

ENGINEERING  
TOMORROW

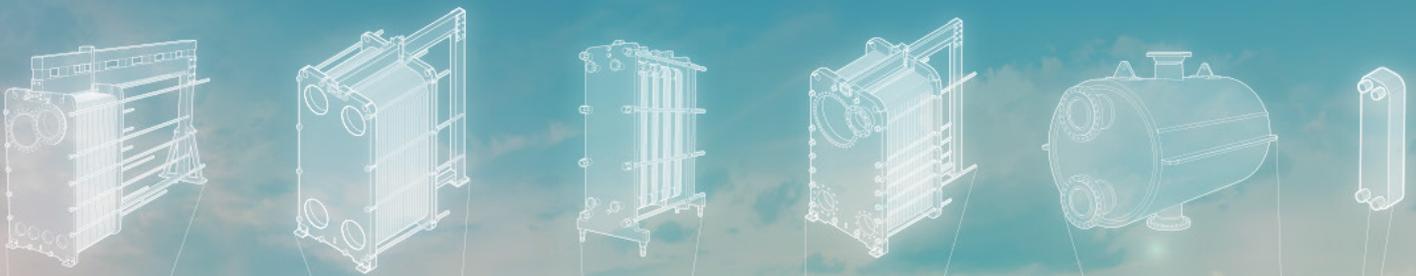
*Danfoss*

Heat exchangers

# A world of heat exchangers

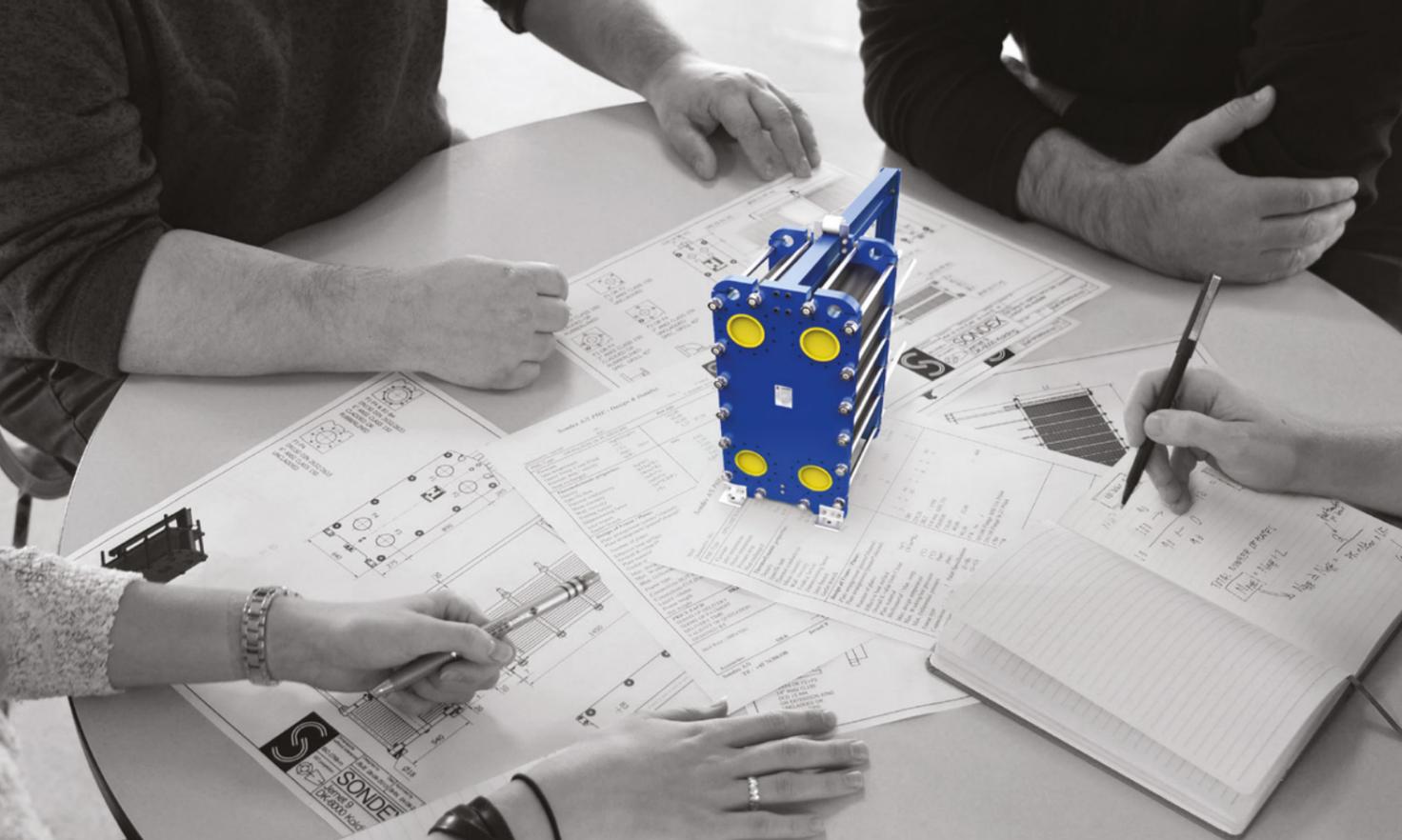
Optimized heat transfer solutions  
for every application

Gasketed, welded, and brazed heat exchangers



[www.heatexchangers.danfoss.com](http://www.heatexchangers.danfoss.com)

**SONDEX**®



## Heat transfer solutions that **match your requirements**

**Next-generation SONDEX® heat exchangers from Danfoss are designed with a single purpose in mind - to create optimal heat transfer.**

Developing optimized solutions is a core value of our design philosophy and we have used our deep process knowledge and input from customers to create a second-to-none plate portfolio.

Our many plate varieties ensure that we can better configure our heat exchangers to match the exact requirements of your application and deliver a powerful solution that provides reliable, unmatched heat transfer while lowering the energy consumption of your connected systems.

We are always in direct contact with you to ensure that each heat exchanger is designed around your application and your media.

### **Closed-loop production**

We are specialized in the development and manufacture of heat exchangers. We do all our own tooling and have our own hydraulic presses in-house. This closed-loop production makes it easier to control and monitor the quality.

### **Efficiency is key**

The secret ingredient to an efficient installation is how closely your heat exchanger matches the thermal requirements of the duty.

If the heat exchanger is oversized, you will have paid too much for it. If it is undersized, you will either need additional heat exchangers, or you will have to add extra (expensive, non-regenerative) energy elsewhere in the process to reach the desired media temperatures.

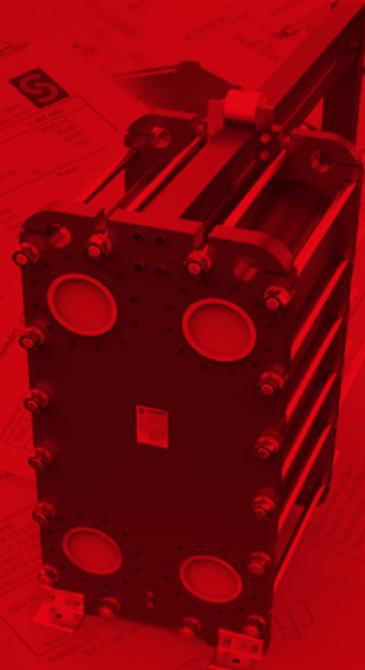


## Value throughout the entire project



Danfoss is with you every step of the way - from selecting the right product for you, to after-sales service.

Get in touch **today** and let us help you **lower your expenses** and **increase the performance** of your entire system



## Free Flow plate heat exchangers

Our SONDEX® Free Flow plate heat exchangers are excellent choices for applications that use media with particle-rich contents, fouling tendency, or high viscosity. Each Free Flow heat exchanger is configured to suit your application and media type, with contact-free plate channels for an unimpeded flow and long intervals between cleaning.

### Features and benefits

- Gentle treatment and even distribution of the media provide the highest possible product output quality.
- High heat transfer efficiency and extended intervals between cleaning ensure operation for an entire campaign with minimum downtime and maximum value for money.
- Large plate gap designed to counteract fouling with sizeable plate channels and no stagnant zones.

### Common applications

- Sugar processing.
- Grain-based ethanol production.
- Cooling/heating of fibrous material, for example juice containing pulp.
- Heat recovery from industrial applications containing impurities like waste water or cellulose, for example.
- Heat recovery from fibrous waste streams in pulp and paper processing.



## Traditional plate heat exchangers

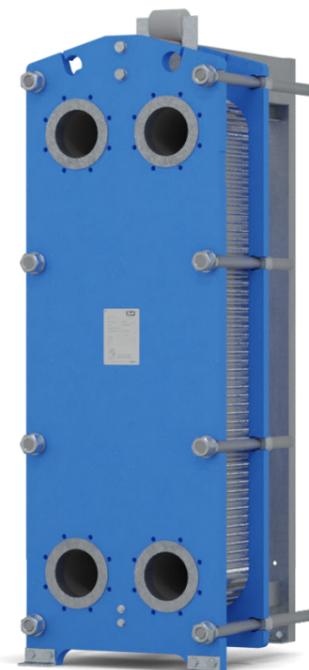
Our SONDEX® traditional plate heat exchangers are the ideal choice for a wide range of applications across numerous market segments. We have one of the largest plate portfolio in the world, and we configure each heat exchanger to meet your requirements. Innovative technologies and smart design make our traditional plate heat exchangers a stellar investment.

### Features and benefits

- Experience the benefit of a heat transfer solution that perfectly matches your requirements and lowers your energy consumption.
- High performance and a low pressure drop eliminate unnecessary burdens on your system and optimize overall system performance.
- The design results in a compact solution with a small footprint, simple installation, and easy access for maintenance.

### Common applications

- Marine applications, such as central and lubrication oil cooling.
- District cooling solutions using seawater and groundwater as a cooling source.
- District heating solutions using, for example, solar and geothermal energy as heating source.
- Food and dairy applications, including pasteurization, heat recovery, and duties that require gentle treatment.
- Chemical applications, for example waste heat recovery from condenser water.



## Semi-welded plate heat exchangers

Our SONDEX® semi-welded plate heat exchangers are the prime choice for challenging applications that involve aggressive media or high pressure. We configure each heat exchanger according to your specifications and offer durable solutions designed to withstand extreme conditions and minimize the risks of operating with chemicals or refrigerants.

### Features and benefits

- High efficiency means that fewer plates are needed for high performance and consequently lowers the hold-up volume. Fewer plates also lowers the cost of each heat exchanger, as an added bonus.
- Engineered to use smaller amounts of potentially hazardous media, the SONDEX® semi-welded range is a safe and responsible choice for demanding duties.

- Unique gasket system intended for high working pressures and vacuum applications. A closed gasket groove keeps the gasket firmly in place and prevents misalignment of the plate pack during assembly and operation.

### Common applications

- Industrial refrigeration, including duties that use ammonia as a refrigerant.
- Evaporation and condensing duties.
- High pressure liquid/liquid applications.
- Chemical processing, for instance rich/lean amine treatment.



# Evaporators

Our SONDEX® evaporators are designed to handle advanced evaporation duties. Using semi-welded plate cassettes, the media are guaranteed to never mix. The plate cassettes are designed to ensure the optimal level of turbulence on both sides while providing an even distribution of the media for superior performance and product quality.

### Features and benefits

- Special plate design featuring an extra-large inlet connection for steam. Steam consumption can be reduced when operating with multi-stage evaporators, as the product vapor will serve as the heating media.
- Flexible design that makes it easy to increase capacity by adding additional cassettes or decrease it to save energy. Low residence time leads to perfect evaporation conditions and superior product quality.

- High performance, even with low temperature differences between the media, which is especially great for mechanical vapor recompression (MVR) and thermal vapor recompression (TVR).

### Common applications

- Food production, for example juice and alcohol processing.
- Sugar production, for example concentration of sugar content in sugarcane juice.
- Biogas production.
- Pulp and paper industry.
- Chemical industry.



# Condensers

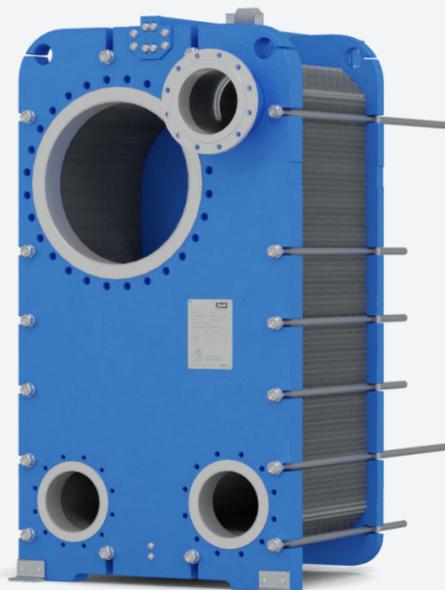
Our SONDEX® condensers are the perfect choice for special applications that regular plate heat exchangers cannot handle. Designed to accommodate high-volume vapor flows, this product features a large inlet for the vapor stream. This, combined with a short residence time creates the optimal condensation conditions – even for low-pressure vapor duties.

### Features and benefits

- Designed specifically for demanding condensation duties that benefit from a special asymmetric plate design that is unavailable for regular heat exchangers.
- Experience the high thermal efficiency of our SONDEX® heat exchangers and enjoy peace of mind with an ideal turbulent flow that reduces the risk of fouling.
- Special Multi-gap plate design that can lower the energy consumption considerably for condensation duties that differ in flow volume.

### Common applications

- Vapor condensation of fruit juice, for example, and pasteurization and cooling of soft drinks.
- Vacuum condensation duties, for example in sugar refineries.
- Biogas production.
- Pulp and paper industry.
- Chemical and petrochemical industries.



Closed-loop production. In-house tooling and hydraulic presses for increased quality control



# Sanitary plate heat exchangers

Our SONDEX® sanitary plate heat exchangers are made for applications with strict hygienic requirements and use FDA compliant materials. We care greatly about your end product and take the necessary steps to ensure the highest output quality. Each solution is designed based on your specifications to provide the perfect conditions for your product.

### Features and benefits

- Heat exchanger solutions that adhere to the strict hygienic demands of the industries and complies with FDA material standards.
- Plate technology made to provide the highest output product quality. We ensure gentle media treatment during processing with precise flow control, perfect temperature profiles, and the optimal residence time for all applications.

- Cladded or stainless steel frames designed to be easily accessible for quick and trouble-free inspection, maintenance, or cleaning – including cleaning in place (CIP).
- Get huge savings on your power consumption with our regenerative pasteurizers that can recycle up to 95% of the energy.

### Common applications

- Dairy/food/beverage industry - e.g. regenerative pasteurization applications
- Industries with sanitary requirements



Our extensive **plate portfolio** allows us to **match the requirements** of your application for the **optimal heat transfer** solution

## Micro channel heat exchangers

Our micro channel heat exchangers (MCHE) are ideal for use in residential and commercial air conditioning systems as well as in refrigeration equipment driven by energy efficiency and reduction of the refrigerant charge. The MCHE technology offers several advantages over traditional fin & tube coils.

### Common applications

- RTU & DOAS
- Chillers
- Data center solutions
- Residential AC
- Refrigeration

### Features and benefits

- With the MCHE you get an ingeniously simple, all-aluminum design that is not only lightweight but is also immune to galvanic corrosion. The aluminum construction makes it one of the most sustainable solutions in the market due to its high strength, sealed design and recyclable materials. MCHEs are also very customizable and can be produced in various lengths, heights and thicknesses.
- Increased efficiency
- High corrosion resistance
- Reduced refrigerant charge



## Plate and shell heat exchangers

Our SONDEX® plate and shell heat exchangers (SPS) are perfect choices for condensation and steam heating duties. A fully welded plate pack makes the heat exchangers well-suited for handling aggressive media as well as high pressure levels and temperatures. Less space demanding and much lighter in weight, they are good replacements for shell and tube heat exchangers.

### Features and benefits?

- Very adaptable heat exchanger. An excellent choice for handling condensation duties, especially duties without condensate sub-cooling. They are also perfect steam heaters of clean fluids, demineralized water, and clean thermal oils.
- The heat exchanger is designed to be highly resistant to thermal shocks as well as thermal and pressure fatigue making it very well-suited for cyclic duties and other duties with sudden, large fluctuations in temperature.

- Available in both bolted and fully welded designs. The fully welded types can handle higher temperatures and pressure levels than the bolted types, but cannot be opened for cleaning. This can instead be done with CIP (Cleaning in Place) systems.

### Common applications

- HVAC industry
- Marine/offshore industry
- Dairy/food/beverage industry
- Sugar industry
- Biogas industry
- Refrigeration industry
- Pulp and paper industry
- Heavy industry
- Mining industry
- Petrochemical industry
- Chemical industry
- Condensation
- Steam heating
- Oil coolers
- Gas heaters/coolers



## Spiral heat exchangers

Our SONDEX® spiral heat exchangers are the definitive solution for applications that require treatment of challenging fluids, such as sludges, slurries, waste water, liquids with high viscosity, and liquids that cause fouling or contain fibers and solids.

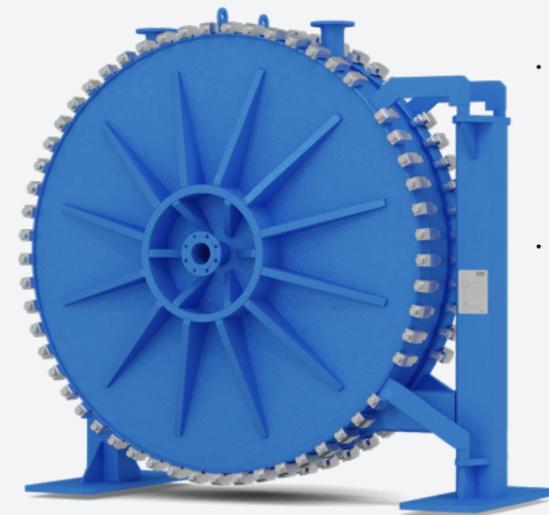
### Features and benefits

- The design allows for a countercurrent flow that makes it possible to achieve very close temperature approaches.
- Single-channel design that generates high shear rates which contribute to a self-cleaning effect, preventing clogging of the unit. Spiral heat exchangers are the perfect solution for high-viscosity media.
- The channel size is selected to fit the flow and qualities of the media. The many variations in diameters and widths of the spiral coil allow for many different combinations, which mean that we can create the optimal solution for every duty.
- Designed to handle a very aggressive temperature program and with a wide range of materials and plate thicknesses available, we customize each spiral heat exchanger to match the requirements of your application.

- Limited need for maintenance and cleaning ensures extended operational uptime. If particularly difficult media makes it necessary to clean, the hinged covers provide easy access to the entire heat transfer surface.
- Our spiral heat exchangers have minimal space requirements. Despite being small, the long, curved flow paths allow for very high heat transfer coefficients up to twice as high as their shell and tube counterparts.

### Common applications

- Dairy/food/beverage industry
- Biogas industry
- Wastewater industry
- Pulp and paper industry
- Heavy industry
- Petrochemical industry
- Chemical industry





## Brazed plate heat exchangers

Danfoss and SONDEX® brazed heat exchangers (XB/SL) have been consolidated into a single, combined product portfolio for complete coverage of all applications. The durable, permanently sealed heat exchangers feature advanced technology and superior safety measures designed to provide you with the ultimate in heat transfer with minimal operational costs.

### Features and benefits

- Low operational costs, small hold-up volume, and high performance make our brazed heat exchanger solutions the ideal choice for many applications. Cut your costs and increase your profits with the help of our brazed portfolio.
- The permanently sealed heat exchangers offer a durable solution with an extended lifetime. Get peace of mind with the double-walled design that provides the ultimate protection against leaks.

- With the energy-optimized, tried-and-true Fishbone technology, or the revolutionary Micro Plate™ technology; the combined Danfoss and SONDEX® product range offers the ultimate in brazed heat transfer solutions.

### Common applications

- HVAC industry
- Dairy/food/beverage industry
- Refrigeration industry
- Evaporator and condenser applications
- Solar heating
- Oil units
- Heat recovery
- Engine cooling
- Evaporation and condensing
- Desuperheating
- Absorption systems
- Domestic hot water installations
- Process cooling
- Hydraulic oil cooling
- Laser cooling
- Water cooling and heating

We can **analyze** your **current setup** to determine if your installation can be **optimized with a SONDEX®** brand heat transfer solution

# A partnership based on extensive application knowledge

Working with Danfoss means more. It means that you do not only get highly reliable, efficient, and innovative solutions – you also get a partner that is a world-leading supplier in a wide range of applications.

Our partnership gives you access to a wide range of benefits. From extensive application knowledge to a wide range of solutions and tools.

**Do you want to discover more?**

Visit [heatexchangers.danfoss.com](http://heatexchangers.danfoss.com) to learn more about our heat exchanger solutions.

## Gasketed HEX

- Standard plate HEX
- Semi-welded plate HEX
- Free Flow plate HEX
- Sanitary plate HEX
- Evaporators
- Condensers

## Welded HEX

- Plate and shell HEX
- Spiral HEX

## Brazed HEX

- Fishbone brazed HEX
- Micro Plate™ brazed HEX

## Micro channel

- Flat condenser
- Formed condenser
- Slab evaporator
- Folded evaporator
- Interlaced MCHE
- V-coil



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