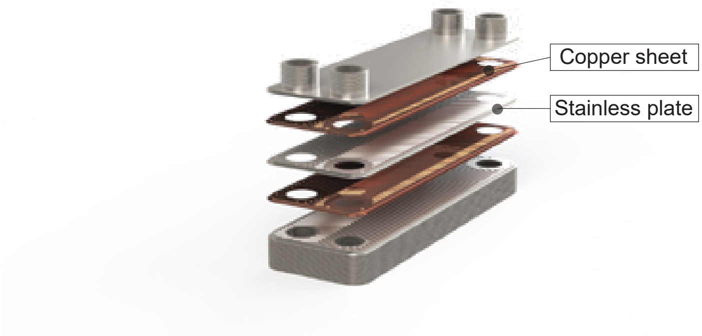
Brazed Plate Heat Exchanger

Brazed heat exchanger (BPHE) is a type of compact heat exchanger that consists of corrugated metal plates that are brazed together to form a single unit. The brazing process involves melting a filler material, tipically copper-based alloy (Stainless or Nickle are available) between the plates to create a strong and leak-proof joint.



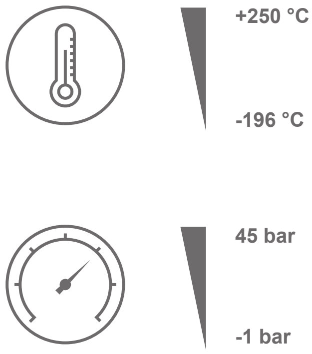
Copper BPHE construction demonstration

Benefits

- Compact size & light weight
- Easy to install
- High compression resistance
- Robust construction
- High corrosion resistance
- High application diversity
- Efficient heat transfer

Wide Range of Applications:

- Heating / hot water systems
- District heating systems
- Evaporator
- Subcooler
- Economizer
- Oil cooler
- Heat pumps
- Laser cooling
- Ammonia systems
- Applications with deionized water
- CO_2 supermarket refrigeration systems
- Data Center



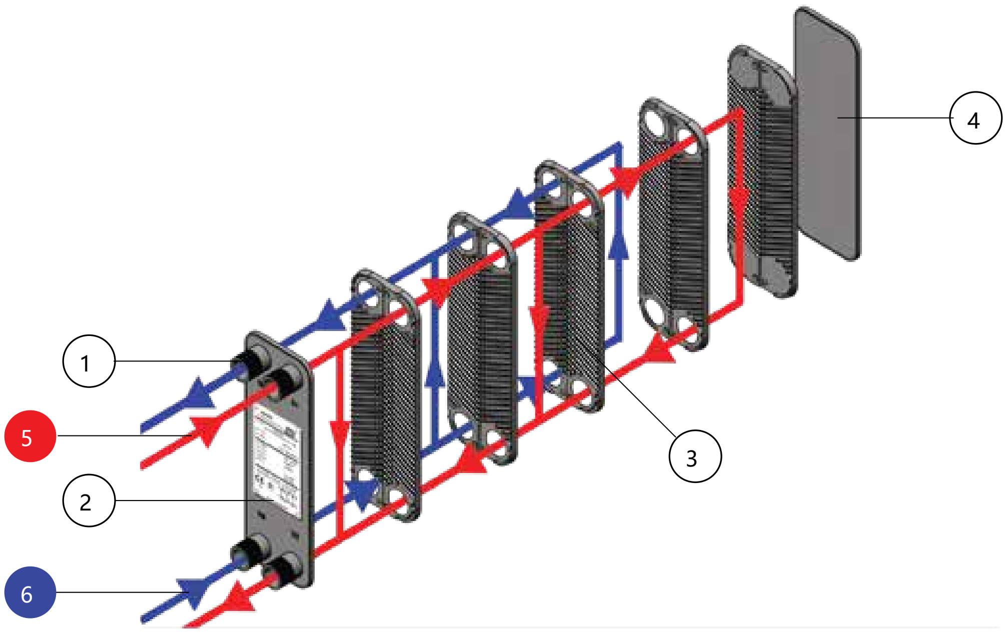
Operating condition

Why BAODE?

- Deep Application & Product competence
- Reliable Partner
- Sustainable
- Efficient

Chemicals | Food & Beverage | Refrigeration | Marine | Oil & Gas | Data Center | Power | Transportation | HVAC

Brazed plate heat exchanger construction

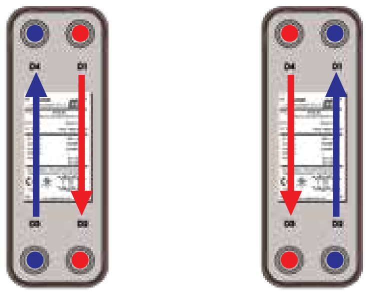


1. Connection 2. Front pressure plate 3. Channel plates 4. End pressure plate 5. Hot fluid 6. Cold fluid

Flow principle

The basic flow principle in a brazed plate heat exchanger is parallel to achieve the most efficient heat transfer process.In a single pass design, all connections are located on one side of the heat exchanger, making installation very easy.

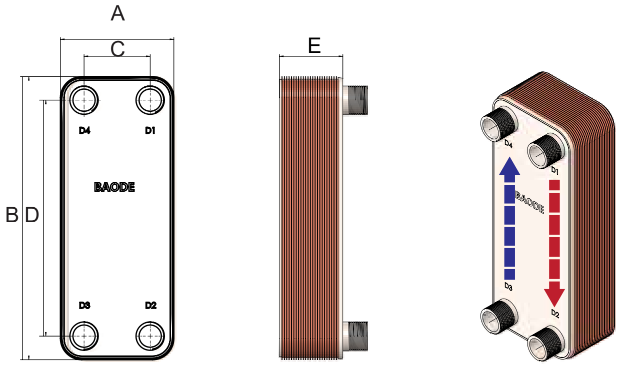
The flow principle of a brazed heat exchanger is based on the counter-current flow configuration, where the two fluids involved in the heat transfer process flow in opposite directions. e.g the picture A and B



A B

Connections

Male Thread Female Thread Flange SAE Flange Solder connection

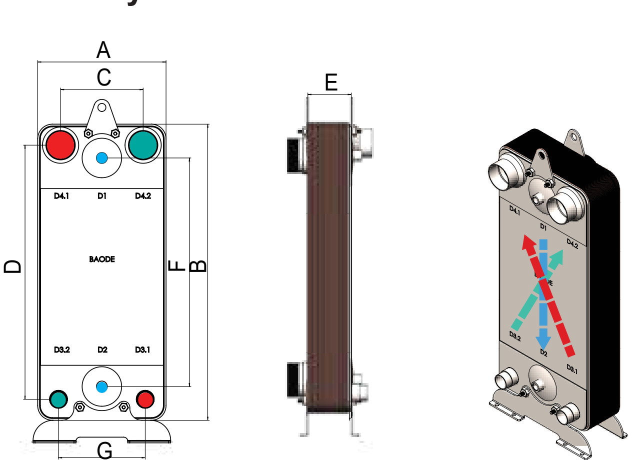


Single circuit BPHE data (unit: mm)

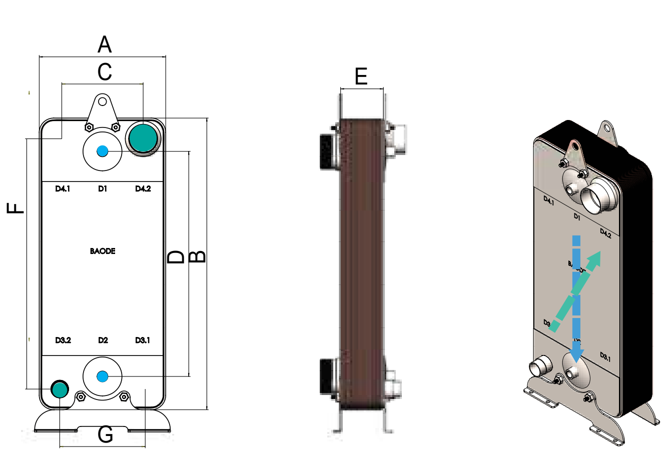
Model	Design Pressure	A	B	C	D	E	Chinnel Volume L
BL6	30/45	55	119	26	91	7+1.29N	0.0053
BL12	30/45	76	152	42	120	7+1.29N	0.01
BL13	30/45	76.5	194	40	154	8+1.05N	0.0093
BL14	30/45	76	206	42	172	8.6+2.3N	0.027
BL14D	10	71	186	40	154	7.5+2.26N	0.026
BL15A	10	83	193	40	154	7+2.26N	0.029
BL14W	30/45	78	206	42	172	7.5+2.26N	0.028
BL16	30/45	78	206	42	172	7.5+2.26N	0.028
BL17	30	85	202	39	153	24.5+2.31N	0.031
BL18	10	91	210	50	162	9+3.3N	0.053
BL20	30/45	77	317	42	282	8+2.31N	0.042
BL20W	30/45	75	315	42	282	11+2.25N	0.042
BL21	45	76	312	42	278	6.6+1.23N	0.021
BL25	30/45	92	322	39	268	8+1.55N	0.032
BL26	30/45	109	310	50	250	10.6+2.35N	0.057
BL26W	30/45	106	306	50	250	10.9+2.25N	0.057
BL30	30/45	124	304	70	250	12+2.31N	0.069
BL50	30/45	108	525	50	466	9.5+2.31N	0.097
BL60	30/45	119	526	63	470	9.4+2.31N	0.11
BL95A	30/45	187	616	92	519	10.2+2.31N	0.2
BL95B	30/45	187	616	92	519	11+2.81N	0.25
BL95C	30/45	187	616	92	519	11+2.81N	0.25
BL120	30/45	245	529	174	456	12.4+2.31N	0.24
BL122	30/45	246	529	174	456	12.4+2.31N	0.24
BL125	30	248	530	159	441	12+1.95N	0.2
BL180	30/45	256	846	160	750	8+2.31N	0.4
BL190	15/21/30	307	698	179	567	9+2.81N	0.49
BL195	15/21/30	306	694	179	567	11.2.31N	0.39
BL200	15/21/30	320	740	188	603	12+2.75N	0.54
BL350	30	304	981	179	854	11.5+2.31N	0.55
BL600	15/21	436	140	220	1190	16.3+2.8N	1.4

*N means the plates number

Dual system BPHE



Dual system



Single system (optional)

Model	Design Pressure (bar)	A	B	C	D	F	E	Channel Volume L
BL100	30/45	248	496	405	157	405	7+1.29N	0.2
BL100E	30/45	248	495	411	159	369	10+2.09N	0.2
BL100EW	30/45	243	491	411	159	369	10+2.03N	0.2
BL130AS	45	293	532	397	177	399	12.3+2.05N	0.27/0.24
BL210	30/45	320	737	568	205	631	8+2.61N	0.5

*N means the plates number

True Dual technology BPHEs have two independent refrigerant circuits combined with a common secondary fluid circuit. A True Dual heat exchanger is shown in Figure 1.

When half-load operation, water flow is also halived and the part-load evaporation temperature to remain at a high level, resulting in increased efficiency at part load and the water temperature will be the same as for full-load operation. Because secondary fluid channels will surround the active refrigerant circuit, the evaporating process will also remain fully stable.

For a schematic system sketch of a True Dual system, see Figure 3.

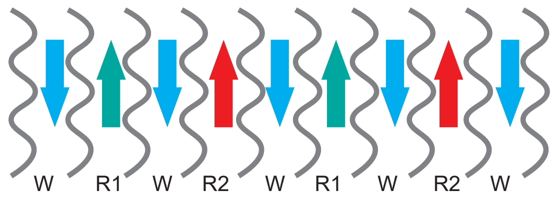


Figure 1 Cross-section of the channels inside a True Dual with both refrigerant sides operating R1 & R2

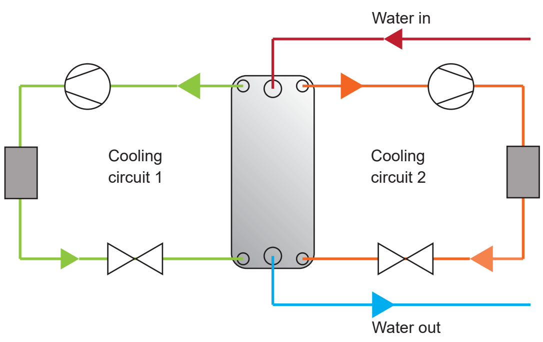


Figure 3 Schematic system sketch of a True Dual system.

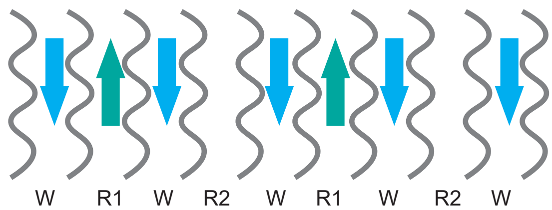
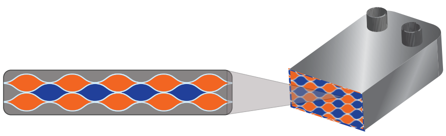


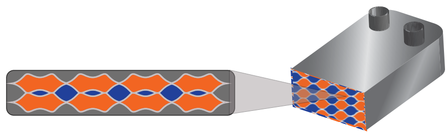
Figure 2 Cross-section of the channels inside a True Dual with only one refrigerant circuit operating.

Asymmetrical brazed plate heat exchanger.

Regular BPHE channel



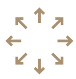
Asymmetrical BPHE channel



Hot liquid side   Cold Freon side

The term "asymmetrical" refers to the fact that the two sides of the heat exchanger have different geometries, specifically different channel depths. This design is often used when the heat transfer requirements on the hot and cold sides are different.
In an asymmetrical brazed plate heat exchanger, the hot fluid flows through channels with a larger depth, which allows for greater heat transfer. The cold fluid flows through channels with a smaller depth, which offers less resistance to flow, reducing the pressure drop.
This design is particularly useful in applications where one fluid is at a much higher temperature than the other, such as in a condenser or evaporator.

The asymmetrical design allows for efficient heat transfer while minimizing the pressure drop on the lower temperature side, improving overall performance.
Studies have shown that an asymmetrical brazed plate heat exchanger can provide up to 15% higher heat transfer rates and up to 30% lower pressure drops than a regular design brazed plate heat exchanger, depending on the specific operating conditions and application requirements. However, these percentages are approximate and may vary depending on the specific application and heat exchanger design.



Higher Capacity

Higher performance

Improved heat transfer

Reduced Carbon footprint

Less Refrigerant

Compact Size

Low pressure Drop

Smaller Pump

Model	Design Pressure	A	B	C	D	E	Chinnel Volume L
BL37AS	30/45	121	332	68	279	11.3+1.55N	0.05/0.04
BL40AS	30/45	119	376	72	329	12+1.55N	0.044/0.066
BL61AS	30/45	118	524	63	470	10.5+1.91N	0.092/0.075
BL95AS	30	185	613	92	519	11.3+2.07N	0.2/0.16
BL150AS	21/30	266	696	122/131	564/545	10+2.31N	0.36/0.3