BRAZED HEAT EXCHANGER

Brazed Plate Heat Exchanger

challenge for innovation

HISAKA WORKS,LTD. Heat Exchanger Div.

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Hisaka Works, Ltd., Heat Exchanger Division, is ISO9001 certified for its quality management system for all products including plate heat exchangers.

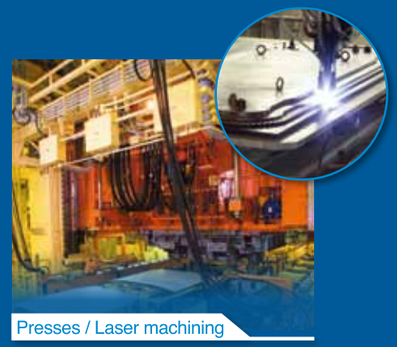
Hisaka Works, Ltd., is ISO14001 certified for its environmental management system.

Agent

HE-CE001901
14.12.200.YMZN

Hisaka's brazed plate heat exchangers (BHE) support energy-saving, improved quality and productivity, and a comfortable life.

In the 21st century society, eco-support and energy-saving functions have become an important added value in various merchandise and services.
All kinds of facilities in society, such as factories, commercial facilities, high-rise buildings, and housing complexes, are required to use less energy and less resources.
Hisaka's BHEs are installed in and play an active role in the air conditioning, hot water heaters, refrigerators / freezers, and industrial machines used in those kinds of facilities.
BHEs, which take plate heat exchangers with conventional gaskets and apply brazing technology, are high-performance heat exchangers that combine high energy-saving capabilities, resource-saving capabilities in their light-weight, compact size, and durability, and economic value.


Presses / Laser machining


High-rise air conditioning


Freezers / refrigerators / air conditioning

Hisaka's "brazed plate heat exchangers" in your everyday life


Semiconductor manufacturing devices


Boilers


Hot water / heating and cooling


Home hot water heaters


MRI / X-ray devices


CGS / GHP

・CGS is an abbreviation for "CoGeneration System".
・GHP is an abbreviation for "Gas engine Heat Pump".

Structure

Brazed plate heat exchangers with a tough body and brazed structure

Components

Copper (Cu) brazed type

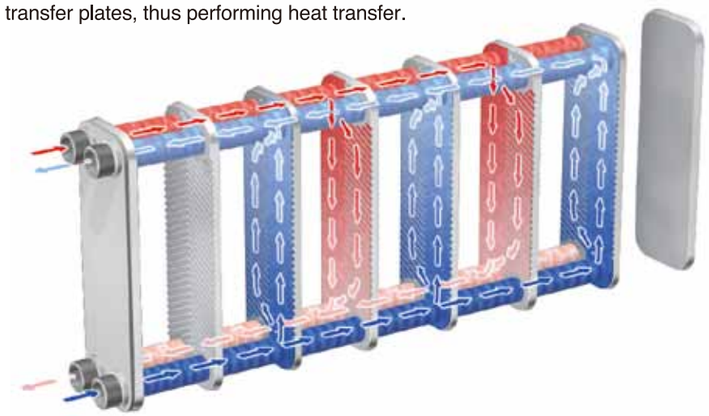
Nickel (Ni) brazed type

Brazed plate heat exchangers inherit the high performance of conventional gasket-type plate heat exchangers and cut down on the number of parts with an even simpler structure, and by using a brazed structure, are light weight, compact, durable, and have even higher economic value. Due to the strong sealing from the brazed structure, they also support heat exchanging processes that use refrigerants such as ammonia and CFCs.

Brazed plate heat exchangers consist of the minimum amount of parts: stainless steel heat transfer plates, a stainless steel S-frame and E-frame to support them, and stainless steel nozzles which are the inlets and outlets for the fluids. These parts are brazed with copper (Cu) and/or nickel (Ni) and integrated via brazing in a vacuum heating furnace.

Flow structure

As shown in the figure, the hot fluid and cold fluid flow in alternate directions through the heat transfer plates, thus performing heat transfer.



■ Process of making our products

Plate layering / assembly

The components are assembled.

Brazing

Assembled plates are brazed using the prescribed operating program in vacuum heating furnaces.

Inspection / completed product / shipping

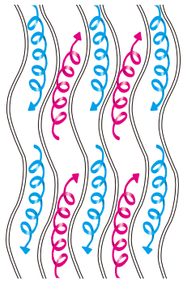
After brazing, we inspect the pressure air tightness, exterior, and dimensions of all products before shipping them.

Strong Point

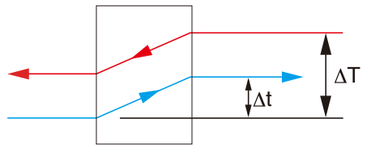
High performance, light weight and compact, high resistance to pressure and heat, excellent economic qualities

High performance

The overall heat transfer coefficient (U value) for water / water-use is normally 4,000 to 8,000 W/(m²•°C). Due to the wave-shaped ridges formed in the heat transfer surface, swirling currents form in the fluid, and it flows with intense turbulence. This is one reason why the heat transfer coefficient for plate heat exchangers is excellent. Also, the intense swirling current also fulfills the role of preventing the scaling that occurs on the plate's surface. The ridge pattern in the plates is designed to allow for the most efficient heat transfer to be performed.



The ridge pattern in the plates is designed to allow for the most efficient heat transfer to be performed.



Complete opposing flows allow for higher heat recovery rates.
Heat recovery rate $\frac{\Delta t}{\Delta T}$ = 80 to 90%

- Thin heat transfer plates → Low heat transfer resistance
- Complex flow route → High turbulence
- Complete opposing flows → Utmost use of terminal temperature gap

High resistance to pressure and heat

Due to the sturdy brazed structure that does not use gaskets, it not only has excellent sealing, but also excellent resistance to pressure, heat, and cold. Each model cleared a severe endurance test before being merchandised, and before shipping products, we perform air tightness and pressure tests on all products and only ship those that passed.

● Design pressure
F.V. - 4.5MPa
● Design temperature
-100℃ - 200℃

*Varies depending on the model. Please inquire at our company.

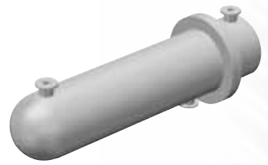
Light weight / compact

The BHE consists of heat transfer plates and filler metal stacked alternately and brazed. The filler metal also functions as a pressure-resistance material, like a gasket, achieving smaller size and lighter weight than the multipipe heat exchanger.

Merits

- Contributes to reducing the device's unit size
- Improves workability in mounting and installation

S&T



BHE

Excellent economic quality

We pursued even better economic qualities from PHE and cut the components to the bare minimum necessary. Using a brazed structure allows us to heat multiple devices at once in our large vacuum heating furnace. We achieved a lower price through mass production.
Also, due to the compact structure, the amount of held fluid is also decreased. If using an expensive liquid, you can reduce the amount of liquid used, a huge cost merit.

High quality management

The Heat Exchanger Division has acquired ISO9001 certification related to the quality management system for all of our products, and strives everyday to provide safe products with higher quality. At Research and Development, along with developing products and technology to match rapidly advancing needs, we repeat severe endurance tests in order to create very safe products, continuing research and development to ensure the BHE's reliability.
Also, on the Manufacturing Line, we rigorously manage the production process with our strict quality management techniques, ensuring the safety and high quality of each and every product before we deliver them to our customer.

OEM

We customize or develop new, exclusive devices to meet needs for reducing costs and improving performance for various units.

The BHE is being used and installed more and more for all kinds of mass production units due to the expansion of the energy-saving market.
For customers who want to acquire a certain lot on a continuous basis, we can also develop an exclusive device customized from a standard product.

*Please inquire at our company for specifications and details.

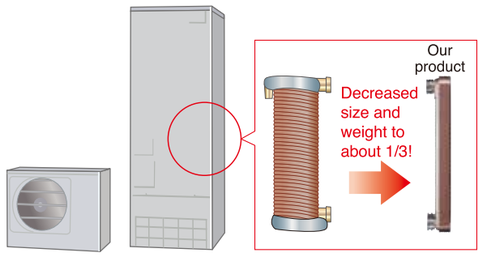
Various unique high performance models

Used for reheating bathwater

BMC-007

■ High performance, light weight, compact

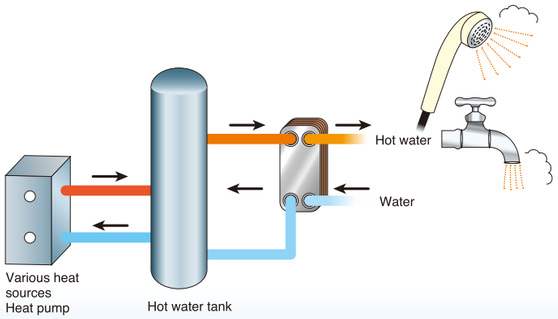
Because it can obtain a heat transfer coefficient higher than conventional tube heat exchangers, the heat transfer area can be reduced. Furthermore, we use a thin plate, making it lighter weight and more compact than tube heat exchangers.



For hot water

BXC-084

This brazed plate heat exchanger was designed to make full use of the provided heat source to efficiently heat the water to the set temperature. We use quick nozzles as standards for our high performance, compact heat exchangers, allowing for smooth design on hot water heaters.



Double wall which emphasizes safety

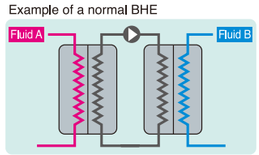
BXC-016D

■ Further increase reliability through the double wall structure

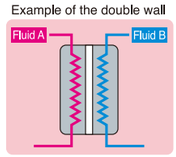
Brazed plate heat exchangers are used as heaters for hot water in the hot water systems used in everyday life.
For customers to use heaters with even more peace of mind, we developed the double wall brazed plate heat exchanger with a design that emphasizes safety.

● Allows for smaller, less expensive devices

Example of a normal BHE

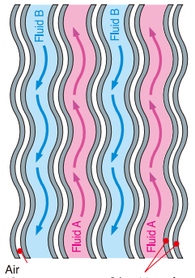


Example of the double wall



Shows effect with just one device

● Safe and secure structure that prevents the two fluids from mixing



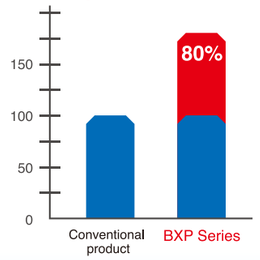
Increased durability

BXP Series

■ Further increasing durability through super nickel brazing

Nickel brazing filler metal was developed to heighten endurance. Super nickel brazed plate heat exchangers achieve unprecedented endurance. We added further endurance to the anti-corrosive properties of nickel brazing, expanding the uses.

Improved endurance by over 80%!



*Varies by conditions of use and model.

Use

Refrigeration air conditioning

Compression: The BHE is employed for various kinds of heat exchangers, such as the evaporator, condenser, oil cooler, and subcooler in compression refrigeration cycles. The compact BHE uses the least amount of coolant necessary even while improving device performance. It is used in various air conditioners.
Absorption: The BHE is also used in absorption refrigerators used in large scale air conditioning. Use the highly efficient BHE in solution heat exchange or drain heat exchange to help improve device performance.

Hot water heating

Heat pump: Heat pumps are gaining attention as a re-usable energy source. By using a BHE, which can handle high pressure, as a condenser, they can efficiently provide hot water.
Hot water heater: The BHE is optimal for raising the temperature of cold water in system that provides hot water separately to each household through heat exchange between tap water and a centrally produced heat source.
Boiler: The BHE matches non-pressure open-type boilers that require heat exchange with the boiler water, and is used by many manufacturers.

Cogeneration

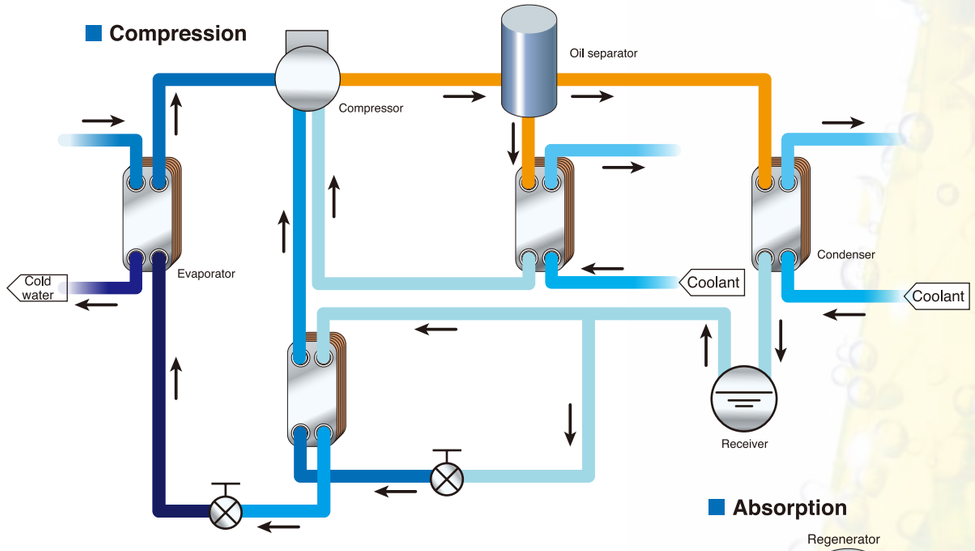
The BHE is used for various uses, such as heat collection and heat release. In the bare minimum amount of space necessary, it can increase the heat recovery rate and improve device performance, and is absolutely necessary for compact cogeneration systems.

Industrial instrument temperature control

This is used in many devices such as temperature control systems for hydraulic fluid, lubricant, and finishing liquid necessary for various machining tools and presses, and cleaning agent temperature control system for various kinds of washers. The BHE is also used in temperature control inside semiconductor manufacturing equipment, which requires precise temperature control and reliability.

Refrigerator cycle (flow)

There are two types of refrigeration cycles; “compression” through an electric compressor, and “absorption”, heat-driven by steam or burning gas. Recently, energy efficient “heat pumps” have been used to prevent global warming. This “heat pump cycle” has the same principle as the “refrigeration cycle”. Many brazed plate heat exchangers are used for their efficiency even in heat pump cycles.



Semiconductors

- Etching devices
- Coaters
- Sputtering devices
- Dicing devices
- Washing devices
- Testers, etc.

Machining tools

- Wire cutters
- Grinding machines
- Spot welders
- Plasma welders
- Laser finishing machines, etc.

Molding

- Plastic molders
- Rubber molders
- Wire coating devices
- Injection molders, etc.

Food

- Bottle washers
- Tofu manufacturing devices
- Noodle production machines, etc.

Analysis

- Electron microscopes
- X-ray analyzers
- Gas chromatographs
- Sugar content analyzers, etc.

Printing

- Offset printers
- Automatic film developers
- UV devices, etc.

Medical

- X-ray apparatus
- MRIs
- Blood storage cooling devices

Hydraulics

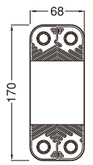
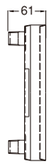
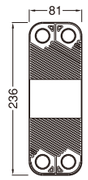
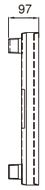
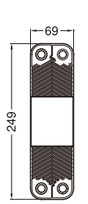
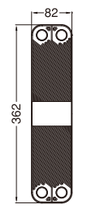
- Presses

Power generation

- Binary cycle generators

Product lineup

The following chart lists the specifications of our standard products.

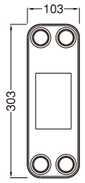
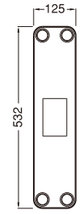
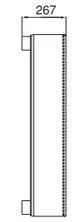
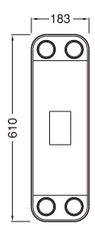
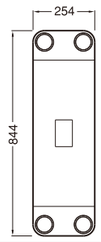
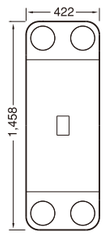
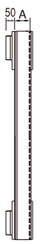
Model	Main specifications			Exterior outline dimensions	
BX-02 Parallel flow (↓↑)	Maximum design pressure (MPa) *1	Cu brazing	4.2		
		Ni brazing	1.5		
	Maximum design temperature (°C) *2	Cu/Ni brazing	200		
	Standard inlet/outlet diameter (A)		10		
	Maximum heat transfer area (m^2/device)		0.3		
BX-05 Diagonal flow (⤭)	Maximum design pressure (MPa) *1	Cu brazing	4.2		
		Ni brazing	3.0		
	Maximum design temperature (°C) *2	Cu/Ni brazing	200		
	Standard inlet/outlet diameter (A)		15		
	Maximum heat transfer area (m^2/device)		0.5		
BX-006 Parallel flow (↓↑)	Maximum design pressure (MPa) *1	Cu brazing	4.5		
		Ni brazing	1.0		
	Maximum design temperature (°C) *2	Cu/Ni brazing	200		
	Standard inlet/outlet diameter (A)		10		
	Maximum heat transfer area (m^2/device)		1.1		
BX-15 Diagonal flow (⤭)	Maximum design pressure (MPa) *1	Cu brazing	3.0		
		Ni brazing	1.0		
	Maximum design temperature (°C) *2	Cu/Ni brazing	200		
	Standard inlet/outlet diameter (A)		15		
	Maximum heat transfer area (m^2/device)		0.9		

Model display

BX□-□□□-□□□□-□□□

- **Plate thickness**
- **Plate model**
- **Brazing material**
  C: Copper (Cu)
  N: Nickel (Ni)
- **Series name**
- **Frame model** (Combination of the following)
  Frame/ N: Wave plate can be seen from the exterior
  P: Exterior is a flat plate
  Nozzle positions/ E: Only if there are nozzles on the front and rear sides
  Nozzle form *3**/** I : Internal thread
  O: External thread
  B: For brazing
  Q: Quick nozzle
  X: Special, etc.
- **Number of plates**

***1: The maximum design pressure may vary depending on the frame model. Please confirm with us regarding your selection.**
***2: The maximum design temperature varies depending on the conditions of use. Please confirm with us regarding the actual design temperature.**
***3: The nozzle shape varies depending on the model. Please inquire at our company.**

Model	Main specifications			Exterior outline dimensions	
BX-20 Parallel flow (↓↑)	Maximum design pressure (MPa) *1	Cu brazing	4.2		
		Ni brazing	2.0		
	Maximum design temperature (°C) *2	Cu/Ni brazing	200		
	Standard inlet/outlet diameter (A)		25		
	Maximum heat transfer area (m^2/device)		3		
BX-30 Parallel flow (↓↑)	Maximum design pressure (MPa) *1	Cu brazing	4.2		
		Ni brazing	2.3		
	Maximum design temperature (°C) *2	Cu/Ni brazing	200		
	Standard inlet/outlet diameter (A)		25		
	Maximum heat transfer area (m^2/device)		6.2		
BX-50 Parallel flow (↓↑)	Maximum design pressure (MPa) *1	Cu brazing	4.2		
		Ni brazing	2.3		
	Maximum design temperature (°C) *2	Cu/Ni brazing	200		
	Standard inlet/outlet diameter (A)		50		
	Maximum heat transfer area (m^2/device)		20		
BX-70II Parallel flow (↓↑) **BX-70X** Diagonal flow (⤭)	Maximum design pressure (MPa) *1	Cu brazing	3.3		
		Ni brazing	1.3		
	Maximum design temperature (°C) *2	Cu/Ni brazing	200		
	Standard inlet/outlet diameter (A)		65		
	Maximum heat transfer area (m^2/device)		52		
BX-90 Diagonal flow (⤭)	Maximum design pressure (MPa) *1	Cu brazing	2.8		
		Ni brazing	—		
	Maximum design temperature (°C) *2	Cu brazing	200		
	Standard inlet/outlet diameter (A)		125		
	Maximum heat transfer area (m^2/device)		98		

Regarding the use of Hisaka brazed plate heat exchangers

Please carefully read the user's manual (included with the unit) before use, and use the product properly.
You can also download the user's manual from our homepage.

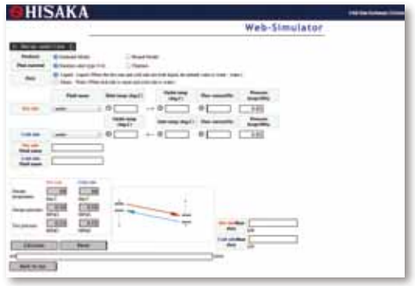
http://www.hisaka.co.jp/phekatalog/index.html

Model selection

Design plate heat exchangers over the Web!

HISAKA Web-Simulator (HWS)

This is the world's first plate heat exchanger design website opened on the Internet. Access the URL below, and click on the Heat Exchanger Division. Follow the on-screen directions from the Heat Exchanger Division top page, and input your design conditions. Just like that, you can design the plate heat exchanger you want. This allows for optimal design simulation of plate heat exchangers, anytime, anywhere, to meet your needs.



If you would like brazed plate heat exchangers from Hisaka Works, Ltd., please fill in the following items and fax it to the number below.
One of our representative will contact you. If you tell us any other necessary information besides those items below, we can offer you an even better selection of models.
If you have any questions, please feel free to contact your local agency or sales representative.

Osaka FAX : +81-72-966-9602　Nagoya FAX : +81-52-217-2494　Tokyo FAX : +81-3-3562-2759

		Hot side		Cold side	
Liquid name					
Flow rate	m^3/hr				
Temperature	°C	Inlet	Outlet	Inlet	Outlet
Vaporizing temperature	°C	———			
Compression temperature	°C			———	
Amount of heat exchanged	kW				
Permissible pressure damage	MPa				
Design pressure	MPa				
Liquid properties Not necessary for water	Specific gravity				
	Specific heat	KJ/kg°C		KJ/kg°C	
	Thermal conductivity	W/m°C		W/m°C	
	Viscosity 1	mPa·s (at °C)		mPa·s (at °C)	
	Viscosity 2	mPa·s (at °C)		mPa·s (at °C)	
Material	Plate	SUS316			
	Brazing	☐ Copper / ☐ Nickel			

Global Network

—Bringing our technology overseas!—

●Hisaka Group

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