Online Simulator

HISAKA Web-Simulator (HWS)

This is the first plate heat exchanger design website opened on the Internet in the world.
Access the URL below and click on the Web-Simulator icon.
You can simulate the plate heat exchanger perfect for your needs, any time of the day, from anywhere.

http://www.hisaka.co.jp/simulator_english/

Quotation Request by FAX

Osaka - FAX: +81-6-6363-0161

If necessary to help for selection of Plate Heat Exchanger, please fax the form below to us.

1. Heat duty		kW
	Hot side	Cold side
2. Fluid name		
3. Inlet temperature	°C	°C
4. Outlet temperature	°C	°C
5. Flow rate	m^3/h	m^3/h
6. Pressure loss	MPa or less	MPa or less
7. Maximum working pressure	MPaG	MPaG
8. Special notes Plate materials, gasket materials, etc.		

HISAKA WORKS, LTD. Heat Exchanger Div.

Sales Department
Osaka Sales Section : 2-12-7 Sonezaki, Kita-ku, Osaka City,
Osaka 530-0057 Japan
TEL: +81-6-6363-0020 FAX: +81-6-6363-0161
Tokyo Sales Section : 1-19-8 Kyobashi, Chuo-ku,
Tokyo 104-0031 Japan
TEL: +81-3-5250-0760 FAX: +81-3-3562-2760
Nagoya Sales Section: 1-12-17 Sakae, Naka-ku, Nagoya City,
Aichi 460-0008 Japan
TEL: +81-52-217-2491 FAX: +81-52-217-2494
Customer Service : 2-1-48 Higashi-konoike-cho, Higashi-Osaka City,
Osaka 578-0973 Japan
TEL: +81-72-966-9601 FAX: +81-72-966-8923

URL: http://www.hisaka.co.jp/english/phe/

The Thermal Solution Company

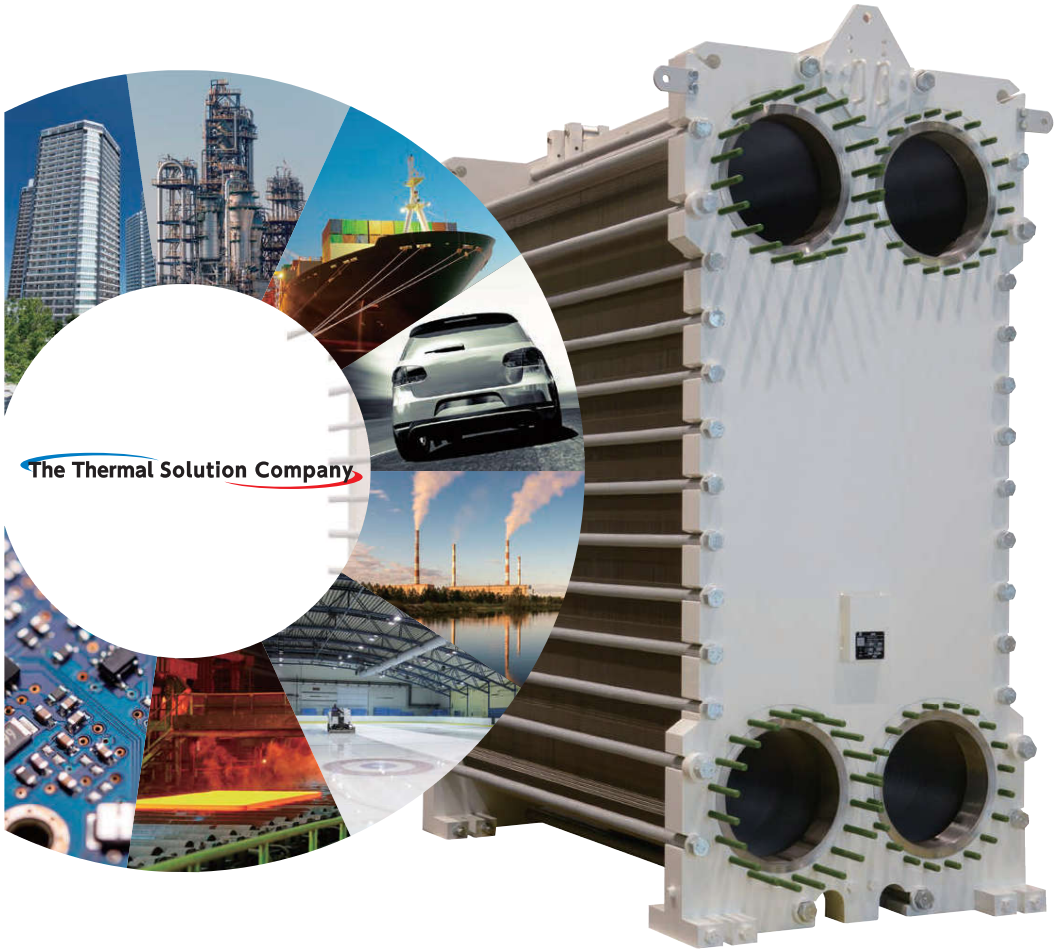
Using plate type heat exchangers as our core technology, HISAKA WORKS provides thermal solutions to our customers all over the world.

"HISAKA WORKS, LTD., Heat Exchanger Division" is ISO9001 and ISO14001 certified.

Agent

HE-CE000222
18.11.100 AIB

Plate Heat Exchanger



HISAKA

The Thermal Solution Company

**Using plate type heat exchangers as our core technology,
we provide thermal solutions to our customers all over the world.**

HISAKA WORKS / Konoike Plant

HISAKAWORKS S.E.A. (Malaysia)

HISAKA WORKS (CHINA) CO., LTD. (China)

UX-160, one of the largest plate heat exchangers in the world

**Use it "surely."
Use it "more."
Use it "longer" into the future.
HISAKA continues
to supply reliable
plate heat exchangers.**

HISAKA WORKS, LTD. is the largest plate heat exchanger manufacturer in Asia.
By manufacturing and selling plate heat exchangers used in applications such as heating, cooling, sterilization, pasteurization, heat recovery, and condensation in various industrial processes for chemicals, food, air conditioning, marine, pulp and paper, steel / metal and automobile and related. We contribute to the effective use of resources and the improved efficiency of production facilities. We are also actively engaged in overseas expansion. We have established network in Malaysia, Thailand, Singapore, China, South Korea, Indonesia, Vietnam, the Philippines, and Saudi Arabia, and also provide technology to ARSOPI THERMAL (Portugal).

40,000 ton press, one of the largest in the world

Fully-automated 20,000 ton press

High-speed, automated 4,000 ton press

Design Plate Heat Exchangers Online

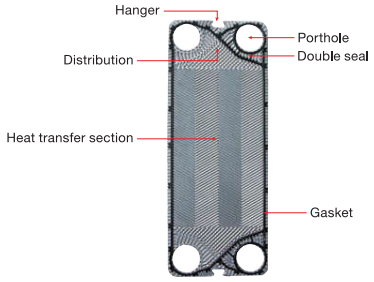
Since we delivered our first domestically-produced device in 1953, HISAKA plate heat exchangers have been used in all kinds of industries as compact heat exchangers with maximum efficiency. In order to meet more diverse and more sophisticated needs, we have arranged a rich variety of models, from small models of 0.18 m²/unit to large models up to 3,400 m²/unit.

Basic Structure

Heat transfer plates are made by pressing thin sheets of corrosion-resistant metal such as stainless steel or titanium, then set them with seal gaskets and hang and pile them on the guide bar. Then, plates are tightened with bolts between the fixed frame and the movable frame. Here, there is a certain gap between the heat transfer plates that allows liquid to flow. The liquid inlets and outlets are in the fixed frame or the movable frame.

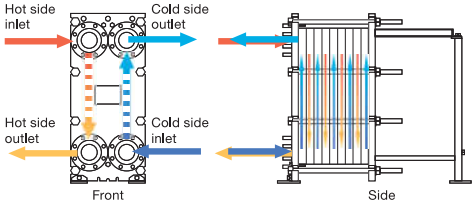
Heat Transfer Plate

Each heat transfer plate is corrugated to various patterns to increase its strength and surface area. Furthermore, the corrugation makes high turbulence and thereby achieves high heat transfer coefficient. Portholes are formed in the plate's four corners. The gasket is set into the groove around the plate edge to seal in the fluid. (Refer to P7.)

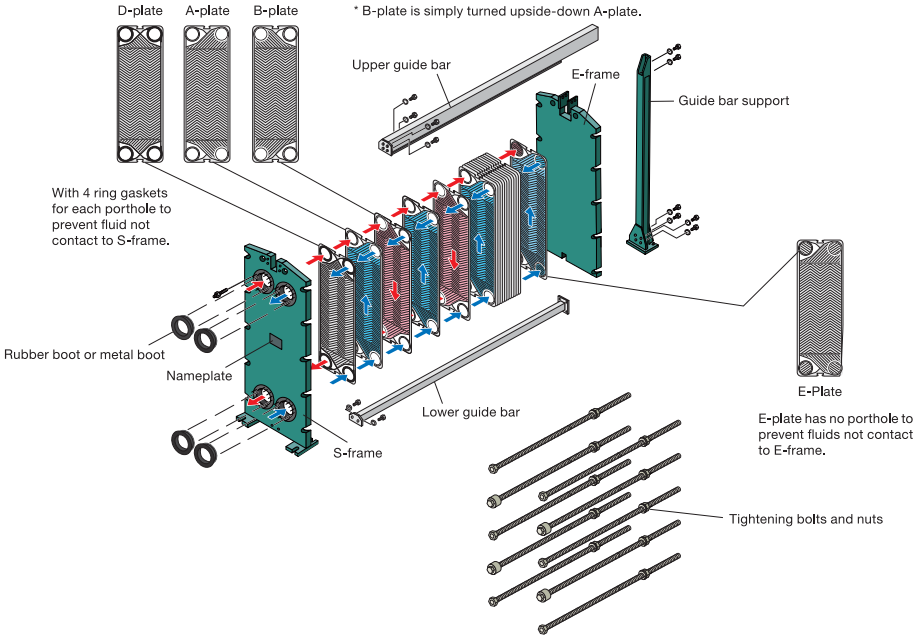


Herringbone pattern plate

Flow Channel of Fluid



Structure of a Plate Heat Exchanger (PHE)



Standard Operational Data

Processing capacity: 0.1 m³/h to 7,300 m³/h
Working pressure: max. 4.0 MPaG
Working temperature: max. 180°C
Heat transfer area: 0.18 m²/unit to 3,400 m²/unit
Plate material:
- Stainless steel: 304, 316, 315J1, 317, Etc.
- Titanium: TP270, TP270-Pd
- High nickel alloy: C-276, C-22, B, G
- Nickel: NNCP, NLCP
- Other: Domestic and international standard materials

Gasket materials:
- NBR, IIR, EPDM, FPM, Silicon,
- TCG (PTFE cushion gasket)

*** The above data varies depending on the model, material, plate thickness, and operating specifications.**

PHE Model Numbers

The plate type, thickness, and number, and the frame type for HISAKA PHEs are indicated as below.

Plate type

RX-146A-TNHJR-24

- **Series name**: LX·UX·RX·SX·FX·EX·GX·NX·YX·CX
- **Plate type**: 00 (small) to 169 (large)
- **Plate thickness**: 5 ··· 0.5 mm 6 ··· 0.6 mm 8 ··· 0.8 mm 0 ··· 1.0 mm
- **Gasket type**: A: Slit-in type (without glue) B: Slit-in type (with glue) Blank: Glue type
- **Frame type**
- **Number of plates**

Pressure Vessel Code and Standard

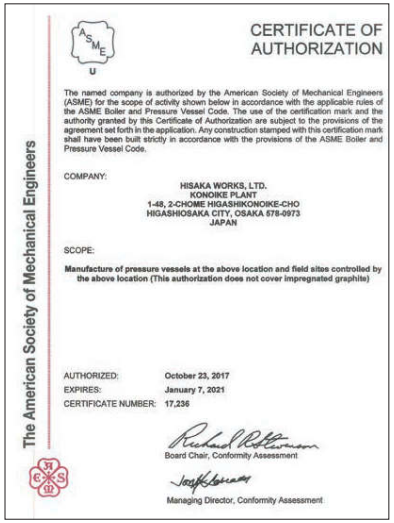
Our company can design and manufacture plate heat exchangers subject to the following regulations and applications. As certain applications may not be possible depending on the model, material, plate thickness, and other factors, please be sure to inquire with us if regulations may apply.

Overseas Standards

ASME Ⓤ STAMP

We can design and manufacture plate heat exchangers in compliance with ASME (American Society of Mechanical Engineers standard).
ASME Boiler and Pressure Vessel Code, Section Ⅷ, Division 1.

Note: As the design temperature may be subject to restrictions depending on the aforementioned plate material, plate thickness, and gasket materials, please be sure to inquire with us.



CERTIFICATE OF AUTHORIZATION

The named company is authorized by the American Society of Mechanical Engineers (ASME) for the scope of activity shown below in accordance with the applicable rules of the ASME Boiler and Pressure Vessel Code. The use of the certification mark and the authority granted by this Certificate of Authorization are subject to the provisions of the agreement set forth in the application. Any construction stamped with this certification mark shall have been built strictly in accordance with the provisions of the ASME Boiler and Pressure Vessel Code.

COMPANY:

HISAKA WORKS, LTD.
KONOIKE PLANT
1-48, 2-CHOME HIGASHIKONOIKE-CHO
HIGASHIOSAKA CITY, OSAKA 578-0973
JAPAN

SCOPE:

Manufacture of pressure vessels at the above location and field sites controlled by the above location (This authorization does not cover impregnated graphite)

AUTHORIZED: October 23, 2017
EXPIRES: January 7, 2021
CERTIFICATE NUMBER: 17,236

Board Chair, Conformity Assessment

Managing Director, Conformity Assessment

The American Society of Mechanical Engineers

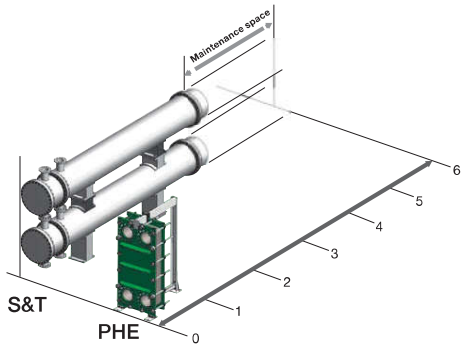
Features

High Performance

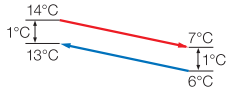
The overall heat transfer co-efficient (U-value) ranges from 4,000 to 9,000 W/m² · °C in water application, since the plate corrugation provides a highly turbulent flow. This is one of the reasons why plate heat exchangers have such a high heat transfer coefficient. In addition, this turbulent flow also acts to prevent scales on the plate surface.

Smaller Footprint

The lightweight and compact construction reduces the installation space to 1/3 and the weight to 1/10 of S&T (shell & tube heat exchangers), respectively. In addition, the lightweight and thin heating plates and less liquid hold facilitate the installation work. The Plate Heat Exchanger can be disassembled for cleaning without piping work, while the S&T heat exchanger needs additional space for drawing out the tube bundle.



The terminal temperatures difference up to the limit.



The construction which permits heat exchanging in a perfect counter-current flow with very efficient heat transfer makes it possible to approach a temperature difference between the hot and cold fluids of 1°C or less.

Line up

We have a rich variety from small to large plate heat exchanger. You can select the most suitable type for your specification requirements.

Easy Maintenance

Loosening the tightening bolts allows for simple disassembly. The heat transfer plates can be easily inspected visually, and cleaning is easy.

Steam available as the heat source

The use of a synthetic rubber gasket with a special composition enables the use of steam as a heat source, that is, an operating temperature range up to 180°C.

Minimal heat radiation

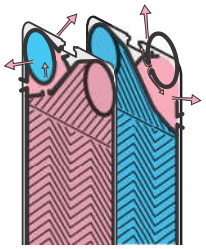
Heat radiation from plate pack is blocked by the gasket, with only a minimal amount of heat radiation from the thin fin-shaped edge. Also, as the front and rear of plate pack is connected to the frame of each through an air layer, the heat radiation is minimal. Except in cases with an extremely small number of plates, it is less than 1% of the heat exchange amount.

Short delivery time

We have a stock of plates in standard materials (SUS304 / 316 and TP270) and have standardized the construction to achieve short delivery time. However, regarding special materials such as high nickel alloy, NNCP, TP270-Pd, and the like, please inquire.

Prevention of Liquid Inter-mixing

Special consideration is taken for the gasket so as to protect it from direct contact with the liquid. Furthermore, the gasket is a double-seal type so as to permit liquid draining outside the exchanger even in a case of a liquid leak caused by its deterioration.



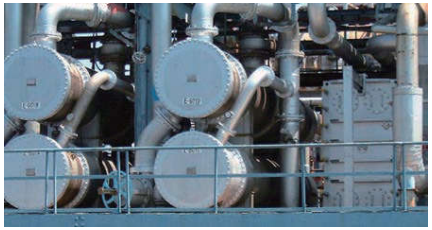


Plate Element Types

The plates are specially selected from various patterns so as to achieve optimum heat transfer area and cost effective heat exchanger type for each requirement. These plates include the corrugated pattern EX and FX series, the herringbone pattern RX, UX, LX, SX, and CX series, and the specific pattern GX and YX series.

Corrugated Pattern

The corrugated pattern is also called the wash board pattern. It has less metal contact points between plates and allows for even liquids with fiber or sludge contents to flow easily without blockage. The FX series was developed exclusively for food application even beyond the conventional corrugated pattern. (Refer to P16)


Corrugated

Herringbone Pattern

The "herringbone" pattern was named as the V-shaped press grooves resemble the bones of a herring. There are numerous contact points by pilling the V-shaped pressed plates, turning them 180° in an alternating pattern. This ensures high pressure resistance, and also the complex flow channels formed by the V-shaped press grooves get high heat transfer performance. Furthermore, including the decreased heat transfer resistance due to the thinner plate results in heat transfer performance three to five times higher than that of S&T heat exchangers.
A herringbone pattern with a W-shaped press groove is called a "double herringbone" and is an improved version of the V-shaped herringbone.
The "lightning herringbone" is a herringbone for higher NTU duty.


Single herringbone


Double herringbone


Lightning herringbone


LX series


RX, UX series


SX series

Pressing depth Deep ⟷ Shallow
Pressing pitch Big ⟷ Small
NTU Low ⟷ High

Specific Patterns

In addition to the above plates, we also develop high-functionality plate patterns, such as multi-gap, exclusive condensation use.

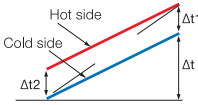
NTU (θ)

NTU = 3 is heat recovery performance of 75%

The heat transfer characteristic of each plate are expressed using NTU (Number of Transfer Unit, θ) and are defined as follows.

$$\theta = U \cdot A / G \cdot C_p = \Delta t / \Delta t_{lm}$$

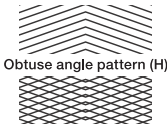
U: Overall heat transfer coefficient
A: Heat transfer area
G: Flow rate of the fluid
Cp: Specific heat of the fluid
Δt: Temperature change of one fluid
Δtlm: Logarithmic mean temperature difference between Δt1 and Δt2

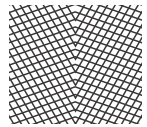


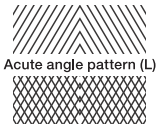
As heat recovery ratio η is expressed as $\eta = \frac{\Delta t}{\Delta t + \Delta t_{lm}}$
when $\Delta t1 = \Delta t2 (= \Delta t_{lm})$, θ is $\eta = \frac{\theta}{\theta + 1}$.
Therefore, for a plate where $\theta = 3$, $\eta = \frac{3}{3+1} = 0.75$,
which means it has a heat recovery performance of 75%.

Plate Patterns and NTU

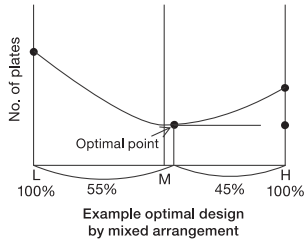
There are two types of herringbone pattern plates; one where the V (W) angle is obtuse (H-plate), and one where it is acute (L-plate). Combining H-plates and L-plates can allow for three types of different flow channels; H-H, H-L, and L-L. Our optimal design method which combines plates, known as the "mixed arrangement," can decrease the heat transfer area by approx. 25% compared to designs with a single plate.


Obtuse angle pattern (H)
H-H combined


Mixed (H-L)

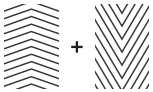

Acute angle pattern (L)
L-L combined

NTU High ⟷ Moderate ⟷ Low
Pressure loss Big ⟷ Moderate ⟷ Small



Example optimal design by mixed arrangement

The figure (left) shows that the heat transfer area is reduced by the mixed arrangement.


H-plate 55% + L-plate 45%

This case shows a mixed arrangement wherein there are 55 H-plates and 45 L-plates for a total of 100 plates.
Two plates form one channel, so there are 45 M channels (H-L) and 5 H channels (H-H). The number of plates is significantly reduced compared to a case with only H channels case.

Gaskets

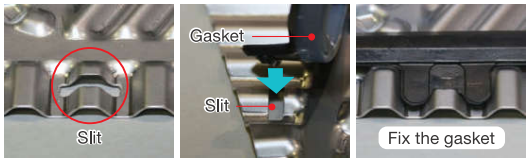
Gaskets used in plate heat exchangers must have durability in various liquid qualities and temperature / pressure conditions. Hisaka has prepared the following gasket materials in order to support a wide variety of applications.

Standard material: NBR, EPDM (ethylene propylene rubber), IIR (butyl rubber)
Special material: FPM (fluororubber), silicon, PTFE cushion gasket

1. Slit-in Gasket (Glue-free type)

These plate gaskets do not need glue. The slit-in gasket is especially recommended for those applications where frequent replacement of the gasket is required. Further, without the glue, glue odor is reduced. The slit-in type gasket is suitable for applications such as water treatment or food processing.
(D-plate gaskets and distance piece gaskets use glue. Also, some plates do not support slit-in gaskets.)

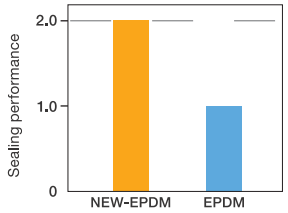
Installation of Slit-in Gaskets



2. NEW-EPDM (N-EPDM)

Usually, EPDM gasket is selected either for high temperature or aggressive fluid applications. Although EPDM gaskets are high quality, rubber gaskets lose elasticity as time passes. A cutting edge N-EPDM gasket, newly developed by Hisaka, was introduced. The N-EPDM gasket improves both the heat and chemical resistance. The life-time is two times higher than conventional EPDM. Originally invented specifically for the CO2 chemical recovery process, the N-EPDM is useful for other applications with many advantages.

Life time of NEW-EPDM and EPDM (180°C)

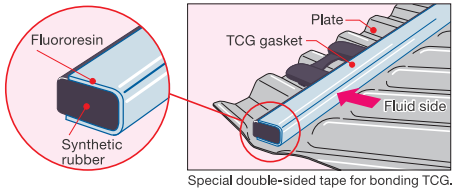


The above compares the sealing performance of the conventional EPDM and the NEW-EPDM. The NEW-EPDM can realize a better heat resistance compared to the conventional EPDM and achieves long time operation.

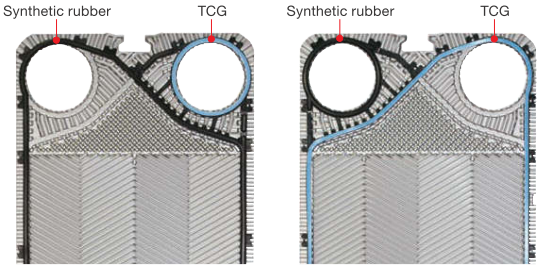
3. PTFE Cushion Gaskets (TCG)

Through our own development, HISAKA has pioneered PTFE Cushion Gaskets for the Plate Heat Exchanger. It is normally used in applications where conventional synthetic rubber would have limitations due to the corrosiveness of the fluid being handled. With this new development, the Plate Heat Exchangers can be applied in a wider variety of applications than before due to the chemical resistance and the durability of PTFE. Due to the elastic core of the TCG gasket, it does not require strong tightening torque during the assembly of the unit. Thus, it reduces the risks of plate deformation by over tightening. A TCG gasket can be used for one side only, if the noncorrosive fluid is running in the other side where a conventional gasket can be used.

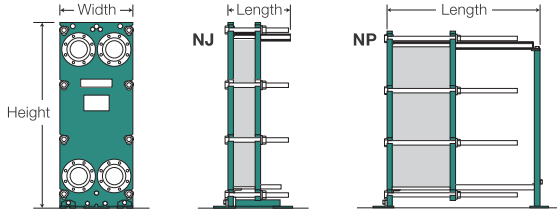
Structure of Fluororesin Cushion Gaskets



Special double-sided tape for bonding TCG.



Dimensions and Weight



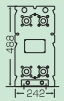
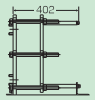
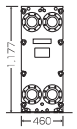
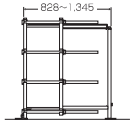
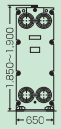
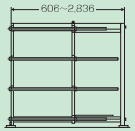
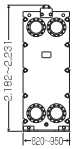
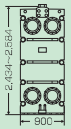
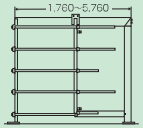
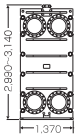
The standard frame is connection type.
Piping is connected directly to the S-frame / E-frame using the stud bolts / nuts on the connection holes of the frame.

For the frame model number, refer to P5.

Model	Installation height (mm)	Installation width (mm)	Heat transfer area and installation length / weight (Top: Installation length (mm) / Bottom: Weight (kg))											
			1m²	5m²	10m²	15m²	30m²	60m²	100m²	200m²	500m²	800m²	1,200m²	1,600m²
RX-00	488	242	400											
			50											
RX-10	1,177	460	396	396	396	836	1,036							
			345	380	427	478	615							
RX-30	1,850	650				816	816	1,216	1,416	1,616				
						1,086	1,222	1,530	1,924	2,932				
RX-50	2,231	820					913	1,113	1,513	2,113	3,513			
							1,983	2,289	2,708	3,730	6,169			
RX-70	2,584	900						1,760	1,760	2,260	4,010			
								2,620	3,030	4,150	7,880			
RX-90	3,140	1,370							1,762	2,012	3,012	4,012	5,512	6,262
									5,890	6,950	10,280	14,290	19,000	22,350
LX-00	857	350	418	518										
			170	210										
LX-10	1,066	460	396	396	836	1,336								
			310	364	433	508								
LX-30	1,675	650			816	816	1,016	1,616	2,216					
					1,000	1,050	1,240	1,630	2,160					
LX-50	2,045	810					913	1,113	1,513	2,313				
							1,920	2,350	2,900	4,310				
LX-90	2,418	1,480						1,007	1,257	2,007	4,010	5,510		
								3,830	4,390	5,840	11,200	15,870		
SX-10	1,590	360	426	426	426	426	726	926	1,526					
			280	310	340	390	500	730	1,030					
SX-20	1,870	540				620	820	1,020	1,220	2,020				
						950	1,050	1,250	1,520	2,220				
SX-30	2,683	684					713	913	1,113	1,713	2,913	3,713		
							1,670	1,860	2,120	2,800	4,970	6,170		
SX-40	2,166	805						913	1,113	1,513	3,113			
								2,040	2,400	3,290	6,210			
SX-70	2,692	1,070								1,510	2,510	3,510		
										4,220	6,270	8,750		
SX-80	2,929	1,220							1,757	1,757	2,507	3,757	4,507	
									4,180	5,130	8,160	11,270	14,820	
SX-90	3,410	1,290									3,000	4,000	5,300	6,300
											8,800	11,200	15,300	18,700
UX-10	1,115	408	392	392	832	832	1,032							
			264	300	353	398	556							
UX-20	1,540	550	372	372	372	798	998	1,598						
			580	630	680	770	940	1,280						
UX-30	1,891	610				608	808	1,008	1,608	2,608				
						970	1,120	1,450	1,880	2,970				
UX-90	2,929	1,300									2,757	4,007		
											8,740	13,210		
UX-100	3,780	1,570									2,757	4,007	5,257	6,507
											12,370	15,990	21,880	26,880
UX-130	4,215	1,570									2,262	3,012	4,012	4,762
											13,110	16,520	21,830	26,520
UX-160	4,246	1,900									2,182	2,852	3,732	4,632
											23,000	26,140	30,360	34,640
WX-10	3,140	1,370		400	832	1,032	1,333							
				449	499	546	716							
WX-50	2,233	820							1,513	2,443				
									3,123	4,190				
WX-90	2,829	1,450									3,300	4,600		
											7,100	10,000		
CX-10	895	346	328	328	638	838								
			170	209	267	325								
GX-20	1,593	580	933	933	933	1,133	1,933							
			520	640	830	1,000	1,460							
EX-15	1,445	550	366	366	792	992	1,192	1,992						
			477	551	697	788	1,063	1,618						
EX-11	2,100	760					1,207	1,407	1,807					
							1,915	2,418	3,088					

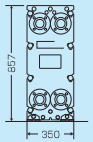
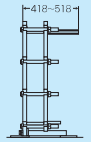
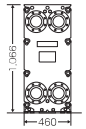
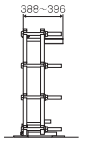
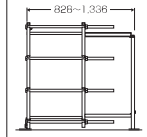
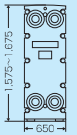
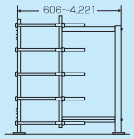
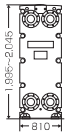
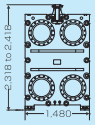
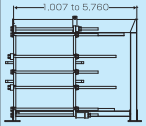
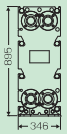
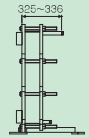
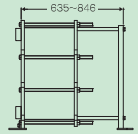
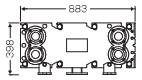
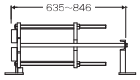
Note: The dimensions and weight are subject to change without notice.

Plate Types and Dimensions

Type	Main specifications		Frame standard type		
			Width and Height	NJ type	NP type
RX-00	Max. flow rate / unit	~20m³/h			
	Max. working pressure	2.0MPaG			
	Max. working temperature	180℃			
	Max. heat transfer area / unit	1m²			
	Porthole Dia.	35mm			
	Connection Dia.	20A			
RX-10	Max. flow rate / unit	197m³/h			
	Max. working pressure	2.7MPaG			
	Max. working temperature	180℃			
	Max. heat transfer area / unit	30m²			
	Porthole Dia.	100mm			
	Connection Dia.	100A			
RX-30	Max. flow rate / unit	445m³/h			
	Max. working pressure	1.8MPaG			
	Max. working temperature	180℃			
	Max. heat transfer area / unit	200m²			
	Porthole Dia.	150mm			
	Connection Dia.	150A			
RX-50	Max. flow rate / unit	923m³/h			
	Max. working pressure	2.1MPaG			
	Max. working temperature	180℃			
	Max. heat transfer area / unit	500m²			
	Porthole Dia.	216mm			
	Connection Dia.	200A			
RX-70	Max. flow rate / unit	1,286m³/h			
	Max. working pressure	1.3MPaG			
	Max. working temperature	150℃			
	Max. heat transfer area / unit	500m²			
	Porthole Dia.	255mm			
	Connection Dia.	250A			
RX-90	Max. flow rate / unit	3,167m³/h			
	Max. working pressure	1.6MPaG			
	Max. working temperature	130℃			
	Max. heat transfer area / unit	1,600m²			
	Porthole Dia.	400mm			
	Connection Dia.	400A			

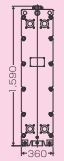
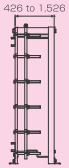
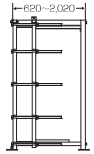
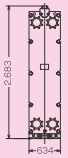
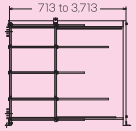
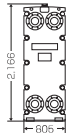
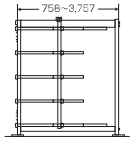
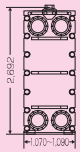
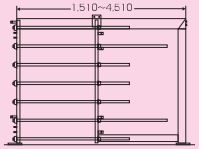
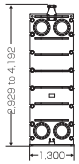
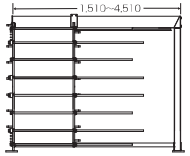
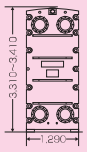
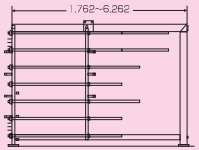
Note : The above data are subject to change without notice.

Plate Types and Dimensions

Type	Main specifications		Frame standard type		
			Width and Height	NJ type	NP type
LX-00	Max. flow rate / unit	69m³/h			
	Max. working pressure	1.8MPaG			
	Max. working temperature	180℃			
	Max. heat transfer area / unit	5m²			
	Porthole Dia.	59mm			
	Connection Dia.	50A			
LX-10	Max. flow rate / unit	197m³/h			
	Max. working pressure	1.6MPaG			
	Max. working temperature	180℃			
	Max. heat transfer area / unit	15m²			
	Porthole Dia.	100mm			
	Connection Dia.	100A			
LX-30	Max. flow rate / unit	481m³/h			
	Max. working pressure	1.25MPaG			
	Max. working temperature	180℃			
	Max. heat transfer area / unit	100m²			
	Porthole Dia.	156mm			
	Connection Dia.	150A			
LX-50	Max. flow rate / unit	791m³/h			
	Max. working pressure	1.25MPaG			
	Max. working temperature	180℃			
	Max. heat transfer area / unit	200m²			
	Porthole Dia.	200mm			
	Connection Dia.	200A			
LX-90	Max. flow rate / unit	3,230m³/h			
	Max. working pressure	1.6MPaG			
	Max. working temperature	130℃			
	Max. heat transfer area / unit	800m²			
	Porthole Dia.	404mm			
	Connection Dia.	400A			
CX-10 Vertical	Max. flow rate / unit	108m³/h			
	Max. working pressure	1.9MPaG			
	Max. working temperature	150℃			
	Max. heat transfer area / unit	15m²			
	Porthole Dia.	74mm			
	Connection Dia.	50A			
CX-10 Horizontal	Max. flow rate / unit	108m³/h			
	Max. working pressure	1.9MPaG			
	Max. working temperature	150℃			
	Max. heat transfer area / unit	15m²			
	Porthole Dia.	74mm			
	Connection Dia.	50A			

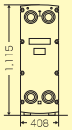
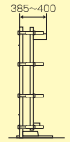
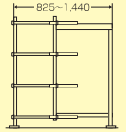
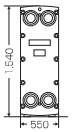
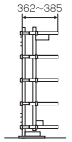
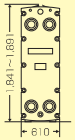
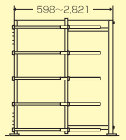
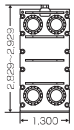
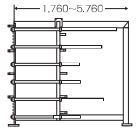
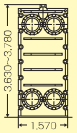
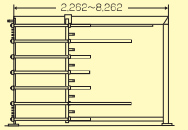
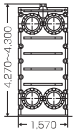
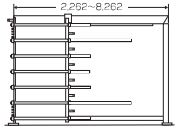
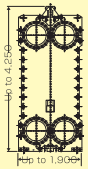
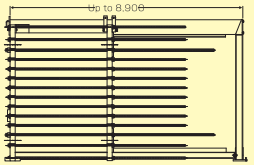
Note : The above data are subject to change without notice.

Plate Types and Dimensions

Type	Main specifications		Frame standard type		
			Width and Height	NJ type	NP type
SX-10	Max. flow rate / unit	80m³/h			
	Max. working pressure	2.0MPaG			
	Max. working temperature	100℃			
	Max. heat transfer area / unit	100m²			
	Porthole Dia.	65mm			
	Connection Dia.	50A			
SX-20	Max. flow rate / unit	220m³/h			
	Max. working pressure	3.0MPaG			
	Max. working temperature	100℃			
	Max. heat transfer area / unit	200m²			
	Porthole Dia.	105mm			
	Connection Dia.	100A			
SX-30	Max. flow rate / unit	445m³/h			
	Max. working pressure	3.0MPaG			
	Max. working temperature	100℃			
	Max. heat transfer area / unit	600m²			
	Porthole Dia.	150mm			
	Connection Dia.	150A			
SX-40	Max. flow rate / unit	940m³/h			
	Max. working pressure	2.4MPaG			
	Max. working temperature	110℃ (100℃ for some cases)			
	Max. heat transfer area / unit	500m²			
	Porthole Dia.	218mm			
	Connection Dia.	200A			
SX-70	Max. flow rate / unit	1,337m³/h			
	Max. working pressure	3.0MPaG			
	Max. working temperature	100℃			
	Max. heat transfer area / unit	800m²			
	Porthole Dia.	260mm			
	Connection Dia.	250A			
SX-80	Max. flow rate / unit	2,424m³/h			
	Max. working pressure	2.0MPaG			
	Max. working temperature	180℃			
	Max. heat transfer area / unit	1,600m²			
	Porthole Dia.	350mm			
	Connection Dia.	350A			
SX-90	Max. flow rate / unit	2,565m³/h			
	Max. working pressure	2.0MPaG			
	Max. working temperature	130℃			
	Max. heat transfer area / unit	1,600m²			
	Porthole Dia.	360mm			
	Connection Dia.	350A			

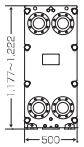
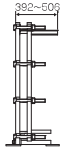
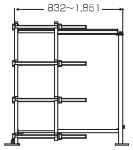
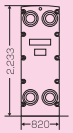
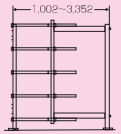
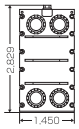
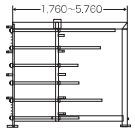
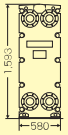
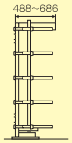
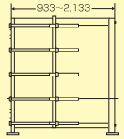
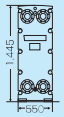
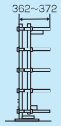
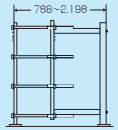
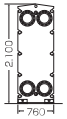
Note : The above data are subject to change without notice.

Plate Types and Dimensions

Type	Main specifications		Frame standard type		
			Width and Height	NJ type	NP type
UX-10	Max. flow rate / unit	97m³/h			
	Max. working pressure	2.5MPaG			
	Max. working temperature	150℃			
	Max. heat transfer area / unit	30m²			
	Porthole Dia.	70mm			
	Connection Dia.	50A			
UX-20	Max. flow rate / unit	197m³/h			
	Max. working pressure	2.0MPaG			
	Max. working temperature	180℃			
	Max. heat transfer area / unit	60m²			
	Porthole Dia.	100mm			
	Connection Dia.	100A			
UX-30	Max. flow rate / unit	285m³/h			
	Max. working pressure	2.2MPaG			
	Max. working temperature	180℃			
	Max. heat transfer area / unit	200m²			
	Porthole Dia.	120mm			
	Connection Dia.	100A			
UX-90	Max. flow rate / unit	2,314m³/h			
	Max. working pressure	1.7MPaG			
	Max. working temperature	150℃			
	Max. heat transfer area / unit	800m²			
	Porthole Dia.	342mm			
	Connection Dia.	350A			
UX-100	Max. flow rate / unit	4,948m³/h			
	Max. working pressure	1.3MPaG			
	Max. working temperature	100℃			
	Max. heat transfer area / unit	1,600m²			
	Porthole Dia.	500mm			
	Connection Dia.	500A			
UX-130	Max. flow rate / unit	4,948m³/h			
	Max. working pressure	1.3MPaG			
	Max. working temperature	100℃			
	Max. heat transfer area / unit	1,600m²			
	Porthole Dia.	500mm			
	Connection Dia.	500A			
UX-160	Max. flow rate / unit	7,300m³/h			
	Max. working pressure	2.3MPaG			
	Max. working temperature	100℃			
	Max. heat transfer area / unit	4,300m²			
	Porthole Dia.	600mm			
	Connection Dia.	600A			

Note : The above data are subject to change without notice.

Plate Types and Dimensions

Type	Main specifications		Frame standard type		
			Width and Height	NJ type	NP type
WX-10	Max. flow rate / unit	209m³/h			
	Max. working pressure	4.8MPaG			
	Max. working temperature	180℃			
	Max. heat transfer area / unit	30m²			
	Porthole Dia.	103mm			
	Connection Dia.	100A			
WX-50	Max. flow rate / unit	791m³/h			
	Max. working pressure	4.1MPaG			
	Max. working temperature	180℃			
	Max. heat transfer area / unit	200m²			
	Porthole Dia.	200mm			
	Connection Dia.	200A			
WX-90	Max. flow rate / unit	2,208m³/h			
	Max. working pressure	2.3MPaG			
	Max. working temperature	150℃			
	Max. heat transfer area / unit	800m²			
	Porthole Dia.	334mm			
	Connection Dia.	350A			
GX-20	Max. flow rate / unit	314m³/h			
	Max. working pressure	0.65MPaG			
	Max. working temperature	130℃			
	Max. heat transfer area / unit	30m²			
	Porthole Dia.	126mm			
	Connection Dia.	100A			
EX-15	Max. flow rate / unit	197m³/h			
	Max. working pressure	1.3MPaG			
	Max. working temperature	180℃			
	Max. heat transfer area / unit	60m²			
	Porthole Dia.	100mm			
	Connection Dia.	100A			
EX-11	Max. flow rate / unit	641m³/h			
	Max. working pressure	1.2MPaG			
	Max. working temperature	180℃			
	Max. heat transfer area / unit	100m²			
	Porthole Dia.	180mm			
	Connection Dia.	200A			

Note : The above data are subject to change without notice.

Plate Heat Exchanger Lineup

Condenser / Gas Cooler (YX)

Cooling water side　Vapor side

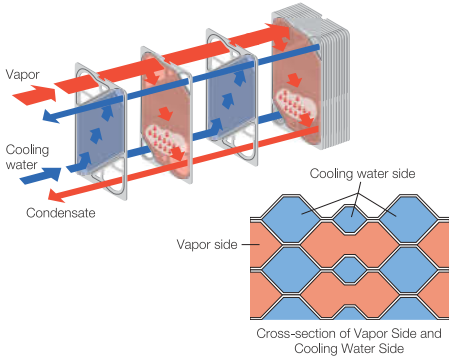
YX-83 plate

Characteristics

1. The heat transfer coefficient is about 2 times higher than that of shell & tube heat exchangers. The condensing surface is always secured and the heat transfer coefficient is improved because condensate is immediately drained out.
2. Special considerations are taken for the plate characteristics in order to achieve a much lower vapor pressure drop than conventional Plate Heat Exchangers.
3. The cooling water consumption is about half that of S&T heat exchangers.
4. TCG gaskets are selectively used to permit a wide range of applications.
5. Less maintenance work, as the plates can be easily cleaned and inspected.
6. The vapor connection sizes holes are the same for the inlets and outlets, allowing for use as a cooling condenser for vapor with inert gas.
7. Various international Pressure Vessel Code and Standard such as ASME, JIS, CE available.

Applications

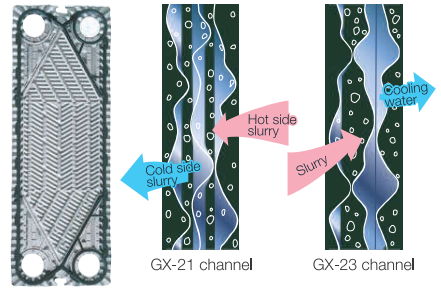
1. Overhead condensers for various distillation columns
2. Condensers / preheaters for evaporators
3. Condensers for gas drying / air conditioning
4. Heat recovery exchangers from exhaust steam
5. Gas coolers, etc.



Cross-section of Vapor Side and Cooling Water Side

Multi Gap Plate (GX)

By combination of one plate arrangement gives 3 multiple-channel configulation.



GX-20　GX-21 channel　GX-23 channel

GX-20
(By reversing and upside-down GX-21 to GX-22.)

Characteristics

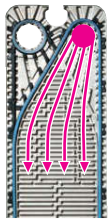
1. Easy for fluids containing solids to flow between wide gap channels (10 mm).
2. A combination of plates provides the widest channel spacing (20 mm).
3. It provides better performance for slurry, sludge and liquid containing crystals.
4. Electrolytic polishing selectively used for food applications.
5. Shorter maintenance time due to the slit-in gasket.

Applications

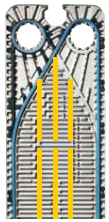
1. **Chemicals**
   - Fluids containing solids: Polyvinyl chloride (polymer), various slurry fluids
   - High viscosity fluids: Rubber latexes, resin latexes
2. **Dyeing**
   - Fluids containing fibers: Waste fluid from Dyeing machine
   - High viscosity fluids: Viscose
3. **Food**
   - Fluids containing solids: Sauce for grilled meat, juice with fiber, factory waste water
   - Fluids containing fibers: Amazake
   - High viscosity fluids: Mayonnaise, various sauces, starch saccharification liquid, syrup
4. **Sugar**
   - Fluids containing solids: Raw juice, sugar making process such as the Steffen process, processed fluids, factory waste water
5. **Pulp and paper**
   - Fluids containing fibers: Diluted black liquor, white liquor
6. **Other**
   - Plating fluid containing sludge, quenching oil
   - High concentration sodium hypochlorite, sodium aluminate
   - Heat transfer for significantly different flow rates on the hot / cold sides plant
   - Snow melting plant

Plate Heat Exchanger Lineup

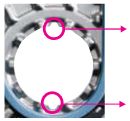
Exclusive Food Application Plate (FX)



Shoulder shape and uniform distribution pattern



Liner and few contact points



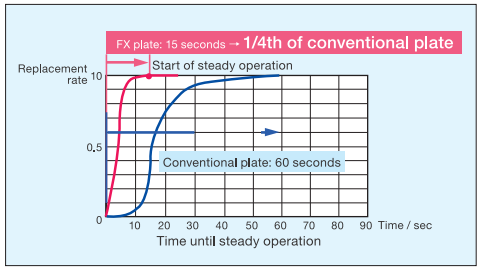
Porthole notch

Air blow notch removes the air in the unit and prevents contamination of bubbles, oxidation, and scorching. The drainage notch can completely drain out the fluid or the cleaning detergent in the unit.

Characteristics

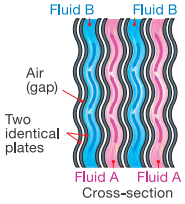
1. The uniform distribution pattern and the shape of the shoulder section are smoothened to create a uniformly smooth flow through the plate channels, enabling product-gently heat transfer with a uniform, and even temperature in the unit.
2. The plate contact points have been significantly reduced to 1/4th of the conventional pattern, and the liner and few contact points arrangement has a self-cleaning effect. For that reason, long-term operation is possible, as it is less to clogs, scales and partial scorching than conventional type.
3. The piston flow in the plate channels reduce the fluid replacement time to 1/4th of the conventional type, significantly reducing the product loss by 75%.
4. There is also little dead space within the channels and holding volume is small, achieving a high CIP effect.
5. The slit-in type TCG gasket also prevents rubber smells / glue smells in the product and remain scents when switching products to be produced.

Less Product Loss



Dual Wall Plate

Dual Wall Plate
In case anyone of plates were to fail, the leak can be detected from outside.



Two identical plates are stacked and laser-welded around the portholes.

The dual wall plate heat exchangers use to achieve "relief and reliance" for preventing contamination of the two fluids.

Characteristics

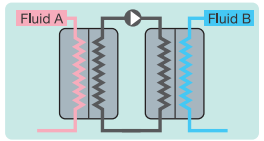
1. The dual wall design prevents any leaks from going farther due to the air gap and the second plate. In case any one of plates were to fail, the leak can be detected from outside because of leaking through the gap of the plates.
2. To prevent intermixing of the fluids, “Double seal gasket” (refer to P6) system is used. Any leakage of fluids across the gasket can be detected from the outside because the liquid escapes from the units.

Applications

1. Cooling of transformer oil, which might explode if mixed with the cooling water
2. Cooling of lubrication or hydraulic oil, which can damage the rotator or hydraulic equipment if mixed with the cooling water
3. Heating / cooling of food processing, where there must be no mixing of foreign materials in the product
4. Heating / cooling of fuel oil (marine gas oil: MGO) where fatigue breakdown due to highly frequent pulsation
5. Heating / cooling in bio-process where the process fluid may cause environmental pollution
6. Heating / cooling between fluids where mixing can cause a sudden chemical reaction or generate environmental pollutants

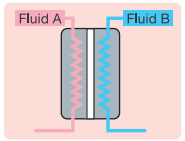
It is normally necessary to install two heat exchangers where it is dangerous if fluid A and fluid B are mixed. However, with the dual wall plate, this is possible with just one unit.

Conventional PHEs Installation



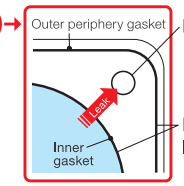
2 sets of heat exchangers in addition to extra pumps and piping.

Dual Wall Installation



Only one PHE is enough for the duty.

Double-lined Gasket Plate Hestia NX-50



Leak detection hole

Leak detection
Even if a leak from the inner gasket occurs, a leak can be detected promptly.

Double-gasketed line design

Prevention of oxidation degradation
This prevents oxidation degradation of the inner gasket due to outside air.

Prevention of dispersal
Dispersion of fluid to outside of the unit is prevented the fluid from reaching outside.

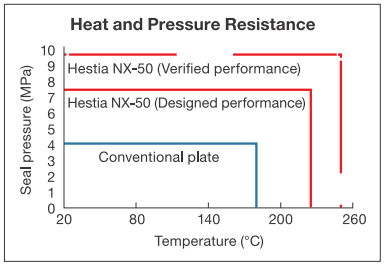
Characteristics

1. The double-gasketed line design provides a gasket line to the outermost periphery to inhibit oxidation degradation in the inner gasket (which serves as a seal) from outside air.
2. It prevents leakage dispersal. Should a leak occur in the inner gasket, this prevents the fluid from reaching outside.
3. To achieve high heat-resistance, the compounding ratio of the gasket has been improved.
4. The improved gasket groove and plate pattern increase seal pressure and ensure high pressure-resistance.
5. It achieves a life time 5 times longer than Hisaka's conventional Plate Heat Exchangers.
6. High heat-resistance and pressure-resistance allow for environments with high temperature of 250°C and seal pressure of 9.5Mpa or higher, which conventional PHE couldn’t use.

Applications

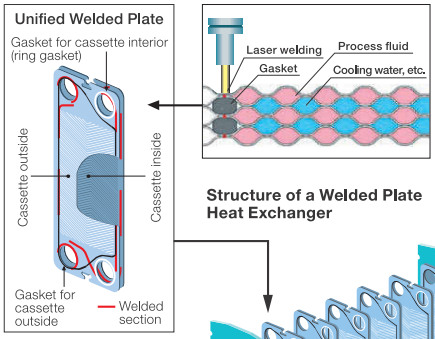
1. High temperature / High pressure fluids
   High temperature, high pressure heat exchangers around boilers or the like
   Heat exchangers in conventional / nuclear power applications
2. Dangerous fluids
   Heat exchangers for flammable and dangerous fluids in locations such as chemical plants

High-Heat / High-Pressure Resistance

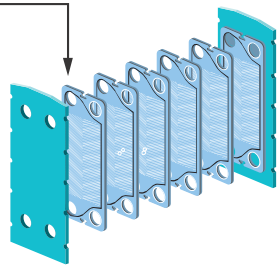


* The Hestia NX-50 was developed jointly with Hitachi-GE Nuclear Energy, Ltd.
* Patent pending

Semi-welded Plate (WX)



Structure of a Welded Plate Heat Exchanger



Characteristics

1. A couple of plates are laser welded with o-ring at portholes between the plates. One fluid flowing through the inside of the cassettes and the other fluid flowing on the outside of the cassettes.
2. As disassembly is possible for each plate cassette, both sides of the plate cassette can be cleaned.
3. As plate cassettes is sealed by laser welding except the portholes, this product is fit for high pressure duty, Freon refrigerants or fluids that corrode synthetic rubber.
4. There are two types of ring gaskets; a synthetic rubber, and PTFE gasket (TCG) with outstanding chemical resistance.

Applications

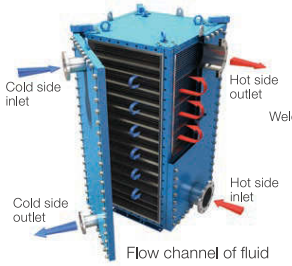
1. Heating / cooling of fluids that corrode synthetic rubber
2. Heating / cooling of dangerous fluids such as sulfuric acid
3. Heating / cooling for the duty exceeding the heat or pressure resistance of gasket-type plate heat exchangers
4. Heating / cooling in refrigeration cycles using refrigerant

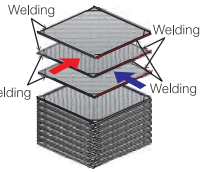
Specification

	Conventional model	Welded model
Pressure resistance	Up to 3.0 MPaG	Up to 4.0 MPaG
Heat resistance	150°C	180°C

Plate Heat Exchanger Lineup

Welded Plate Heat Exchangers





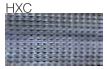
Press-molded plates are layered then laser-welded to create the plate flow channels.

Variety of plate gap

(1) Both sides dirty fluids
HXS: Both side rectangular free gap circuits equipped with studs.

(2) One side highly charged fluid
HXE: One side free gap circuit and the other side dimpled circuit.

(3) One charged fluid
HXC Freeflow: One side free gap corrugated circuit and the other side corrugated circuit.



(4) Both sides lightly charged fluid
HXC: Both sides corrugated circuits

*Free gap: Plate gap with no contact between the heat transfer plates

Characteristics

1. The press-molded plate is molded with a special corrugation pattern to ensure a high transfer coefficient.
2. It supports high temperatures and high pressures, showing its performance in a wide range of fields.
3. The seal gasket consists only of the side cover, so there are virtually no restrictions due to gasket materials.
4. As baffles can be installed to enable a multi-pass design, heat transfer performance is close to a counter-current flow, and has a flexible flow rate.
5. As the holding volume is small, the amount of fluid remaining in the unit is also small and only a small amount of CIP detergent can be used.
6. Easy mechanical cleaning by the cross flow channel structure.

Applications

1. Heat transfer process for higher efficiency than Shell & Tube heat exchangers
2. Heat recovery in high temperature / high pressure applications
3. Condensers
4. Vaporizers
5. Heat transfer process where a Gasketed PHE cannot be used

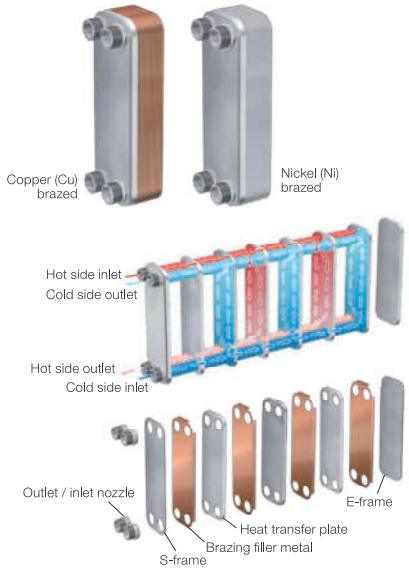
They are also able to replace Shell & Tube heat exchangers in other cases as well.

Specification

Max. working pressure	3.5 [MPaG]
Max. working temperature	Up to 350 [°C]
Connection size	50A to 600A
Max. heat transfer area	Up to 700 m²/unit
Plate material	Stainless steel, titanium, high nickel alloy

* The above mentioned varies depending on the operating conditions. Please inquire with our company when planning.

Brazed Plate Heat Exchangers



Characteristics

1. Brazed plate heat exchangers are brazed stainless steel plates by brazing filler metal such as copper or nickel.
2. It is high performance and allows for a small heat transfer area.
3. Due to the small heat transfer area and the thin material by sturdy brazed structure, light weight, and compact design are achieved.
4. With brazed structure, it provides a high level of sealing and outstanding heat and pressure resistance.
5. The brazed structure reduced material to minimum is fit for mass production and is economically outstanding.

Applications

1. Vaporizers / condensers of refrigerant in compression refrigeration cycles (refrigerators / heat pumps)
2. Solution heat exchangers for absorption refrigerators
3. Industrial and home water heaters
4. Heat recovery heat exchangers for cogeneration systems or gas heat pumps
5. Oil coolers for hydraulic equipment
6. Heat exchangers for temparature control of various industrial equipment and medical examinations

Specification

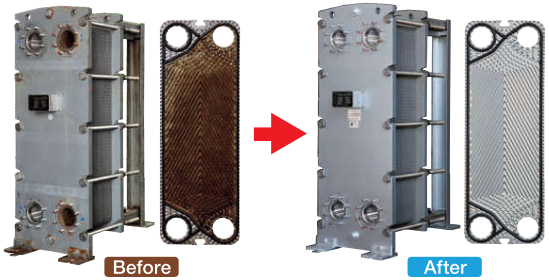
Design pressure: F.V. to 4.5 MPa
Design temperature: -100°C to 200°C

* The above mentioned varies by model. Please inquire with our company when planning.

Maintenance Menu

PHE Total Maintenance [Full Service Package] from pickup to assembly

The Full Service Package is a total maintenance service in HISAKA. PHE disassembly, visual checks of plates, cleaning, regasketing, frame repairs, assembly, and final inspection are all performed by service centers, for the best possible performance and a long operating life time for PHEs.
We also offer the "Full Service Package" for plates only.



Return Containers for "Full Service Package" for plate only (Optional)

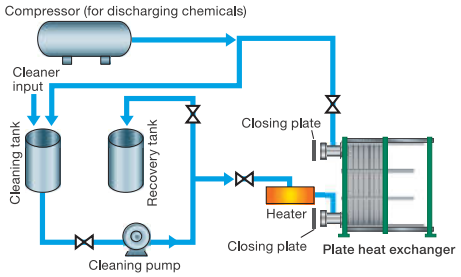
Return containers that precisely fit the plates that are currently in use are provided upon customers' request.

On-site Maintenance

HISAKA can send skilled service engineers to perform maintenance work at the customer's site. We use specialized tools, such as automatic tightening devices, to efficiently dissemble and assemble the PHE and high temperature hot water jet cleaning to remove to sticky oil residues, providing high quality maintenance service at the customer's site.

Cleaning In Place (CIP)

Disassembly and cleaning a PHE makes it possible to remove hard scale and clogging matters and to recover performance to nearly the same level as new. However, if disassembly and cleaning are not possible, HISAKA offers CIP using "Plate-Clean" at customers' site. Before scaling, CIP with Plate-Clean can restore performance by removing scale through washing and dissolving. This is effective in prolonging the disassembly cleaning cycle of the PHE. This is effective for extending the disassembly cleaning cycle of plate heat exchangers.



CIP Flow Chart

Plate-Clean

Plate-Clean is a dedicated cleaner for PHEs. By circulating the cleaner inside the PHE, hard scale that forms on the cooling water, warm water, and steam sides can be easily removed by CIP without disassembling the unit.

*Each cleaner can be purchased.

Plate-Clean S
For slime

Plate-Clean C
For Ca scales

Plate-Clean F
For iron rust

Plate Heat Exchangers Used in Various Applications

Chemicals

Soda, fertilizer, petrochemistry, petroleum refining, oil and fat, chemicals, general inorganic / organic chemical industry, etc.

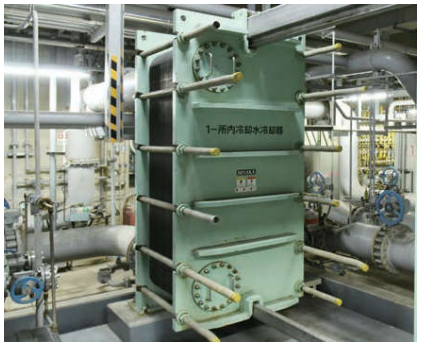
HVAC

Heating / cooling system, water heating, district heating / cooling, building heat storage tank systems, unused energy

Marine

Cooling of engine jacket water and lubricant oil

Electric Power



Generators, cogeneration

Gas Treatment

CO_2 recovery, desulfurization plant solution heat exchange

Metal

Sulfuric acid, electrolytic plating cooling

Environment

Solvent recovery, exhaust gas cooling

Central Cooling

Central cooling system

Iron and Steel

Blast furnace cooling, continuous casting equipment cooling, COG, various plating fluid cooling

Pulp & Paper

Heat exchange of black liquor / white water, oven blow gas condensation, waste heat recovery

Food

Beer, edible oil, sodium glutamate

Fermentation / Distillation

Brewing, alcohol fermentation process such as for bioethanol