Edition November 2016

Pfannenberg Case Studies

Customer Applications in Thermal Management, Process Cooling and Signaling Technology.

SHARING COMPETENCE

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ELECTRO-TECHNOLOGY FOR INDUSTRY

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CASE STUDY

Safety and system uptime in the St. Gotthard Base Tunnel

Two competent partners – one solution: electrical enclosure manufacturer and thermal management specialist develop a concept that withstands the alternating pressure load in tunnels

Pfannenberg and Swibox's concept for the thermal management of electrical enclosures for the 176 cross passages in the St. Gotthard Base Tunnel successfully withstands high alternating pressure loads, temperature differences and dusty environments. Electrical enclosures with an especially designed pressure body which protects the cooling circuit, and an integrated controller guarantee a high level of system uptime.

The Gotthard Base Tunnel impresses with many outstanding figures: It is the longest railway tunnel in the world at 57 km and its tunnel run, with all the transverse and connection tunnels, stretches over 154 km. From 2016, passenger trains should have a top speed of 250 km/h, reducing the travelling time e.g. between Milan and Zurich to under 3 hours and should almost double the haulage capacity on the Swiss North-South Axis to 40 m tons of goods.

Looking at these figures, it becomes clear that the safe and smooth operation in the tunnel must be guaranteed at all times. In order to achieve this level of safety, the technology used in the tunnel must always be up to date; this applies not only to the whole system, but also to the individual components. The most important components here are Pfannenberg's electrical enclosure climate control units, which are situated, in the 176 cross passages amongst other places.

Fig. 1: Inside view Gotthard Tunnel

These climate control units or cooling units ensure that the thermal pressure of the electronic components integrated inside the electrical enclosures does not become too high and that they work safely and reliably throughout their whole service lives.

Pfannenberg and Swibox – a time-tested team

Two long-term partners have joined forces once more for the Gotthard Base Tunnel project: Pfannenberg, a medium-sized company with its headquarters in Hamburg and specialist for the thermal management and process cooling of electrical enclosures, and the company Swibox, also an expert in the area of customized electrical enclosure manufacture with its headquarters in Balterswil in Switzerland.

At the beginning of the cooperation, standard products from Pfannenberg's comprehensive portfolio of products were installed in the Swibox switch cabinets. The first time the two companies developed a climate control concept for a specific customer was 2003, during the "Lötschberg Tunnel" project. This concept was designed especially for the challenging demands of railway tunnel applications.

Electrical enclosures withstand every alternating pressure

The largest technical challenges were the high requirements to the system of protection of the electrical enclosure, IP65, and also the high alternating pressure load which is caused by the trains passing through. When entering the tunnel, the train pushes the air ahead of it, causing overpressure until the train passes by the cross passage where the electrical enclosures are standing. As soon as the train has passed, the overpressure transforms suddenly to a corresponding under-pressure. All the electrical enclosures and the installed cooling units are exposed to the load of this alternating pressure of up to +/- 5 kPa. (Figure 2 cross passage Lötschberg Tunnel with electrical enclosures and climate control units). It had to be ensured that all devices can withstand this alternating pressure mechanically, simultaneously implementing the high system of protection.

Fig. 2: Swibox electrical enclosures in cross passage of Lötschberg Tunnel

It was possible to meet these requirements, thanks to the mechanical unit construction (Figure 3: Swibox electrical enclosure with Pfannenberg DTGT cooling units without top cover) developed especially in cooperation with the company Swibox. This construction ensures a leak-proof separation of the surrounding (outer wall of the unit) and the inside of the electrical enclosure (unit inside), also under pressure load. A special feature here is the developed pressure body inside which the components of the inner cooling circuit are housed. Therefore, it was not enough to use reinforced sheet metal: the selection of a suitable material and the increased material thickness in combination with specially installed stiffening plates led to the desired compressive strength.

Fig. 3: Electrical enclosure with Pfannenberg DTGT cooling unit without top cover

Climate control concept of electrical enclosures does not only mean cooling

Another challenge in tunnels is the ambient air. Large temperature differences ranging from -20 °C to +40 °C, maximum humidity of 100%, and ferrous abrasion of brakes, rails and contact lines in the ambient air increase the risk of corrosion and show how different a tunnel application is compared to standard applications.

Therefore, a special climate control concept had to be established for specifically this application. It becomes clear that it is not just about the cooling of the components when you look closely at the task of thermal management and process cooling of electrical enclosures again. It comprises an extensive protection for the electronic components against damaging ambient influences such as dust, moisture and temperature.

Naturally, protection plays a special role, but also other factors can be influenced by thermal management and process cooling such as the length of service life of the electronic components for example. Many developers and design engineers are aware of the fact that climate control of electrical enclosures is necessary, but often not where the actual requirement comes from. Here it is helpful when one looks at the technical data of frequently installed components closely, especially cost intensive components like controllers. The technical data includes information on minimum/maximum operating temperature, humidity, and condensate but also on other critical parameters like the dust pollution.

The controllers in modern electrical enclosures are based on semi-conductor components. The monitoring elements and control elements used are becoming more and more powerful. The extremely high packing densities result in a higher power loss. The larger the temperature stress of these components, the shorter their service life. Thus, it can lead to overheating, the so-called hotspots and in the worst case premature failures.

Humidity is another parameter which has to be assessed within the framework of a concept for the thermal management and process cooling of electrical enclosures. In the ambient air there is always a proportion of dissolved water. Depending on the temperature, the air can absorb a larger or smaller amount of water. If the temperature drops e.g. due to day / night change, there is a risk of condensation building on and between the electronic elements. Corrosion and electronic failures can be a consequence here, too.

Since 2005 we have started to implement the climate control concept we developed together. In addition to the cooling units, which are predominantly used inside the mountains (ambient temperatures up to +40 °C), Pfannenberg heaters also had to be installed in the portal sector (ambient temperatures to -20 °C). These heaters ensure that the temperature inside electrical enclosures does not fall below the so-called dew-point. The dew-point is the temperature that moist air has to drop to –by unchanged pressure – so that the amount of water dissolved in the air is precipitated as condensate. At the dew-point, the relative humidity is 100%; that means that the air is saturated with water vapour.

The successful collaboration between both companies is to be continued in form of the new project Gotthard Base Tunnel. In 2006, work was started on a solution for the increased requirements of thermal management and process cooling of electrical enclosures on the basis of the tried and tested concept. For example, the demands on the alternating pressure load with +/- 10 kPa doubled, which made it necessary to completely rework the mechanics of the cooling units. In a Swibox test laboratory developed especially for such projects, the new design and the electrical enclosure proved their functionality – successfully running through 200,000 alternating pressure loads +/- 10 kPa.

Controllers ensure system uptime

Fig. 4: Pfannenberg cooling unit DTGT mounted on the back of an electrical enclosure

The integration of the electrical enclosure climate control units (figure 4: Pfannenberg cooling unit DTGT mounted on the back of the electrical enclosure) into the central tunnel system was a further requirement which had to be implemented. As a result of the integration, there will be the possibility to access all operating data of the cooling unit in the future.

Thus, the current temperature of the electrical enclosure can be read for example, or the hours of operation of the most important main components can be monitored. This is especially important to prevent unplanned failures and downtime and, by planning maintenance works in advance, to guarantee a high level of system uptime.

Pfannenberg's new Generation of Controllers, designed especially for this project, have an Ethernet transmission protocol, and provide a variety of parameters which can now be monitored in the central tunnel control. These heaters ensure that the temperature inside electrical enclosures does not fall below the so-called dew-point. The dew-point is the temperature that moist air has to drop to – by unchanged pressure – so that the amount of water dissolved in the air is precipitated as condensate. At the dew-point, the relative humidity is 100%; that means that the air is saturated with water vapour.

The controllers are not only used directly inside the cooling units. The climate controller was also integrated into 500 other electrical enclosures without a cooling unit. This makes a temperature monitoring system possible, which, like the climate control units, can communicate with the tunnel control system and, if necessary, can be replaced with such, without having to reinstall the data transfer.

Another first in this development is attention paid to energy efficiency. An intelligent control concept was implemented for this, optimizing the energy efficiency, which is already very good in the active cooling mode, additionally in the passive mode (only the electrical enclosure air is circulated). Due to the integration of a temperature sensor at the allegedly most critical point inside the electrical enclosure, the internal fan responsible for the circulation of the air in the electrical enclosure is only switched on when a defined limit temperature is exceeded. The cooling unit does not start to cool actively again until a limit temperature is exceeded despite the circulation of the air. This control concept helps to reduce the energy consumption further, since all active components are switched off in the event of the energy saving mode described above.

Another important point is that the uptime of the units is guaranteed to last for 10 years after the initial operation of the tunnel in 2016. This results in the increased demands to maintenance friendliness. Thus, the MTTR (Mean Time To Repair) has to be as short as possible, this means the time necessary to replace the components quickly and easily in the framework of defined maintenance work.

In 2010 the first cooling units were delivered to the company Swibox. In the meantime, all units have been delivered and will be installed one by one, together with the electrical enclosures, in the 176 cross passages of the Gotthard Base Tunnel. They have already been able to prove their reliability every day, as the various test phases started a while ago and will continue until the start of the scheduled railway operation on 2016.

Facts at a glance

Task	Development of an electrical enclosure climate control concept for 176 cross passages in the St. Gotthard base tunnel
Project period for equipment installation	2013 / 2014
Challenges	• Alternating pressure loads of up to +/- 10 kPa • Temperature differences ranging from -20 °C up to +40 °C • Humidity up to 100%
Technique applied	DTGT 9041, DTGT 9541; approx. 980 units
Success factors	• Especially developed pressure body with integrated circuit • Pfannenberg's new Generation of Controllers with Ethernet transmission protocol for central tunnel control • Intelligent control concept for energy efficiency • Uptime of the units is guaranteed to last for 10 years and defined maintenance work for short MTTR

Summary

Operating a tunnel poses a huge challenge for engineers and operators time and time again. All products and solutions have to meet the highest requirements and have to work perfectly even under harsh ambient conditions.

In particular, this applies to electrical enclosures and their thermal management, which are subject to extreme alternating pressure loads, temperature differences and are also exposed to dust and moisture.

In close collaboration, Swibox and Pfannenberg have developed a special climate control concept for tunnel applications. Robust Swibox electrical enclosures with a pressure body which was developed especially to protect the cooling circuit and the side mounted cooling units with integrated controller and heater from Pfannenberg guarantee a high system uptime.

CASE STUDY

Design experts recommend top-mounted cooling units

Clever design and functionality in machine and plant engineering

When it comes to electric components, machine and panel builders are very keen on cutting costs and on space-saving design. Other aspects such as reliable operation, easy maintenance, energy efficiency and an appealing design are equally important. The industrial design experts at ma design in Kiel, Germany, encounter these requirements on a daily basis and therefore know exactly what makes the grade. For the thermal management of electrical enclosures, they recommend to machine and plant builders a product with an innovative design which meets these requirements in a unique way: DTT series top-mounted cooling units from Pfannenberg.

ma design is a think tank for innovative products, processes and business models. Awarded the "Grand SME Prize" (Großer Preis des Mittelstandes) in 2014, the company is one of the most successful design businesses in Germany. Around 50 employees based in Kiel and Dresden develop concepts and strategies, visualise ideas and approaches, and design process and function models, prototypes and complete physical and digital products. The company's philosophy is to ensure that the solutions it develops are simple, intelligent and consistent down to the last detail.

The DTT series top-mounted cooling units from Pfannenberg fulfil these functional industrial design standards. They combine the optimum use of space and attractive, ergonomic design with high functionality. The experts at ma design were persuaded by this concept and recommended the machine and plant builder BHS Corrugated* to integrate the DTT in a new machine design.

Rising temperatures

Floor space is now more than ever a valuable asset in the manufacturing industry. The aim is to use existing space as effectively as possible in order to maximise its yield per unit area. This constraint means that greater demands are now made of machine and plant manufacturers in terms of design. Their products must be designed to be as compact as possible and to combine a maximum of functions in the smallest space. It is not just a matter of the area that the machines occupy; space for escape and traffic routes are also important.

The trend towards compact solutions applies in the same way to industrial automation. Electronic control components are becoming smaller and smaller. At the same time, they are increasing in number and are more powerful because of the multiple functions of modern machines and plants. As a result, the packing density in switch cabinets is very high which presents a challenge to designers as they must protect each electrical component effectively from overheating and remove the dissipated heat.

Clever design

Traditionally, thermal management is undertaken by active side-mounted cooling units. However, this approach can obstruct escape or transit routes. Furthermore, projecting components can present a risk of injury to the operating personnel and do not enhance the visual design of the machine. The logical consequence to be drawn from this and from the increasing pressure on space in the manufacturing environment is to use top-mounted cooling units.

The design experts at ma design recommend top-mounted cooling units: they save valuable space in manufacturing environments, harmonize visually with the machine or plant design and allow the operating personnel more room in which to move around.

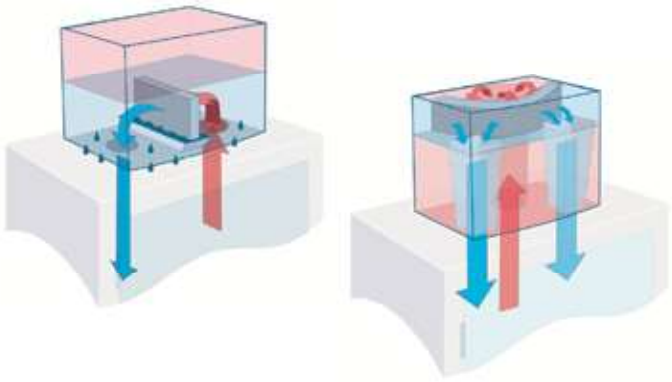
Placing DTT cooling units on top of the machines improves work safety by creating more corridor space and more room in which the operating personnel can move around freely, allowing the mandatory emergency escape routes to be kept free. It also removes unpleasant draughts from the direct vicinity of the operating personnel.

The clever design of the DTT cooling units has impressed Michael Arpe, CEO at ma design: "The top-mounted cooling units reduce the footprint of machines, plants and panels and the space gained around the switch cabinets can be used for other components."

Furthermore, functional design is important to German machine and plant manufacturers. This means that components from other companies should not interfere with the brand look of the products used by the customer. Arpe explains: "A thermal management solution should be visually integrated in the overall design of the machine or plant. Top-mounted cooling units merge with the background and do not compete visually with the machines and plants."

100% condensate protection

In the past, top-mounted thermal management solutions presented many users with problems, as the lower cold side of the cooling unit rested on the upper warm side of the electrical enclosure, causing condensation to form on the top of the electrical enclosure which could drip into the interior. If this happens, the moisture can seriously damage the electronics – with very costly consequences.



The repositioning of the cooling circuits (traditional top-mounted units on the left, DDT on the right) means that there are no thermal bridges on the top of the electrical enclosure and condensation is prevented from forming.

Users of top-mounted cooling units from Pfannenberg, such as BHS Corrugated or Hermle**, do not have this problem, as DTT devices combine the benefits of top-mounted thermal management with 100% condensate protection. This is achieved mainly with an ingenious arrangement of the cooling circuits. Positioning the cooling components in the upper section of the cooling unit prevents the formation of a thermal bridge to the electrical enclosure and allows the condensation to drain harmlessly. A wide thermal separation of the air intake and the evaporator also prevents the formation of droplet twirls. The integrated air exhaust nozzles make it unnecessary to fit traditional condensation-prone air hoses. Thanks to the high circulation speeds even electrical enclosures with densely packed components receive optimum cooling.

BHS Corrugated Wet End

BHS Corrugated Dry End

BHS Corrugated Rotary Shear KQ-M

Tests at the Thermodynamics Department at the University of Stuttgart, Germany, have proved this. "We have achieved very good results in thermal management with experiments on the top-mounted cooling unit DTT 6201. The temperatures in both, the free flow area in front of the components and in the hotspot zones, were consistently at an uncritical level," explains Dr. Ing. Wolfgang Heidemann, Deputy Head of the Institute for Thermodynamics and Heating Technology at the University of Stuttgart.

Focus on user benefits

Machine and plant manufacturers also benefit from above-average energy efficiency and simple installation and maintenance. Compared to previous models, the developers have improved the energy efficiency in the latest generation of devices by another 10%. The heat exchanger and the geometry of the air outflows have been optimised. Energy-saving mode also reduces the operating costs because the internal fan switches off automatically. The integrated multimaster function allows several devices to be linked for parallel cooling via a simple two-wire connection. The latest generation of DTT devices also offers remote monitoring for the operator's convenience.

The user-friendliness of the DTT series is particularly apparent in commissioning and maintenance. For example, snap closures make installation of the top-mounted devices quick and easy. The fans and the electronics are easily accessible as the robust metal cover can be removed completely by pulling it forwards. There is a service flap on the front through which the service technician can replace the pre-filter in a simple process that takes just seconds. This maintenance-friendly approach ensures a minimum mean time to repair and very short replacement times.

The facts at a glance

Task	• Cooling units that optically blends with machine design • Reduce of footprints of machines • High functionality for users: energy efficient and low-maintenance
Challenges	• Ergonomic design with simultaneous high level of functionality for machine and plant engineers
Products used	• Top-mounted cooling unit of the DTT series
Success factors	• Space-saving through compact design • Easy to integrate into existing machinery design • Energy efficient • Low-maintenance and mounting-friendly • 100% condensate protection

Summary

ma design is not the only company to be impressed by the functional design of the DTT: there are already more than 1,000 top-mounted cooling units from Pfannenberg in use, i.e. in the automotive sector, in Germany as well as in other countries. They are available in three sizes and six power levels from 500 W to 4,000 W. Thanks to an extensive range of filter media, such as aluminium filters for air contaminated with oil and aerosols and fluted filters for environments in which dust poses a major problem, they can be used for almost every application.

Author: Ulla Wenderoth, Marketing Communications at Pfannenberg

About BHS Corrugated

BHS Corrugated Maschinen- und Anlagenbau GmbH (BHS Corrugated) has been building corrugated cardboard machines and manufacturing corrugating rolls for over 50 years. Thanks to these many years of experience, the company is now the world's largest provider of solutions for the corrugated cardboard industry. www.bhs-world.com

About Hermle

Maschinenfabrik Berthold Hermle AG is one of the world's leading manufacturers of milling machines and machining centres. With their excellent quality and precision, Hermle machine tools are used in sectors with specialist requirements, such as medical technology, the optical industry, energy technology, aviation, the automotive and racing car industries and by their suppliers. www.hermle.de

CASE STUDY

It's all about the cut-out

Cut-out-compatible cooling solutions from Pfannenberg reduce maintenance requirements and improve machine availability for the Swiss Krono Group, producers of engineered wood products based in Heiligengrabe, Germany

"The people from Pfannenberg first presented their thermal management concept and then over the following weeks pointed out many areas in our production facility where there was room for improvement. We are now satisfied users."

Oliver Marten,
Swiss Krono Group

Large amounts of dust in the air are a particular challenge for electronic components and cooling systems for electrical enclosures used in the wood engineering industry. In the search for a solution which would prevent machine failure caused by heavy soiling and would also guarantee rapid retrofitting, the Swiss Krono Group chose the cut-out-compatible thermal management concept from Pfannenberg. Since then, the woodworking company has installed and refitted a number of different systems from the Hamburg-based expert in thermal management solutions at the production site in Heiligengrabe including cooling units, air/water heat exchangers and filter fans.

Production reliability 24/7

The Swiss Krono Group is one of the world's leading producers of engineered wood products and its facility in Heiligengrabe is one of the most successful manufacturers of OSB – oriented strand boards – in Europe. Other core competences at the site are the production of high-quality laminate flooring, medium and high-density fibre (MDF/HDF) boards and high-quality insulation material made of wood fibre.

To fulfil their customers' demand for excellent quality and to meet their tight deadlines, the Swiss Krono Group is compelled to run the production systems 24 hours a day on almost every day of the year. Reliable cooling of electrical enclosures therefore plays a crucial role, as Frank Schmidt and Oliver Marten, Heads of electrical engineering in Flooring Manufacture and OSB Departments respectively at the site in Heiligengrabe, explain:

"The maintenance staff have a lot of responsibility for ensuring that production runs smoothly at our site – day and night, on workdays and at weekends and on public holidays. The cost of production losses caused by machine downtime rapidly amounts to six-figure sums if we do not use the right technology, such as reliable cooling for our switching and machine control systems, of which we have many."

Discussion about a new electrical system: Frank Schmidt (centre) talking to his colleagues Rico Koßmann (left) and Werner Hille (right).

Challenges of the wood processing industry

Since the site in Heiligengrabe started up in the 1990s, many switching systems have been put into operation on the shop floor. They have been cooled up to now with filter fans and cooling units. The systems have frequently malfunctioned and production has even ground to a complete halt on occasion. Production downtime costs have resulted.

None of this is surprising, given the extreme conditions to which the switching systems in the wood processing industry are exposed. First of all, the air is contaminated with large amounts of dust. In some production areas, this is exacerbated by soot from the diesel engines in HGVs and forklift trucks.

Furthermore, heat and cold can also have a detrimental effect on technical systems under some circumstances. Last, but not least, there is a latent fire hazard: in wood processing, a short-circuit in the electronics can rapidly develop into a fire and therefore a serious risk in terms of safety and insurance.

No maintenance and no dust

The switching systems for a short-cycle press system at the Heiligengrabe site for producing flooring was fitted with twelve cooling units for electrical enclosures. Particularly in the summer, the extreme environmental conditions caused the plant to break down frequently: the control components overheated because the temperatures in the electrical enclosures were too high.

As there was water available for cooling in this workshop, Pfannenberg recommended the implementation of a thermal management concept with air/water heat exchangers with closed cooling circuits which would render them impervious to environmental conditions such as the dusty atmosphere or changing temperatures.

As a result, the existing cooling units for the electrical enclosures were replaced by air/water heat exchangers of Pfannenberg's PWS/PWI series. These offer maximum reliability even at ambient temperatures of over 55°C and in particularly polluted environments.

The air/water heat exchangers put a stop to the dust problem and the maintenance required was reduced almost to zero as, unlike in cooling systems, there were no condensers nor filter fans to require servicing. What's more, the cooling system used 60% to 70% less energy after the change to different technology.

A very dirty electrical cabinet (above), and in contrast, a cabinet for the packaging line that has been cleaned on the outside (below).

Clean and clever: deluxe retrofitting

Pfannenberg also modified a packaging line in the dispatch area of the production facility in Heiligengrabe where the finished goods are collected by HGVs. This area had also been plagued by breakdowns in the past due to the high levels of dust in the air. Previously, this switching system was cooled with ceiling fans and filters built into the enclosure doors to clean incoming air. First, Pfannenberg provided a deep-cleaning service for the whole switchgear cabinet, inside and out, including the PCBs on the inverters.

To prevent the cabinet from becoming dirty again and generating more costs as a result in the future, the ceiling fan combination was replaced by partially recessed, energy-efficient εCOOL DTI 6301 cooling units in combination with filter fans manufactured by Pfannenberg. These units are particularly suitable for use in higher ambient temperatures and in contaminated environments. For example, compressors with widely spaced fans prevent the deposit of dust and dirt and thus ensure that operation is reliable and maintenance at a minimum. The filter fans with their patented fluted filter mats have remarkably long maintenance intervals.

As part of the εCOOL range, the cooling units in the 6000 series also require up to 43% less energy than traditional cooling systems and are equipped to be particularly service-friendly. Worn parts and other components can be replaced very quickly. A single technician can install or remove one of these units in about 10 minutes.

Very dirty frequency converters before cleaning (above). The cleaned switchgear (below) was put back into reliable operation for the packaging line.

The electrical enclosures for the packaging line after being refitted with DTI cooling units.

The filter fans from Pfannenberg are fully sealed so that no air can enter them.

Cost benefits and maximum flexibility

Cut-out compatibility was the crucial reason why the Swiss Krono Group chose thermal management solutions from Pfannenberg. This means that the air/air and air/water heat exchangers and the cooling units from Pfannenberg have identical housing cut-outs and fixing points.

Even the most recent devices in the energy-efficient εCOOL series are backwards compatible thanks to the standardised housing, so that older devices from the manufacturer can be replaced easily. It is now possible for one cut-out to be used for 11 different thermal management solutions.

Plant operators such as the Swiss Krono Group benefit from this in several respects. Identical housing cut-outs for almost every electrical enclosure bring standardisation to the service requirements and the stocking of spare and replacement parts. Another plus is the option to adapt the cooling technology quickly to changes in the environmental conditions, temperature and technology, which was the case in Heiligengrabe when the cooling units were quickly replaced by air/water heat exchangers.

"This versatile thermal management concept allows us to shift considerable service capacity towards other tasks. We can respond to any requirement for maintenance and service with just a few replacement parts quickly and flexibly. That's why we integrated Pfannenberg in our list of approved materials," explains Schmidt.

Consistent package solution

The project in Heiligengrabe demonstrates the enormous importance of taking advice on thermal management for electrical enclosures. Without accurate analysis and extensive consultation on site with experienced experts, it is unlikely that these projects would ever have been implemented in the way they were and the considerable potential for optimisation would probably have remained unused.

It was the whole package of advice, service and technology that persuaded Frank Schmidt: "Our company is benefiting from the manufacturer's know-how and carefree package. Obtaining advice, servicing and maintenance from a single source saves time and money."

New switchgear cabinet for a short-cycle press for flooring manufacture, equipped with air/water heat exchangers from Pfannenberg.

Facts at a glance

Task	• Ensure the availability of machines and systems for wood processing at the Heiligengrabe site • Design a thermal management solution which would be impervious to dust-heavy atmosphere and reduce maintenance requirement • Develop a flexible thermal management solution which would guarantee rapid response times to breakdowns and allow easy adaptation to changes in the ambient conditions
Challenges	• Protect sensitive switchgear from dust pollution • Stop switching systems from overheating and generally protect them from temperature fluctuations • Contain the latent risk of fire associated with wood processing
Products used	• εCOOL cooling units (DTI/DTS series) • Air/water heat exchangers (PWI/PWS series) • Filter fans
Success factors	• Compatible cut-outs guarantee rapid set-up times and facilitate warehousing • Easy retrofitting and upgrading thanks to cut-out compatibility and easily installed devices • Significantly lower maintenance requirement by replacing cooling units with air/water heat exchangers • Significantly lower energy consumption with energy-efficient εCOOL technology • Comprehensive consultation and thorough service

Summary

By implementing the Pfannenberg thermal management concept with its unique cut-out compatibility, the Swiss Krono Group at Heiligengrabe was able to reduce stocking and maintenance costs significantly. Furthermore the wood engineering company is benefiting from better machine and system availability thanks to greatly improved protection from dust. Using the energy-efficient εCOOL technology has also resulted in lower energy costs.

CASE STUDY

Service friendliness and reliability are top priority

Electrical enclosures cooling units from experts – for experts!

Reliable products which, in an emergency case, have to be maintained or replaced immediately – this is the requirement that our industrial clients have to us and to our products that they use. In order to meet these requirements, we need reliable partners whose products fulfil this criteria. In the cooling unit sector, we have found a competent partner in Pfannenberg. Their thermal management solutions meet exactly these demands.

Thorsten Drewes, Geitekk GmbH

Reliable thermal management solutions are necessary when sensitive electronics in electrical enclosures need to be protected against too high temperatures – otherwise lengthy expensive downtime can occur. The cooling units' reliability becomes more of a focus point at the assembly line – such as at Mercedes-Benz, because the standstill of an assembly line can barely be financially compensated. Geitekk GmbH is a full service provider for the thermal management sector at the automobile plants Bremen and Hamburg and is responsible for the high uptime of the plants and systems.

A solution for all cases

With the second generation of the tried and tested ECOOL cooling units, Pfannenberg offers an extremely efficient, modern thermal management range. The units are available as models for door or side mounting (series DTS/DTI) and as top-mounted cooling units (DTT). The DTS/DTI models are available in five performance classes from 1,000 - 4,000 watts and can easily be switched with each other thanks to a uniform mounting cut-out or they can replace models from the previous series as part of modernisation processes. "This has allowed us to simplify and reduce warehouse storage", says Drewes "and still have a suitable unit available quickly in a service case."

ECOOL cooling unit DTS

Mounting and service friendly cooling unit series

The cooling units have a robust, modern industrial design. Their steel plate cover can be removed easily so that the entire outside area is easily accessible at all times. The easy to clean condenser with large fin spacing, which enables very long service intervals, and the construction of the interior and exterior fans as a total unit box round off the complete package. The removable cover can also be painted quickly and easily, so that the cooling unit can be optimally integrated in the desired customer design.

One technician alone can install a cooling unit from the DTI series in less than three minutes without tools. On the whole, this results in immense advantages regarding mounting-time compared to comparable cooling units. The aluminium, vlies and fluted filters can be retrofitted with an optional filter adapter – they can be fitted, also without tools, in less than a minute.

Using the quick installation frame, the top-mounted cooling units can be installed quickly and can be removed again either for maintenance or for transportation. The whole cover can be pulled off to the front, and filtermats and control elements at the front are easily accessible.

Space-saving top-mounted cooling units

The ECOOL cooling unit series includes the innovative DTT models for top-mounting which is particularly suitable for applications with little installation space. It remedies problems that occur in traditional top-mounted cooling units: Condensate can arise here, this penetrates the electrical enclosure and, in the worst case, leads to machine breakdowns. Thanks to an intelligent, patented condensate management system, DTT top-mounted units reliably prevent the creation of condensate and the penetration of condensate into the electrical enclosure. To do this, the cooling units were literally turned upside down: Contrary to previously, the cold side no longer touches the ceiling of the electrical enclosure. Thus, larger differences in temperature on the contact surface between cooling unit and electrical enclosure are avoided and the condensate accumulated in the cooling unit is led securely into the integrated condensate evaporator.

„As a result of the high acceleration of the cold outlet air, an airflow path in the inside of the electrical enclosure can be dispensed with. Firstly, this saves installation time and secondly, it reduces costs" adds Patrick Sassmann, Industry Group Manager Automotive at Pfannenberg.

DTT-top-mounted cooling units reliably prevent the penetration of condensate into electrical enclosures

Facts at a glance

Task	• Ensure availability of the plants in automotive industry through reliable enclosure thermal management • Provide mounting and service friendly cooling unit series
Challenge	• Protect sensitive electronics in electrical enclosures against too high temperatures – to avoid lengthy expensive downtime
Products used	• ECOOL cooling units for door or side mounting (series DTS / DTI 1,000 – 4,000 Watt) • ECOOL top-mounted cooling units (DTT)
Success factors	• Cooling units can easily be switched with each other thanks to a uniform mounting cut-out • Robust, modern industrial design • Installation of DTI cooling units without tools in less than three minutes • Quick installation frame of top-mounted cooling units can be installed quickly and can be removed again either for maintenance • Intelligent, patented condensate management system

Conclusion

„Pfannenberg cooling units have proven themselves in operation up to now and are distinguished by very small maintenance costs", summarizes Drewes. "In particular, we are able to provide answers to our customers from the automobile environment who attach importance to reliable solutions. The price-performance ratio is optimal. We can also always count on reliable advice from Pfannenberg: If special cases or special customer wishes arise, we receive personal support immediately."

CASE STUDY

Closed Loop Liquid Cooling of Electronics Reduces Downtime, Maintenance & Repair Costs for Commercial Bakeries

Pfannenberg provides custom enclosure cooling solution for one of the fastest growing independent, family-owned wholesale bakers in America.

Since 1906, families across the United States have been asking for Schwebel's breads by name. Known for their fresh, outstanding taste, and superior quality bread; Schwebel's has maintained their strong reputation. They have grown into a company proud to serve customers with various bread product lines.

Flour is one of the paramount enemies of electrical enclosures and enclosure air conditioners, particularly in the make-up area of a commercial bakery.

The "make-up" area, also known as the dough preparation area is the area within a commercial bakery that contains the greatest combination of flour, moisture, and heat. When the flour becomes wet (due to the ambient humidity levels) it forms a paste-like consistency. It is this build-up of flour and paste within the air conditioner that leads to reduced performance and failure. Without this proper cooling there is added stress and risk of failure for the variable frequency drives (VFDs) and enclosure electronics, leading to costly repairs and downtime.

For over 100 years, the Schwebel Baking Company has been one of the fastest growing independent, family owned baking manufacturers in the United States. This family run business was founded by Joseph and Dora Schwebel and their family bread recipe. The Schwebel's began baking bread in their home kitchen. Known for a fresh, outstanding taste, and superior quality bread, the reputation of their bread flourished.

The Schwebel Baking Company has maintained competitive advantage by implementing new trends in the marketplace. The organization continues to instill pride in their product; meeting the nutritional and flavor requirements of customers they serve.

Today Schwebel's produces more than 700,000 loaves of various breads at their 4 baking facilities and 30 distribution centers in New York, Ohio, Pennsylvania, and West Virginia. Schwebel's provides various branded breads to retail and foodservice customers. Schwebel's mission for distinction has continued throughout the years as a result of the Schwebel family's high standards and individual responsiveness to every product and customer account. Schwebel's sought out Pfannenberg in assistance of solving problems and optimizing their resources.

Fig. 1: Previous competitor cooling equipment

Fig. 2: Flour and dust buildup inside their previous competitor unit

Challenges:

The electronics cooling "sweet spot" is between 85°F - 95°F. Any temperature lower is in danger of condensation which could lead to water forming on the electronics, anything higher can cause heat stress failure on the equipment. It is imperative that electronics get the proper cooling solutions.

With manufacturing space in high demand, machine bundles have become smaller and liquid cooling has emerged as the most efficient and economical means of eradicating heat from enclosures. Liquid cooling is especially well adapted to hot, dirty environments where it provides a method of removing the heat from the machines. This liquid cooling method is an ideal solution for the makeup area in a commercial bakery.

Many commercial bakeries still use air conditioners to cool their electronics in the make-up area because they are a convenient means of effective closed-loop electronics cooling. This is not a sustainable solution due to the high concentration of particulate in the air, ultimately leading to clogged air conditioners that fail. As an internal solution to this problem the doors to the enclosure are opened to provide the needed cooling, allowing dust into the cabinet, doing more damage by compromising the NEMA 4/4X environment. The proposed water solution provided by Pfannenberg is often the only method of providing sustainable, efficient, and reliable performance in such environments.

How the PWS Series Air/Water Heat Exchangers Helped

Pfannenberg's PWS Series Air/Water Heat Exchangers were an ideal solution for the Schwebel Baking Company – trouble free cooling of their electrical enclosures in areas with high amount of dust, moisture and flour in the air. The PWS Air/Water Heat Exchangers utilize glycol or a cool water source that is already available in the factory, to cool their electrical units.

By installing Pfannenberg' s Air/Water Heat Exchangers, Schwebel's was able to see a big difference in the cleanliness of their electrical cabinets. Pfannenberg's Air/ Water Heat Exchanger has no filters, which means there is no down time trying to change filters or having them becoming clogged.

Not only were their electrical enclosures cleaner and required less maintenance, there was also a big difference in the efficiency of the cooled air. In the past, most of their AC units would cool the enclosures, but because their filters would get clogged with airborne particles, the stability of the cool air was not present. Pfannenberg has been able to provide the proper solution to keep the electronics cool and at a stable temperature, regardless of the environment.

Fig. 4: Pfannenberg's PWS unit installed on enclosure

Fig. 3: Pfannenberg's Stainless Steel PWS Unit

The Aftermath:

Pfannenberg implemented 4 PWS-3202 Air/Water Heat Exchangers at the Youngstown, Ohio Schwebel's facility in their Make-up area. There are energy savings when integrating a PWS Series Air/Water Heat exchanger. There are no compressors which reduce the energy usage and they tap into already existing water/glycol lines that run throughout the plant.

The additional benefits that Schwebel's obtained:

- Reduced maintenance costs
- No filters - eliminated the risk of having a clogged system
- Prevent unplanned repairs
- Uses less energy - costs reduced

The company's product, equipment, and employees are integral to Schwebel's operation. Schwebel's has spent many years building their strong reputation in the marketplace and with their customers; this is a top priority. Pfannenberg and Schwebel's have developed a strong relationship. Schwebel's has raved about the products and are beginning to implement more Pfannenberg products within their facility; such as installing Pfannenberg's PA X-1-05 Flashing Light Sounders.

Pfannenberg products and solutions are designed to meet high quality requirements and operate in the harshest of conditions. Pfannenberg continues to strengthen its position as a leader in providing plant wide protection of electronics and personnel.

Summary

Keeping the electronics cool which power the machines, is essential to the entire operation of the Schwebel Baking Company. Without the electrical enclosures staying cool, the machines fail and require replacement or downtime for repair. Inside a baking facility, there is lots of dust/flour throughout the air and can clog the operating machines.

Pfannenberg's PWS Series Air/Water Heat Exchanger was the precise solution for Schwebel's complications. Incorporating the Air/Water Heat Exchanger improved performance, reduced maintenance, was energy efficient, and prevented unplanned repairs.

CASE STUDY

Singapore is working towards being a Smart Nation with the help of Pfannenberg

Four parties, 3 months of technical discussions, 6 months of testing and 9 months on installations, Pfannenberg takes advantage of our readily available & proven DTS-3000 cooling units

Pfannenberg is now thermal managing part of Singapore Electronic Road Management System.

Application: Outdoor Transmission Stations located Island wide. These stations are to enhance the coverage of the wireless network connection. The hot and wet climate in Singapore is the main challenge to these Electrical enclosures.

Executive Summary

Singapore is building the World's First Smart Nation system by harnessing Technology to the fullest with the aim of improving the lives of their citizens. The Singapore Land Transport Authority is now enhancing the network coverage of their Electronic Road Management System with Pfannenberg, thermal management solution for their Transmission stations island wide.

Challenges

This project involved 4 parties, the Consulting Company, System Integrator, Panel builder and Thermal Management Specialist (Pfannenberg). From 2012, we have the initial contact to this project, and to the installation of the last transmission station in 2015 (Q2). Much time were spent to finalize on the technical specification, set-up, trial stations and acceptance test on these outdoor transmission stations, located at the rooftops of residential and commercial buildings operating 24/7.

The proto type test station is essential because this new system is designed for new coverage locations with the plan to replace the existing 15 year-old systems. Hence, robust and service friendliness is a must as these new systems as they are meant to last the next 20 years.

How Product Helped

Singapore climate is generally characterized as hot (23 °C to 33 °C), high humidity (average is 95%) and with abundant rainfall. So it is almost always warm and wet throughout the year.

Pfannenberg DTS-3000 series is particularly suitable for this application, with its high IP56 protection system and low maintenance.

The earlier system supplied by competitors were heavily customized with specially designed cover to achieve the required high IP rating.

Results, Return on Investment and Future Plans

September 1998, Singapore implemented the Electronic Road Pricing (ERP) System to better manage the road traffic situation. Progressively, 1000 stations were in place for the past decades and more are in the pipelines.

Pfannenberg is now thermal managing the new designed transmission stations of the Electronic Road Management System.

With the Smart Nation Vision, Pfannenberg will not only be serving the Nation Infrastructure needs. We can be expecting more opportunities in contributing to the building of the Smart Nation.

This project has also enabled Pfannenberg to tie up with the Singapore government One-stop Solution partner, System Integrator and panel builder.

Next step:

The vision of Singapore towards being a SMART Nation has also increased the complexity, capabilities & function of these Transmission Stations. As these stations will not only be used for managing the Electronic Road Pricing (ERP) system, they will also be used to monitor & transmit information such as road traffic condition, traffic surveillance camera and speed camera etc. The old ERP Transmission stations will progressively be replaced with the new System.

Pfannenberg is currently also providing the preventive maintenance to ensure these newly installed transmission stations are functioning effectively & reliably.

Facts at a glance

Task	Thermal Management of Outdoor Electronic Road Management Transmission stations.
Project period for equipment installation	2014 / 2015
Challenges	• 24/7 application • Outdoor application with hot, wet and high humidity environment. • Strict government directive and accessibility to after Sales Service support.
Technique applied	DTS-3165 x 20 units
Success factors	• Equipped with Outdoorversion – DTS - 3000 • Timely response (Calculation, trial unit and after sales service support) • Competent partners

Summary

Singapore is marching towards being a SMART Nation and an Electronic Road Management System will be one of the key initiatives to connect the country at all times. The collaboration with our competence partners, took us nearly 3 years, from the day of initial contact to the installation of the last Transmission station.

Effective Cooling of sensitive equipment in Outdoor cabinets, located in a hot and humid environment like Singapore is a constant challenge. Pfannenberg is proud to be able to play a part in the building of a SMART Nation in Singapore with our DTS 3000 series.

CASE STUDY

Control Panel Cooling Technique Helps Mitigate Hydrogen Sulfide Corrosion Problems with Wastewater Pumping Systems

Money-saving approach yields longer service life while conserving energy.

Air-to-water heat exchangers provide an energy efficient and reduced manintenance method for cooling electrical control panels.

Enclosure cooling units offer a straightforward active-cooling technique for pump control panels, however, they are not necessarily the best choice for all installation locations. Dirt, dust, and other airborne contaminants can clog condenser coils; while corrosive gasses in the environment can lead to premature failures.

On the other hand, air-to-water heat exchangers can satisfy the same requirements without circulating ambient air within the housing, thereby eliminating the clogging and corrosion problems associated with airborne contamination.

A common threat to organic wastewater handling and treatment systems is the presence of hydrogen sulfide gas. Not only is this gas toxic to humans, but it also contributes heavily to corrosion problems in pipes, structures, instrumentation, and electrical systems. Lift stations and pumping systems are particularly vulnerable as H2S sour gas readily attacks copper used in wires, electrical contacts, and cooling units used on motor control centers (MCC's).

Enclosure cooling is vital for MCC's containing the variable frequency drives (VFD's) that are used to maintain efficient operation by conserving energy through regulating the speed at which pumps operate. Since VFD's generate a considerable amount of heat, it is necessary to employ an active enclosure cooling technique in order to keep VFD's operating within acceptable temperature limits. The absence of effective enclosure cooling will quickly allow VFD's to overheat, shut down, or even catastrophically fail. In addition to being an economic loss, such outages disrupt production and affect the efficiency of plant operations.

Effective electrical enclosure cooling for environments where H2S gas is present must utilize a closed loop technique to ensure that sour gas is not introduced into the enclosure where it could harm wiring, electrical connections, switches, and other components. In fact, for many installations it is advantageous to deploy an air or nitrogen purge system which creates a positive pressure within the enclosure in order to keep undesirable ambient elements, including sour gas, outside of it. As opposed to an open loop system that uses fans to draw ambient air into and push heat out of the enclosure, a closed loop system maintains isolation of the ambient air and permits the NEMA rating of the electrical enclosure to be maintained. Examples of closed loop cooling equipment for electrical enclosures include cooling units (also known as enclosure air conditioners) and air-to-water heat exchangers.

Cooling units offer the advantage of a being a plug and play solution – they simply hang onto the outside of the enclosure and are connected to power already available inside the enclosure. However, these compressor-based refrigeration systems consume a fair amount of energy and require periodic maintenance. Additionally, to endure the sour gas environment, exposed copper pipes and condenser coils must be treated with a conformal coating – which is not necessarily standard. Over time, the need to clean condenser coils – which may require partial disassembly of the cabinet – can lead to scratched paint, compromised coatings, and eventual corrosion.

Pfannenberg air-to-water heat exchange on a lift pump control panel at a wastewater treatment facility.

Air-to-water heat exchangers offer several advantages making them the preferred method for closed-loop, electrical enclosure cooling. Acquisition and operating expenses are significantly lower than those of a compressor-based cooling unit. Additionally, the air-to-water heat exchanger is virtually maintenance free and since there is no ambient air circulation within the unit, there is no risk of H2S sour gas corrosion to internal components. There are, however, two challenges with acquiring and implementing air-to-water heat exchangers. First, the units must be specified as the solution of choice with the MCC or pump system integrator and second, the units must be connected to a viable source of clean water or coolant to circulate through the heat exchanger coil. Another viable implementation is to consider retrofitting cooling units with air-to-water heat exchangers. This modification can be readily accomplished without difficulty since some units share the same enclosure cut-out. For dissimilar cutouts, an adaptor plate may be required to reduce the size of the opening.

Pfannenberg air-to-water heat exchangers in the pump control room of a wastewater treatment plant.

Summary

In summary, the use of water cooling for keeping vital components within control panels and electrical enclosures operating within acceptable temperature limits is an economical and maintenance-free approach worthy of consideration. Energy savings, longer service life, reduced upkeep, and lower acquisition costs are some of the obvious benefits gained by utilizing air-to-water heat exchangers for such requirements. In locations where H2S sour gas is present, such as in wastewater treatment plants and sewage lift stations, the added benefit of total isolation of components, which could become corroded in such environments, is an advantage that should not be overlooked.

CASE STUDY

Total quality from switchgear cabinet to bathroom

Modular chillers from Pfannenberg

Duravit, a worldwide manufacturer of design bathrooms, is based in Hornberg in Germany's Black Forest region and stands for top quality and intelligent use of technology. In the bath furniture production at the Schenkenzell plant, the process cooling system for an edge banding machine needed to be replaced. For this Duravit chose a chiller from Hamburg-based cooling specialist Pfannenberg, which is now doing its job of maintaining the right temperature. "The Pfannenberg unit is top quality. You just switch it on and it works. It was delivered quickly, and the sales team put a lot of effort into it. The entire process was very smooth", says Peter Brüstle, responsible Electrician at Duravit.

With 5,700 employees worldwide and a revenue of EUR 380 million in 2013, Duravit is a leading global vendor of ceramic sanitary equipment, bath furniture, showers and bath-tubs, whirlpool and wellness systems, shower WCs, saunas, kitchen sinks and accessories. Duravit makes top-grade bath furniture at the Schenkenzell site.

One of the production operations is edge banding. A twelve-year-old chiller for the subsystem switchgear cabinets of an edge banding machine in the Schenkenzell plant needed to be replaced.

First comes the advice

The sanitary equipment specialist turned to the consulting engineering firm Konrad Weinmann for advice. As a sales partner and distributor for a wide variety of renowned manufacturers, this family-owned business acts as a Pfannenberg Competence Centre (PCC) when it comes to switchgear cabinet and process cooling, as well as visual and audible signaling technology.

PCC technical sales staff member Philipp Weinmann was already familiar with the Duravit plant in Schenkenzell, and as an expert in thermal management of switchgear cabinets he knew exactly what the case was about. In cooperation with Vincent von Wieding, business development manager chiller at Pfannenberg, he performed a needs analysis and personally visited the site.

At the end of this process the decision was clear: the new chiller for the switchgear cabinets of the edge banding machine would be a Pfannenberg type EB60 with a custom configuration.

Brüstle comments: "We already had some Pfannenberg chillers in use at various places in the Schenkenzell plant. When the existing chiller for our edge banding machine had to be replaced, it was clear that we needed a new solution. In the end we chose the energy-efficient solution from Pfannenberg due our good experience with them in the past."

Reliable cooling capacity

The edge banding machine and feed unit glues edging to bath furniture. With double-sided gluing and four sides to be handled, each item passes through the machine twice – and thousands of items are processed per day.

Due to high dust levels in furniture manufacturing, a closed-circuit cooling system with water refrigerant is the ideal solution for thermal management of switchgear cabinets. In the summer the ambient temperature can rise to 40°C when bright sunlight shines through the glass roof of the Schenkenzell factory building. This makes a reliable, high-performance cooling solution especially important.

The EB60 WT CE chiller (WT stands for water refrigerant, and CE means that it is certified for the European market) has a rated cooling capacity of 6 kW and delivers a continuous flow of chilled water. The water is used to cool the electronic components inside the switchgear cabinets distributed over the 50 m length of the machine, including variable speed drives and controllers. The modular switchgear cabinets are integrated into the machine as pull-out subcabinets.

The edge banding machine in Duravit's Schenkenzell plant runs about 4,500 passes a day.

Individually adaptable and easy to service

A special feature of Pfannenberg's EB series is their modular architecture, which makes them easy to adapt to individual applications. Duravit chose the following standard options from the 30 option packages available for the EB60: flow monitor with individual alerts, level monitoring for the tank, thermostat, 6-way Harting connectors for power and signal connections, transport castors, and inlet filter monitoring with pressure sensors. In addition, Duravit opted for an especially high-performance pump with rated pressure up to 5 bar, instead of the standard 3 bar with 35 litre flow volume in 50 Hz operation.

The chiller's flow monitor keeps an eye on how much water is flowing through the cooling circuit, and the thermostat measures the water temperature.

If the cooling water flow is too low or the refrigerant temperature is too high (risk of overheating) or too low (risk of condensation), the chiller sends an alert to the machine's operator console so that damage to the electronic components of the edge banding machine can be avoided and high machine availability can be achieved.

The refrigerant tank (the chilled water contains 20% of the Pfannenberg Protect refrigerant) is also monitored by a sensor so that service personnel are informed promptly when the tank needs refilling. Pressure sensors also monitor the air flow through the inlet filter. This enables preventive maintenance and reduces the need for wear parts.

The EB60 WT CE chiller, with a cooling capacity of 6 kW, cools the twelve subsystem switchgear cabinets along the edge banding machine.

The alerts are made possible by chiller's ability to exchange control signals with the edge banding machine through the Harting connectors. The HMI display makes EB60 operation convenient for users, who can also view fault messages and causes on the display.

"A decisive factor for us was that the EB60 is very easy to maintain. For example, the filter mats only have to be cleaned every two to three weeks, despite the high dust level. The unit was installed six months ago, and we haven't had to replace the filter mats yet. Thanks to the various alerts, we can perform preventive maintenance to increase our machine availability", says Brüstle.

The EB60 features very high operational reliability, low maintenance and easy servicing.

Modular and energy-efficient chiller technology

In a closed-circuit system, switchgear cabinets or electronic components are cooled by pumping cold water at a defined supply temperature through the switchgear cabinets in a pipe system.

After passing through the switchgear cabinets, the water flows back to the chiller at a higher temperature (return temperature). The chiller removes the temperature difference by cooling the water from the return temperature back to the supply temperature.

Thermal management specialist Pfannenberg offers chiller solutions covering the capacity range from 1 to 70 kW, using water or oil as the refrigerant. Particularly in combination with air/water heat exchangers, water chillers (WT) provide an ideal system solution because all cooling tasks in a plant or machine can be implemented easily and economically using a closed-circuit pipe system.

The modular design of the EB series gives users a choice of up to 30 standard options, including UL certification. Good access from all sides enables easy and efficient maintenance. All components are rugged and top quality. In addition, Pfannenberg's ECO chiller is an especially energy-efficient chiller with load-based speed control that can reduce energy consumption by about 40% compared to the standard series.

The various alerts generated by the chiller enable Duravit technicians to perform preventive maintenance, contributing to higher machine availability.

The facts at a glance

Task	• Replace a twelve-year-old chiller for an edge banding machine to avoid machine outage • Cost-effective, perfect-match solution
Challenges	• Fast delivery • High ambient dust level • Low maintenance
Deployed products	• EB60 chiller with 6 kW cooling capacity
Success factors	• Personal advice and maintenance • Fast delivery • Modular architecture of the EB series for optimum customisation • General ease of maintenance of Pfannenberg chillers

Summary

The EB60 WT CE chiller with the selected additional options is a perfectly matched, optimally dimensioned solution for cooling the subsystem switchgear cabinets of the edge banding machine in Schenkenzell. The helpful monitoring and alert functions simplify maintenance and contribute to reliable and cost-effective operation of the production line. Along with individual advice and technical layout of the system, the PCC has been supporting Duravit in Schenkenzell since the commissioning of the chiller with periodic maintenance services and spare parts.

Authors: Vincent von Wieding, Business Development Manager Process Cooling at Pfannenberg,
Andreas Berberich, Application Engineer at Pfannenberg

CASE STUDY

Custom Chiller Satisfies Temperature Control in Chemical Synthesis Reactor.

Pfannenberg fits chiller into confined space within a packaged Ferrator® targeted for water and wastewater treatment in third world countries.

The "Packaged Ferrator®" overcomes the obstacles and high cost of using Ferrate, a highly potent oxidizing disinfectant for water and wastewater treatment.

The portable Ferrate sythesis system is a game changer for delivering effective treatment for remote locations in underdeveloped nations.

In their quest to develop an affordable Ferrate synthesis system, Ferrate Treatment Technologies, LLC of Orlando turned to Pfannenberg for help with developing a liquid cooling solution for a small, cabinet-based system.

While already using Pfannenberg chillers for larger, trailer-based Ferrate synthesis systems, no standard packaged chiller was capable of integrating seamlessly within the concept of the self-contained cabinet-based Ferrator system.

The treatment or "cleansing" of water takes on two primary requirements – eliminating contamination within acquired water prior to using or drinking (potable water); and eliminating contamination within used water prior to its release back to the environment (waste water). For both requirements, an element of cleansing involves disinfection which can be accomplished by several methods intended to kill, remove, or oxidize the contamination. Techniques include mechanical separation such as filtering and reverse osmosis; exposure to ultraviolet light and radiation; and the addition of chemicals such as chlorine or ozone, and now Ferrate. Each technique has its own advantages, disadvantages, effective cost ratio, and ability to scale up in order to treat the affected volume of water.

Oxidation is a process which causes chemical decomposition as well as breakdown of both organic and non-organic substances and is vital for the removal of contamination from water. As a chemical additive, Ferrate possesses extraordinary oxidation capabilities, however, it has historically been quite expensive to manufacture, which has limited its use primarily to laboratory research applications. Attempts to produce economical and commercially viable quantities of Ferrate had seen limited success until Ferrate Treatment Technologies, LLC of Orlando (FTT) changed the game by creating a streamlined synthesis process and point-of-use production device. By eliminating storage, handling, and transportation costs associated with a pre-packaged product, FTT has cut Ferrate deployment costs by more than 85%.

Pfannenberg chillers on trailer-mounted Ferrator.

Pfannenberg CC 6301 chiller in a rack-mount Ferrator prototype.

The breakthrough device is called a Ferrator, initially available as a trailer or skid mounted system with various capacities targeted for water treatment applications in rural areas. The Ferrator is suitable for a variety of applications including municipal wastewater, industrial wastewater, drinking water, ship ballast water, and environmental water restoration. Ferrate is highly effective for oxidation, disinfection, coagulation, de-watering, and deodorizing. Ferrate treatment removes phosphates and heavy metals; kills spores, bacteria, viruses and protozoa; removes colors and odors; and its by products are non-toxic.

The Ferrator synthesizes Ferrate on-site from three raw ingredients: iron, bleach, and caustic, which are pumped to a homogenizer and reaction chamber. The final product is a liquid which is stored in a tank. Both the reaction and storage areas require cooling, which is provided by Pfannenberg chillers.

Pfannenberg open-frame chiller on factory production line.

Pfannenberg open-frame chiller inside packaged Ferrator.

When FTT encountered problems with chillers from another manufacturer they contacted Pfannenberg to provide EB 150 chillers for skid-based systems. Due to their successful experience with Pfannenberg chillers for these applications, FTT turned to Pfannenberg once again for assistance with a project they had to fit a smaller scale Ferrator system into an enclosure. Initially, a CC 6301 packaged chiller was used successfully; however, new design criteria required further miniaturization and this standard packaged chiller would no longer fit. The Pfannenberg engineering team went to work on designing, building, and delivering and open frame chiller based on the CC 6301 that could fit within the confines of the small Ferrator enclosure.

" Without Pfannenberg's cooperation, full support and timely expertise, FTT could never have achieved this historic build for a major philanthropic foundation that is committed to improving the lives of impoverished people in developing countries."

-Luke Daly, CEO
Ferrate Treatment Technologies, LLC

Luke Daly, CEO of Ferrate Treatment Technologies, LLC with the packaged Ferrator system

The small scale Ferrator is targeted for use in third world areas for the treatment of human wastewater and drinking water. Here, the efficiency of the self-contained system will permit water purification in remote areas in which there are no sewer systems, water distribution systems, or central water treatment facilities. The small size of the Ferrator permits it to be readily transported to such remote areas and even be used as a portable device for use at multiple locations. The goal is not only to reduce the adverse effects of discharging untreated wastewater to the environment, but also improve human health by reducing contamination in water available for drinking.

Summary

Water is a vital resource with an ever-increasing demand due to pressure from human expansion, activity, and population increase. Clean water is a necessity for both human health and environmental sustainability. With a limited supply to that found on earth, man must utilize and develop ways to protect and ensure the availability of clean water. Newer technologies involving reverse osmosis for desalination will increase the fresh water supply derived from the seas while improvements in disinfection technologies will be vital for recycling and conservation of rainfall-dependent fresh water derived from lakes, rivers, and wells. Automated controls, pumps, and chemical reactions utilized in these efforts can all be protected by products from Pfannenberg.

CASE STUDY

D.R. Ferroviaria Italia

From urgent repair to maintenance contract

Quote:

„In order to fully satisfy a customer is important to go beyond their specific request and understand their business needs in a broader sense."

Andrea Pavarani
Service Specialist
Pfannenberg Italia srl

Application

End User - Infrastructure

D.R. Ferroviaria Italia provides construction and maintenance of railway lines, in both the public and private sectors, including major port facilities, freight logistics centres, refineries, coke ovens, and rail connections for goods transport.

Challenge

D.R. Ferroviaria Italia contacted us for an urgent technical intervention on two old Pfannenberg customized oil chillers (GDV 40) serving a boring machine. We did not only repaired the units but also analized the application and made a new sizing: the need for refrigeration was now higher than the capacity of the chillers in use! We have then provided

more extensive advice and demonstrated professionalism that get the customer to sign a 1one year contract for preventative maintenance.

Our solution

We were asked to urgently repair of n.2 old customized oil chillers made in Pfannenberg (GDV 40) since the customer's local service partner didn't succeed. **We carried out an inspection** and found that - during the revamping intervention on the boring machine - there had been changes to the machine settings without considering the increased refrigeration need that would follow. The chillers could indeed do the boring work only in the early hours of the morning and then stop during the hottest hours of the day. We replaced them with one EB OIL 90 with pump also providing the installation and start-up.

The importance of preventative maintenance

Wishing to **preserve machine efficiency and avoid any further unplanned downtime and urgent maintenance activity**, D.R. Ferroviaria was happy to sign **a one year contract for preventative maintenance** with Pfannenberg.

The Pfannenberg Advantage

The technical service is much more than a simple repair intervention for Pfannenberg. Our success is due to the ability to understand the application and the issue while quickly offering a solution. That's why we use first of all make an inspection and fully understand the application.

When provinding a technical support service, we offer our customers the opportunity to take advantage of our 60 years of experience and, therefore, to handle any issue through a broader view, oriented not only to solve the immediate problem but also those that could follow.

When provinding a technical support service, we offer our customers the opportunity to take advantage of our 60 years of experience and, therefore, to handle any issue through a broader view, oriented not only to solve the immediate problem but also those that could follow.

Facts at a glance

IG	Infrastructure
SVC	End User
Business Unit	BU6 - BU4
Application	boring machine for the production of railway tracks
Solution	EB OIL 90
Sales	1 unit
Success	one year maintenance contract
Further opportunities	other needs in the 14,000 sm production area

CASE STUDY

Milk vending machines: Pfannenberg products help to preserve the freshness and the use of milk

Thermostats and heaters for a microclimate of vending machines

A-MOLOKO vending machines are machines, adapted to the harsh Russian climate. Milk is a delicate product, so reliability is critical. The goal was to ensure the smooth operation of the machine in severe weather conditions.

We needed well-proven equipment with guaranteed quality. That is why we have chosen Pfannenberg products.

Olga Bobrova,
Project Manager,
MIG Electro

Business owners associated with the vending machines are increasingly wonder how to ensure the smooth operation of the machines, installed outside or in rooms without heating. The company A-MOLOKO also faced this question when they decided to launch a network of milk vending machines in Moscow.

To implement the project the company selectedstandard vending machines that widely used in European countries for the sale of milk. However, they had to adapt the machines for the Russian climatic conditions.

A solution for a microclimate of vending machines

Milk vending machines are refrigerators with payment system and a camera for empty containers. The milk is stored in the machine 2 °C to 4 °C. The refrigeration compartment has a removable stainless tank. Before each filling this tank together with the pump and tubes are subjected to a hygiene treatment. After each milking the milk is cooled to 4 °C, then poured in 100-200 l stainless steel tank. During 4 hours after milked the milk is delivered to the vending machines in special refrigerated vehicles. A temperature inside milk vending machines is also kept at the 2 °C to 4 °C. In order to work outside milk vending machines had to be able to keep their performance at temperatures up to -30 °C, which significantly differs from their nominal temperature.

The company MIG-Electro, the contractor of the project, has proposed to equip vending machines with FLZ thermostats and FLH heaters from Pfannenberg.

Heaters FLH heat vending machine

Heater FLH 400

Heaters FLH with 400W heating power became an optimal solution for the task. The FLH heaters are equipped with a built-in fan which supports natural convection and provides rapid and uniform distribution heat in the vending machine.

Thermostats FLZ support the right temperature

Thermostat FLZ 520

FLZ thermostats in combination with FLH heaters perform the task of maintaining a predetermined temperature in vending machines very well. They also provide additional savings of electricity. The reliability of operation of the equipment increases thanks to reducing of heat dissipation and longer life of fans.

After equipping with Pfannenberg products, A-MOLOKO vending machines are fully prepared to work in conditions of the Russian winter at temperatures down to -30 °C.

Moscow network of A-MOLOKO milk vending machines is equiped with Pfannenberg climatic product

Specialists from MIG Electro company supplied Pfannenberg climatic equipment for A-MOLOKO company, which launched a network of milk vending machines in Moscow. A-MOLOKO vending machines offer natural milk from large farms from Dmitrov district, Moscow region.

Automated trading process can be performed at temperatures below zero, down to -30 °C. In order to maintain efficient operation the vending machines are equiped with the following Pfannenberg products:

- Heaters series FLH (version with built-in fan or not),
- Thermostats series FLZ.

We are proud that our equipment in vending machines allows to save the useful properties of natural milk.

Conclusion

Thermostats an heaters, produced by Pfannenberg, appeared to be the right choice. Pfannenberg products have allowed our clients to expand the range of applications of its equipment.

Olga Bobrova,
Product Manager,
MIG Electro

Facts at a glance

Task	• Ensure smooth operation at any temperature of A-MOLOKO milk vending machines, which offer for sale milk on the streets of Moscow
Challenges	• The need to ensure an automated process of trade at negative temperatures down to -30 °C
Products used	• Fan Heaters FLH 400 • Thermostats FLZ 520
Success factors	• 100% duty cycle • The lower limit of the working temperature range to -40 °C • Large variability of installation positions • Robust bimetal sensor of the temperature control system • Compliance of the technical specifications with the real product • High breaking capacity of contacts in conditions of an unstable voltage

CASE STUDY

EN 54-23 – Hekatron and Pfannenberg explain

EN 54-23 – Increased requirements made to visual signaling devices mean that special attention must be paid to select the correct products in the respective application.

Hekatron has focussed all its experience, competence and innovation on developing and producing systems for preventive technical fire protection for 50 years. Safety – a fundamental human need, which we and the 22 other subsidiaries and 9,000 employees of the family run Securitas Group Switzerland are taking on. The delivery program, produced at the highest quality level "Made in Germany", comprises fire alarm systems, controlling fire extinguishing systems, hold-open systems for fire protection barriers, mechanical smoke extraction, smoke detection in ventilation ducts, universal management systems, smoke alarms and special solutions.

One of the tasks for the manufacturers of fire alarm systems is to provide norm-compliant components in their systems. Furthermore, appropriate educational work still needs to be carried out by constructors, planners, operators and experts. In accordance with Pfannenberg's motto "Sharing Competence", Hekatron and Pfannenberg are accomplishing this task together: They provide norm compliant units by using signalling devices that have recently been added to the system approval and ensure the education work of all involved parties.

In most European countries, the new norm EN 54-23 for visual signaling devices came into effect on 1st January 2014. Visual and visual-audible sounders that were previously approved may no longer be used in new installations. The demands of these product standards are currently being revised in the planning and project design regulations of the VDE 0833-2. Therefore, there is presently a grey zone until these requirements are implemented across all norms.

Safety for Man and Machine

Safe and prompt fire alerting is important, not only in production (traditional industry), but also in administration and in public buildings. In these areas, fire alarm systems have the advantage that fires can be detected quickly regardless of whether people are present or not, and appropriate measures can then be taken. People who have been alerted can, in individual cases, act early on and extinguish a fire when it is still in its initial phase. The top priority is the protection of people but also of material assets. Fire alarm systems are required according to building regulations and are regulated within the framework of special building regulations. For the planning of fire alarm systems which are in accordance with building regulations, the requirements of DIN 14675 are used. The design and components are regulated in the VDE 0833-2. The parts themselves are defined in the series standards EN 54.

Audible signaling devices have always been a fixed component of fire alarm systems. In the era of increasingly growing ambient influences, especially of the audible kind, the exclusive audible alerting in dangerous situations has to be analysed and reassessed according to the changed ambient conditions. In addition to the requirement that ear protection must be worn at the workplace, other disruptive audible factors have long since become embedded into normal life. Hence, it is extremely difficult to discern between signals that inform and signals that alert. A large variety of noises due to technology such as, for example, the confirmation signal of a machine, but also the wearing of media players contribute to the fact that audible alarm signals are either not heard or simply not deemed relevant. A visual-audible alerting for example is always required when the so-called ambient noise level is already very high and it is not a given that an audible signal will definitely be heard.

Yet it is not only the continuously increasing “acoustic smog” that is making it difficult to hear and recognise an alarm signal correctly: According to estimates by the World Health Organization from 2005, 278 million people are affected by mildly to seriously impaired hearing. For those affected, a purely audible alerting is not effective. Therefore, in compliance with the German Equal Opportunities for People with Disabilities Act, visual signaling devices are increasingly becoming mandatory as a supplement to the audible signals.

EN 54-23 takes this growing need for visual signaling devices into account and determines the requirements to visual signaling devices. With that, it also allows a comparison of different light sources for example XENON or LED. Thus, it is determined which performance characteristics the devices need to have to be used in the fire detection zone.

Which requirements does EN 54-23 stipulate?

DEN 54-23 (visual signaling devices) was developed as a supplement to EN 54-3 (audible signaling devices). In contrast to EN 54-3, EN 54-23 gives direct information regarding the planning and use of visual signaling devices. Thus, it is for example stipulated which lighting intensity (lx) needs to be created by the signaling device at all positions in the signal reception range. Further, the devices are classified in three categories, regardless of the intended use. In the categories “W” (wall installation) and “C” (ceiling installation), the geometry of the signal reception area is already stipulated, while the category “O” (open installation) allows the manufacturer to describe the signaling area and the characteristics of the signaling device in detail or to design it optimally for certain applications and constructions.

As geometry, the category “W” stipulates a cubic signaling range which is specified by the designation W-x-y whereby:

- x is the maximum mounting height of the signaling device on the wall given in metres (m) with a minimum value of 2.4 m; and
- y is the breadth of a square room which is lit by the signaling device given in metres (m).

Thus, “W-3.5-11.5” stands, for example, for a wall mounted signaling device with a mounting height of max. 3.5m and a cubic signaling area of max 11.5m × 11.5m.

Signaling devices of the category “C” are specified with the designation C-x-y where:

- x is either 3, 6 or 9 and represents the maximum height in which the signaling device may be fixed on the ceiling, given in metres (m); and
- y is the diameter of the cylindrical signaling area given in metres (m), when the signaling device is fixed in the stipulated ceiling height.

Thus, “C-3-15” stands for example, for a ceiling mounted signaling device with a mounting height of max. 3 m and a cylindrical signaling area of 15 m diameter. Whereby the shape specification of a cylinder is, as a rule, not compatible with that of the rooms and therefore has to be recalculated into a cubic signaling area.

Normally, red or clear lights are defined as approved light colours. This colour specification applies for the so-called “designated signaling devices”, which pursues the objective of rescuing people (internal alarm). EN 54-23 does not apply to the visual signaling devices at the key depot or the initial information centre of the fire service, here other colours may continue to be used.

The correct alarm concept saves costs

In the future, as is already the case for audible signaling devices, appropriate content will be integrated into the alarm concept also for visual signaling devices – here the so-called signaling areas are planned. This alarm concept will gain larger significance, as an “inflation” of the amount of signaling devices and the costs connected therewith can be prevented by giving an exact definition of the areas which need to be supplemented with visual alarms.

At the moment, it is becoming apparent that there will be two types of visual signaling devices. Devices with LED technology which are approved for the categories “C” and “W”. These devices will be used especially in the administration sector with small rooms. If the devices are to be mounted on the ceiling, then only ceiling heights of up to 3 m can be covered with the devices that are currently available. Alternatively, devices with XENON-technology are available which are increasingly available in the O category. These devices are used especially in production plants in traditional industry. In the future, there will be devices that are approved for and can cover ceiling heights of up to 13.5 m with a surface area of approx. 27 m x 25 m.

Consequently, devices that feature a significantly higher light intensity than those used in the past will be needed for larger areas and rooms. Due to the lack of guidelines, the power consumption was frequently used as a criterion for the selection of the visual signaling device, as this has a strong influence on the emergency power supply. In the future there will be new performance indicators, such as the relative power input per m^3.

When selecting and planning visual signaling devices it will be necessary in the future to choose the suitable signaling devices in the planning stage and to define them in accordance with the requirements from the alerting concept. A direct comparability from product to product is not given as the signaling ranges of the signaling devices available on the market vary.

Hekatron relies on signaling devices from the PYRA and PATROL series

Hekatron counts on signaling devices from the PYRA and PATROL series for industrial applications. In these surroundings, higher requirements to signaling devices prevail in comparison to public administration buildings. In these applications, the PYRA and PATROL series in IP 66 and IK08 meet the requirements of a high IP system of protection as well as having an impact-proof housing. Furthermore, the connection terminals in the base, undetachable seals and quick locking elements facilitate mounting.

PA X-1-05
Flashing light sounder

PY X-1
Flashing light

At a glance

Task	• Provide standard compliant devices • Educational work for constructors, planners, operators and experts
Challenges	• Constantly growing ambient influences – especially audible nature • Higher noise levels • People with mildly impaired to seriously impaired hearing • Increase of number of signaling devices and the related costs
Products used	• Flashing lights from the PYRA series • Flashing light sounders from the PATROL series
Success factors	• High IP system of protection (IP 66) • Impact-proof housing • Quick mounting due to connection terminals in the base, undetachably seals, quick locking elements

Summary

When the EU standard EN 54-23 was introduced on 1st January 2014, the requirements made to the visual alerting of people increased significantly. Certified visual and/or visual-audible signaling devices for fire alarm systems became mandatory. Additionally, EN 54-23 places special requirements on light intensity and light distribution.

In many alerting cases, in which up to now only audible signals have been used, visual alerting must now be used too. The basis for this is the alarm concept that is to be created according to DIN 14675 and VDE 0833-2. More significance is placed on this concept and also on the planning of signaling ranges.

CASE STUDY

EXPO 2015 - EN 54-23 certified visual fire alarm devices for „Palazzo Italia“

Fire alarm devices protecting over 21 million visitors

Quote:

„A significant project in several respects - first of all the high international profile. I want to emphasize that this was the result of a long team effort which involved both the marketing and sales departments.“

Annarita Amadei
New Business Development Director
Pfannenberg Italia srl

Application

Infrastructure - Building security

Palazzo Italia was the Italian pavillion at the World Exposition held in Milan, Italy, from May 1 to Oct 31 2015. It constituted the very heart of the Expo site and will remain after the event as the city center for technological innovation.

Challenges

An engineer from the system integrator involved in the project contacted us directly once he understood the need for EN 54-23 beacon lights. The system integration firm - responsible for the choice of each component in the security system - has chosen our solution after a long technical evaluation and comparison process, considering all the units available in the market.

The customer

Selex ES was a subsidiary of Finmeccanica S.p.A., active in the electronics and information technology business, based in Italy and the UK, and formed in January 2013, following Finmeccanica's decision to combine its existing SELEX Galileo, SELEX Elsag and SELEX Sistemi Integrati businesses. From 1 January 2016, the activities of Selex ES merged into Finmeccanica's Electronics, Defence and Security Systems Sector.

In particular, Selex ES's activities have been organised in three Divisions within the sector: Airborne & Space Systems, Land and Naval Defence Electronics and Security and Information Systems.

SELEX was also a major supplier of avionics for the Eurofighter Typhoon.

The application: EXPO 2015

Expo 2015 was a Universal Exposition hosted by Milan, Italy. The area occupied by the Expo 2015 site is located about 15 kilometres (9.3 mi) northwest of Milan in the municipalities of Rho and Pero, and covers an area of 1.1 km2 (0.42 sq mi).

Participants to the Expo include 145 countries, three international organizations, several civil society organizations, several corporations and non-governmental organizations (NGOs). The participants were hosted inside individual or grouped pavilions.

The figures show just how successful the Italy Pavilion has been, with over 2 million people going to the "House of Italian Identity" exhibition in Palazzo Italia - out of the overall 21 million visitors.

The solution: PY X-S-05

PY X-S-05 is a compact 5J beacon light with an EN 54-23 certified coverage of 11,1 m (6,6 m+ 4,5 m) x 8.4 m (4.2 m + 4,2 m) x 6.3 m (front side). Such a big coverage means the system integrator could install 1 unit every 6-8 necessary using competing products. Moreover our customer appreciated the possibility to choose a grey body due to the reduced aesthetical impact.

EN 54-23 certification

Given the nature of the project, the engineer responsible for planning the fire safety system followed the current European standard EN 54-23 by including in the project visual signaling devices alongside acoustic devices.

For many years visual alarm devices, in the form of beacons or combined sounder/beacons, have been part of fire alarm systems.

They assist hearing impaired people or staff working in noisy environments to recognise when a fire alarm has been raised.

This product standard, EN 54-23:2010 has been introduced tostandardise the requirements, test methods and performance of VADs and ensure light output is measured in a uniform manner. This standard is mandatory throughout Europe since 1st January 2014.

EXPO MILANO 2015

CASE STUDY

Signaling Solution for Schwebel's Baking Company

Protecting Man & Machine – creating a safer and more efficient workplace for large independent family-owned wholesale baker.

For over 100 years, the Schwebel Baking Company has been one of the fastest growing independent, family owned baking manufacturers in the United States. Known for a fresh, outstanding taste, and superior quality bread, the reputation of the company grew. The organization continues to instill pride in their product; meeting the nutritional and flavor requirements of customers they serve.

Since 1906, families across the United States have been asking for Schwebel's breads by name. Known for their fresh, outstanding taste, and superior quality bread; Schwebel's has maintained their strong reputation. They have grown into a company proud to serve customers with various bread product lines. Schwebel's produces more than 700,000 loaves of various breads at their four baking facilities and 30 distribution centers. Schwebel's provides various branded breads to retail and food service customers.

Challenges:

One of the most important aspects within any manufacturing plant is safety measures; protecting machinery and employees. Schwebel's and Pfannenberg had worked together previously, installing PWS Series Air/Water Heat Exchangers in their Make-up area. Once again, Schwebel's trusted Pfannenberg to perform a secondary plant survey as part of the Pfannenberg Advantage. The Pfannenberg Advantage is a value proposition that provides recommendations related to machine performance and solution issues.

Following the evaluation, it was determined that there were no alerting measures in place for Schwebel's loaf detection machine. Originally, Schwebel's would have had an operator inspecting the rejected loaves, but Pfannenberg saw an opportunity to alert the employee when there was a new rejected loaf.

Pfannenberg PA X 1-05 100 dB Flashing Light Sounder attached to inspection machine

How The Flashing Light Sounder Helped:

The Pfannenberg PA X 1-05 Flashing Light Sounder is attached to Schwebel's detecting machine. The alarm sounds and a light flashes anytime there's a defective loaf manufactured. Once it alerts, the detecting machine removes the rejected bread into a waste receiving area. Schwebel's implemented the Flashing Light Sounder and installed a time delay which would shut off the horn after a few seconds, but the light would continue flashing until an operator acknowledged it.

This solution solved the signaling confusion problem; increasing awareness of the operators related to quality control. The PA X 1-05 Flashing Light Sounder offers 80 different alarm tones with 4 different stages; providing separate control of the audible sounder and the visual flashing strobe. The sounders can operate in any climate (outdoor or indoor) and can be installed in less time than competitors systems.

Pfannenberg PAX-1 Flashing Light Sounder

The Conclusion:

Schwebel's decision to install the PA X 1-05 Flashing Light Sounder improved the quality control process; increasing the operational return. Pfannenberg is recognized as a leading manufacturer in the signaling technology sector due to its continuous product development and high quality standards. Implementation of our signaling solutions provides increased awareness for Schwebel's to each and every rejected loaf of bread. The PA X 1-05 Flashing Light Sounder increases awareness to defective loaf frequency, profit loss, quality measures, and time spent producing such rejected loafs.

The company's product, equipment, and employees are integral to Schwebel's operation. Schwebel's has spent many years building their strong reputation in the marketplace and with their customers; this is a top priority. They believe that investing in the best equipment will benefit their employees and bottom line of the organization. The Schwebel Baking Company relies on signaling devices from the PATROL series to support their manufacturing applications.

Pfanneneberg The PA X 1-05 Flashing Light Sounder in the inspection line

Summary

Pfannenberg products and solutions are designed to meet high quality requirements and operate in the harshest of conditions. Pfannenberg continues to strengthen its position as a leader in innovative industrial signaling devices with a high demand on quality along with the best value for money. Pfannenberg offers modern industrial alarms with visual and audible notifications to protect personnel and an organization most stringent processes.

CASE STUDY

Alarmin Marcegaglia's Plants - World leader in steel processing.

Fire alarm devices in a 250,000 m2 manufacturing plant

Quote:

„When you think of a big manufacturing site from a leading industrial group you expect large volumes but it's only when you dive into the detailed fire safety planning that you understand the actual vastity of such a plant."

Luigi D'Onofrio
IG Infrastructure Manager
Pfannenberg Italia srl

Application

Manufacturing - End User

Marcegaglia is the leading industrial group worldwide in the steel processing sector, with a yearly output of over 5 million tons. The group has operations worldwide with 43 manufacturing plants needing a new fire alarm system. Starting from Gazoldo, the solution will be then implemented in all the other plants.

Challenges

They contacted us after firefighters had blocked the renewal of the fire prevention certificate, believing the system was not up to standard. The engineering firm and the chief of plant security contacted several suppliers that produce acoustic and optical devices for fire alarm. Only Pfannenberg's PYRA and PATROL products have passed field tests.

The customer

Marcegaglia is the leading industrial group worldwide in the steel process-ing sector, with a yearly output of over 5 million tons.

The group has operations worldwide with 6,500 employees, 60 sales offices, 210 representations and 43 manufacturing plants covering 6 million square metres.

Activities in the steel sector and other businesses generated over 4 billion euro turnover in 2014.

Founded in 1959 and fullyowned by the Marcegaglia family, the group is headquartered in Gazoldo degli Ippoliti, Mantova (Italy).

The solution: PA 20 + PY X-M-10

The Gazoldo degli Ippoliti plant hosts manfacturing lines for the production of steel coils, strips, sheets, flat bars, welded structural and precision tubes. The plant also hosts the central offices dedicated to quality control, technical services, IT and logistics management of all the group's manufacturing units.

It consist of 38 buildings of about 80 m x 100 m.

Aerial view of Gazoldo degli Ippoliti

The chosen solution to properly spread the alarm in the each building is **a combination of PA 20 sounders** (high penetration acoustic devices with 120 dB sound pressure level and 178 m covering distance) with **PY X-M-10 beacons** (Xenon flash light in a compact pyramidal body with the widest EN 54-23 certified coverage) in **white and red lens**. Sounders give two different alarm signals - one for prealarm and one for alarm - each one supported by a white or red flashing light. The combination of the products in the installation differs depending on the background noise and visibility in the specific building.

Future plans

Next stage in collaboration with the Marcegaglia's chief of plant security and the system integrator's CEO will be the extension of the same solution in other manufacturing sites - starting from Ravenna, where Marcegaglia has set up its by far biggest plant (spreading over a 540,000 m2 surface, 225,000 covered) working as the nerve-center for integrated logistics as well.

PA 20 and PY X-M-10 installed

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