OUR PRODUCTS

SUPERLATIVE HEAT EXCHANGERS





SIMPLY SUPERLATIVE

SWEP makes heat exchangers – world-class, highly compact, high-performance heat exchangers that generate profits for our customers.

We believe in matching our products to your needs, not vice-versa. We have the financial strength and development support of our parent organization, combined with the agility and accessibility of a small, specialized company. This enables us to work closely with you, to listen to you, to learn about your needs, then build the heat exchanger that matches them better than any other.

We combine this understanding of your needs with technical excellence and the highest manufacturing standards.

SWEP's heat exchangers are based on the corrugated plate concept. But SWEP takes it further than anyone else. By combining various numbers of high-precision, standardized plate designs into complete, extremely compact units with various connection configurations and sealing techniques (gaskets, brazing, glue, welding etc.), we achieve almost infinite flexibility to meet the needs of each individual customer. Your needs.

The economical advantages are clear: performance optimized to your particular application, combined with the use of standardized parts and manufacturing procedures and amazingly compact design. It all adds up to the quickest payback time in the business.

SWEP is not content merely to keep up with the development of heat exchanger technology. We aim to lead it. That's another reason for our close contact with you. Our continuous research and development work is customer-driven, designed both to anticipate your requirements and exceed your expectations.

The bottom line for SWEP is thus to give each and every customer

tailor-made solutions

cost-effective, standardized components

the most compact design in the business

superlative performance.

SWEP heat exchangers are typically up to just one-tenth the size of conventional shell-and-tube exchangers for any given performance rating. That means correspondingly less heat transfer medium. Smaller pumps. Less piping. Less energy consumption. And think what all that savings in space can mean in your application!

SWEP is the global leader in compact brazed exchangers (CBEs). We're also a world leader in compact gasketed plate heat exchangers (PHEs). Since our exchangers can be tailored to your specs, the size of our range is dictated by your needs.

The exchangers you see below are just a few examples of our broad range. The steel-coloured CBEs run from 200 mm to nearly 1 m high. The red PHEs – including the world's smallest PHE (far left) – run from 180 mm to 4300 mm high, flow rates up to 1600 m^3/h .

We've got the one you need. And in your size, too.



REFRIGERANT APPLICATIONS for condensers, evaporators, superheaters, subcoolers, economizers, intercoolers etc.

3 M

2 m



HVAC APPLICATIONS wherever heat exchangers are required for heating, ventilation and air conditioning



INDUSTRIAL APPLICATIONS industrial cooling and heating systems for the chemical, engineering, car, pulp and paper pharmaceutical and food industries etc.



MARINE APPLICATIONS

all heat exchanger applications onboard ships









THE PLATE PRINCIPLE

The fundamental principle of heat exchange is to transfer the heat from one flow of fluid/gas to another – without any physical contact, i.e. without actually mixing the two flows.

There are two main types of heat exchangers:

shell-and-tube exchangers

Such exchangers are

- extremely bulky and low-tech
- inefficient and costly
- prone to scaling and hard to clean

plate-type heat exchangers

Such exchangers are

- extremely compact and high-tech
- highly efficient and economical
- resistant to scaling and easy to clean



For a given performance rating of 90kW, a conventional shell-and-tube is about 1350 mm long and weighs some 50 kg. The SWEP exchanger, at less than 300 mm long and just 10 kg, achieves the same heat transfer with far greater economy.

HOW CAN PLATE-TYPE HEAT EXCHANGERS DELIVER SO MUCH MORE?

In a shell-and-tube, only a small percentage of the huge bulk is actually used for heat transfer. In a SWEP plate pack, practically all material is a high-



Herringbone patterns are the building blocks

1. low-theta plates

(with acute-angled chevrons)

- lower degree of turbulence
- larger temperature approaches
- lower pressure drops

2. high-theta

- (with obtuse-angled chevrons)
- higher degree of turbulence
- close temperatue approches
- higher pressure drops

performance heat exchange surface.

The combination of compact design and high heat transfer efficiency greatly reduces the volume of cooling medium – and the need for energy-consuming systems (pumps, compressors etc.) to handle it.

This cuts costs drastically. Boosts profits dramatically. And opens up a whole new world of opportunity for the design of any system in which a heat exchanger is used.

HOW THEY WORK

The earliest PHEs used thick plates, and little was known about embossing plates with sophisticated patterns to create turbulence, regulate flow and pressure drop, and thereby enhance heat transfer.

Today, SWEP's outstanding engineering expertise, supported by CAD/ CAM, has created a whole new set of standards for the industry. Our heat exchangers use thin plates of high thermal conductivity, pressed into meticulously calculated herringbone patterns. When stacked together, with alternate plates turned 180°, the patterns intersect and form channels for a turbulent flow of media from inlet to outlet.

SWEP's unique plate design uses extremely little material and achieves highly efficient heat transfer. This design, combined with SWEP's intelligent exchanger geometry, gives an outstanding relationship between pressure drop and U-values, resulting in optimal heat transfer and minimal pressure waste. In other words, with SWEP's unique plate designs you pay much less.

It is the requirements of your appli-





When two plates are turned 180° to each other, the herringbone patterns intersect to form three kinds of channels:

- H = high-theta channels formed by 2 high-theta plates
- L = low-theta channels formed by 2 low-theta plates
- M = medium-theta channels formed by one of each plate



Swep takes it a step further

cation that should dictate the choice of flows. A pair of high-theta plates gives a high heat transfer ratio and a comparatively high pressure drop. A pair of low-theta plates does the opposite. One of each gives a medium theta effect. Combining different pairs in a plate pack thus gives you complete control of the flow rate and pressure drop.

Some applications call for co-current flow through the exchanger, while most applications benefit from counter-current flow. Whatever the parameters of your application, SWEP has unique capability to deliver exchangers that do the job. Every time.

MASTERING ASYMMETRY

Many heat exchanger applications involve asymmetrical flows, i.e. the volumes of the two flows through the



Plate packs may consist of H+H+H+M... or L+L+L+L... or M+L+M+L... etc., depending on the demands for heat transfer vs. pressure drop of a given application.

Plate design for full flexibility



SWEP's unique, patented design allows plates to be turned and rotated, giving not three but six combinations of the high- and low-theta of any given plate size. This means double the precision in matching the performance parameters of your application!

exchanger are different. This means you have two thermal lengths: one for the hot side and one for the cold. Many heat exchangers cannot handle this and must be over-sized, thereby creating unnecessary costs.

SWEP has solved this problem with versatile, patented plate designs that make it possible to achieve both asym-



metrical flows and full turbulence in each of them, with co-current or counter-current flows. This also gives you a higher capacity with less plate surface, which means a smaller heat exchanger for a given performance rating.

DESIGNED TO MATCH

The complex parameters of heat exchanger requirements call for great flexibility and technological know-how to optimize performance and cost efficiency. Here again, SWEP's unique plate design, specially developed software – and service-minded experts – are uniquely capable of matching performance requirements exactly.

Combined with technological leadership in all plate concepts, SWEP thus has unbeatable expertise and flexibility to meet your heat exchanger needs.





The SWEP compact brazed heat exchanger (CBE) was developed in the late 70s by the team of engineers that later went on to found SWEP. Today SWEP is the world's leading manufacturer of brazed plate heat exchangers, for a number of very good reasons:

EXTREMELY COMPACT – an 85-90% reduction in the volume and weight of a shell-and-tube exchanger of the same capacity. This means great design freedom for every application – and reduced installation costs.

MAXIMUM MATERIAL EFFICIENCY – no "dead zone" outside gaskets because there is no need for gaskets. Up to 25% more capacity utilization than competing plate heat exchangers, up to 10 times more than shelland-tube!

SMALL HOLD-UP VOLUMES – the compact system uses only a fraction of the heat transfer medium, e.g. refrigerant. Less volume costs less – and is positive for the environment.



Our philosophy is simple: "If you need it, we'll make it"

LOWER SYSTEM COSTS – the lower volume of media and greater heat transfer efficiency allow smaller, less expensive pumps, etc. and lower energy consumption.

production runs of heat exchanger components. Allows tailored solutions at off-the-shelf prices!

MODULAR DESIGN - means larger

SMALL TEMPERATURE DIFFEREN-TIAL – operates efficiently even at temperature differences as low as 1°C!

HIGH WORKING PRESSURE – no problem even if you have high pressure on the condensing side. Our CBEs are tested at 1.5 times the nominal working pressure rating.

LOW PRESSURE DROP on the liquid side – in most cases lower than in any other system. Allows smaller pumps, lower operating costs.

SELF-CLEANING – thanks to high turbulence throughout the exchanger. Boosts uptime and cuts costs. **UNIFORM HIGH QUALITY –** plates are pressed in the same tool, brazed in the same automated procedure with rigorous standards of quality control. Performance is known and consistent! Maintenance and repair are minimized.

OVERALL ECONOMY – high-volume, automated production, easy assembly, low operating costs, excellent heat transfer. The bottom line: outstanding performance and a short payback time!



CBE SPECS

Pressure:	Up to 31 bar.
Temperature:	From +225°C to -195°C.
Port sizes:	Up to 100 mm.
Materials:	Extremely high grade AISI 316. Stainless + 99.99% copper (or nickel).
Connections:	External or internal threading, connections for soldering or welding, additional flanges. (DIN standard or compact, SAE, ANSI etc.)
Media:	Water, steam, brine, glycol, alcohols, oil, refrigerants. (Some of our newest models are designed for opera- tion with new refrigerants, e.g. R407c.)

Applications

- heat pumps from single-family dwellings to high-rises
- industrial chillers from small lab chillers to large processing plants
- air conditioners
- refrigeration & water coolers
 best recovery from factory w/
- heat recovery from factory waste water to heat the plant, hot water for showers
- climatization of buildings
- heating and cooling systems onboard ships
- district heating in sub-stationsgas boilers
- oil cooling
- all types of industrial applications
- etc.

CBE DESIGN & PRODUCTION



The basic CBE design is for counter-current operation, with four connections. One medium enters at F4, flows through every other plate pair, exits at F3. The other medium enters at F1, flows through the alternate plate pairs, exits at F2. This counter-current flow creates the greatest turbulence and gives the highest heat transfer efficiency.

THE BASIC CBE DESIGN

Sheets of stainless steel and high-purity copper are punch-pressed together to create SWEP's unique high- and lowtheta plates. According to the demands of each application, these plates are then stacked and the ridges intersect to form the channels for the media. In the actual brazing process, the stack is heated and capillary force moves liquefied copper to the contact points between the plates, sealing them tightly.

SWEP's unique expertise in plate design is matched by our knowledge of how these plates should be combined into a compact heat exchanger. The result is a CBE that is free of dead zones – and one that is customized to all the parameters of your particular application. This ensures top heat transfer efficiency, the right pressure drop, and superlative costefficiency.

ALL STAINLESS DESIGN

SWEP's comprehensive product range also includes a line of all-stainless brazed exchangers. These special exchangers are designed for operation in tougher environments and more demanding applications.





SWEP's simulation program determines in the design stage how a heat exchanger will perform once it is manufactured.



Each tool is manufactured under CAD/CAM controls to assure full uniformity of each type of plate, year after year.



Careful control of materials is one of the key steps in the production process.



Each plate is formed with equal precision in the same tool.







A few examples of SWEP's flexibility





SPECIAL CONFIGURATIONS - FLEXIBLE ARRANGEMENTS

PARALLEL BACK-TO-BACK CBEs This optional design features two separate refrigerant circuits and a single water circuit, for use as either evaporator or condensor.

The dual refrigerant circuits make it possible to use hermetic compressors for large capacities, and to control the capacity by switching off one of the circuits when cooling demands are low.

When used with two separate compressors, this CBE also means a builtin safety system: even if one compressor fails, the other cooling circuit remains in operation.

2- AND 3-PASS CBEs

These are normally used for district heating and oil cooling/heating. The flow of the media is routed back to make two or even three passes through the exchanger to achieve a more compact CBE where so required.

SERIAL BACK-TO-BACK CBEs

These exchangers combine the features of the parallel back-to-back CBE with those of the 2-pass, to allow extreme thermal duties.



Copper and steel sheets are punch-pressed into SWEP's patented plate designs before being stacked together for brazing.



Capillary force moves liquefied copper to the contact points between the plates.



After brazing, each CBE is leak-tested. Our detection equipment can pinpoint escaping helium corresponding to 2 g of R22 per year.



SWEP's standard CBEs are for working pressures up to 31 bar.







SWEP's compact gasketed plate heat exchangers (PHEs) are the products of a quarter of a century of plate heat exchanger experience and expertise. There are several very good reasons why our customers have made us one of the world leaders in gasketed PHEs today:

THINNER PLATE MATERIAL and highturbulence flow in the channels mean higher heat transfer capabilities.

PATENTED PLATE DESIGN allows two plates to be combined in six different

ways. This means greater flexibility and cost savings.

MORE CHANNELS, ASYMMETRICAL CHANNELS – unique design allows different flows in the hot and cold sides of the same PHE – without oversizing. You get a smaller, less costly exchanger that utilizes pressure drops better.

FULL TURBULENCE – boosts heat transfer efficiency. Our PHEs require less than one-tenth the flow of shell-and-tube to achieve full turbulence.



Our philosophy is simple: "If you need it, we'll make it."

Even other gasketed PHEs are no match for ours!

SAME PORT SIZES for different plate lengths. Covers a wider temperature range in one pass.

TAILOR MADE to match your requirements, yet with a high level of standardization to save you money.

EASY TO MODIFY the number and combination of plates if your duty requirements change. You can also match your future requirements – and save money again!

LESS FOULING AND SCALING - thanks to the high turbulence and smooth surfaces. Boosts uptime, keeps performance optimal year after year.

EASY TO MAINTAIN – easy access to any plate in the pack; fast cleaning; gaskets you can change quickly and easily yourself. Saves time, trouble and money.

CAN BE DESIGNED FOR DIFFERENT PRESSURE DROPS, e.g. when only one medium requires a low pressure drop. Allows asymmetrical flow – to optimize performance and economy.

DOUBLE GASKETS around the portholes prevent internal leakage, facilitate detection. There can be no mixing of the media.

USES LESS MATERIAL thanks to thin plates with high thermal transfer efficiency. Particularly important when expensive materials, e.g. exotic alloys or titanium, are needed.

CLOSE TEMPERATURE DUTIES – efficient heat transfer even when temperature differences between the two media are as low as 1°C. Broadens application opportunities!

SPECIAL PHES AVAILABLE to meet specialized needs in the food and pharmaceutical industries, for dairies or district heating. SWEP always has the right PHE for you!

PHE SPECS

Pressure:	Up to 25 bar.
Temperature:	Normally up to 150°C. Depending on gaskets and applications, can be up to 180°C.
Port sizes:	Up to 300 mm; different plate lengths with the same port size.
Materials:	A wide variety to suit the application, e.g. stainless stee titanium, titanium-palladium, nickel and nickel alloys etc.
Gaskets:	A wide variety depending on media, pressure and temperature requirements. Normally glued for greatest strength and durability. Glue-free alternatives available for special applications.
Connections:	Different types of applications have different requirement (type of threading, flanges, materials, welds etc).
Media:	Essentially all liquids.

Applications

• district heating

- hot water supply from home water heaters to huge power plants
- heating/cooling of oil
- cooling of cutting fluids
- pressure breakers
- marine applications from inboard motors on pleasure craft to giant supertankers
- Etc. just about every liquidliquid heat transfer application you can imagine.

THE BASIC PHE DESIGN

Like CBEs, the basic gasketed PHE unit is corrugated plates. Built in along the edges of the plates, however, there are grooves for gaskets. Instead of being brazed, gasketed PHEs are assembled in a frame, or plate rack, and then bolted tightly together between two frame plates.

It is the customer's requirements – your needs – that determine the choice of materials, number of plates in the stack, plate design, choice of gaskets etc. What we do is to offer you superlative, tailor-made performance at offthe-shelf prices.

SWEP's unique, patented plate design offers full configuration reversibility. This means that any two plates can be combined in six different ways (instead of three in conventional PHEs), simply by turning the plates around or upside-down. You can thus achieve both symmetrical and asymmetrical flows (without loss of turbulence), and flows in the same or in opposite directions. The results:

- higher capacity with less plate surface
- a smaller heat exchanger for a given performance rating
- far greater precision in matching performance requirements.

Or, put another way, fully optimized, custom-built heat exchangers from standardized components.

SPECIAL DESIGNS

SLIM GC-28 PHE

Created especially for the dairy industry, for shock-cooling of warm milk to enhance quality by preserving more milk protein. Thin (0.4 mm) plates for enhanced heat transfer. Extremely cost effective for milk capacities of 600-8,000 L per hour. Made from acid- and corrosion-resistant stainless steel. Other applications: food and pharmaceutical industries where hygienic requirements are high.



The G28



By combining our simulation program with the latest CAD/CAM techniques, new ideas are tested before they ever go into production.



Raw materials are subject to rigorous quality specifications. Exact measurements and metallurgical analyses are made in accordance with the SWEP Quality Manual.



Fully automated plate presses assure the uniform high quality of every plate we produce.



The depth of pressing and material strength are double-checked after pressing.





MINEX

The world's smallest gasketed PHE. Frame of stainless or carbon steel. Thin plates of 0.3 mm stainless, with elastomer gaskets. Extremely hygienic and easy to clean, making it ideal for the food or pharmaceutical industry.

Application examples: tap-water systems, instant beverage cooling.

DOUBLE-WALL PHE

Provides double security against mixing of hostile media, even in the event of leakage. Each double-wall is laserwelded around the four portholes.

Application examples: district heating, cooling of transformer oil etc.





Even if medium 1 should leak, it cannot mix with medium 2.

COMBI-COOLER

SWEP's innovative technology results in a multitude of smart solutions, such as this multiple-section PHE with individually compressed sections. Used for cooling oil in ships' engines, SWEP's gasketed PHE can be disassembled for cleaning without draining the oil! This saves time and money – like all SWEP solutions!



The Combi-Cooler exemplifies SWEP's many special solutions.



So small it fits in a porthole!



Additional tests are made using UV light and microscopic inspection of the surface.



Gaskets are bonded in place with a special glue.



Each PHE is assembled, then tested, to meet the customer's exact specifications.



Before packing and shipping, there is one last check against the customer's order.



QUALITY EVERY STEP OF THE WAY





Although we believe in flexibility in the design of our products, when it comes to quality we are totally rigid. Our policy of Total Quality Management means that we accept nothing but the best. Not surprisingly, therefore, engineering authorities (as well as some of our key customers) around the world have type-approved our models and certified our manufacturing and control routines.

Today, most SWEP manufacturing facilities are certified in accordance with the ISO 9001 quality assurance standard.

You will be pleased to know that we take equal pride in the quality of our staff for their high level of technical expertise, their experience and their dedication to serving you.

ANTICIPATING THE FUTURE

ENERGY

Our world is changing. Rising energy costs are placing increasing demands on heat recovery. New applications for heat exchangers are being found. New plate-type heat exchanger designs are making these new applications feasible – and SWEP is on the cutting edge of this development. The focus of our heat transfer research is on ever-greater efficiency, thus enabling you and your customers to utilize the world's energy resources more efficiently.

ECOLOGY

New refrigerants are being developed to rectify the problem of ozone-depletion. SWEP has developed heat exchangers for these new refrigerants. And because SWEP's exchangers are so compact, they use only a fraction of the charge of other exchangers.

Another example is our innovative PHEs that turn the hazardous emissions of petroleum cracking plants into profitable raw materials. Every contribution to a cleaner environment helps. We're making ours. And in so doing, we're helping you make yours.



SWEP can help you meet the challenges of today's world – and tomorrow's.

ECONOMY

The use of heat exchangers is ultimately about money. Improved quality of life through a more pleasant indoor climate, greater thermal efficiency of an industrial process, recovery of valuable energy that would otherwise be wasted, smoother operation of a ship's engine: these are all salable commodities. SWEP's position at the forefront of plate-type heat exchanger technology enables us to consistently supply heat exchangers that outperform all others. That means there's more profit for you. That's the bottom line.



The efficient utilization of energy is more important than ever.



SWEP has heat exchangers adapted to environmentally safer refrigerants.



SWEP's superior performance is ultimately a question of economy.

SWEP was founded by a small team of pioneers in thermal engineering who turned revolutionary technology into highly efficient, compact brazed exchangers (CBEs). SWEP then acquired the experience and expertise of another company in compact gasketed plate heat exchangers (PHEs), making SWEP uniquely qualified to meet the needs of just about every application.

Today SWEP is a steadily growing, global company in the Tranter group, a subsidiary of Dover Corporation, and is represented in more than 50 countries on six continents.

The creativity, technical expertise and dedication of SWEP's people have resulted in the world's most comprehensive range of plate-type heat exchangers. As world leaders within this field, SWEP continues to push the frontiers of heat exchanger technology forward in order to consistently offer its customers superior performance, economy and service.



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