,000 m³ is used as wetting water.

For the full reference description along with further technical details, go to: www.jaeggi-hybrid.eu/know-how/references



Hybrid cooler HTK-SE – self-draining

JAEGGI also offers a self-draining hybrid cooler – the *HTK-SE* that can be operated using pure water in open circuits as replacement for a cooling tower. The self-draining function is made possible thanks to design modifications such as inclined cooling coils with a specific receiver construction. When the circuit pump is deactivated, the cooling coils drain into a frost-proof storage tank installed in the building. This means that these units, available with a capacity of up to 2 MW, provide an alternative not only to an existing open cooling tower but also for future glycol-free systems.



▲ Plant drawing *HTK-SE* with pump bypass without measuring points

Many advantages over open cooling towers

Depending on the design, the *HTK-SE* saves up to 70 – 80 % of water per year when compared to open wet cooling towers. Year-round plume-free operation guaranteed; all hygiene-relevant areas can easily be accessed, thereby significantly facilitating inspection, maintenance and cleaning.

Certified hygienic safety

JAEGGI has had their unit's conformity with the hygiene requirements of the VDI guideline 2047-2 (the German equivalent to the UK guidelines ACOP L8 and HSG274) confirmed by an independent body.

Top UK safety accreditation

JAEGGI has been awarded accreditation from Alcumus SafeContractor in the UK. Alcumus SafeContractor is an independent organisation which recognises rigorous standards in health and safety in the workplace and awards this quality label to manufacturers and companies for meeting these extremely high quality criteria. The label is to create a uniform standard and to provide customers with a guidance when it comes to selecting their suppliers.



Everything under control with the Master Panel

In addition to high-quality heat exchangers for refrigeration and air conditioning, Güntner also offers the corresponding controls developed in-house. What's new at Güntner Controls? The following article looks at recent developments.

Master Panel: Easy integration into the building management system

The Güntner Master Panel (GMP) provides a central communication interface to the customer's system and in so doing supports a variety of different communication protocols.

These days, more and more units with different technologies are combined in your installations for heat dissipation. Dry coolers, evaporative condensers, adiabatic units and hybrid fluid coolers – every unit is equipped with its individual, specifically adjusted control. The Güntner Master Panel helps you organise your communication. Instead of integrating this vast number of controls individually into the superordinate building management system, you can now consolidate all subordinate controllers via the Master Panel and integrate them via this central interface into the superordinate system.

This allows you to reduce costs regarding the control engineering for visualising and programming the individual coolers. The Master Panel “understands” all conventional communication protocols. In addition to the classic fieldbus technology such as Modbus RTU, BACnet MS/TP and Profibus DP that have become the current standard for integrating

heat exchangers into building management systems, Industrial Ethernet communication modules such as BACnet/IP and Modbus/TCP are also implemented into the Master Panel.

So the Güntner Master Panel (GMP) provides the possibility of centrally controlling, optimising and monitoring the connected coolers via touch panel. The touch panel allows for extremely easy and intuitive operation; the user interface is available in German and English. The overview screen pre-defined as start screen gives you a quick overview of all the connected coolers, indicating information on “operation” and “error”, and you can access further information and setting options via lower navigation levels.

Add to this the trend function providing you with an overview of the current operating state and the behaviour of the individual systems, and monitoring all relevant data. The key values such as setpoint, actual value and air volume are represented graphically in a trend diagram for each of the connected coolers.



▲ Overview of the operating state

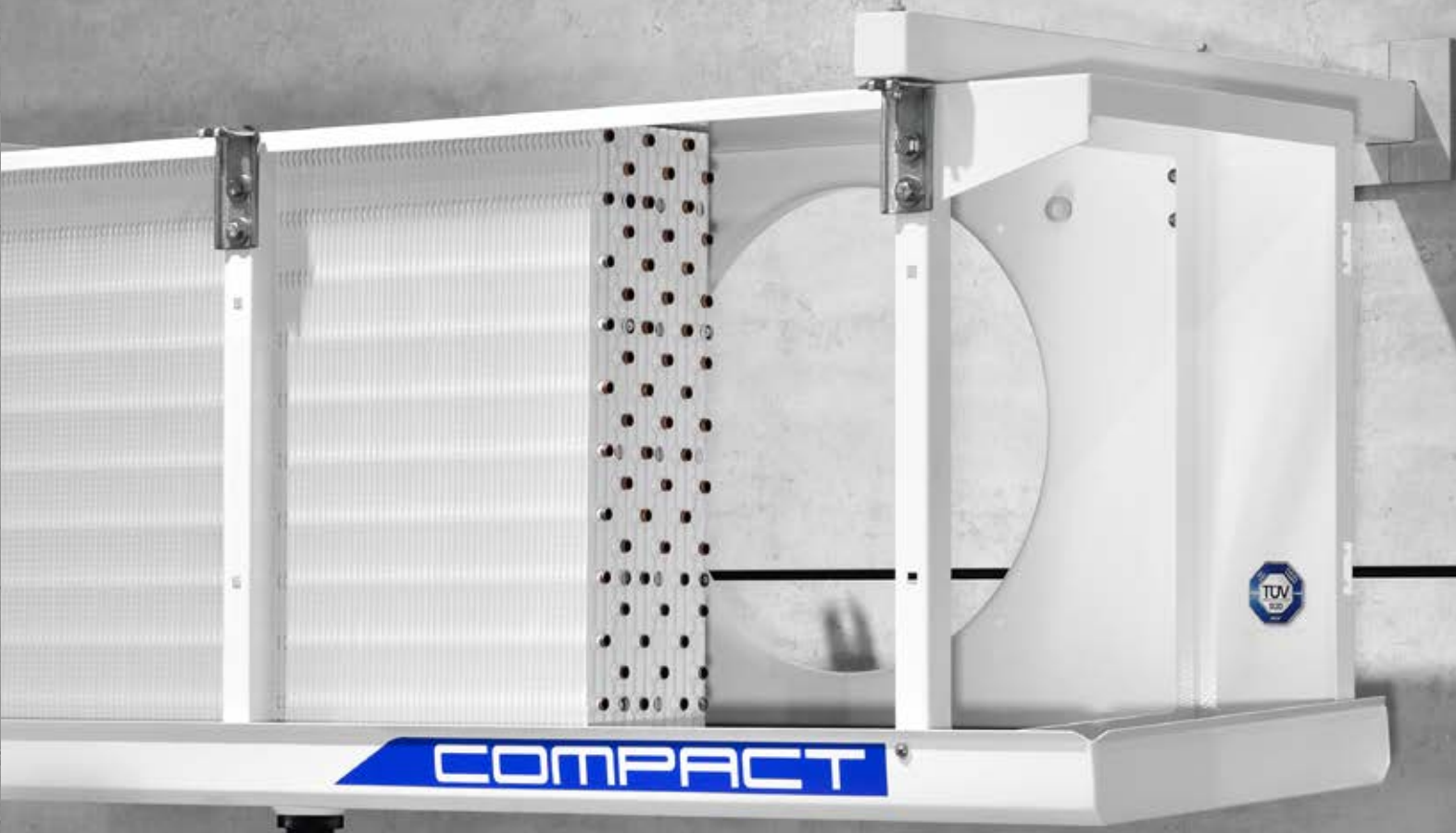
New alternative against corrosion

Cold rooms with slightly aggressive atmosphere where, for example, foodstuffs are processed and stored require corrosion-resistant units. It is precisely these applications for which Güntner offers the Coil Defender, a high-quality yet reasonably priced addition to our corrosion protection portfolio in the Compact product line.

Particularly in the sensitive food sector, e.g. for the storage of citrus fruits, in cold rooms for smoked foods and in processing rooms, the Güntner Coil Defender is a high-quality solution for all cases that require a unit with increased corrosion protection and where stainless steel would be over the top. The powder coating, evenly applied to the entire coil, is available for all compact air coolers and reliably protects the conventional material combination of copper/aluminium from corrosion.

The air coolers equipped with Coil Defender are designed in a way that facilitates cleaning and, in general, mounting and accessibility. In addition, all air coolers of the Compact product line are certified by the independent body TÜV SÜD in accordance with the HACCP hygiene concept, thus offering many advantages. The Coil Defender coating is an available option for all air coolers of the Compact product line and can be selected by clicking the mouse in the Güntner Product Configurator (GPC).

The Coil Defender coating offers maximum corrosion protection for the unit families of the Compact product line while thermal conductivity remains at high levels. Which variants are best suited for your application? This depends on the respective operating conditions such as the intensity of reactive substances and the cleaning agents.



▲ The newly developed Güntner Coil Defender coating was presented to the public for the first time at Chillventa 2016.

Possibilities for corrosion prevention based on the same unit capacity:

Copper pipes + aluminium fins	Copper pipes + epoxy resin-coated aluminium fins	Copper pipes + aluminium fins with Coil Defender
Unit capacity ★★★★	Unit capacity ★★★★	Unit capacity ★★★★
Thermal conductivity ★★★★	Thermal conductivity ★★★☆☆	Thermal conductivity ★★★☆☆
Capacity/investment ★★★★	Capacity/investment ★★★☆☆	Capacity/investment ★★★☆☆
Corrosion prevention ☆☆☆☆	Corrosion prevention ★☆☆☆☆	Corrosion prevention ★★★★



The food-related Plus: The Coil Defender coating is not only food-safe but also part of the HACCP certification.

The HACCP concept

HACCP stands for "Hazard Analysis of Critical Control Points" in industrial food processing.

The HACCP concept, prescribed in Article 5 of Regulation (EC) No 853/2004 of the European Parliament and the Council on the hygiene of foodstuffs, has the general objective to control hazards related to foodstuffs. The system relies on prevention and not on the control of final products. The scope of the regulation is not restricted to EU territory.

As foodstuffs imported into the Community have to meet at least the same or equivalent hygiene standards as food produced in the Community, HACCP is also mandatory for countries outside of the EU in case they want to import products into the EU.



For more information on HACCP-certified air coolers, please visit our website:
www.guentner.eu/know-how/technical-articles

GPC-News

What’s new in the Güntner Product Configurator? A number of new features and revisions has been additionally implemented into our popular design software. In the following, we would like to briefly introduce these updates.

CUBIC compact - GACC RX
High efficiency aircoolers with cubic design

DUAL vario - DHN
Dual discharge unit coolers

CUBIC vario - GHF.2
High efficiency unit coolers

CUBIC vario - GHN
Unit coolers

PROCESS application - GBK
Processing room unit coolers

Clear presentation of the product portfolio

The product series are now colour-coded according to their respective product line (Compact, Vario, Application). This makes for a good structure and better comprehension. The presentation is now consistent with the product presentation on our homepage and in our product brochures.

Drag & drop functionality

You already have a number of GPC designs? You can now easily open them by dragging them to the GPC mask and by dropping them there. The program will automatically open the files.

Condenser calculation based on mean temperature

It is now possible to calculate condensers with the mean temperature. This method allows for an exact design of units for recent refrigerant mixtures having a high temperature glide as it takes into account their specific characteristics and thus reduces the impacts of the temperature glide on the heat exchangers to a minimum.

For the full technical publication on the subject of “Designing evaporators and condensers for refrigerant mixtures with high temperature glide”, please visit: www.guentner.eu/know-how/technical-articles

Medium: R449A

Hot gas temp.: 75 °C

Cond. temp.: 45 °C

☐ Dew point at inlet (DIN EN 327)

☒ Mean

Three new refrigerants available

These new refrigerants are now available: R-454C from Chemours, R-455A from Honeywell and R-457A from Arkema. All three of them are characterised by a low GWP. In contrast to the other two refrigerants though, R-455A has a high temperature glide. This has a major influence on the configuration and the operation of the heat exchangers respectively, and should be considered for calculations. The above-mentioned technical article provides a thorough explanation on this topic.

Medium: R134a

Evaporation temp.: 32.0 °C

Superheating: R407F, R408A, R409A, R410A, R417A, R422A, R422D, R448A, R449A, R450A, R452A, R454C, R455A, R457A, R502, R507A, R513A, R600

Subcooler and oil cooler as separate unit category

It is now possible to select subcoolers and oil coolers already on the welcome page via a separate unit category. This allows you to save a few steps when searching for a specific product.

Drycooler (air heater)

Oil cooler

Condenser

Subcooler

Pressure drop indication for condensers

Güntner is the only manufacturer that states the refrigerant-side pressure drop on the data sheet. This is because we want to support you in your plant efficiency observations. Only this indication – even for several condensers with different pressure drops – allows for hydraulic balancing.

The new GPC version is valid as of June 1. The old 2015 version can still be used for designing units. However, current prices and delivery times are not indicated and updates for GPC 2015 are no longer available.

Three years of warranty for the Compact product line

We are glad to offer you, in addition to the technical advantages of our units, also a Plus in service: Güntner extends the warranty period for the Compact product line from 24 to 36 months.

This extended warranty is standard for all the Compact units in Europe, regardless of whether the unit is equipped with finoox or microox technology. Just as for our products, we underline our commitment to provide you “Always with the special Plus”. This means we give you safety for an additional year – safety that is based on the quality of our products.

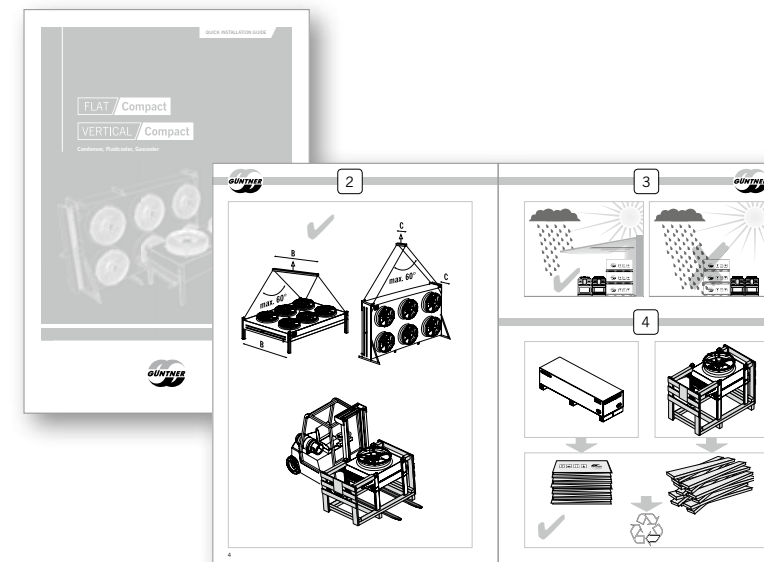


Let the pictures speak for themselves – Güntner Quick Installation Guides

Pictures speak louder than words, and Güntner takes this saying literally. To overcome linguistic barriers at construction sites, irrespective of language and culture, Güntner has started to create Quick Installation Guides for the units of the Compact product line.

These simplified basic instructions consist of sketches that speak an international “language” and thereby guide the fitter safely through the installation process and simple maintenance work. A number of customers is already familiar with this kind of guide for the Compact FLAT and CUBIC air coolers, and Güntner has recently completed this simplified installation guide also for the flatbed condenser FLAT Compact.

The Quick Installation Guides are available online and will be supplied with the respective units. Of course, the Quick Installation Guides are not intended to replace the conventional installation instructions as we are subject to legal requirements stipulating detailed documentation on particular subject areas.



Güntner wins F+E Performance Award 2017

In May, Güntner was awarded 3rd place in the extraordinary F&E Performance Award 2017 for having successfully established the team management system “Agile Product Development”.

Andreas Spengler, Head of Product Configuration and Data Management, received the prize sponsored by business consultancy AS&P on behalf of Andreas Wintersteiger, Head of Project Management and Product Development. Andreas Wintersteiger was heavily involved in adopting this method at Güntner and leads the interdisciplinary teams following these principles.

The award rewards measurable success achieved following the launch of “agile product development”. In contrast to conventional project management where the time horizon is variably adapted to the respective task, the team members are asked here which tasks they can actually complete within a fortnight. This approach promotes the self-responsibility and the self-confidence of each team member as it is possible to achieve self-imposed targets. This successfully established method allows to complete projects much earlier.



Imprint

heatXchange

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Edited by:
Bernd Oehlerking, Stefanie Neuhs

Design:
Carina Metzger

Published by:
Güntner GmbH & Co. KG
Hans-Güntner-Str. 2-6
82256 FÜRSTENFELDBRUCK
Tel: +49 8141 242-0
Fax: +49 8141 242-155
www.guentner.eu

Sales offices:
JAEGGI Hybridtechnology Ltd.
Hirschgässlein 11
CH-401 Basel
www.jaeggi-hybrid.ch

**thermowave Gesellschaft
für Wärmetechnik mbH**
Eichenweg 4
06536 Berga
www.thermowave.de

100 % coated

The **Güntner Coil Defender** coating is applied to the entire coil to ensure that there is no chance of any aggressive substances attacking it.



Powder-coated heat exchanger – Coil Defender

Güntner Coil Defender – the attractive addition to our corrosion protection portfolio, suitable for cold rooms with slightly aggressive atmosphere. Your application requires a corrosion-resistant unit, but stainless steel would be over the top? Then the fully coated air coolers of the Compact product line are exactly what you need. Are you interested? Visit our website for details.



Corrosion protection thanks to food-safe hygienic coating, Plus: series HACCP-certified – tested by TÜV Süd (German Technical Inspection Authority)



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