GREEN FUTURE

LEADING THE WAY IN ENERGY SOLUTIONS - CHILLER OY'S CORPORATE MAGAZINE • 2 • 2014

Katarina Enholm,
CEO of Brunberg Oy:

WINTER IS THE SEASON OF CHOCOLATE

A new cooling system for the Brunberg sweet factory

▶ ESTIKO PLASTAR TRUSTS IN CHILLQUICK™ WATER CHILLERS ▶ HOTEL KLAUS K – DESIGN INDOOR AIR AT THE DESIGN HOTEL ▶ HOTEL DOMBÅS AND CHILLQUICK THERMO™ HEAT PUMPS

CONTROLLING DOESN'T GET EASIER THAN THIS

▶ FROM THE EDITOR-IN-CHIEF

Although there are positive signs of improvement on a global scale, the economy here in Finland is struggling to improve across the board. According to the experts, patience is still needed in this regard. Sadly, the poor state of the Finnish economy has seen the levels of investment slow down even in the usually-buoyant construction sector.

In spite of global economy, companies must seek new kinds of market opportunities. There are definitely plenty out there. We just need to be able to react quickly and sufficiently renew our activities in order to capitalise on them. We must be able to look into the future, predict changes and the needs that subsequently arise because of these changes, and we must be able to do this promptly – preferably more quickly than our competitors.

Creating indoor environments requires us to stay ahead of the game in terms of development. To this end, the next product development cycle must begin as soon as the previous innovation enters the testing phase. Thanks to developments in the field of electronics, a wide range of functions are now available and they have an impact on the system life-cycle costs.

Nevertheless, advanced technology and user-friendliness do not always go hand in hand. Indeed, the goal of product development should be the creation of an easy-to-use device or piece of software, the secrets of which are abundantly obvious to users of all ages. I consider our Vari PRO™ wall-mounted control unit to be a revolutionary piece of equipment. On top of functioning as a control unit, the Vari PRO™ also monitors and reports energy consumption levels and system faults. The Vari PRO™ unit can work in conjunction with a building automation system and allows the owner of the building to keep a close eye on the smooth running and energy-efficiency of the system, wherever and whenever.

The Vari PRO™ and our Service Next™ remote control and maintenance system are examples of the kinds of products and services that help building owners and users improve the efficiency of their activities.

I hope you enjoy our Green Future Magazine!

Heikki Lahdenperä
CEO, Chiller Oy

Image: Pauli Juppi

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CHILLER OY'S CORPORATE MAGAZINE, GREEN FUTURE

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NEW PRECISION AIR CONDITIONING PRODUCTS

▶ Text: Dakota Lavento ▶ Images: Chiller Oy

Laboratories, pharmaceutical factories, testing facilities, and data centres have strict requirements for indoor air. This means that the air conditioning solutions for such spaces must be precise, reliable, and easy to control. SMART Vari™ Precision & Close Control units are up to 50% more energy-efficient.

When it comes to choosing the right air conditioning system for giant machine rooms or data centres, energy-efficiency becomes one of the most important factors. The indoor conditions must be kept at the right levels and this has to be achieved as efficiently as possible.

COST-EFFECTIVE AND BESPOKE SOLUTIONS

Precision and close control is always tailored to meet the specific needs of our clients. At Chiller we put a lot effort into product development, maintaining high quality, a long product life cycle, energy-efficient solutions, and ensuring that our units can be easily serviced and adapted.

AVAILABLE IN THREE SIZES

The SMART Vari™ S series (5–14 kW) has been developed specifically for laboratories that require continuous and precise control.
The SMART Vari™ L series (15–130 kW) is designed for computer rooms and other spaces with a considerable heat load.
The SMART Vari™ XL series of close control units (20–200 kW) has been designed with production plants and data centres that have a low humidity load in mind. The units work exceptionally well with a district cooling connection. In fact, the XL series units have been optimised for use with chilled water in the temperature input-output range of 10/18 °C. The higher temperature minimises dehumidification and notably improves energy-efficiency levels. The fans used in the units can be fitted in any desired stream direction.

RELIABLE IN ANY CONDITIONS

Multiple water sources can be utilised on a needs basis in order to ensure the desired environmental conditions are maintained in all situations. The larger devices in the SMART Vari™ range are equipped with ***A TWIN COOLING SYSTEM (TCS)***. In this system, one of the cooling units functions as the primary source of water cooling, while the other units are only used when necessary. The SMART Vari™ TCS provides energy-efficient control of the system's triple vents.

The L and XL series can also be fitted with ***AN EMERGENCY COOLING SYSTEM (ECS)***. This ECS makes it possible to connect the chilling units to additional water circulation systems, such as a mains water supply. The ECS system in the SMART Vari™ units automatically starts working in emergency situations, depending on the need for chilling.

ENERGY-EFFICIENT SOLUTIONS

All of the components and solutions used in the SMART Vari™ product range – from the electronics in the EC fans to the expansion valves and optional inverter controls – save energy and extend the product's lifespan. Thanks to the optimised EC fan motors, the units require 10% less energy to operate.

Downward blowing is used in order to achieve the optimal level of energy-efficiency. In this technique, the fan is attached to the bottom of the unit, which is then positioned above the floor.

THE RIGHT UNIT FOR THE RIGHT SPACE

Chiller's patented Option programme helps our customers to choose the best possible cooling and heating modules for their needs. In addition to all the relevant electricity information and unit dimensions, the programme also enters all of the project-specific documentation into a handy table. •

CHILLING AND SERVICE

▶ Text and images: Meelis Kolmkant

Estiko Plastar AS relies on Chiller for Chillquick™ Eco water chillers with free cooling.

Estiko Plastar AS can trace its roots far back into Estonian history. It started life as the so-called national comb factory in 1918. In 1969, the scope of the factory broadened to include the manufacturing of polythene packaging and compressed plastics. A little later in its history, the factory also started producing toys and domestic goods. The factory is still renowned for its toys today. In fact, it's hard to find a middle-aged Estonian who does not have very fond memories of these toys.

MODERN MANUFACTURING

When Estonia gained its independence in 1993, the factory welcomed a private owner and a new development direction. Then, following significant investments in hardware and machinery at the start of the next decade, the factory was able to modernise and start producing plastic laminate packaging. The factory was granted an ISO certification in 2004, and in 2010 it met the British standard (BRC/IOP) for goods packaging.

Around half of the factory's output is exported; primarily to the Baltic and Scandinavian markets. Of the packaging products it manufacturers, 50% supply the food industry, with the remainder supplying the construction, peat, and textile industries. In total, approximately 8,000 tonnes of packaging material is manufactured at the factory annually.

The continuous process of modernisation has been supported by the company's close ties with researchers, goods suppliers, and product development specialists.

"We have to move with the times and be able to increase the demand for our products", stresses **Meelis Jürgens**, the factory's production manager.

All of the company's production functions are centralised at the factory site – from product design to marketing and sales. Estiko Plastar AS purchases and processes the raw plastic ingredients in accordance with the work's graphic identity. It also buys in plastic roll materials, which are then refined into end products.

The plastic packaging manufactured at the factory is produced using an extrusion process. This means that the raw plastic is plasticised and shaped through a nozzle into the desired product form, which might be a piece of pipe, a toy, or even film. In this process, the plastic particles are melted, conveyed, and then homogenised in a device known as an extruder. The molten plastic is compressed through the device's nozzle to form a continuous profile, which is then cooled. When using an extrusion fan, a plastic hose or tube is first produced, which is then stretched using compressed air into a thin film. This film can be wound onto a roll. Multi-layer films are also made in this way.

Estiko Plastar AS's extruder is as tall as a three-storey building. It blows molten plastic (which reaches around +220 °C) into bubbles, which are then cooled and rolled. Once it is cut into the desired dimensions, the packaging material is transferred to the press. Here, up to eight colours can be applied to the material to achieve a high-quality graphic finish.

RELIABLE COOLING

A modern extruder represents a significant investment. And the water chillers used in the production process plays a significant role in the smooth running of the whole factory. Chiller supplied the factory with two free cooling-compatible Chillquick™ Eco water chillers in 2013 and 2014. Each unit has an output of approximately 100 kW. The installation was handled by Climaref OÜ, one of Chiller's Estonian partner organisations. Climaref also carried out the installation of the new Chiller cooling system included in the extension to the Estonian University of Life Sciences.

According to Meelis Jürgens, Estiko Plastar AS chose to use Chiller as its supplier precisely because of the company's reputation for reliability and energy efficiency. The modern printing press

The modern printing press cooling must be accurate. The maximum permissible temperature difference is +/- 1 celcius.

The extruder producing the plastic tube needs efficient cooling.

Thanks to the Service Next™ Overall Concept, faults in the cooling system are spotted so quickly that the production doesn't need to be put on hold, says Climaref OÜ's Arvi Angerjärv.

cooling is accurate. The maximum permissible temperature difference is +/- 1 celcius.

"Chiller's product can be controlled by a single automated system and it immediately felt like the right solution", he says.

As part of its Service Next™ Overall concept, the new Chiller cooling system has been fitted with a remote monitoring unit. In the eyes of the system users, this has proven to be an outstanding addition.

"In truth, we only know about a problem with the cooling system once it's been eliminated", remarks a very satisfied Jürgens.

The Climaref OÜ personnel have succeeded in safeguarding the continued smooth running of the production line by using smartphone technology to promptly respond to fault notifications.

In fact, thanks to Chiller's Service Next™ Overall Concept and Climaref OÜ's skilful team, the factory personnel can concentrate on what they do best, safe in the knowledge that the cooling system works like a dream.

"When everyone is able to focus on doing their own work in the best possible way, it's the best thing for the whole team. This allows the factory to supply its customers as energy efficient as possible", Jürgens notes.

Kaarel Vislapuu, from Climaref OÜ has, nothing but praise for the remote monitoring feature included in Chiller's Service Next™

"The first of the devices has been up and running for more than a year now, so I can reliably say that the support we've received from Chiller has been a lot better than the usual "We'll send a fitter out to the site" kind of service", he says.

RAPID ACTION

The Chiller project was the first time that Climaref had installed a free cooling system. In fact, the whole project was exceptional for the Climaref team. The delivery was completed really quickly, with only three months passing from the first point of contact to getting the system up and running on the factory site. This speedy delivery came as a result of the new, well-designed cooling system brought in to take the place of the unreliable Eastern-European version that was previously in use.

The delivery included a Chillquick™ Eco water chiller and a liquid cooler. The Service Next™ Overall Concept was particularly important, as the customer wanted to ensure fault-free operation for the end user. The comprehensive nature of the Chiller product concept put them way ahead of the competition during the decision-making stage of the project. The Service Next™ made it possible to reduce the time needed for installation and to operate more efficiently than the existing product assembled in accordance with the Eastern European climate impact scale.

Climaref OÜ is a small company operating in the cooling sector. The team behind it is actually a pair of entrepreneurs, Arvi Angerjärv and Kaarel Vislapuu, who carry out installation work. On average, the company continuously employs 4 fitters. •

ESTIKO PLASTAR, HVAC SOLUTION

- *Chillquick Eco™ cold water station (CGIW-31).*
- *Service Next ™ Overall Concept.*
- *HVAC contractor: Climaref OÜ.*

- *Read more: www.chiller.fi/en/waterchillers, www.chiller.fi/en/references, www.chiller.fi/en/servicenext*

▶ Text: Dakota Lavento ▶ Images: Hotell Klaus K and Dakota Lavento

A challenging renovation saw drab offices being transformed into refined rooms at the Klaus K Hotel. Thanks to this renovation, the hotel's new ventilation system is exceptionally effective and operates almost entirely unnoticed.

DESIGN INDOOR AIR AT THE DESIGN HOTEL

At its best a hotel stay is all about that special experience of luxury. And all over the world, hotels that manage to create a unique and distinct visitor concept are the ones getting noticed by discerning guests. Such guests can, of course, find what they're looking for right here in Finland, too. Creatively combining modern design and the mythology of Finland's national epic, the Kalevala, the Klaus K Hotel in Helsinki is the country's first design hotel. The history of the property and surrounding city quarter can be traced back to the 1880s. After first opening its doors to guests in 2005, the hotel underwent a significant renovation in 2012.

LUXURY LOFTS

Until recently, the top two storeys at the front and rear of the hotel were taken up by offices. The dream of the building's owner, however, was to convert these spaces into hotel rooms. The subsequent major renovation was completed in autumn 2014. Now, the Klaus K Hotel is crowned by thirty astoundingly luxurious and playful Sky Loft terrace rooms, designed by **Vertti Kivi** from dSign.

The smallest of the new rooms have a floor space of 30 m^2. As they are situated in parts of the building constructed during two different eras, the rooms are also structurally different from each other. In fact, despite the interior design elements being the same throughout, each room has its own distinct flavour.

DESIGN INDOOR AIR

Installed on the office storeys during the 1980s, the old ventilation system had to be completely removed. Both the hotel's management team and the building's owner had clear requirements for the new system.

"A top quality hotel room has to have top quality air conditioning. There must be enough fresh air for all kinds of conditions. We also need to be able to adjust the temperature and output levels of the air conditioning system on a room-by-room basis. In other words, room-specific air conditioning using quiet convectors. Near-silence and draft-free – these are the top priorities when thinking about the requirements for high-class hotel room air conditioning", says **Kari Oja**, Real Estate Manager at Rake Oy, the building's owner.

The task of designing the air conditioning system rested on the shoulders of **Kari Hyyky** from Granlund Oy.

"From a hotel guest's perspective, adjustability is extremely important. Indoor conditions are a really personal choice. For example, what one person might experience as a pleasant temperature might be completely uncomfortable for another", he notes.

Truly controllable and suitable indoor conditions cannot be guaranteed merely by cooling intake air. Nowadays, room-specific air conditioning is usually achieved through the use of fan coils. Owing to the fact that the dimensions of the windows in each of the street-facing rooms on the property's two facades slightly differ from each

"The decision to use Chiller's GRAND Vari™ system was determined by how easy it would be to install and maintain, its adjustability, and, especially for a hotel renowned for its tranquillity, how quiet it was", says Kari Oja, Real Estate Manager at Rake Oy

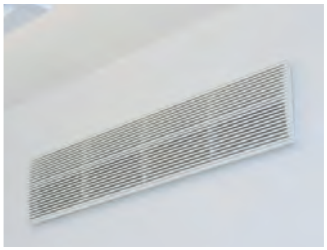
other, there are also variations in their respective air conditioning needs

According to Hyyky, the decision of which system to use was determined by how easy it would be to install and maintain, its adjustability, and, especially for a hotel renowned for its tranquillity, how quiet it was.

PEACE AND QUIET

The product chosen to meet the specific air conditioning and ventilation needs of the site's new hotel rooms was the GRAND Vari™ Fan Coil. The units are energy-efficient, made to an exceptionally high standard, and are easy to install and clean. And the fact that the units run in near silence makes them the ideal solution for a hotel famed for its acoustics. The GRAND Vari™ Fan Coils achieve this thanks to their sealed structure and the acoustic dampening in the fan chamber.

The units force air up to the ceiling and around the room without causing any draught. This goes a long way towards guaranteeing that guests enjoy pleasant conditions throughout their stay.



▶ *The ground-breaking GRAND Vari™ concept offers effortless installation, use and service. The system grille is an integrated part of the room architecture*

The Klaus K hotel is known for its stylish interiors and quiet hotel rooms.

"Instead of slide bearings, Chiller always uses more durable ball bearings in its motors. This ensures that there are no horizontal movements in the fans and, thereby, prevents excessive noise."

Chiller's STUDIO Vari™ fan coils are also extremely quiet as their whole structure is acoustically attenuated. The fan component is fitted right at the heart of the motor, ensuring that some of the noise produced is dampened by the body of the motor itself. This solution helps to eliminate the noisy fan movements and vibrations that are otherwise caused when the fan is fitted to the arm of the motor axel. The linearity between the stator and rotor is achieved by positioning them close to each other on a single axel. Furthermore, instead of slide bearings, Chiller always uses more durable ball bearings in its motors. This ensures that there are no horizontal movements in the fans and, thereby, prevents the noise that these movements would normally produce.

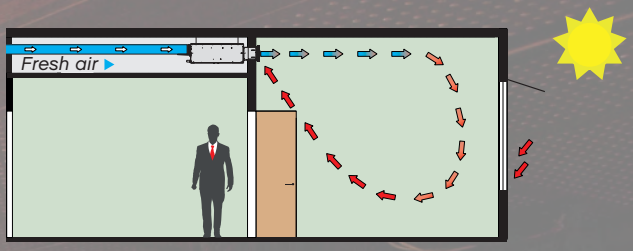
The fantastic acoustic properties of the Sky Loft rooms do not only depend on the quiet running of the ventilation and air conditioning systems. In fact, thanks to the old building structure, inventive suspended ceiling solutions were required in order to achieve the acoustic quality befitting rooms in a high-class hotel.

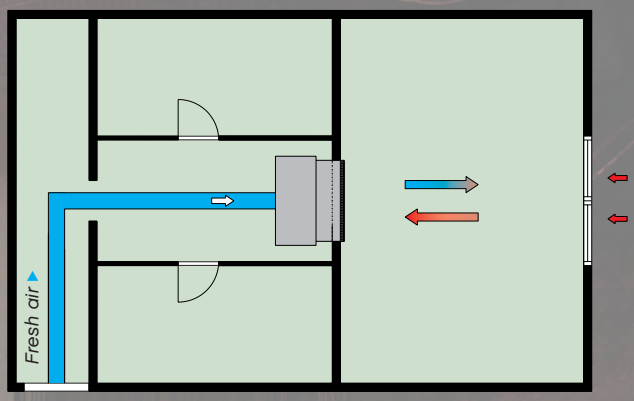
Hiding all the ventilation terminals and convectors wasn't easy in these delicately-decorated rooms, however. Thankfully, dSign's Vertti Kivi was on hand to tackle this challenge superbly. One example of the innovative approach taken by Kivi was the decision to use a brand-new "stretch" material in the ceilings.

THE RIGHT PLACE AT THE RIGHT TIME

The renovation project's technical building services were taken care of by Consti Talotekniikka Oy. The firm was also responsible for the overall renovation contract. The challenging nature of the project ensured that Project Manager **Timo Mäkäräinen** wouldn't forget it any time soon.

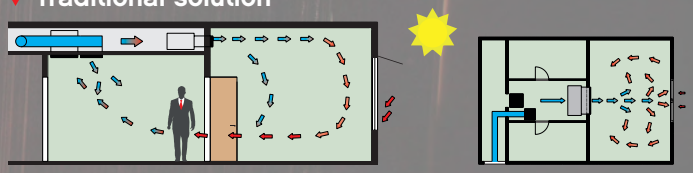
"The issue was that we had a top-quality property that was in continuous use. Among other things, this meant that we were only able to start work at 9 am because of the high likelihood that the hotel guests in the rooms below us would still be asleep," he explains.





▲ **Chiller's solution**

▼ **Traditional solution**



▲ *Chiller's solution ensures ideal indoor air conditions with minimal energy consumption.*

▶ *Each of the new rooms is a little different. They all share creative solutions and excellent indoor air conditions.*

EASY TO INSTALL

Mäkäräinen is very happy with how easy it was to install the GRAND Vari™ units. Part of this can be attributed to the method used to attach the unit to the ceiling via the mountings on its base. A push-through bracket is attached to the unit and pushed through the wall or ceiling surface. The unit is then mounted via its grille, which is fitted with a collar and filter. All of the unit's connectors are found on its back plate. The logistics of the project were a real challenge during the renovation phase. This was largely due to the almost complete lack of storage space on the site. In practical terms, the renovation team was only able to use a small elevator and a single balcony. So it was extremely important that the building supplies and other deliveries arrived on time and were handled according to plan. Mäkäräinen is grateful to Chiller for the role they played.

"We were able to get all the necessary approvals from the designer and the correct items arrived at the site at the right times." •

FACTS, KLAUS K

- ***Owner: Kämp Group Oy***
- ***HVAC consultant: LVI Granlund Oy***
- ***HVAC contractor: Consti Talotekniikka Oy***
- ***Chiller delivery:***
  - ***11 pcs Chiller GRAND Vari™ fan coils***
  - ***3 pcs Chiller BOX Vari™ fan coils***
  - ***9 pcs STUDIO Vari™ fan coils***

▶ ***Read more: www.chiller.fi/en/air-conditioning, www.chiller.fi/en/references***

Brunberg confectionary factory, Finland

More than 12 million kisses are sold every year. The "Kiss machine" makes 10,000 kisses per hour. The whole process is monitored by Mauri Niemelä, Brunberg's Head of Product Development.

The Brunberg staff are responsible for monitoring the temperature displays on the cold water stations. All other maintenance and upkeep measures are taken care of remotely by Chiller, remarks a grateful Ted Björkstrand, Head of Real Estate at Brunberg.

ONE TRADITIONAL FAMILY BUSINESS HAS AN EYE ON THE FUTURE

CHOCOLATE AND KISSES

▶ Text: Katri Karsi ▶ Images: Jaanis Kerkis

With the autumn rush in mind, the Brunberg factory has been working flat out since May. Although the work has been intense, the factory has in fact been kept nice and cool thanks to the new air conditioning and chilling systems installed in line with a recent EU directive on the use of refrigerants.

Based in Porvoo in Southern Finland, Brunberg Oy, which operates the country's oldest confectionary factory, is renowned for delights such as its truffles and "kisses". The company also makes liquorice, marmalade, and toffee confectionaries, the most famous of which is probably the "Alku caramel", developed more than a century ago. The sale of chocolate constitutes 70% of the company's annual turnover, and the lion's share of these sales comes from the the 12-13 million "kisses" that it sells every year. In other words, on average two "kisses" a year melt in the mouths of every Finn!

"Autumn is the season of chocolate. As the nights draw in, we start looking for a bit of extra comfort. And, then, as we approach the holiday season, sweets and treats become just as big a part of the celebrations as Christmas presents", says **Katarina Enholm**, Brunberg's CEO.

THE MANY STAGES OF A TASTE SENSATION

Making melt-in-your-mouth chocolate is not easy. It involves a multi-step process in which temperature has an important part to play. First, the cocoa mass is kneaded or ground in cylinders containing

"The new cooling system doesn't necessarily generate direct savings, but it does save us money indirectly thanks to the fact that we get a much higher output for the same money", remarks Brunberg's Head of Real Estate, Ted Björkstrand.

cold water until it is as fine as possible. This prevents the consumer detecting the sugar crystals in the chocolate when they eat it. Next, the cocoa paste is transferred to a conching machine, a type of mixer, which evaporates the remaining liquid and any bitter aromas. The "conches" are enclosed in water baths that keep the chocolate cool as it tempers. Each conche is able to temper between two and three tonnes of chocolate per batch

Maintaining the correct temperature is also essential in the processing that the chocolate undergoes in order to change the cocoa's crystal structure and maintain the desired colour.

"Anyone who's ever kept a bar of chocolate in the fridge at home knows that its colour changes from a rich brown to a greyish hue with the cold. The tempering machines ensure that the chocolate stays at the correct temperature for each stage of its processing", explains **Mauri Niemelä**, Head of Product Development at Brunberg.

When the delicious chocolate is ready to be sent out to retailers for consumers to enjoy, it needs to be stored at a slightly cooler temperature (between +16 and 18 °C). Brunberg has three storerooms purpose-built for this task.

REAPING THE REWARDS OF A LARGE INVESTMENT

The cooling system at the Brunberg factory was replaced in two stages, carried out in 2012 and 2013. The decision to make such an investment owed a lot to the new EU refrigerants directive and the gradual ageing of the existing cooling equipment. The move to bring Chiller on board as both the equipment and solutions supplier made perfect sense.

"The Service Next™ overall concept that Chiller offers enables our machines to communicate with the Chiller databases, and this ensures that the systems management can be carried out reliably. On top of this, Chiller is a Finnish company and, therefore, almost our neighbour. Their testimonials speak for themselves – the service concept is flexible and the whole deal-making process went well Once we settled on the price, the final decision was easy", Niemelä continues.

"The new cooling system doesn't necessarily generate direct savings, but it does save us money indirectly thanks to the fact that we get a much higher output for the same money, remarks Brunberg's Head of Real Estate", **Ted Björkstrand**.

EASY UPKEEP

The maintenance requirements for the factory's cooling system are much less than before. Whereas thirteen air conditioning units were previously needed to cool the Brunberg operation, now, four units do the job. The responsibility for their upkeep lies with Chiller.

In Björkstrand's eyes, the new Chiller units are even easier to adjust than a domestic radiator.

"One call to Chiller is all it takes. We ask them to increase or decrease the temperature and it's done. At the same time, any changes are always recorded in the Chiller databases."

Katarina Enholm, CEO of Brunberg Oy knows that maintaining the right temperature is crucial at every stage of the chocolate-making process.

Some of the adjustments to the cooling system are made on a timer, which makes the job of the Brunberg workers much easier; all they have to do is keep an eye on the displays to ensure that the temperature readouts are correct. In fact, to-date there have been no faults with the new system. There are always a few minor adjustments to make to any new system when it is first installed, but in the case of the Chiller system, these were all sorted out immediately.

"We've got a sensibly-priced maintenance contract with Chiller and this includes a system-wide inspection once a year", says Niemelä.

BETTER WORKING CONDITIONS

If it hadn't have been for the new air conditioning system at the factory, the energy levels of the Brunberg production line staff would have truly been tested by last summer's heat wave. Before its installation, temperatures in the production room often hit +28°C, whereas they now remain between +21 and 22 °C, which is perfect for working in such an environment.

During the winter months, the factory utilises the so-called free cooling technique; i.e. the compressors in the cooling stations are turned off when the outdoor temperature drops below +5 °C.

SYMPATHETIC QUARTERLY THINKING

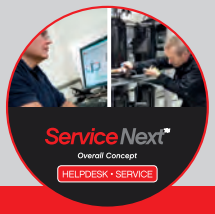
It's often said that the family business quarter is actually a quarter of a century, and the Brunberg team definitely subscribes to this way of thinking.

"We take good care of our staff and the rises and falls in the economy don't cause us to panic or lay people off", says Katarina Enholm, Brunberg's CEO.

In conjunction with the installation of the new Chiller cooling system, Brunberg also changed all of the pipes at the factory, which are now stainless steel. Considering that the cooling equipment will last for 25–30 years, and the new pipes even longer, it seems that the Brunberg approach to quarterly thinking is evident in this investment too. •

FACTS, BRUNBERG

- *Owner: Brunberg family.*
- *Chillquick Eco™ cold water stations (CGIW-31).*
- *Service Next™ Overall Concept.*
- *HVAC contractor: Chiller Oy.*



- *Read more: www.chiller.fi/en/waterchillers, www.chiller.fi/en/references, www.chiller.fi/en/servicenext*

Free cooling can be utilised during the winter months, as the outdoor temperature remains below +5 °C.

The Brunberg staff surrounded by chocolate boxes.

Located near the Dovrefjell mountain range, the Dombås Hotel welcomes guests from all over the world.

ALL-IN-ONE-HEATING SOLUTION IN THE DOVREFJELL MOUNTAINS

Text: Kerstin Lundell Images: Svein Rune Berg

The heating and cooling for the hotel, situated 800 metres above sea level, comes from 200 metres underground. At the core of its integrated system is a Chillquick Thermo™ heat pump, which runs on both gas and electricity.

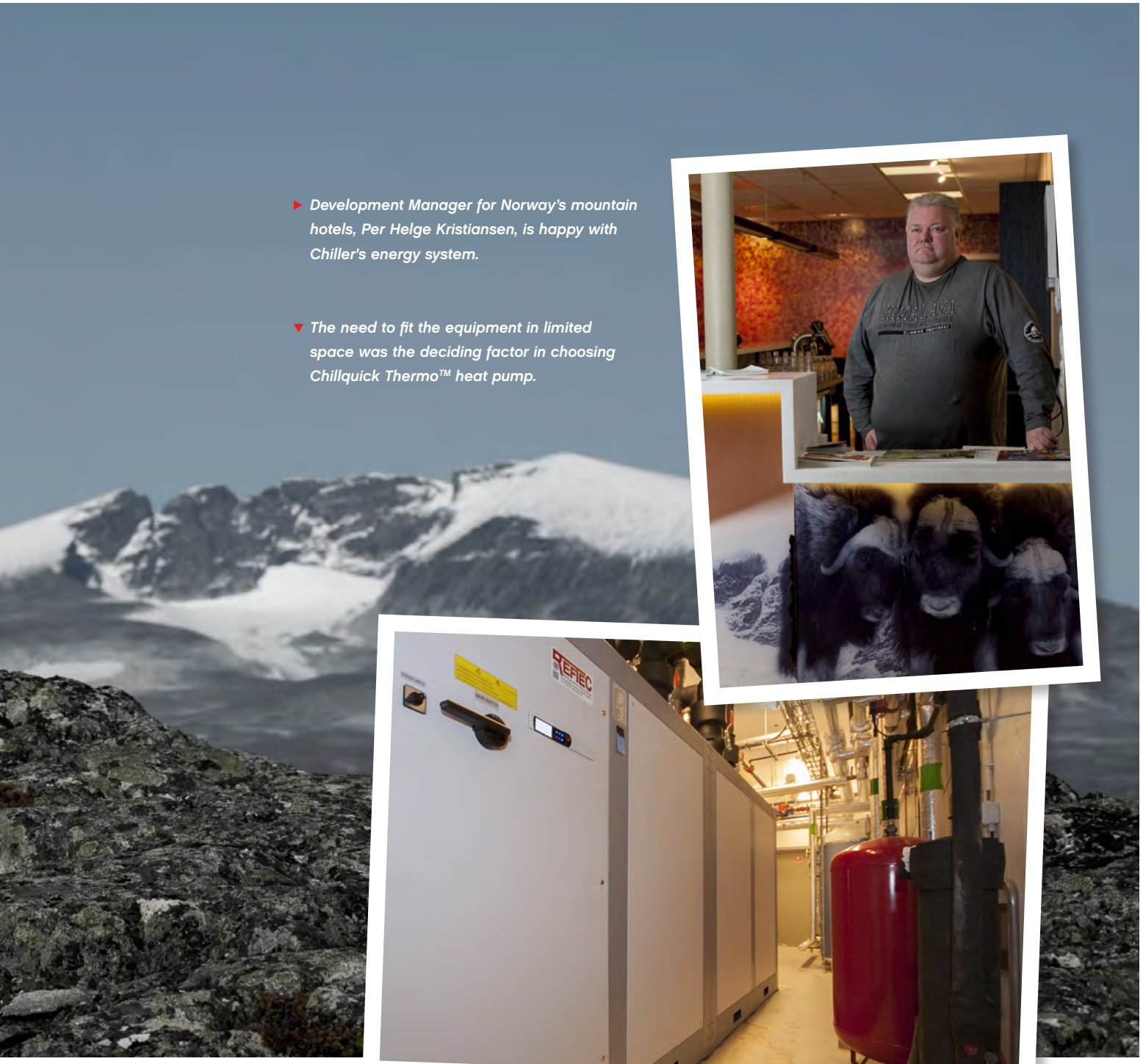
The mountains tower high above the hotel in the Norwegian town of Dombås, close to two major European highways. A pipe extending 200 metres beneath the hotel supplies its 99 rooms, conference wings, and restaurant with heat and, when needed, cooling.

This March, five vehicles arrived carrying the new heating and cooling system, which consisted of three 8 cubic-metre units. The whole thing was installed in two days. Since then, the hotel's heating and air conditioning has been handled by four Chillquick Thermo™ heat pumps without any problems at all.

"There have been a few minor faults, but nothing that would have warranted bringing out the supplier. The faults we've had have been caused, for example, by power cuts, says the hotel's development manager", **Per Helge Kristiansen**.

PRE-TESTED DELIVERY MAKES INSTALLATION EASIER

The motivation for the new system was the desire to have a single installation handle the hotel's heating and cooling needs, ready-to-go when it arrived from the supplier. In addition to the heating pump, the integrated system also



Development Manager for Norway's mountain hotels, Per Helge Kristiansen, is happy with Chiller's energy system.

The need to fit the equipment in limited space was the deciding factor in choosing Chillquick Thermo™ heat pump.

"Depending on the temperature, the system can generate between 2.5 and 3.5 kWh for every single kW of electricity. The system can also heat water."

includes a gas burner and an immersion heater, just in case the geothermal heat drawn from the mountain is not enough. A control panel is connected to the heat pump and this is used to set the correct heating mix from the energy sources. According to Per Helge Kristiansen, the need to fit the equipment in limited space was the deciding factor in choosing to have an integrated system.

Erik Dyrseth from Trondheim-based firm, Reftec, was in charge of the installation. He explains why the Chiller system was integrated. According to him, it was easy to get the equipment up and running because the entire system had been pre-tested at Chiller's factory in Finland. There was no need for a plumber or any systems experts to get it started; instead, Chiller's partner company, Reftec, took care of everything. Everyone involved could easily see who was responsible for what.

"Furthermore, the new system is set up to be much more energy-efficient", Dyrseth notes.

The pumps are frequency controlled, which is one means by which the energy consumption is controlled. Also, the water that flows from the mountains warms slightly as it passes through the hotel. This water then continues through an additional loop, connected to the heat exchanger, which can

***"The system works automatically",
says the hotel's development manager, Per Helge Kristiansen.***

be also used to generate cooling if necessary. The heating and cooling outputs of the system are both 100 kW.

WATER CIRCULATION HEATS UP

As such, when the water used for cooling purposes passes through the heat radiators, the hotel's fan coil system, and the under-floor heating pipes, it is warmer than when it was pumped upwards. All of this allows the system to convey more heat. During the summer months, the condensation heat is pumped back through the system in such a way that the system-wide temperature rises before the colder winter months arrive in the mountains. Depending on the ambient temperature, one kWh of electricity generates 2 to 2.5 kW of heat. The system is also capable of heating water.

UNBEATABLE RELIABILITY

Dyrseth also emphasises the reliability of the integrated system.

And his opinion is shared by Per Helge Kristiansen, who says that "the system runs by itself".

Thanks to the higher energy-efficiency of the equipment it will save the hotel money in the long-term. The alternative would have been a wood burner. According to Norwegian legislation, buildings above a certain size must be heated by other sources than electricity. The use of a fuel, however, would have required more space, and the stove would have needed filling every now and again. In the end, it was much easier to install a heat pump.

IN FRONT OF HEATING SEASON

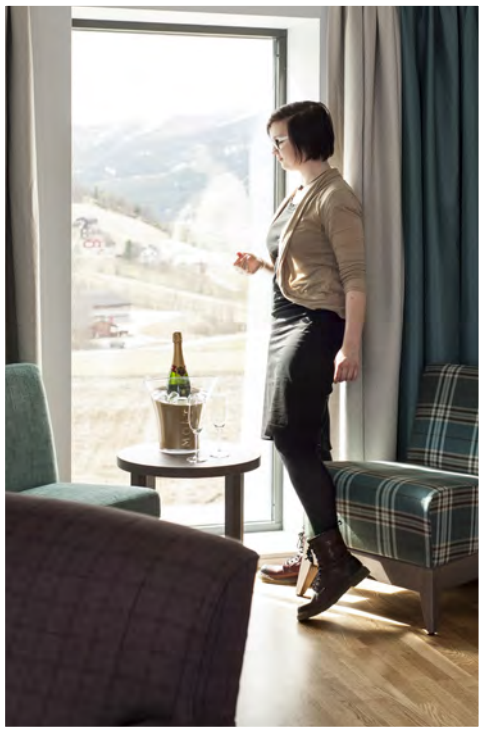
The system has so far provided heating to the fan system. However, when winter arrives, the equipment will start heating the under-floor heating system on the first floor, as well as radiators elsewhere in the hotel. This will be its true test.

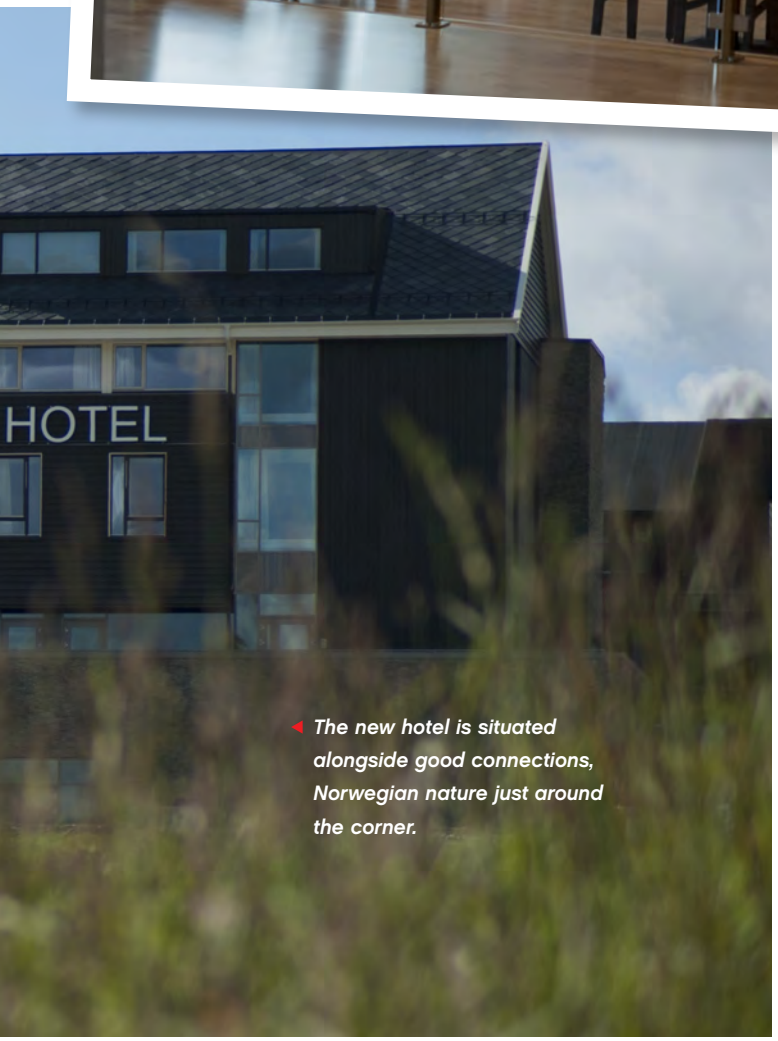
"It will be interesting to divide the heating between the fan coil and heating systems", Per Helge Kristiansen continues.

Guests from around the world come for conferences, for hikes in any of the five national parks nearby, to ski, or to sleep over on their way onwards north, south, east or west. And they are often families. The busy E6 highway runs nearby the hotel, so the area is popular. •

▶ *Geothermal energy supplies the underfloor heating.*

▼ *The restaurant is heated by Chillquick Thermo™ heat pumps.*





◀ *The new hotel is situated alongside good connections, Norwegian nature just around the corner.*

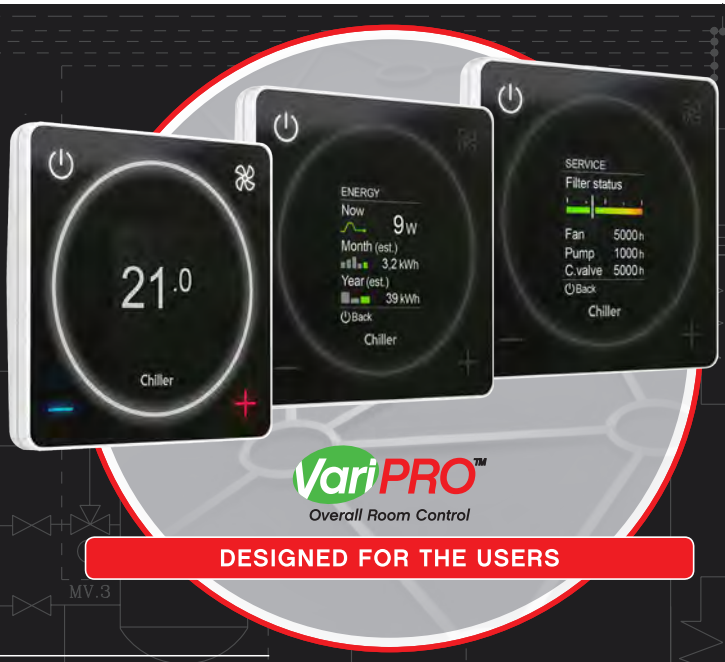
FACTS - HOTEL DOMBÅS

- *Chillquick Thermo™ heat pump*
  - *Delivered with circulation pumps controlled by the heat pump for optimal efficiency. The pumps only run when needed.*
  - *Titanium heat exchanger.*
  - *Desuperheater – Heating of tap water from the heat pump heating coil. Temperatures up to +65 °C.*
- *COPtronic™ – An integrated COP sensor which measures both monetary values and accumulated energy consumption.*
- *ELtronic – Controls additional heating from the heat pump regulator.*
- *Service Next™ and Modbus TCP/IP – Enables supervision of the heat pump using and IP adress. In case of problems, the vendor or manufacturer can log on to the heat pump and find or fix any issues before they become serious.*

▶ *Read more: www.chiller.fi/en/heatpumps, www.chiller.fi/en/servicenext, www.chiller.fi/en/references*

THE Vari PRO™ OFFERS NEW POSSIBILITIES FOR AIR CONDITIONING CONTROL

A USER-CENTRIC APPROACH



▶ Text: Dakota Iavento ▶ Images: Chiller Oy

The Vari Pro™ wall control unit runs Chiller's Box Vari™ and Grand Vari™ air conditioning units. These units are typically installed in hotels, offices, and residential properties in which user-friendly controls are a top priority.

According to Chiller's Product Manager, **Mikko Toivonen**, the starting point for the product's development was the desire to achieve user-friendliness throughout the entire product lifespan.

– We started by mapping out the different user groups, installation sites, and ways of using the product. Our research indicated that there were four different groups: ***the end users, the fitters, maintenance personnel, and building supervisors***. Each of these had a markedly different way of using the product.

WITH THE END USER IN MIND

At the end of the day, the most important thing a building user wants is good quality indoor air. There is no absolutely correct temperature, though. In fact, air temperature is affected by many things – from the outdoor conditions to the degree of humidity and the preferences of the individual.

"It's often the case that simple-looking control units are not actually up to the task at hand. No one knows how to use them or understands how they control the system. In fact, such units are usually shunned thanks to bad user experiences" says Toivonen.

"We decided that the user only needed to be able to change the setpoint and to turn the fan on and off."

"Generally-speaking, problems occur when users don't get any feedback after pressing a button. They wonder what happens when they press one button or another – did it change something or is it even working at all?"

"Users are interested in things such as what the 'Ambient Room Temperature' and 'Setpoint' are, how long it takes to achieve the desired setpoint, and whether the unit is trying to heat or cool the space at any given moment", he remarks.

"It was on the basis of these kinds of problems that we developed the principle of ***'Instant Feedback'*** when designing the unit's interface. This means that the user always gets feedback via a display when he or she presses any button. For example, if the user tries to turn the heating on but the system doesn't do this for one reason or another, then they get a 'No Heating' message."

"The user interface also shows the ambient temperature and set-point, as well as the estimated time it will take to achieve the setpoint temperature", says Toivonen.

"We designed the LED ring on the unit to display every operating state. When the ring lights up blue, the control unit is trying to cool the room. And when it is red, the room is being heated. This means that the user only needs to quickly glance at the unit to work out what it is trying to do at that precise moment."

BUILDING SERVICES SYSTEM INTEGRATION

There are many kinds of building services system, and they consist of a vast array of sensors, regulators, and apparatus. This can be challenging for engineers.

"The large number of connections and limited time available for installation increase the number of mistakes."

"An engineer or fitter may end up installing tens or even hundreds of different devices at a site. And the time for each installation must be kept to a minimum. We made the connections between the controllers and units as simple as possible in order to reduce the number of mistakes and faults."

"The test runs for these kinds of units often end up being too much trouble for the user. This then results in a poor experience and causes headaches for the contractors after the end of the contract. We made a ***"Start Up Wizard"*** function to make life easier for the fitters. The controller actually configures itself through the wizard. This means that the fitter doesn't need to worry about all kinds of parametrics and settings or a thick configuration manual when trying to get the unit up and running", Toivonen explains.

WITH MAINTENANCE IN MIND

"We wanted to make the lives of the maintenance workers a little easier by bringing all of the information on the unit to the ground level. There's no longer any need to strain oneself to find the serial number or work out what's causing a fault."

"We made a special menu in the unit's software specifically for maintenance personnel. It centralises all of the information relevant to

- *Thanks to careful design, the Vari PRO™ wall controller has comprehensive and easy-to-use software.*

AVAILABLE FROM Q2/2015!

their needs. All the encrypted parametrics were left aside, with the focus instead being on the key info, such as the unit's serial number, the usage time of the components, the estimated filter degradation, and even the temperature of the intake and outtake air."

"When one or more of the components breaks or stops working as intended, the control unit informs the user of the cause of the problem as well as the serial number of the faulty air conditioning unit. The maintenance worker can then use this information to order the correct parts and avoid unnecessary systems inspections."

BUILDING SUPERVISORS WANT THE BEST

The spaces in modern buildings need to be flexible and their purpose can change radically. In fact, it is often the case that air conditioning levels need to be increased or decreased in a short space of time. Sometimes, a little noise can be tolerated in order to maintain a pleasant indoor air temperature.

The Vari PRO™ controller makes it possible to monitor the operation of every unit in a system from a single control room. The desired airflow can be set in the control room, from where it is also possible to monitor the prevailing temperature differential. Any adjustments can then be made through the software, without touching any of the physical connectors. The data collected by the control unit can be analysed in order to work out if the device is working in the desired way and to prevent unwarranted site visits.

PRECISE MONITORING OF ENERGY USE

The Vari PRO™ controller enables the energy consumption of any unit connected to it to be precisely monitored.

"The data on energy use is conveyed to the control room for the purpose of reporting. Precise monitoring of energy use helps save money and optimise the system." •

"We began by analysing the different user groups and the ways they used the unit. Next, we examined their roles and considered the potential on-site difficulties they may encounter", says Product Manager Mikko Toivonen.

THE COMMANDING ADVANTAGES OF THE Vari PRO™ WALL CONTROLLER

- *User-friendly and clear functions.*
- *Designed for use with Chiller's EC ceiling products.*
- *Energy use display.*
- *Maintenance and fault notifications.*
- *Low operating noise and energy-efficient.*
- *Localised information output and via building automation systems.*
- *Quick to install.*

▶ *Read more: www.chiller.fi/en/varipro*

Chiller
AIR-CONDITIONING

GRAND Vari™

A new concept for air-conditioning
in hotel rooms, offices, and villas

The new EC motor technology and the unit solution constitute a technological combination the like of which has never been seen on the marketplace. The grille of the unit consists of two sections, which enable an unprecedented logarithmic temperature difference for a heat exchanger coil.

- ***Control of valves and EC motor in the range of 0–100 %***
- ***The new EC grille enables minimal energy consumption (in the range of 3–11 W)***
- ***The new EC grille enables blowing that is completely free from draught***
- ***The filter is conveniently located behind the hinged grille and is easy to clean***

Chillquick Thermo™ is a revolutionary range of heat pumps that provide for more flexible and energy-efficient solutions. These dual function units provide both heating and cooling.

One heat pump range is enough to cover the needs of all buildings, up to 2 000 kW capacity. Chillquick Thermo™ heat pumps can be connected to the *Service Next™ Overall Concept*.

- ***Read more: www.chiller.fi/en/heat-pumps***

VARIABLE ENERGY-EFFICIENCY

- CHILLQUICK THERMO™ -HEAT PUMPS FOR BUILDINGS

- ***More information:***
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