

BRAZED PLATE HEAT EXCHANGER USER GUIDE

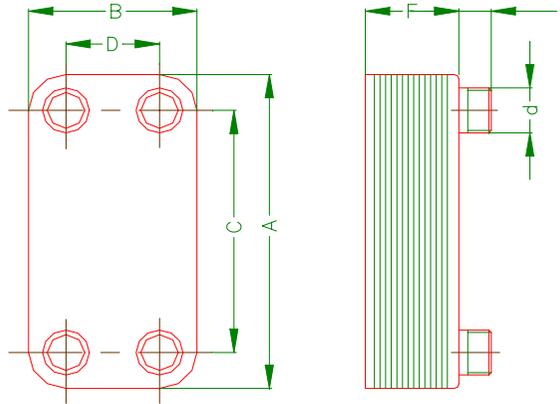
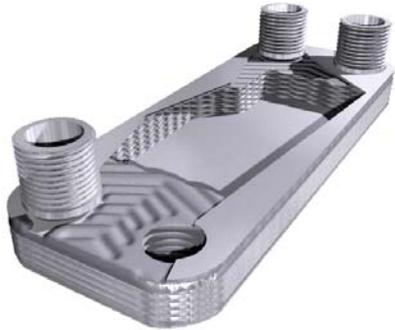


Fig.1 Unit Dimensions

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1. Product Dimensions

Heat exch. type	A	B	C	D	F
	[mm]	[mm]	[mm]	[mm]	[mm]
LA14	201	80	164	42	9+2,3xnp
LA22	300	80	260	42	9+2,3xnp
LA34	469	80	432	42	9+2,3xnp
LB31	286	117	232	68	9+2,4xnp
LB47	414	117	360	68	9+2,4xnp
LB60	534	117	480	68	9+2,4xnp
LC110	463	255	378	170	10+2,0xnp
LC170	685	255	600	170	10+2,0xnp
LD235	784	306	682	204	12+2,6xnp

np: number of plates

2. Operating parameters

Secespol brazed plate heat exchangers (BHE) are suitable for a variety of single-phase fluid-to-fluid and two-phase refrigerant to fluid applications.

WATER/WATER

Boiler systems
District heating
Solar Heating
Geothermal
Swimming pool heaters
Domestic water heating
Engine jacket cooling
Various cooling & heating duties in industrial application)

WATER/OIL

Hydraulic oil
cooling Hydraulic oil heating
Fuel oil
preheating
(Various industrial oil cooling duties)

WATER/GAS

Water-cooled condensers
Liquid chillers
Sub-coolers
De-superheaters
Economizers
Air dryers
Steam

Secespol copper brazed units are not compatible with ammonia (NH₃) systems. Nickel brazed units may be suitable for these applications - consult Secespol. For steam applications, consult Secespol.

Design Conditions

Model-type	Max. Pressure [bar]	Max. Temperature [°C]
LA – type	30	230
LB – type	30	230
LC – type	25	230
LD – type	25	230

Materials

The standard materials are stainless steel of AISI 316 type, vacuum-brazed with a pure copper filler or a nickel-based filler. The use of these materials provides a high degree of corrosion resistance and suitability with a wide variety of fluids. Typical examples are: synthetic or mineral oil, organic solvents, water (not seawater), glycol mixtures (ethylene-, propylene glycol), refrigerants. Please note that if natural refrigerants (e.g. ammonia) are employed, BHEs with nickel-based brazing material must be used.

Cleaning of units

Secespol brazed plate heat exchangers operate with high turbulence flow, even at low flow rates. This high turbulence keeps small particles in suspension minimizing fouling and scaling. However, in some applications the fouling tendency can be very high, e.g. when using extremely hard water at high temperatures. In such cases it is always possible to clean the exchanger by circulating a cleaning liquid. Use a tank with weak acid, 5% phosphoric acid or, if the exchanger is frequently cleaned, 5% oxalic acid. Pump the cleaning liquid through the exchanger. For optimum cleaning, the cleaning solution flow rate should be a minimum of 1,5 times the normal flow rate, preferably in a back-flush mode. After use, do not forget to rinse the heat exchanger carefully with clean water. A solution of 1-2% sodium hydroxide (NaOH) or sodium bicarbonate (NaHCO₃) before the last rinse ensures that all acid is neutralized. Clean at regular intervals.

3. Mounting positions

Secespol heat exchangers should be mounted in such a way that there is sufficient room around the heat exchanger to perform maintenance work. Never expose the unit to pulsations or excessive cyclic pressure or temperature changes. It is also important that no vibrations are transferred to the heat exchanger. If there is a risk of this, install vibration absorbers. For larger connection diameters, use an expanding device in the pipeline, e.g. a rubber mounting strip as a buffer between the BHE and the mounting clamp. It is recommended that Secespol brazed heat exchangers be mounted in the vertical position (Fig.2).

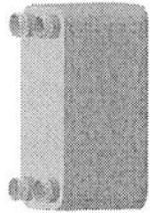


Fig.2 Vertical mounting position - recommended

Where space and piping require another position, the following guidelines should be followed:

For liquid-to-liquid, single phase applications, the heat exchanger can be mounted in any position that does not create the possibility of trapping air or other gases in the heat exchanger (Fig.3). Therefore, never mount the heat exchanger with the connections pointing down (Fig.4). If the heat exchanger must be mounted with the connections on the side, orient the heat exchanger so that the nozzles connected to the fluid that has the possibility of gas or air entrained is at the top.

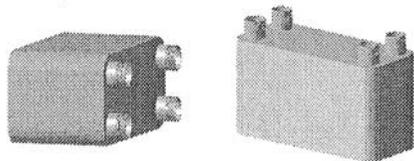


Fig.3 Optional positions for single phase only

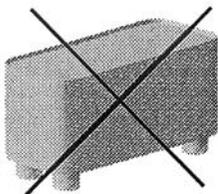


Fig.4 DO NOT mount with connections down

For all two-phase applications the heat exchanger should always be mounted vertically. If this is not possible, contact Secespol for recommendations on mounting. The exchangers may have some sharp edges so exercise caution when handling.

4. Piping Connections

In most applications the highest efficiency will be realized by connecting the heat exchanger for countercurrent flow (Fig.5). Certain special applications may require co-current (parallel) flow (Fig.6).

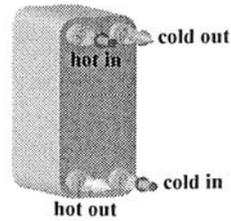


Fig.5 Countercurrent Flow

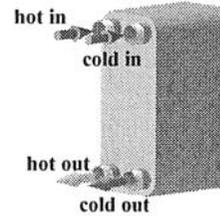


Fig.6 Co-current (parallel) flow

Standard connections for liquid applications are threaded connections. Solder connections are standard for refrigerant units.

Standard Connections (Refer to Fig.1)

Type of heat exchanger	for brazing		outside thread		flange	
	d*(mm)	E(m)	d(in)	E(m)	d (mm/in)	E (mm)
LA14 LA22 LA34	1/4", 3/8", 1/2", φ16, φ22, φ28	20	G 1/2" G 3/4"	22		
LB31 LB22 LB47 LB60	φ35, 1- 5/8", φ42	35	G1" G 1 1/4"	28		
LC110 LC170	φ48, φ55, φ60	56	G1 1/2" G2 "	32	DN50 (2")	100
LD235	-	-	-	-	DN80	100

On systems where the water quality is in question, the installation of a strainer is required to prevent large particles from becoming lodged in the heat exchanger. A 16 to 20 mesh strainer is recommended. Blockage in the heat exchanger will lead to fouling or freezing of the

heat exchanger. The strainer must be located at the inlet to the heat exchanger. Strainers located at the cooling tower or pump, while worthwhile for system operation, will not adequately protect the heat exchanger.

On new or renovation systems, flushing the liquid piping to remove construction debris is recommended before connecting the piping to the heat exchanger.

4. Piping Connections (cont.)

Secespol brazed plate heat exchangers are used extensively as refrigerant condensers and evaporators. For condenser applications, (Fig. 7), the superheated discharge gas enters the heat exchanger at the top left and subcooled liquid refrigerant condensate leaves from the bottom left connection. The cooling water enters at the bottom right and leaves at the top right. This true countercurrent flow allows close approaches resulting in increased efficiency and lower water flow rates.

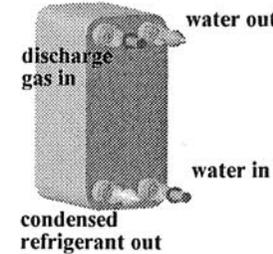


Fig.7 Water-cooled condenser

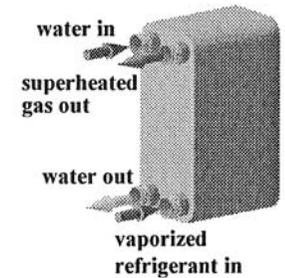


Fig.8 Evaporator-Liquid chiller

Refrigerant Applications and Expansion Valves

For evaporator applications (Fig.8), the expansion valve should be placed close to the inlet connection, whereas the bulb should be mounted about 500 mm from the vaporized refrigerant outlet connection. The pipe diameter between the expansion valve and the BHE should be the same as the diameter of the refrigerant liquid line. The vaporized refrigerant enters the heat exchanger at the bottom right connection and superheated gas leaves from the top right connection. The chilled water enters at the top left and leaves at the bottom left. To prevent freezing:

- Use a filter < 1 mm, 16 mesh.
- Use an antifreeze when the evaporation temperature is close to liquid-side freezing.
- Use a freeze protection thermostat and flow switch to guarantee a constant water flow before, during and after compressor operation.
- Avoid the "pump-down" function.
- When starting up a system, wait a moment before starting the condenser (or have reduced flow through it).

5. Insulation

Secespol offers insulation for its brazed heat exchangers. Insulation is mainly used to reduce heat loss and also offers the operator some degree of personal protection from the hot surface of the unit. For pricing and availability on insulation please contact your dealer.

Fig.9 Step I

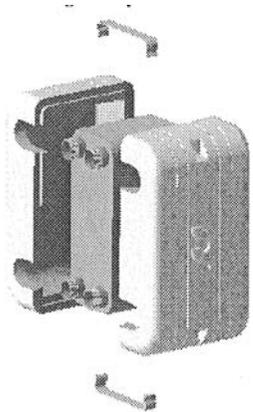


Fig.10 Step II

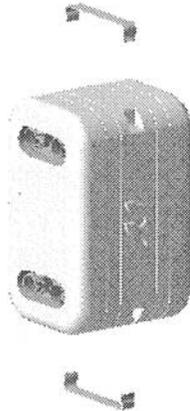
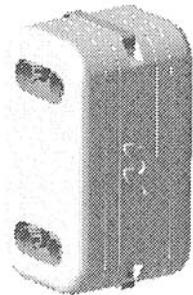


Fig.11 Step III



6. SECESPOL WARRANTY INFORMATION

Secespol's warranty obligations are limited to the terms set forth below:

Secespol-CZ s.r.o. ("Secespol") warrants to the original purchaser that this product will be free of manufacturing defects in material and workmanship for a period of one (1) year from the original purchase date, or eighteen (18) months from Secespol's original invoice, whichever expires first. The original purchase date as used herein shall mean the date stated in the vendor's original invoice.

Secespol will, at its option, repair or replace this product without charge if it is found to be defective during the limited warranty period specified above. If Secespol chooses, at its discretion, to replace any product for which there is a valid warranty claim, Secespol shall replace the product with the same model or, if such model is not available, with a model which is, in Secespol's reasonable judgment, the nearest compatible model available at the time of replacement. Note that each purchaser is limited to one (1) product replacement during the warranty period of the original claim.

NOT UNDER COVERAGE BY THIS WARRANTY

This limited warranty covers defects encountered in normal use of the product while operating according to the specifications set forth by Secespol. The warranty is void and shall not apply to the following, including, but not limited to:

1. The failure or malfunction results from improper or negligent operation, abuse, misuse or maintenance or unauthorized alteration.
2. Malfunctions resulting from, or repairs necessitated by, uses of the product for purposes other than that for which it was designed, or resulting from flood, fire, wind, lightning, freezing, or any other natural disaster, an act of God, an act of destruction, theft, or accident.
3. Damages to the product that occur during shipment.
4. Damages caused by improper or faulty installation.
5. Products exposed to corrosive elements harmful to the structural integrity and durability of the product.

Secespol shall not be liable for any direct, special, incidental, or consequential damages caused by the use, misuse, or inability to use this product. Secespol is under no legal obligations to rectify, including but not limited to, lost profits, downtime, goodwill, damages to or replacement of equipment and property. Purchaser assumes all risk and liability for loss, damage or injury to purchaser and purchaser's property and to others and their property arising out of the use, misuse or inability to use this product. This limited warranty shall not extend to anyone other than the original purchaser of the product.

MAKING A WARRANTY CLAIM

Should your Secespol Brazed Plate Heat Exchanger require warranty service, you should contact Secespol-CZ s.r.o. at tel.: +420 241 441 963 for instructions on how to file your claim.

SECESPOL RESERVES THE RIGHT TO CHANGE SPECIFICATIONS OR DISCONTINUE MODELS WITHOUT NOTICE.

7. Product Information

Unlike traditional heat exchangers, the brazed heat exchangers (BHE) offer the highest level of thermal efficiency and durability in a compact, low-cost unit. In principle, a BHE consists of a plate package of corrugated channel plates between front and rear cover plate packages. The cover plate packages consist of sealing plates, blind rings and cover plates. The type of connection can be customized to meet specific market and application requirements. During the vacuum-brazing process, a braze joint is formed at every contact point between the base and the filler material. The design creates a heat exchanger that consists of two separate channels or circuits. No pressure-retaining parts such as the shell of a shell-and-tube construction or the frame of a plate-and-frame heat exchanger. These features in combination with high efficiency make this construction the most efficient heat exchanger within its operating limits.

The brazed heat exchangers are characterised by:

- low investment costs
- efficient construction
- low weight
- high resistance to pressure and temperature fluctuations
- low space requirements
- easy installation and operation
- low hold-up volume which offers rapid control response

High Efficiency

The design of the plates creates two separate channels for a true counter current flow movement. The plates are corrugated in a herringbone pattern to produce high turbulence for superior heat transfer. Heat transfer coefficients of up to six times those of conventional heat exchangers can be achieved.



8. Type of connection, allowed mounting torque

Heat exchanger type	Connection type	Dimension of connection	Max. torque [Nm]
LA14 LA22 LA34	thread	G 1/2" (outside thread)	90
	thread	G 3/4" (outside thread)	150
	thread	G 1/2" (inside thread)	130
		∅ 18,2 (for brazing, inside)	-
		∅ 22,2 (for brazing, inside)	-
LB31 LB47 LB60	thread	G 1" (outside thread)	290
	thread	G 1 1/4" (outside thread)	505
	thread	G 1" (inside thread)	415
		∅ 35 (for brazing, inside)	-
LC110 LC170	thread	G 1 1/2" (outside thread)	680
	thread	G 2" (outside thread)	1170
	thread	G 1 1/2" (inside thread)	950
	flange	DN50 (flange)	-
		∅ 48,2 (for brazing, inside)	-
		∅ 54,2 (for brazing, inside)	-
LD235	flange	DN65, DN80 flanges	-

9. Working conditions :

Type of heat exchanger	Plate material	Cooper brazed	
		Max. work. pressure [bar]	Max. work. temperature [°C]
LA14	1.4541, 1.4404, 1.4571, 1.4301	30	230
LA22	1.4541, 1.4404, 1.4571, 1.4301	30	230
LA34	1.4541, 1.4404, 1.4571, 1.4301	30	230
LB31	1.4541, 1.4404, 1.4571, 1.4301	30	230
LB47	1.4541, 1.4404, 1.4571, 1.4301	30	230
LB60	1.4541, 1.4404, 1.4571, 1.4301	30	230
LC110	1.4541, 1.4404, 1.4571, 1.4301	25	230
LC170	1.4541, 1.4404, 1.4571, 1.4301	25	230
LD235	1.4541, 1.4404, 1.4571	25	230



SECESPOL-CZ s.r.o.,
 Na Hůrce 1041/2, 161 00 PRAHA 6
 Czech republic
 tel.: +420 241 441 963
 fax: +420 241 440 966
 e-mail: info@secespol.cz
<http://www.secespol.cz>