

NEWS FROM SWEP

EXCHANGE

1-2016



Powerful
technology for
a modern venue



Developing new
infrastructure
for LNG



Power is
in the air

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EXCHANGE.

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With 2016 a year of the Summer Olympics, this issue of Exchange is taking a closer look at how Brazil is gearing up towards the Games in August. Today, more than two thousand years after the first Games in Greece, the athletic achievements are only one part of the event. The other is the extensive logistics required to host the competition smoothly. This includes sustainable solutions for transportation, energy supply, housing, and food for a large number of people.

Although a huge event, the Games are only a small-scale challenge compared with the giant issue of energy supply that the global community is facing today. Faced with a dramatic increase in the world's population, combined with a strong tendency towards urbanization in almost every country, world leaders must find a way to supply everyone with enough energy for a comfortable life while taking sustainability into account.

There is no cut-and-paste solution to this global challenge. That is why we at SWEP believe in long-term partnerships with our customers, with a clear goal of saving costs, energy, and maintenance for specific applications. In this issue of Exchange, you can read about smarter and more efficient solutions, as well as inter-industry collaborations that will contribute to a more sustainable future.



Tommy Simonsen
Marketing Manager

“ All over the world, attempts are being made to utilize more of the energy produced. SWEP's greatest contribution to this endeavor is to help our customers create smart, cost-efficient, and sustainable solutions.



Hytron was founded in 2003 as a spin-off from the Hydrogen Laboratory of the Physics Institute at the State University of Campinas (UNICAMP) in the state of São Paulo, Brazil. With the boom of hydrogen as an energy vector, one of the laboratory's priorities was to develop research methods focused on the use of hydrogen as fuel for vehicles, favoring the use of renewable sources in the production of energy. Other applications such as energy storage and electricity generation were also objects of study in the laboratory.

ACADEMIC RESEARCH **BUSINESS** AT HYTRON

With projects at the university naturally having an academic character, the study aimed at the production of hydrogen via natural gas and ethanol. However, the intention was also to provide viable solutions for the industry. Reformers were designed and developed within the university, which contributed to the technological improvement. Over time, researchers saw the opportunity to extend development through the commercialization of projects, offering the industry solutions for difficult problems.

SWEP talked with Antonio José Marin Neto and Cristiano da Silva Pinto from Hytron to get their view of hydrogen production and development.

Why does Hytron work on reforming ethanol? Is it a promising and environmental technology for hydrogen production?

The main motivation for the research was to enable the use of hydrogen for fuel cells, which generate electricity via a chemical reaction. Fuel cells generate electricity with very little pollution. Much of the hydrogen and oxygen used in generating electricity form a harmless by-product: water. It is technically a very demanding niche, which demonstrates the company's strong vocation within R&D. Hytron's

projects aim to target future hydrogen market development, while meeting current issues in the industry.

The use of ethanol to produce hydrogen has great environmental appeal, especially in Brazil, which is a major producer of ethanol. With a neutral carbon balance, i.e. the amount of CO₂ consumed in the production of sugar cane equals the amount of CO₂ generated by burning the ethanol as fuel, it has great commercial appeal reinforced by the increasing demand for environmentally clean energy. Furthermore, ethanol can be used with the same energy efficiency as natural gas and is an alternative in regions that lack sources of natural gas.

The energy carrier hydrogen must be produced in large quantities from clean, non-fossil energy sources to reduce the negative impact on the environment. There are two main ways to produce hydrogen other than from non-renewable fossil fuels: via the electrolysis of water, provided the electricity source is renewable (this represents less than 4% of global hydrogen production), and via bioethanol.

How does SWEP support Hytron in this work?

For reformers to be economically viable, i.e. attractive, they need to be ►►



MEETS

NEEDS



►► efficient. To accomplish high productivity per consumable unit of input, heat recovery is essential. The support we have had from SWEP has been excellent – some of the best we have had in the design of heat exchangers. The correct dimensioning of all components has a great impact on operating and maintenance costs and, therefore, ultimately the project's viability. For an integrated and efficient process, it is very important to reduce the maximum heat loss, avoiding the waste of energy that has an impact on operating costs.

Which BPHEs are used in this project? Why did you choose them?

Nickel-brazed products from the SWEP B12 platform were chosen for both economizer and condenser duties. We have a large temperature difference to deal with, starting above 260 °C, which calls for a robust heat exchanger. For the economizer, the high operating temperature also requires a copper-free solution. In combination with the demanding temperatures, the process mixture has a high content of water and carbon dioxide, which forms carbonic acid. This, in turn, can be aggressive to copper.

With the nickel-brazed B12, SWEP can provide high operating temperature, robustness against thermal stresses, and good corrosion resistance, combined with high

energy efficiency for both the process and for the auxiliary pumps.

How does Hytron work with SWEP in ORC projects?

Today, Hytron is looking for potential customers and market niches with generic conditions of residual heat. In most cases, we are talking about low-temperature ORC systems. We are increasingly encountering the use of R245fa in various applications. This is an energy-efficient fluid that contributes a low intrinsic consumption to the balance of the plant. As a result, the ORC generator requires little power to operate. The system must be efficient to enable the largest amount of energy possible to be exported to the network.

Hytron makes preliminary calculations for the energy balance, and SWEP takes care of the heat transfer calculations and the dimensioning of heat exchangers. From there, with defined components, the energy balance can be refined and made more accurate before the work in the executive project.

How does the collaboration with SWEP work?

Why did Hytron choose SWEP?

When we are looking for a supplier, we seek to fill two major gaps: technical collaboration and commercial terms. SWEP provided us with the best technical feedback we have received so far in the dimensioning of BPHEs.



To a company like Hytron, that is extremely important. In addition, SWEP's business terms are and remain very attractive. To us, it is natural to maintain the partnership between our companies. ■

TELE2 Arena



Powerful technology for a modern venue

The awarded-winning Tele2 Arena in the Swedish capital of Stockholm can easily host major concerts as well as all kinds of sport. Powerful BPHEs from SWEP enable good-quality ice for winter sports events to be laid quickly and reliably.

Opened in August 2013, the Tele2 Arena in Stockholm is one of Sweden's most modern multi-venues. It won the "Best Arena" prize in the 2014 Stadium Business Awards in competition with global arenas such as Madison Square Garden in New York and Wembley in London. It offers free high-quality Wi-Fi, 600 digital screens, Stadium Vision technology, a retractable roof, and a transparent façade. With a capacity of 30,000-40,000 spectators depending on venue, the Tele2 Arena requires top-notch technology to switch between different kinds of events.

The property owner SGA Fastigheter AB sought to improve the arena's ability to change the climate and surface to suit the sport, for example to transform the football pitch into an ice rink quickly and reliably. SGA was very clear about the temperature requirements. With a mean temperature difference of 1 °C, or even lower if possible, SGA wanted better ice quality and less

time for laying. This demanded a lower system temperature. The existing ethanol mixture in the system meant there would be a risk of freezing in the chillers. Overcoming this required heat exchangers to separate the chiller circuit with a small amount of ethylene glycol. After evaluating several gasket plate heat exchanger options, SGA eventually chose the highest capacity BPHE on the market from SWEP.

This solution saved the destruction of all the ethanol mixture. "The temperature transition had to be possible without major changes to the system, such as the replacement of refrigerants," says Daniel Docekal, Product Development Engineer at SWEP. "Our unique technology enabled us to help with that, allowing SGA to retain their system and avoid disposing of a large amount of ethanol."

With the largest BPHE on the market, the B649, SWEP is unique in offering BPHE technology for even

the largest installations. The B649 offers many advantages over the traditional gasket plate heat exchangers normally used in these types of applications, such as financial and environmental savings thanks to higher energy efficiency, compact design, and reduced maintenance.

For the Tele2 Arena and SGA, SWEP supplied four units of its powerful BPHE B649H/SP 840 with a total cooling load of 2600 kW. The units were delivered through a standard door opening of 90 cm within an hour, and then installed in a modular mode. The compact BPHEs were easily positioned with a hand truck in an hour. "Our choice of supplier was determined by the product's unique values – easy installation, environmental benefits, and SWEP's ability to deliver quickly," says Conny Håkansson, Head of Real Estate Operations at SGA Fastigheter AB. ■

Up to the

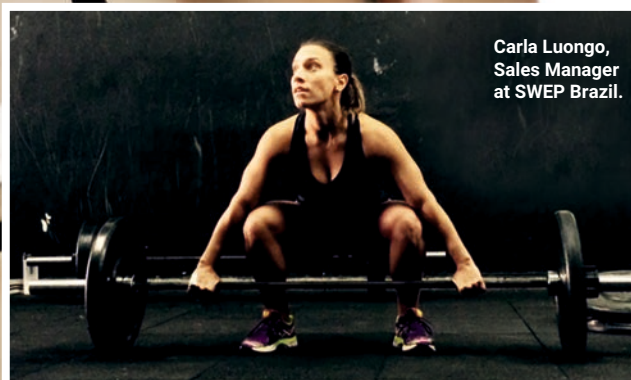
challenge

Carla Luongo, Sales Manager, and Maitê Mecchi, Customer Support, have more in common than just working for the SWEP office in Brazil. They have always liked and practiced all kinds of sports, but both are now hooked on a truly challenging activity: CrossFit.

Maitê Mecchi,
Customer Support
at SWEP Brazil.

Maitê has been practicing CrossFit for almost two years. "I was looking for a sport that could challenge me and push me into coming back for the next class. CrossFit was the answer." Carla started last spring and shares Maitê's excitement: "I used to run, swim, and go the gym, but I needed a different challenge – and found it in CrossFit."

Developed by Greg Glassman over several decades, CrossFit is a fitness regimen that consists of varied functional movements performed at high intensity, ▶▶



Carla Luongo,
Sales Manager
at SWEP Brazil.



Challenge

►► in intervals. Inspiration comes from gymnastics, weightlifting, running, rowing, girevoy sport, calisthenics, etc. By constantly varying your exercises and their intensity, you can improve fitness relatively quickly.

What makes CrossFit so special? "The feeling of pleasure and satisfaction when I reach my goals is exciting. We have many movements, such as Olympic lifting, endurance sports, and gymnastics, all within one session. We call it "WOD" (Work-out of the Day)," says Maitê. "The range of challenges, without the monotony of many other sports, really motivates me, and you get significant results quickly. In CrossFit, you feel challenged and you want to overcome that challenge!"

CrossFit has been growing in popularity for a number of years and has given birth to a global network of over 13,000 affiliates. The concept is better established in the United States and Europe, but it has seen tremendous expansion in South America in recent years, including Brazil. One key component of its popularity is the feeling of being part of a community. Natural camaraderie combined with a competitive edge

brings a special intensity. "You think that perhaps you will not be able to complete the exercise, but there is always someone by your side, encouraging you not to give up," says Maitê.

Carla participated in her first CrossFit competition in June 2015 and loved it. Shortly after that, she became pregnant, but continued her exercise with professional monitoring. Now on maternity leave, she is looking forward to going back to CrossFit soon. Competition is not Maitê's goal; rather she wants to keep practicing CrossFit and improve her performance.

To Carla and Maitê, CrossFit seems more like a lifestyle than just another sport. "What you learn in the exercise hall, you can bring into your everyday life and your work. You develop and improve mental and physical capabilities, improve your cardiovascular endurance, and increase your muscle strength. The exercises give you better flexibility, precision, power, agility, balance, and coordination," says Maitê. "I want to have the capacity to improve, evolve, and be better tomorrow". ■

Ready for the Games to begin



From left: Murylo Santos, Business Engineer Brazil & South America; Marcus Johansson, HUB Manager North America; Daniel Cecchetti, Regional Manager Brazil; Maitê Mecchi, Customer Support Brazil; Hugo Proiete, Business Engineer Brazil.

"This is a great opportunity for people to get to know more about our country. The Olympics attract a huge number of tourists and an audience through television, the Internet, and social media."

Daniel Cecchetti, Sales Team Leader for South America, is excited about the upcoming Olympic Games. Located in São Paulo, SWEP's office is approximately 350 km west of Rio de Janeiro where most events will take place, so the SWEP team follows the preparations mostly through the media. "It is an honor to be hosting this global event. All ►►

► Brazilians celebrated when our country was chosen,” says Carla Luongo, Regional Sales Manager for Brazil. Maitê Mecchi, Customer Support, agrees: “I’m sure it will be great. Brazilians know how to host a party!”

Despite political turmoil, Brazil seems to be ready to welcome people from all over the world. “I was a little bit worried because of the issues that Brazil is currently facing, but almost all the work is finished and everybody is anxious for the Games to start,” says Murylo Santos, Business Engineer.

There is an event for every taste in the Olympics. Hugo Proiete, Key Account Specialist, intends to watch as many as he can. “I want to see Brazil’s competitors earning every possible medal. Brazil’s volleyball, basketball, and soccer teams are very good.” Daniel adds gymnastics, swimming, and sailing as promising competitions for Brazil.

As a rugby fan, Murylo is excited about the sevens version of this demanding sport being re-introduced: “I bought tickets to watch the best players of this sport.” Maitê focuses on her favorites: artistic gymnastics, rhythmic gymnastics, and synchronized swimming. “As a CrossFit practitioner, I love watching weightlifting, too. It is amazing to see how perfectly they perform their movements, how the athletes dedicate themselves to achieve perfection.”

Carla is currently on maternity leave and will not be able to attend any events, but she is still excited: “I am sure it will be an incredible event and it will help our economy.” Hugo has the same prediction: “The Olympics in Brazil will be a giant and beautiful party.” ■

Developing new

LNG is the fastest-growing part of the gas market, and micro- to small-scale LNG is predicted to develop considerably faster than medium- and large-scale LNG. The rapidly growing market has spurred the commercialization of LNG transportation and production. A higher degree of flexibility and an off-the-shelf strategy make it possible to reduce investment and maintenance costs, as well as environmental impact, in terms of the Emission Control Area (ECA) regulations.

The low-cost, low-carbon challenge

Natural gas typically reaches the market by land-based pipelines or by sea in specially designed gas carriers. Recent years have seen a growing demand for LNG as fuel for ships, trains, and trucks, which has driven the development of small-scale LNG plants where gas is liquefied onsite in smaller facilities. This development is meeting the market demands for lower carbon emissions and costs.

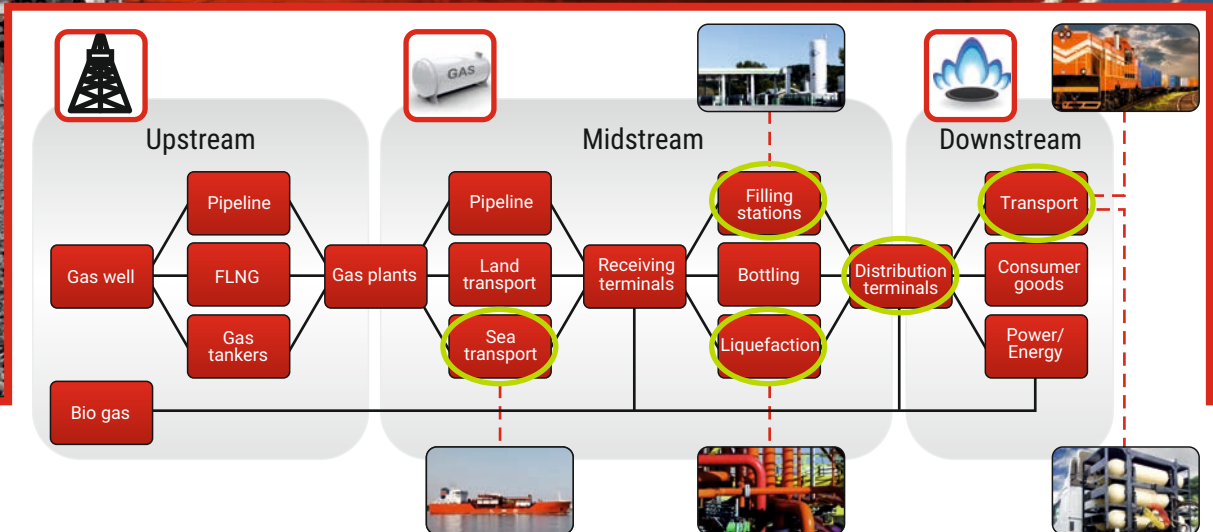
New technological advances

In parallel with the increasing demand for small-scale natural gas liquefaction, there has been a considerable development of BPHE technology. With a normal operating range from -196 °C to +225 °C and the ability to handle pressures around 40 bar, a BPHE provides a compact solution with low maintenance requirements – characteristics that are ideal for handling liquefied gases. However, the LNG industry has not been able to utilize this technology fully because of issues involving capacity, pressure and its common multistream arrangements.

What has changed is that there have been significant leaps in heat exchanger technology, meeting the growing market for smaller systems operating at moderate pressure levels. The material race started ten years ago, and products with strongly asymmetric plate designs have been available from most producers for the past three years or so. There are now BPHEs able to withstand 140 bar without any external support structure, and this development is spreading to higher capacities. This is a giant leap for BPHE technology, as is the step change in capacity. For over two decades, 4” pipes defined the technology’s maximum capacity. However, since SWEP introduced its 6” series in 2012, new opportunities have opened up in the design of systems operating up to 30 bar.

In recent years, the small-scale biogas liquefaction market has established itself. Boil-off gas (BOG) liquefaction for new gas carriers has become close to standard, and a market has formed for small-scale upstream liquefaction. The mixed refrigerant (MR) cycle is beginning to win ground and there is a booming ►►

infrastructure for LNG



- ▶▶ demand for LNG as fuel for ships, trucks, and trains in isolated markets.

Today, BPHEs can be found in BOG systems in the midstream sector of the marine industry, in BOG for bunkers, and in filling stations. BPHEs have also proven reliable in the upstream sector, with LNG and liquefied biogas (LBG) production onsite, and are now entering the automotive LNG vaporizer market.

Modular thinking for high flexibility

Re-liquefaction of BOG from gas carriers requires energy-efficient cooling (without the high capital expenditure that might deter some actors from using re-liquefaction systems) and a minimum of maintenance. The theory behind a micro-LNG plant is to standardize the components, thereby substantially reducing manufacturing lead times. With an off-the-shelf strategy, the components can be combined into custom-made installations at a lower

investment cost. The plants can easily be packed up and relocated to a new gas resource, enabling quick adaptation in projects where it is not technically or economically feasible to build pipelines to end users.

BPHEs, used in the liquefaction system, play a vital part in the development of the SINTEF micro-LNG concept. SINTEF Energy Research is an applied research institute dedicated to creating innovative energy solutions. "Copper-brazed plate heat exchangers fit well into this concept and are found to withstand rapid temperature changes," says Petter Nekså, Professor and Chief Research Scientist at SINTEF. The method was first applied full-scale on a multigas carrier in 2009 in co-operation with SWEF. The SINTEF research shows that the installation of a micro-LNG

unit is both environmentally and financially sound.

The compact components make it possible to use existing vessels, so-called retrofitting, and to means of transportation other than across the sea. The adaptation of the selected equipment, MR, and operational conditions for each application, as well as the composition of the natural gas composition also enable customized solutions in older vessels. The MR system has recently also been introduced in the cargo-handling product line-up from Wärtsilä Gas Solutions. "For conventional LNG carrier capacities we see that MR re-liquefaction technology is the most cost-effective solution – and for these systems BPHEs offer both attractive prices and short lead times," says Dr. Eirik Melaaen, Business Development Manager. ■

SUSTAINABLE GAMES

More than 2000 years after the first Ancient Olympic Games, it is not only the athletes who are facing a challenge. The Games of today involve many people and consume vast amounts of energy, something that must be addressed with sustainable solutions.



The modern Olympic Games found their inspiration in Ancient Greece and its series of athletic competitions among representatives of city-states. The Ancient Olympic Games, the first being traditionally dated to 776 BC, were held in honor of Zeus every four years, or olympiad. Eventually, the Games were discontinued. There were attempts to revive the tradition in later centuries, with limited success. Finally, in the late 19th century, Baron Pierre de Coubertin was able to found the International Olympic Committee (IOC), and the organization hosted its first Games in the Panathenaic stadium in Athens in 1896, bringing together 14 nations and 241 athletes who competed in 43 events.

Now, 120 years later, the Games have evolved into the world's biggest sporting event. They take place every second year, alternating



► winter and summer sports, and the Paralympic Games have been added. Some 13,000 athletes compete in 33 different sports, and nearly 400 events are arranged. There has been a substantial increase in spectators from all over the world. The global broadcasting network requires vast amounts of energy for transmitting information alone. Needless to say, sustainability has become an urgent matter for the IOC and the host city.

The sustainability challenges for the upcoming Rio 2016 Games, which will stretch over 45 days, are obvious: The host city has to buy or hire around 30 million items. There will be 6,000 tons of food supplied, and an estimated 17,000 tons of waste to process. Approximately 23.5 million liters of fuel and 29.5 gigawatts of energy will be required. Some 1,500 buses will transport athletes, technical commissioners, and referees, and further transportation will be needed for the spectators. Around 28,500 athletes and other members of staff – and again, a vast number of visitors – will arrive by air, contributing to the estimated emissions of 3.6 million tons of CO₂eq.

As early as 1994, environmental protection and sustainability were integral parts of the Winter Games in Lillehammer, Norway. The country's then Prime Minister, Gro Harlem Brundtland, was the chair of a 1987 UN Commission that promoted the idea and practice of sustainable development. Following this, aspirant host cities were required to address sustainability in their bids. Among their sustainability efforts, host cities have used carbon offsets or carbon-reduction projects, investment in water supplies, electric transportation for spectators, and building materials from sustainable sources. The Sydney Games in 2000 were built as part of a green project on an industrial waste

zone. The 2010 Vancouver Winter Olympics held the distinction of being the "greenest Olympics ever" for two years. Today, the London Olympics of 2012 are generally considered the most environmentally responsible Games of modern times so far.

The Rio 2016 Organizing Committee has taken on the sustainability challenge. However, as recent reports have shown, ambitious projects are not always easy to realize. Nevertheless, the fact that Rio will not meet all its goals does not mean the whole event will be an environmental failure for the city. Already relying heavily on hydroelectric power, Rio plans to integrate more solar energy into the Olympics operation. The city's water and sewage systems have been improved, and stadiums have been designed to utilize natural light and solar power to reduce their energy consumption. The plan is to use at least 70% of the Olympics infrastructure when the Games are over. The Olympic Village, for example, will be turned into condos.

The challenges and opportunities that the Olympics bring mirror those we will face in our future cities and communities. Key global challenges, such as transportation, energy, infrastructure, and healthcare, are discussed and addressed in connection with the Games. Conclusions drawn from the event can help us in the future planning of the world's infrastructure and energy supply. And perhaps the increased focus on sustainability will bring a new element into the Olympics: which host city will win the medal for the most positive environmental impact? ■

Fuel for the *athletes*

Food is our fuel, but most of us need only between 1,300 and 3,000 calories a day, especially if we are sitting behind a desk most of the day. Olympic athletes require just a little more. In the 2008 Beijing Games, the American swimmer Michael Phelps maintained that his astonishing performance was possible due to the consumption of a staggering 12,000 calories a day. But how much food do athletes in different disciplines need to stay at the tops of their games?

Endurance athletes in sports such as cycling, swimming, the marathon, and rowing need the most calories, because they are competing for hours. An estimated 3,000-8,000 calories daily will help them along. Basketball and football players go hard at it, but for a shorter period of time. They need up to 4,500 calories. Gymnasts require only a little more than the average person (2,000-2,500 calories), while athletes that compete in a weight class, such as in taekwondo, wrestling, fencing, or lightweight rowing, have to be careful about what they eat. A moderate intake of 1,200-1,500 calories before weighing in is followed by an increase in calories to recover and prepare for the competition. ■





Poland's largest outlet goes

XXL

Opened in 2005, the astonishing Fashion House Outlet Centre in Warsaw was designed to reflect the traditional architectural style of Warsaw's Old Town, with its elegant buildings and varying rooflines. With 17,300 sqm, 120 store units and parking for 1,000 vehicles, this is the largest outlet in Poland today.

Located in the suburb of Piaseczno, on the outskirts of the thriving Polish capital, the Warsaw Outlet Centre is a success story. It is the second Fashion House Outlet Centre to open in Poland, and has won several awards, such as Outlet of the Year in 2008 and Best Performing Outlet Centre of the Year in 2013. Today, the developer/operator Fashion House Group offers over 250 international brands to ten million

customers in Poland, Romania and Russia, and the concept is expanding further into the Russian and Ukrainian markets. With an experienced team of experts in the fields of design, development, finance, leasing, operation, and management, Fashion House Group specializes in both the development and the management of outlet centers. Behind the glamorous fashion stores and the vast selection of

restaurants there is a lot of technical equipment that has to work flawlessly to maintain the center's pleasant atmosphere. For the first ten years, the Warsaw Outlet Centre used gasketed plate heat exchangers as pressure breakers. This set-up demanded frequent maintenance, so they decided to try a new technical solution. A 1265 kW pressure breaker heat exchanger with LMTD 2K and a maximum pressure drop of 50 kPa was required. SWEP was able to meet the demands with a gasket-free solution that requires a minimum of maintenance: the B633 M+H 322 plates (16 bar). The high-capacity B633 is built on the unique XXL platform, with 6" ports and high plate numbers. In addition to district heating block stations for LMTD and asymmetric flows, suitable applications include engine oil and jacket water cooling, desuperheaters for R134a chillers, 1 MW R134a condensers, cooling circuit breakers, and ORC evaporators. ■



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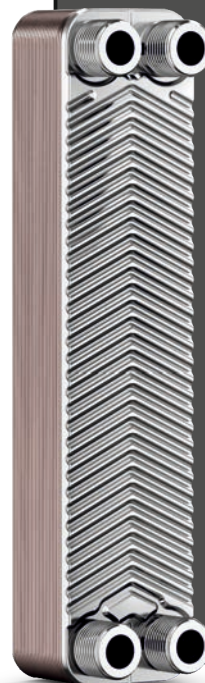
across all kinds of industries. You can search for almost 500,000 products, and check out more than 183,000 catalogues online. It is also easy to find information about major global projects and keep track of news, trends, and major trade fairs around the world. Check

out SWEP's industrial range of compact and powerful BPHEs and the latest news at <http://www.directindustry.com/prod/swep-111139.html> (Direct INDUSTRY / SWEP)



Spreading knowledge

Reflecting a company philosophy founded on long-term co-operation with the customer, the Polish SWEP office recently organized a seminar for designers in the Krakow district. Eleven designers from eight companies participated. They were trained in the calculation of central heating, tap water, two-stage, pressure breaker and free cooling applications. Their success earned them certification as SWEP designers, recognizing their detailed knowledge of BPHE technology.



E8LAS with AsyMatrix[®]

Combining the highest thermal performance with a low pressure drop, the new compact E8LAS has a plate geometry using AsyMatrix[®] technology. The unit offers versatile solutions for high-efficiency heat pumps and refrigeration applications. Also offered in a low-pressure version, the E8LAS meets the market's highest thermal demands for tap water production.



Wind power is one of the most cost-effective and rapidly growing renewable energy technologies available. In the transition from fossil fuels, new markets for wind power are opening up across Africa, Asia, and Latin America, which will become the market leaders of the next decade.

Dominated by an astonishing 30,500 MW of new installations in China, the global wind power industry installed a total of 63,467 MW in 2015, according to the Global Wind Energy Council (GWEC). The US market reached 8.6 GW and Germany beat its record with 6 GW of new installations, including 2.3 GW offshore. At the end of 2015, the total global capacity reached 432,419 MW,

4% of global electricity production. With cumulative growth of 17%, resulting in an impressive compound annual growth rate of 25% since 2000, wind turbines made up 50% of global power generation installations in 2015.

Although China's installed wind capacity will triple from 115.6 GW in 2014 to an estimated 347.2 GW by 2025, global growth will begin to level off towards the end of the forecast period, with annual installations peaking at 56.8 GW in 2022, according to research and consulting firm GlobalData. Despite China's relatively slow growth, global wind installations will continue expanding in the Asia-Pacific area, driven primarily by India, Australia, Japan, South Korea, the Philippines, Thailand, and Taiwan.

Wind installations will also gain momentum in South and Central America, with Argentina, Brazil, Chile, Colombia, and Mexico at the forefront of development. The Middle East and

Africa region is currently developing its wind market and will be the other significant contributor to capacity growth.

The main trend in Europe at the moment is the exploitation of low-wind sites, which is pushing turbine manufacturers to develop special models for specific markets. Most producers approach this challenge by increasing the rotor diameter for existing models, and further focus sales on only a few product platforms.

The conditions for the successful utilization of wind power vary between markets. Brazil and the USA, for example, offer ideal geographical spots for wind farms, due to the strong and ceaseless winds that they experience. Offshore wind farms offer the same benefits. Despite higher initial and operating costs, they make economic sense because the wind is ▶▶



is in the air

►► stronger and steadier out to sea than on land. Factors that determine the profitability of wind energy projects include not only the wind resources available, but also how modern the wind turbines are. There must also be an effective economic regime into which to sell wind energy, and relatively cheap connections to the grid, as well as efficiency in getting to operational status.

In addition, there must be highly optimized management and maintenance. To run windmill stations cost-effectively, especially offshore, it is important to keep maintenance to a minimum. After years in which direct drive wind turbines have increased market share, the geared wind turbine concept has

regained some ground in the last three years, stabilizing at just above 70% thanks to superior efficiency at higher wind speeds and improved reliability. The gearbox that transmits the mechanical power from the slowly rotating rotor requires lubrication with transmission oil, which must be cooled precisely to maintain its optimal performance and protect the gearbox. In a single-circuit solution, the oil is cooled by being pumped through a large air coil. However, this requires a large, expensive pump and air coil, and is neither efficient nor convenient.

Cooling performance can be improved cost-effectively and within a

smaller envelope by using a BPHE. The BPHE solution replaces the single large oil circuit with two smaller circuits, one for oil and one for glycol – a solution that offers several advantages. Its compactness is ideal for the limited space available in a windmill. There is high efficiency even at low flow rates, and heat transfer is generally improved because of the highly turbulent flow through a BPHE. In addition, the pumps and the air coil required for the two-circuit solution are smaller and less expensive to buy and operate. ■



Air Dryer With Integrated Separator

With almost 150,000 units sold, SWEP's ADWIS range is a robust solution in refrigerated air dryer applications. A successful combination of research and a thorough knowledge of market demands, ADWIS solves a common problem without compromising compactness or efficiency.

Moisture in compressed air Refrigerated air dryer systems are commonly used to remove moisture from compressed air. This is necessary to prevent condensation in the subsequent process, leading to costly corrosion. Standard ambient air contains about 10 g moisture per m³. To supply a compressor, intake 100 Nm³/h, with suitable air requires the removal of more than 1 kg/h of moisture. This must be achieved without increasing the size of the system, a challenge that SWEP has accepted and met.

Research with an open mind Engineers at SWEP have worked in close co-operation with industry specialists and academics to set new standards in compactness and performance. A truly compact solution, the ADWIS range combines

an integrated water separator with a circulation system that increases efficiency by exploiting the temperature difference between two plate packages. The engineering that goes into ADWIS is as rational as the concept is simple. For example, all connections for the refrigerant cycle are on one side, and all air connections on the other. There is no need for piping to an external separator, and you can save further cost and space by fitting the unit very closely to the system frame. ADWIS covers the 35-400 Nm³/h capacity range with 11 models in just two envelopes. Extensive field-testing has proven the concept's effectiveness.

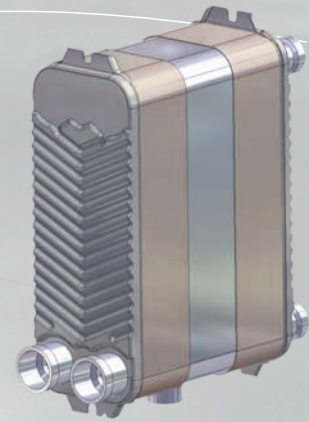
Key advantages of ADWIS

To successfully withstand corrosion, ADWIS components are stainless steel, with copper-brazed heat

exchanger plates. Both envelopes are rated for a maximum working pressure of 16 bar on the air side and 31 bar on the refrigerant side.

The drying efficiency is another major benefit. "The ADWIS heat exchanger enables highly efficient removal of condensate in the most effective footprint. The quality of the heat exchangers, as well as the practical design, enables seamless integration into AIRCEL dryers," says John Jester, Design Engineer at Aircel, LLC. The US-based company designs and manufactures a complete line of compressed air systems. The product line consists of heated/heatless desiccant air dryers, and cycling/non-cycling refrigerated air dryers; from small point-of-use dryers, to large, custom-engineered compressed air dryers for the most exacting industrial applications. ▶▶

“ The ADWIS heat exchanger enables highly efficient removal of condensate in the most effective footprint.



►► Aircel utilizes SWEP's ADWIS heat exchangers for its line of compact non-cycling refrigerated air dryers.

With its robust design, ADWIS minimizes the risk of leakages and unexpected maintenance, while offering high heat recovery efficiency. "The principal advantage of using ADWIS is the high efficiency of heat transfer, which enables very cost-effective operation of the air dryer. We also appreciate the compact design, stable performance, convenient drainage, and simple installation," say Mr. Pradip Ray and Mr. Subhankar Sen, Directors of Zenith Mechanics (India) Pvt. Kolkata-based Zenith Mechanics offers a range of highly technological air receivers, air dryers and reliable clean air compressors, and the company has worked with SWEP for many years.

Compact and with an efficient plate design, ADWIS has a small footprint. The crucial height dimension is the smallest currently available on the market, at only 189 mm for the ADWIS 35-100 Nm³/h envelope and 289 mm for the ADWIS 150-400 Nm³/h envelope. This makes it easy to integrate ADWIS into almost any system.

A rational solution responding to market needs

ADWIS is a financially attractive solution, too. Simplicity is the key: separated water drains from the intuitively obvious place, the unit's lowest point. "The uniqueness of the ADWIS design is that the moisture separator is sandwiched between the recovery section and the evaporator section through a brazing process, thereby creating a very compact unit

in a modular design," say the directors of Zenith Mechanics. "The neat and compact design does not have any external piping, and the cost saving is clearly identifiable because no separate moisture separator is required. There are also cost savings due to the absence of mechanical joints and gaskets, reducing the need for maintenance to a minimum."

Looking ahead

The global refrigerated air dryers market is anticipated to grow substantially over the coming years, which can be attributed to the increased demand for compressed air treatment systems and overall system performance. The demand is expected to surge mainly across the pharmaceutical, food, and beverage industries. SWEP offers optimized solutions for the cycling refrigerated air dryer and non-cycling refrigerated air dryer, as well as the high inlet pressure/temperature refrigerated air dryer. ■



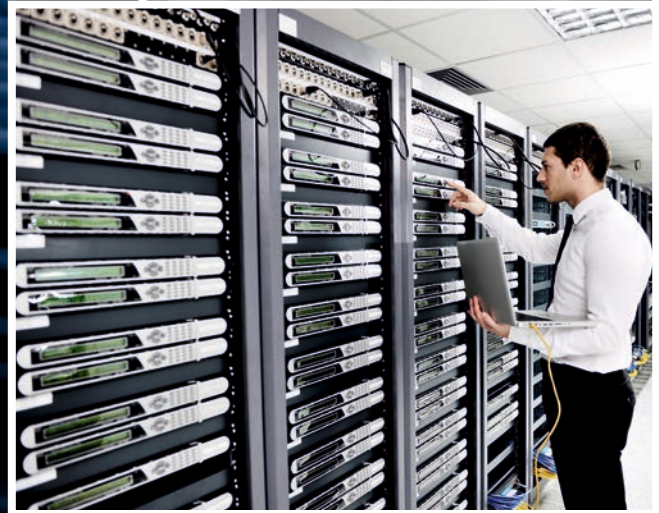
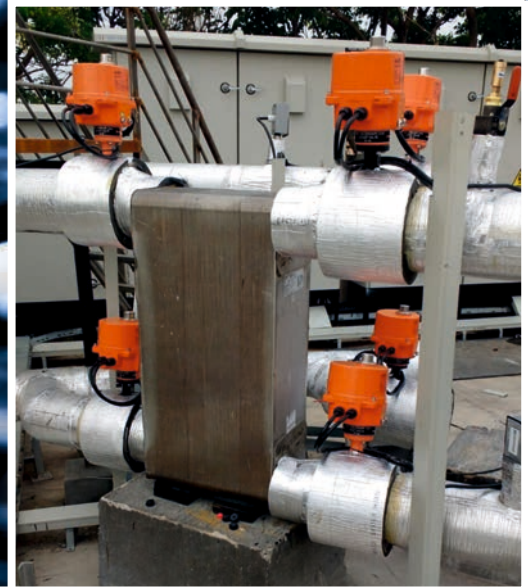


Cooling it down in a sustainable way

A large data center needs a powerful cooling solution. Infosys Technologies Ltd., a leading IT company with its headquarters in Bangalore, India, wanted a cost-effective solution and opted for BPHE technology.

Infosys Technologies was founded in 1981 and is a global leader in consulting, technology, out-sourcing, and next-generation services. With clients in more than 50 countries, Infosys helps enterprises transform and thrive in a changing world through strategic consulting and operational leadership.

At Infosys, responsibility extends beyond business. The Infosys Foundation provides assistance to some of the more socially and economically depressed sectors of the communities where the company is active. Ethical and honest behavior in all interactions creates long-term relationships with clients, partners, ▶▶



►► and employees. This approach to business makes it easy to understand why Infosys executives opted for a cost-effective and environmentally friendly solution when they, in cooperation with Schneider Electric, had to come up with a solution for a data center cooling application.

Schneider Electric is a global company with its roots in the iron and steel, heavy machinery and shipbuilding industries of the late 1800s. It has since transformed itself into the global specialist in electricity and automation management. A solution provider, Schneider Electric believes that access to reliable, safe, efficient, and sustainable energy is a

basic human right. Schneider Electric wants to use innovative new solutions to address the energy paradox, in which our planet's carbon footprint must be balanced against the need for energy.

With the environmental aspect in mind, it is logical that both Infosys and Schneider Electric were keen on an energy-efficient solution. It was decided to utilize BPHEs for the project, and a SWEP B439 was installed. "SWEP is a major global market player in BPHEs today," says Infosys. "We selected SWEP based on the parameters on the selection sheet provided by its sales executive. Following installation of the B439, we

know that the design parameters are in line with the selection sheet and that the efficiency meets our requirements."

The B439 is designed for high heat transfer. It has two plate types, which can also be used together, and is suitable for a wide range of heating, cooling, and industrial applications. With four connections, it handles up to 156 m³/h (686 gpm) water flow. Another advantage is the size. "The B439 is compact and has good MOC (Material of Construction)," says Infosys. "The data center is the most energy-efficient one at Infosys, and the performance of the heat exchanger plays a major role in its efficiency." ■

Sustainable urbanization

Turkey has experienced a steady population growth of 1.2-1.5% annually in the past decade. The urbanization rate exceeds that, with at least 2% of the population leaving the countryside for the cities every year.

With new buildings constantly being erected in urban areas, it is necessary to find cost-effective ways to save energy and create a sustainable society for the future. Turkey has come a long way in setting up a framework for sustainable construction, with several laws that regulate the design of new buildings. One of them is the Energy Efficiency Law of 2007. In the past, construction companies were allowed to use wall-hung boilers, but today they must adhere to a number of design restrictions. Depending on the

number of floors or the total floor space, among other things, the Energy Efficiency Law stipulates that central heating systems must be used in the construction of new apartment buildings. As a result, the Turkish substation market has boomed in recent years.

Since the introduction of the new regulation, two of the companies in the substation business, DAF Energy and Kozanlar, have been involved in the construction of a number of apartment buildings in Turkey. Both DAF Energy and Kozanlar have chosen SWEP as their partner for the majority of their projects. Two of the projects in co-operation with DAF Energy have been Kristal Sehir and Evora, offering more than 5000 and 4800 apartments respectively. Kozanlar has worked with SWEP on a number of projects, among them Viaport Venezia (with approx. 2300 apartments), Bir Istanbul (1200) and Star Towers (700). For most of the projects, SWEP's E8AS has been the preferred BPHE choice. A robust and

high-performance product dedicated to heating solutions, the E8AS – where the "E" stands for "Economy" – is a more than satisfactory solution at a very competitive price. Its asymmetric design means the E8AS can have fewer plates, allowing it to perform better compared with similar products. ■



Semerkant Line with 543 apartments. DAF Energy used SWEP's E8T.



Elit City with 550 apartments. DAF Energy used SWEP's E8T.



Project Istanbul with 483 apartments. Kozanlar used SWEP's E8T.

Expanding the range of double-wall heat exchangers

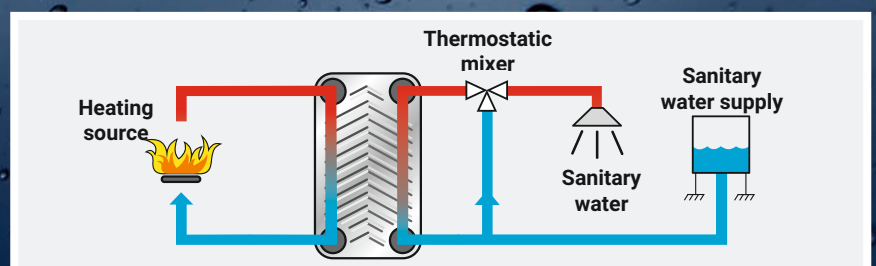
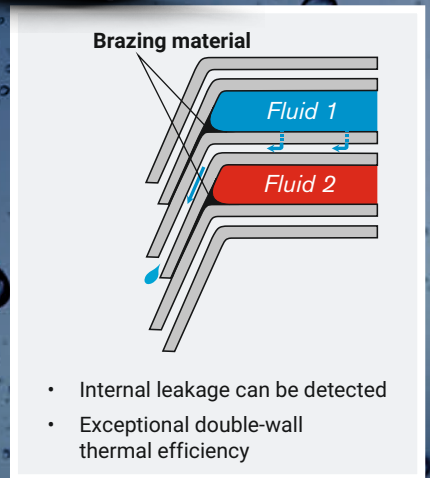
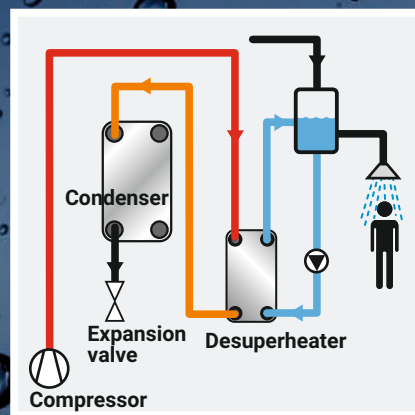
By visualizing any internal leaks, the double-wall technology ensures that liquids do not mix. This is an important factor in applications where safety is a priority, for example in the distribution of tap water.

With the new high-capacity B35TDW, SWEP is expanding its range of BPHEs that utilize double-wall technology. The B35TDW targets boilers for tap water heating, transformer oil cooling, chiller and refrigeration heat recovery, as well as heat recovery from air compressors. It can be used for capacities up to 220 kW (750k Btu/h) for chillers and up to 900 kW (3000k Btu/h) for tap water boilers.

The double-wall technology is an excellent way to prevent contamination of tap water by heating water. One forward-thinking market that has adopted this solution is the Netherlands. Dutch law prohibits single-wall heat exchangers in tap water applications if the heat load is more than 45 kW, and the maximum pressure drop on the hot water side must not exceed 15 kPa. The double-wall technology solves this problem in the most reliable and efficient way possible, in terms of heat transfer. Should a leakage occur, water will seep out between the vented double walls to the atmosphere, which gives a clear visual alarm.

SWEP was one of the first companies to manufacture compact

braced double-wall heat exchangers. All products are produced in a unique way with full control of the process and individually pressure- and leak-tested for safe operation and long lifespan. Small and compact, without compromising thermal efficiency, SWEP's range of double-wall heat exchangers can be integrated into a variety of tap water systems. ■



COMPACT, EFFICIENT, RELIABLE – SIMPLY SMARTER HEAT TRANSFER

SWEP optimizes the use of energy, material, and space in heating and cooling systems. We take pride in contributing to a comfortable and sustainable life for people around the world, and a competitive edge for our customers.

We constantly challenge efficiency: in the products we design, in the way we work, and in all our interactions. Close co-operation, shared expertise, and integrated development enable us to maximize output in each specific application. With production sites and distribution points in strategic locations, we can serve clients effectively, worldwide.

Designed to provide unparalleled performance at the lowest life-cycle cost, our brazed plate heat exchangers offer the widest capacity range on the market, for both aggressive environments and sensitive systems, and with third-party approvals for performance to trust.



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