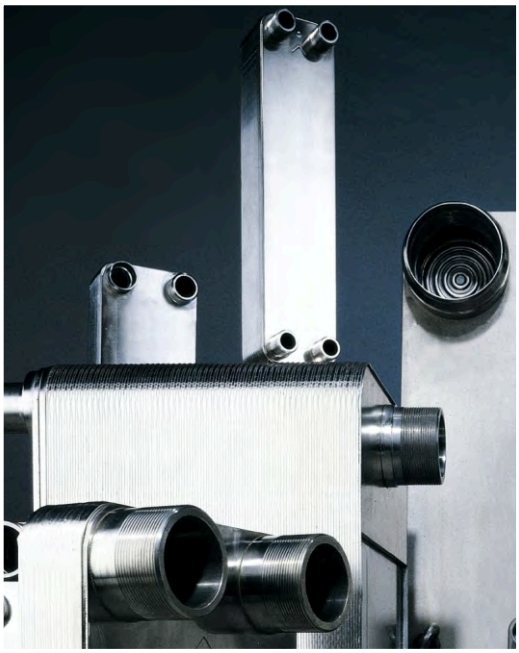
Economy and ecology in supermarket cooling

SWEP
A DOVER COMPANY

For today's supermarkets – and tomorrow's

For supermarkets of all sizes

SWEP offers a wide range of brazed plate heat exchangers (BPHEs) to meet the needs of food display cabinet producers, and supermarkets of all sizes and in all climatic conditions. The low hold-up volumes of our products help to minimize critical charges, and solutions using natural refrigerants enhance sustainability. They are designed to operate with the highest efficiency, safety, and reliability to protect the refrigerated food chain. For typical low- (LT) and medium temperature (MT) capacity requirements, our standard products operate at up to 60 bar, and our double-wall as well as frameless solutions up to 140bar.



Climate-friendly cooling with CO_2

Many synthetic refrigerants have unwanted global warming and ozone depletion effects. For this reason, environmental standards, legislation, consultants, and system manufacturers are increasingly favoring natural refrigerants such as carbon dioxide. Non-toxic and non-flammable, CO_2 is very suitable for applications such as refrigerated display cabinets. However, its physical characteristics impose tough requirements for equipment capable of operating from -50 °C to 5 °C at up to 53 bar. SWEP has built up expertise in CO_2 from thousands of supermarket installations, and we know how to handle these technical challenges. We also know how to keep costs low and reliability high.

Optimized economy and performance

Refrigeration can account for up to 50% of supermarket energy consumption. SWEP's optimized brazed plate heat exchangers enable CO_2 based systems to recover much of the energy used for cooling and reuse it for heating, resulting in a high coefficient of performance (COP). Pumped CO_2 circulation also has advantages over typical brine-based systems. The faster response times increase flexibility, and pipe diameters and pumps can be smaller, saving investment and operating costs as well as valuable retail space. The low hydrofluorocarbon (HFC) charge, confined in the machinery room, is another value to be taken into consideration.

Efficient heat transfer systems for CO_2

Heat recovery

Recovering and reusing heat generated by supermarket cooling systems is increasingly important for environmental, legal, and financial reasons. SWEP's brazed plate heat exchangers offer economical solutions, in terms of low investment as well as operating costs. The 185, 285 and B18 single-wall frameless models are tailored for transcritical operation requirements up to 140 bar. For additional safety, the B16DW, with double walls, is available for working pressures up to 140 bar framed.

Cascade

R404A/CO_2 systems, cascade R290/CO_2 systems and more frequently R134a/CO_2 systems, minimize the use of HFC (hydrofluorocarbon) refrigerants and employ pressure class M. SWEP models 120T, 200T, and 400T, with a maximum working pressure of 45 bar, are a safe and economical choice. For increased safety and a widened operating envelope, we offer the 25, 120T, and 400 models, for pressure classes D and E and with a maximum working pressure up to 60 bar. The B16DW and B18 are approved for operation at up to 140 bar, and are suitable for CO_2 refrigerant in cascade systems that operate transcritically with condensing units at very high pressure.

Booster

Our B12 model is an efficient flash tank heat exchanger for sub-cooling the liquid line for display cases. It offers improved performance thanks to low flash-gas values, and cost savings since smaller diameter liquid lines can be used.

Suction gas heat exchanger

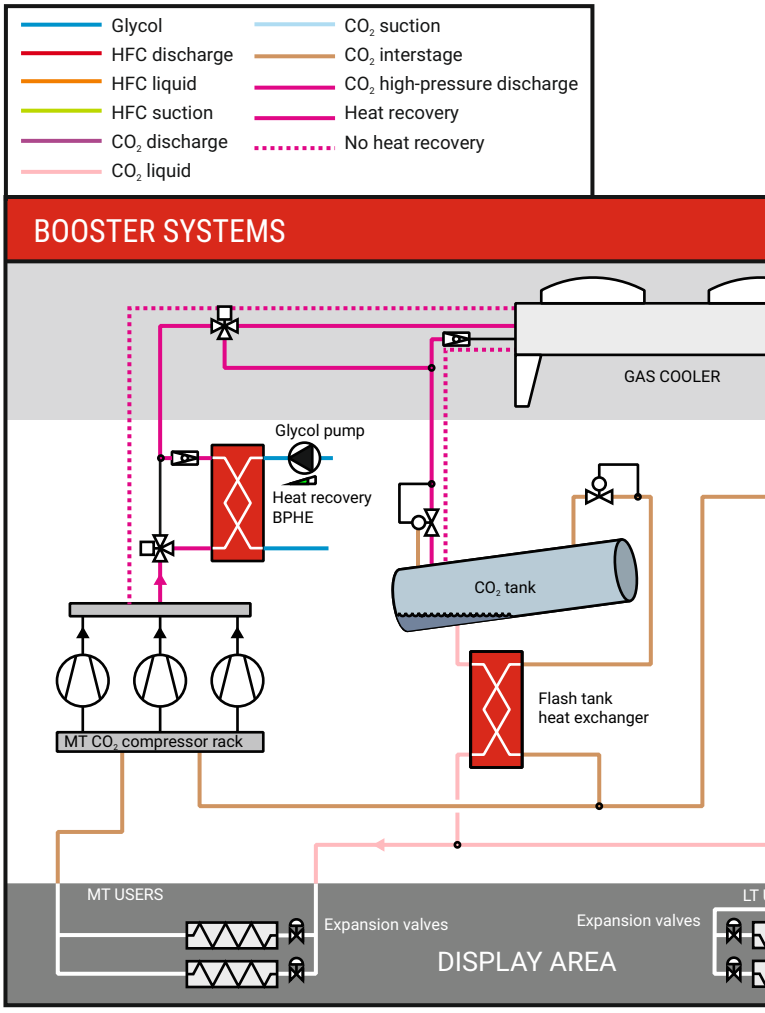
SWEP's B12, B30 and B60 models are the choice when you need liquid sub-cooling coupled with suction gas superheating. This is typical for CO_2 applications, where superheating (>20K) is required for proper system design.

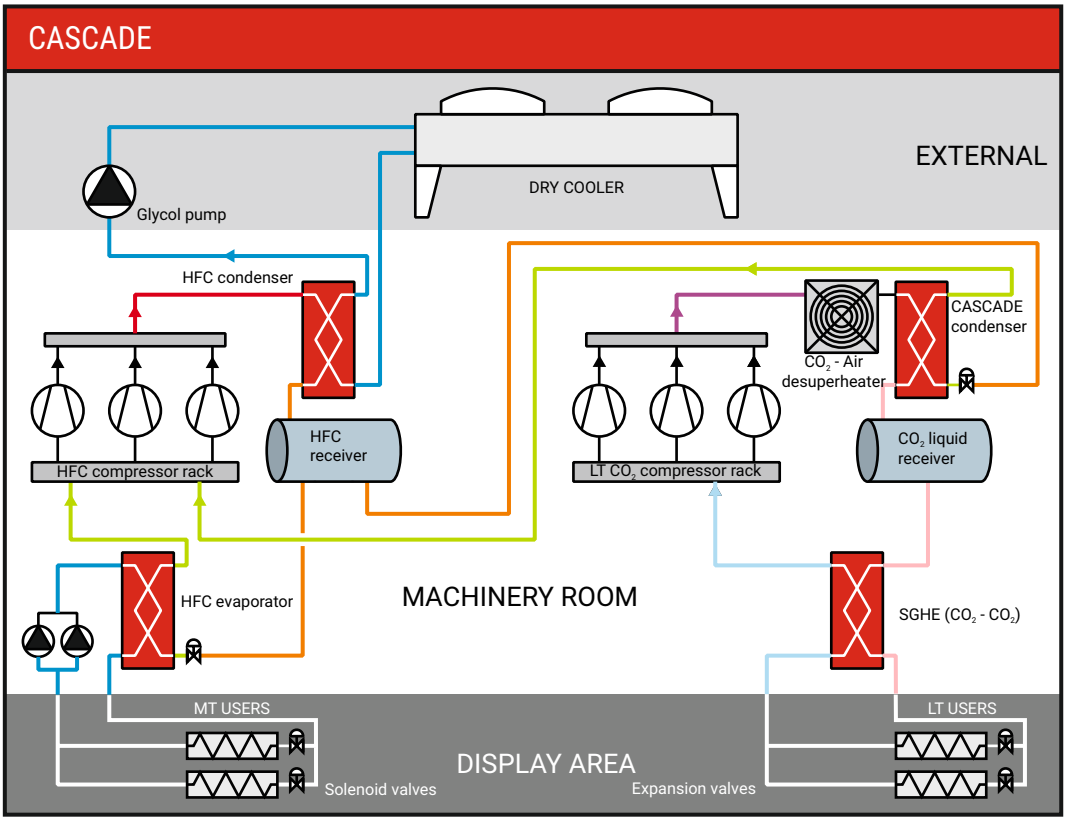
Pumped CO_2

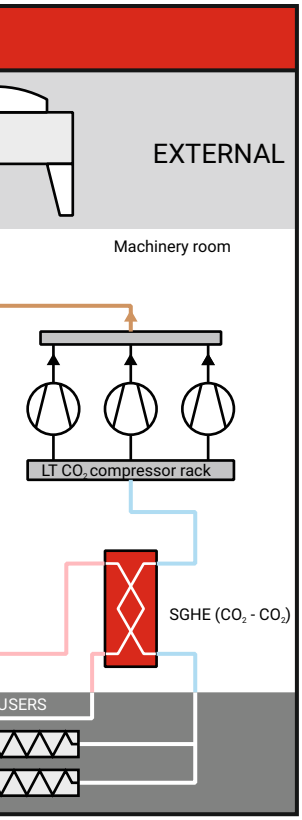
In indirect systems using pumped CO_2, the high vapor density imposes a lower load on the pump than do secondary fluids such as glycol, saving energy and expense. SWEP models 120T, 200T, 400T and 250AS, for pressure class M and with a maximum working pressure of 45 bar, are the ideal heat exchangers for these systems.

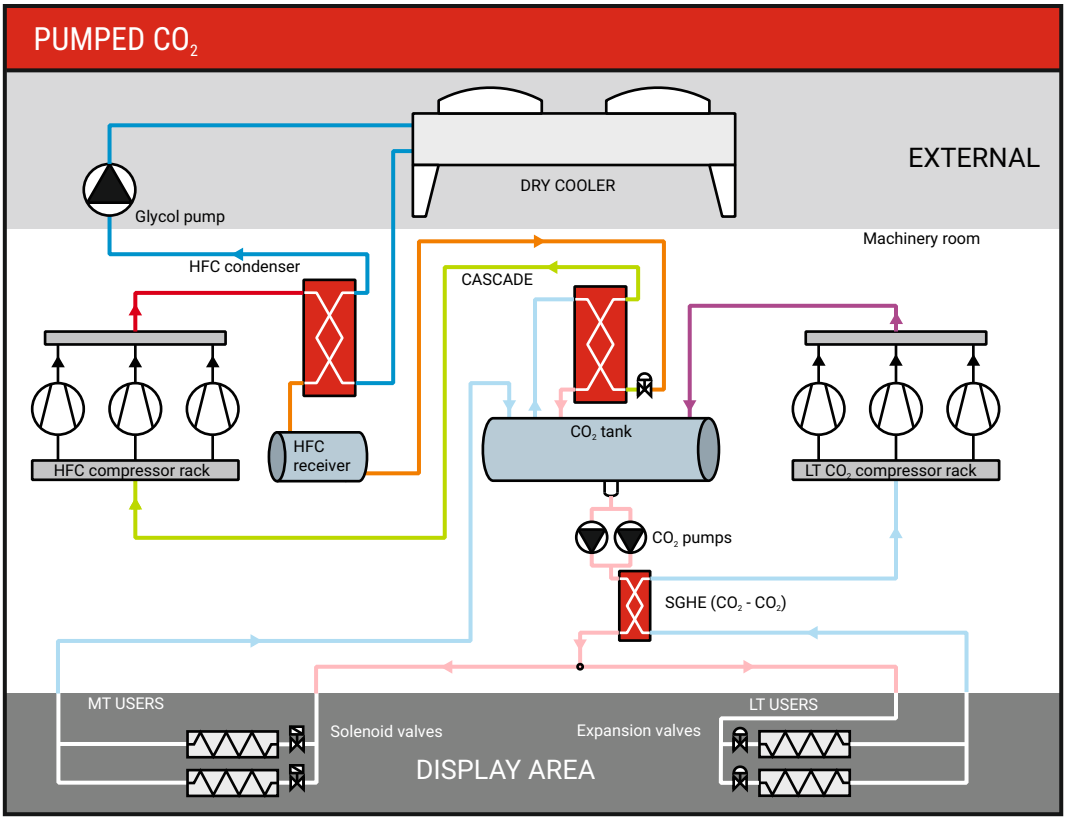
Glycol-CO_2 condenser

Indirect systems using brines for MT applications are now more frequently installing condensers for LT display cabinets, normally used with CO_2 refrigerant. These systems minimize the use of HFC refrigerants and employ pressure class M. SWEP's B120T, B200T, and 250AS, with a maximum working pressure of 45 bar, offer safe and economical performance. For increased safety and a widened operating envelope, we offer the B25T, B120T, and B400 models, for pressure classes D and E and with a maximum working pressure of 60 bar.




CASCADE
EXTERNAL
DRY COOLER
Glycol pump
HFC condenser
HFC compressor rack
HFC receiver
LT CO_2 compressor rack
CO_2 - Air desuperheater
CASCADE condenser
CO_2 liquid receiver
HFC evaporator
MACHINERY ROOM
SGHE (CO_2 - CO_2)
MT USERS
LT USERS
DISPLAY AREA
Solenoid valves
Expansion valves


EXTERNAL
Machinery room
LT CO_2 compressor rack
SGHE (CO_2 - CO_2)
USERS


PUMPED CO_2
EXTERNAL
DRY COOLER
Glycol pump
Machinery room
HFC condenser
CASCADE
HFC compressor rack
HFC receiver
CO_2 tank
LT CO_2 compressor rack
CO_2 pumps
SGHE (CO_2 - CO_2)
MT USERS
LT USERS
Solenoid valves
Expansion valves
DISPLAY AREA

Reliable products for all capacities

Tested for the highest demands

We offer a complete range of brazed plate heat exchangers for supermarket cooling with CO_2 refrigerant. You can rely on them to meet the highest demands for cost-effectiveness, safety and reliability. They are delivered with full traceability and verified functionality, with third-party approvals such as PED, ULC, KHK and UKCA. We test all heat exchangers for internal and external leakage, at pressures higher than the maximum working pressure. Certificates can accompany deliveries on request. You will easily find the model that suits your capacity demands.

Convenience stores

Plug-in display cases are being replaced by centralized CO_2 based systems with heat recovery. SWEP models B16DW (double wall) and B18 (single wall,) are designed to work safely and efficiently at up to 140 bar, and are ideal for systems providing up to 80 kW MT and 10 kW LT cooling. Systems can also be configured with a cascade heat exchanger to limit the requirements for HFC (hydrofluorocarbon) refrigerants.

Supermarkets

The cooling capacity required for supermarkets, 50-250 kW MT and 10-50 kW LT, favors centralized systems with heat recovery. SWEP offers brazed plate heat exchangers designed specifically for this and for performing economically in direct or indirect operation. Our 200T and 400T models are ideal for indirect systems using CO_2 as a single-phase pumpable fluid, increasingly popular for both LT and MT duties.

Hypermarkets

SWEP's 400T provides an economical and versatile solution for cooling capacities up to 500 kW MT and 100 kW LT. Parallel configurations are available to enable pumped CO_2 systems to achieve the highest capacities. The ideal choices for heat recovery in high-pressure transcritical systems are our B16DW (double wall) and B185 and B285 (single wall) models, approved for operation at up to 140 bar.

BPHE Model	Convenience stores	Supermarket	Hypermarket
12	CO_2 SGHE CO_2 Flash tank	CO_2 SGHE CO_2 Flash tank	
80	HFC Evaporator		HFC Economizer
120T	HFC Condenser	CO_2 Cascade CO_2 Pumped	CO_2 Cascade CO_2 Pumped
200T		CO_2 Cascade CO_2 Pumped	CO_2 Cascade CO_2 Pumped
400T		CO_2 Pumped HFC Evaporator HFC Condenser	CO_2 Pumped HFC Evaporator HFC Condenser
500T		HFC Evaporator HFC Condenser	HFC Evaporator HFC Condenser
60		CO_2 SGHE CO_2 Flash tank	CO_2 SGHE CO_2 Flash tank
B185		BOOSTER Heat recovery	BOOSTER Heat recovery
B18		BOOSTER Heat recovery	BOOSTER Heat recovery
B16DW	Booster heat recovery	BOOSTER Heat recovery	BOOSTER Heat recovery
B285		BOOSTER Heat recovery	BOOSTER Heat recovery

For high-pressure CO_2 cooling applications

U-class

For applications operating up to 140 bar at 135°C. Suitable for use as a gas cooler, evaporator, economizer, and suction gas heat exchanger in CO_2 transcritical applications.

B4TH, B4TM

Working conditions	Inner circuit	Outer circuit
Max working pressure at 20°C (68°F)	140 bar (2030 PSIG)	140 bar (2030 PSIG)
Max working pressure at 135°C (275°F)	133 bar (1929 PSIG)	133 bar (1929 PSIG)
Test pressure	201 bar (2915 PSIG)	201 bar (2915 PSIG)

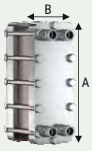
A: 194,5 mm (7.65") B: 76,9 mm (3.02")

B18H, B18L

Working conditions	Inner circuit	Outer circuit
Max working pressure at 20°C (68°F)	140 bar (2030 PSIG)	107 bar (1551 PSIG)
Max working pressure at 135°C (275°F)	133 bar (1929 PSIG)	101 bar (1464 PSIG)
Test pressure	201 bar (2915 PSIG)	154 bar (2233 PSIG)

A: 377 mm (14.84") B: 119.5 mm (4.7")

B16DW



Working conditions	Inner circuit	Outer circuit
Max working pressure at 20°C (68°F)	140 bar (2030 PSIG)	140 bar (2030 PSIG)
Max working pressure at 135°C (275°F)	140 bar (2030 PSIG)	140 bar (2030 PSIG)
Test pressure	200 bar (2900 PSIG)	200 bar (2900 PSIG)

A: 377 mm (16.42") B: 119.5 mm (6.28")

B185

Working conditions	Inner circuit	Outer circuit
Max working pressure at 20°C (68°F)	140 bar (2030 PSIG)	107 bar (1551 PSIG)
Max working pressure at 135°C (275°F)	133 bar (1929 PSIG)	101 bar (1464 PSIG)
Test pressure	201 bar (2915 PSIG)	154 bar (2233 PSIG)

A: 452 mm (16.74") B: 203 mm (8")

D-class

For applications operating at 60 bar up to 100°C. Suitable for use as an evaporator, condenser, suction gas heat exchanger and for cascade operations.

B12L, B12MT, B12H

Working conditions	Inner circuit	Outer circuit
Max working pressure at 20°C (68°F)	61 bar (884 PSIG)	61 bar (884 PSIG)
Max working pressure at 135°C (275°F)	56 bar (812 PSIG)	56 bar (812 PSIG)
Test pressure	88 bar (1276 PSIG)	88 bar (1276 PSIG)

A: 287 mm (11.29") B: 117 mm (4.6")

B285

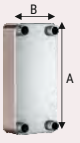
Working conditions	Inner circuit	Outer circuit
Max working pressure at 20°C (68°F)	140 bar (2030 PSIG)	107 bar (1551 PSIG)
Max working pressure at 135°C (275°F)	133 bar (1929 PSIG)	101 bar (1464 PSIG)
Test pressure	201 bar (2915 PSIG)	154 bar (2233 PSIG)

A: 527,1 mm (20.75") B: 245,1 mm (9.65")

E-class

For sub-critical applications operating at 56 bar up to 100°C. Suitable for use as an evaporator, condenser, and for cascade operations.

120TH



Working conditions	Inner circuit	Outer circuit
Max working pressure at 20°C (68°F)	56 bar (812 PSIG)	56 bar (812 PSIG)
Max working pressure at 135°C (275°F)	52 bar (754 PSIG)	52 bar (754 PSIG)
Test pressure	81 bar (1174 PSIG)	81 bar (1174 PSIG)

A: 525 mm (20.66") B: 243 mm (9.56")

400H

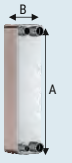
Working conditions	Inner circuit	Outer circuit
Max working pressure at 20°C (68°F)	56 bar (812 PSIG)	56 bar (812 PSIG)
Max working pressure at 135°C (275°F)	52 bar (754 PSIG)	52 bar (754 PSIG)
Test pressure	81 bar (1174 PSIG)	81 bar (1174 PSIG)

A: 694 mm (27.32") B: 304 mm (11.96")

H-class

For sub-critical applications operating at 53 bar up to 100°C. Suitable for use as evaporator or condenser when CO_2 is on the inner circuit.

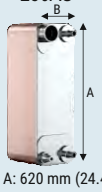
80



Working conditions	Inner circuit	Outer circuit
Max working pressure at 20°C (68°F)	56 bar (812 PSIG)	39 bar (565 PSIG)
Max working pressure at 135°C (275°F)	52 bar (754 PSIG)	36 bar (522 PSIG)
Test pressure	81 bar (1174 PSIG)	56 bar (812 PSIG)

A: 526 mm (20.71") B: 119 mm (4.69")

250AS



Working conditions	Inner circuit	Outer circuit
Max working pressure at 20°C (68°F)	61 bar (884 PSIG)	37 bar (536 PSIG)
Max working pressure at 135°C (275°F)	50 bar (725 PSIG)	31 bar (449 PSIG)
Test pressure	87 bar (1261 PSIG)	53 bar (768 PSIG)

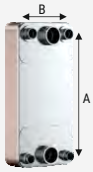
A: 620 mm (24.41") B: 202 mm (7.95")

D310 – Dual circuit

Working conditions	Inner circuit	Outer circuit	Inner circuit
Max working pressure at 20°C (68°F)	61 bar (884 PSIG)	28 bar (406 PSIG)	61 bar (884 PSIG)
Max working pressure at 135°C (275°F)	50 bar (725 PSIG)	23 bar (333 PSIG)	50 bar (725 PSIG)
Test pressure	87 bar (1261 PSIG)	40 bar (580 PSIG)	87 bar (1261 PSIG)

A: 525 mm (20.67") B: 243 mm (9.57")

D400 – Dual circuit



Working conditions	Inner circuit	Outer circuit	Inner circuit
Max working pressure at 20°C (68°F)	61 bar (884 PSIG)	35 bar (507 PSIG)	61 bar (884 PSIG)
Max working pressure at 135°C (275°F)	50 bar (725 PSIG)	29 bar (420 PSIG)	50 bar (725 PSIG)
Test pressure	87 bar (1261 PSIG)	50 bar (725 PSIG)	87 bar (1261 PSIG)

A: 694 mm (27.32") B: 304 mm (11.97")

D650 – Dual circuit

Working conditions	Inner circuit	Outer circuit	Inner circuit
Max working pressure at 20°C (68°F)	61 bar (884 PSIG)	28 bar (406 PSIG)	61 bar (884 PSIG)
Max working pressure at 135°C (275°F)	50 bar (725 PSIG)	23 bar (333 PSIG)	50 bar (725 PSIG)
Test pressure	87 bar (1261 PSIG)	40 bar (580 PSIG)	87 bar (1261 PSIG)

A: 744.6 mm (29.31") B: 365.6 mm (14.39")

PSIG values are related to UL.
All products in the CO_2 range are PED approved.

Challenge efficiency

At SWEP, we believe our future rests on giving more energy than we take – from our planet and our people. That's why we pour our energy into leading the conversion to sustainable energy usage in heat transfer. Over four decades, the SWEP brand has become synonymous with challenging efficiency.

SWEP is a world-leading supplier of brazed plate heat exchangers and prefabricated energy transfer stations for HVAC and industrial applications. With over 1,100 dedicated employees, carefully selected business partners, global presence with production, sales and heartfelt service, we bring a level of expertise and customer intimacy that's redefining competitive edge for a more sustainable future. SWEP is part of Dover Corporation, a multi-billion-dollar, diversified manufacturer of a wide range of proprietary products and components for industrial and commercial use.

Printed on 100% recycled paper. SWEP is an ISO14001 certified company.

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