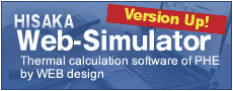


Online Simulator

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.



https://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	m³/h	m³/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 Division

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TEL: +81-52-217-2491 FAX: +81-52-217-2494
- Customer Service:

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TEL: +81-72-966-9601 FAX: +81-72-966-8923
URLhttps://www.hisaka.co.jp/english/phe/



HISAKA provides thermal solutions based on our technologies of the plate heat exchanger to all HISAKA fans in the world.

HISAKA WORKS, LTD., Heat Exchanger Division is both ISO9001 and ISO14001 certified.
HISAKA WORKS, LTD., Konoike Plant is ISO45001 certified.

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Agent

GENERAL CATALOG



Heat Exchanger Division

— Create the future with heat

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

Structure of Plate Heat Exchanger

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.

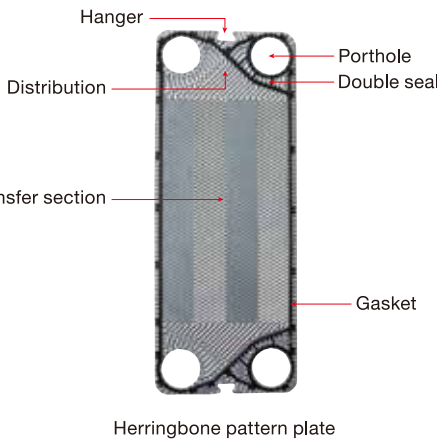
Basic Structure

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.

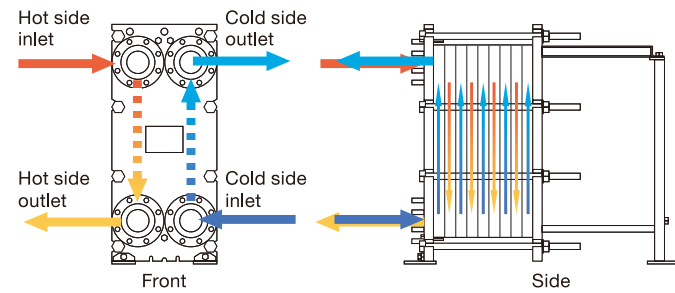


Heat Transfer Plate

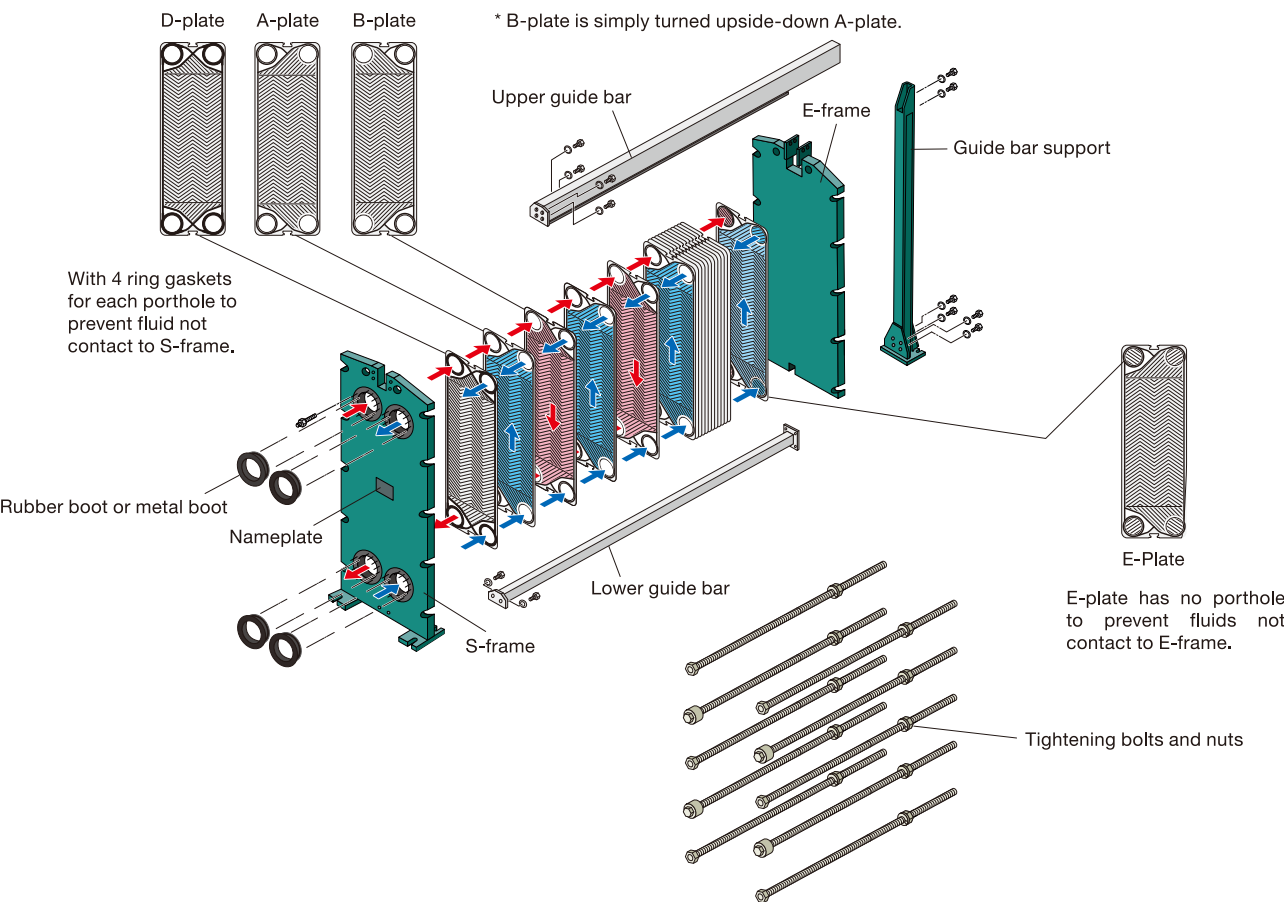
Each heat transfer plate is corrugated to various patterns to increase its strength and surface area. Furthermore, the corrugation makes high turbulence and thereby achieves high heat transfer coefficient. Portholes are formed in the plate's four corners. The gasket is set into the groove around the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



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
- Number of plates**
- Frame type**
- Gasket type**
A: Slit-in type (without glue)
B: Slit-in type (with glue)
Blank: Glue type

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 U 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.



Features

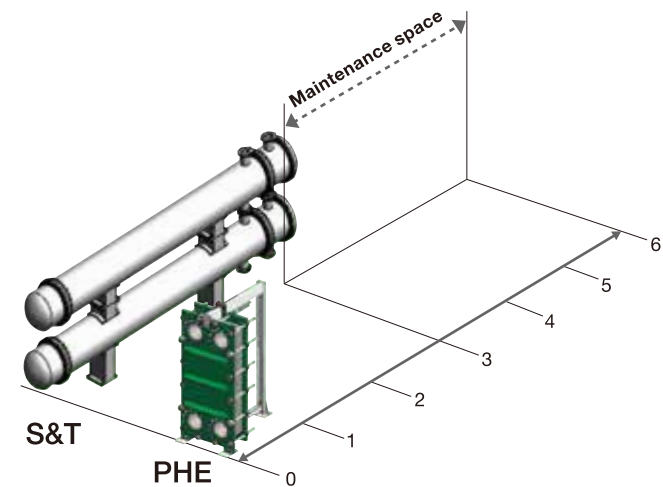
High Performance

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.



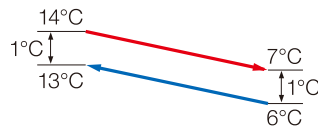
Smaller Footprint

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.

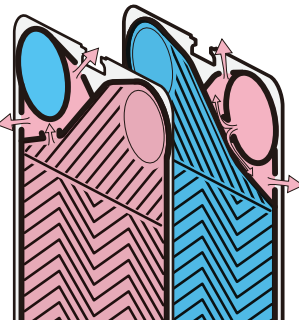


Plate Element Types

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)



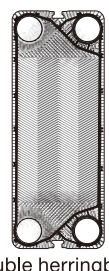
Corrugated

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



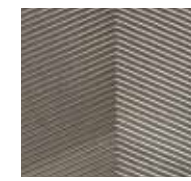
Lightning herringbone



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.

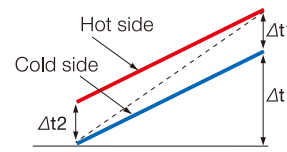
NTU (θ)

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
Δt_{lm}: Logarithmic mean temperature difference between Δt1 and Δt2



As heat recovery ratio η is expressed as $\eta = \frac{\Delta t}{\Delta t + \Delta t_{lm}}$

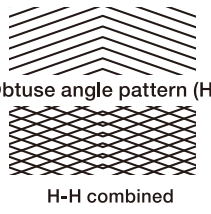
when Δt1 = Δt2 (= Δt_{lm}), θ is $\eta = \frac{\theta}{\theta + 1}$

Therefore, for a plate where θ = 3, $\eta = \frac{3}{3 + 1} = 0.75$,

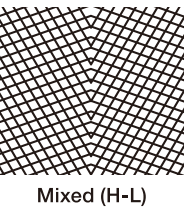
which means it has the performance of 75% heat recovery.

Plate Patterns and NTU

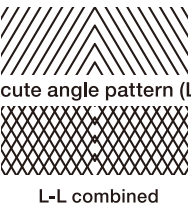
There are two types of herringbone pattern plates; one where the V (W) angle is obtuse (H-plate), and one where it is acute (L-plate). Combining H-plates and L-plates can allow for three types of different flow channels; H-H, H-L, and L-L. Our optimal design method which combines plates, known as the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



Obtuse angle pattern (H)

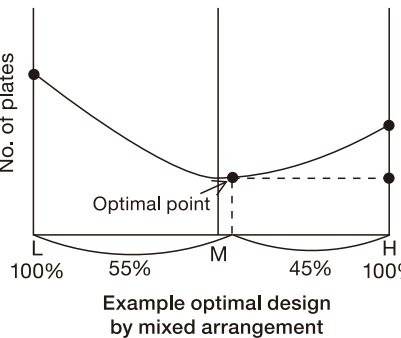


Mixed (H-L)

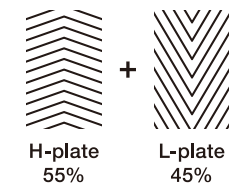


Acute angle pattern (L)

NTU High ← → Moderate ← → Low
Pressure loss Big ← → Moderate ← → Small



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



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

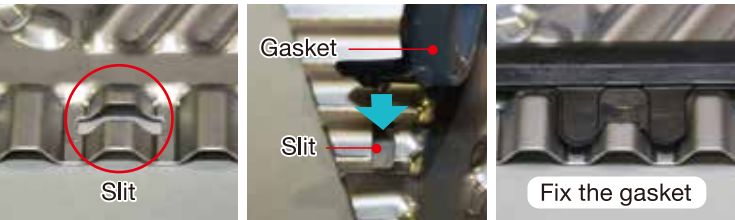
Gaskets used in plate heat exchangers must have durability in various liquid qualities and temperature / pressure conditions. Hisaka has prepared the following gasket materials in order to support a wide variety of applications.

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.)

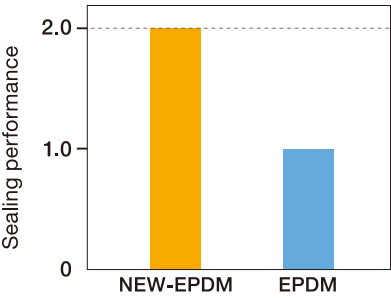
Installation of Slit-in Gaskets



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

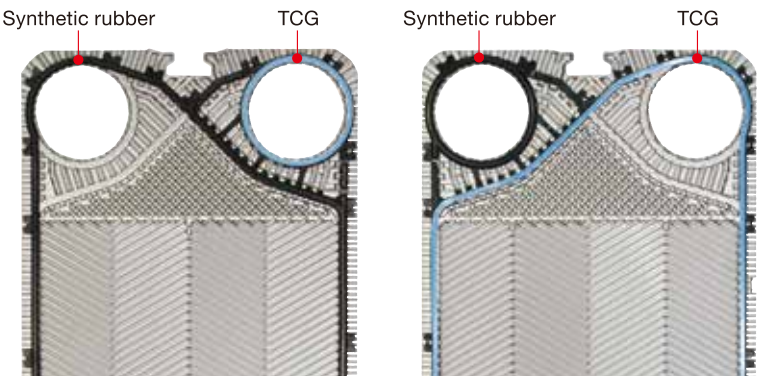
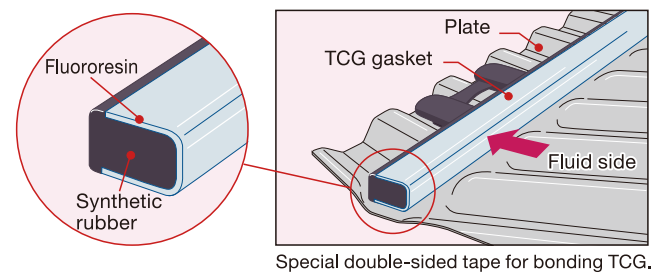
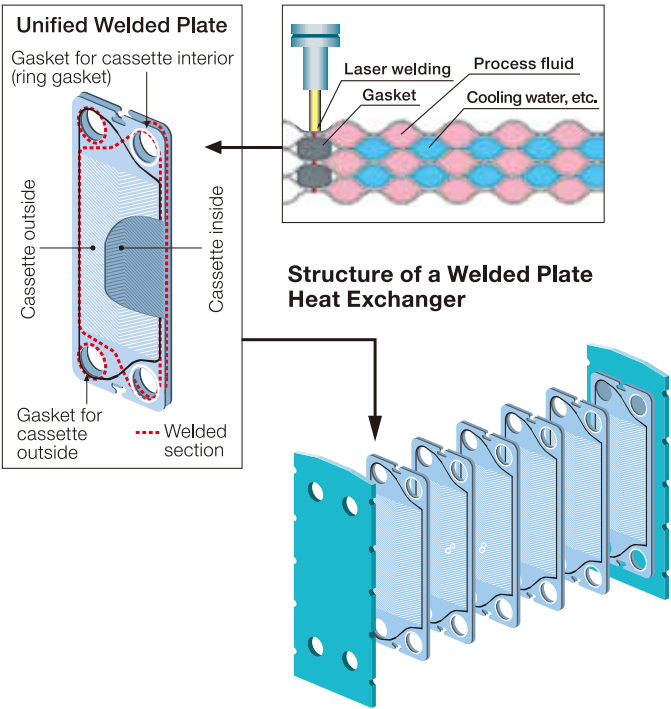


Plate Heat Exchanger Lineup

Semi-welded Plate (WX)



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.

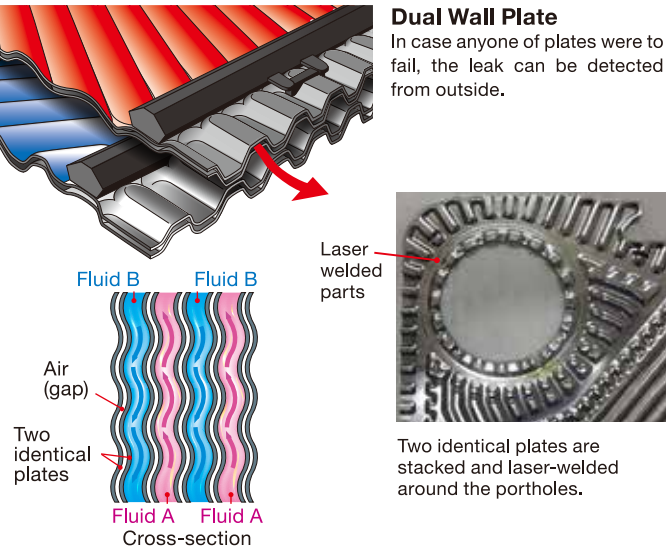
Applications

- 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

Dual Wall Plate



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.

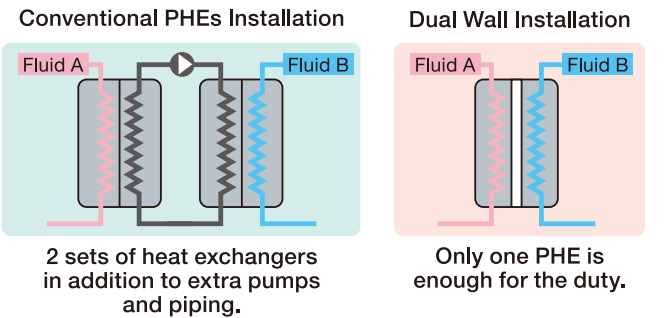


Plate Heat Exchanger Lineup

EXOLUTION (DXC)



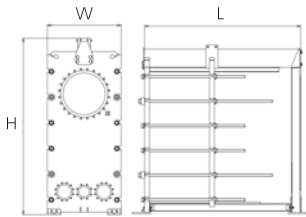
New proposal for condenser with high flow rate to save installation space

Characteristics

- 1 The ultra-large diameter of $\phi 650$ enables processing of vapors up to 70,000 m³/h.
- 2 The high density of the heat transfer surface significantly reduces the size, weight and installation space of the equipment compared to Shell & Tube heat exchanger.
- 3 A special flow path structure is adopted, which is different on the condensation side and the cooling side. The system can achieve a low pressure drop suitable for vapor treatment.
- 4 The nozzle layout maximizes the heat transfer length and achieves high heat transfer efficiency.

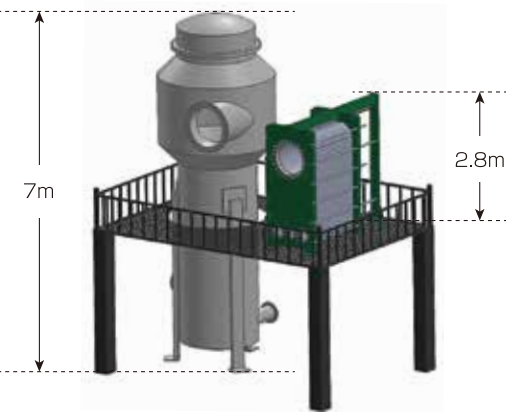
Applications

- 1 Vacuum vapor condenser
- 2 Concentration can condenser
- 3 Replacement of Shell & Tube heat exchanger, etc.



Scope of application

Plate Material	SUS316, SU316L, TP270
Gasket Material	NBR, EPDM, FPM
Maximum design temperature	150°C
Maximum design pressure	0.9MPaG
Equipment size (reference)	L1750~6250xW1150xH2775



Size comparison with vertical Shell & Tube heat exchanger

Condenser / Gas Cooler (YX)



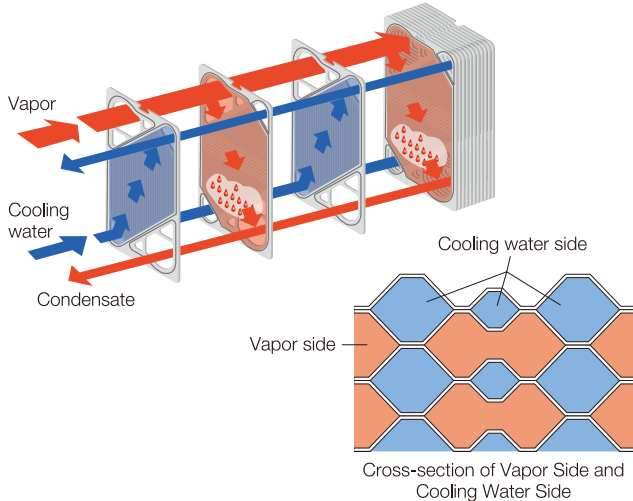
YX-83 plate

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.



EXOLUTION (NX-30)



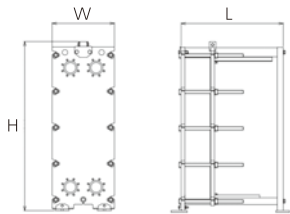
Longer service life due to special construction and safety provided by leakage control

Characteristics

- 1 Double seal line construction with a gasket on the outermost circumference. Oxidative deterioration of the inner gasket can be suppressed.
- 2 The plate thickness is 1.0 mm and a maximum test pressure of 4.0 MPaG has been achieved.
- 3 Even if leakage should occur with the inner gasket, the outermost gasket prevents external dispersal.
- 4 A longer service life of the gasket has been achieved. The replacement cycle of gaskets can be extended.

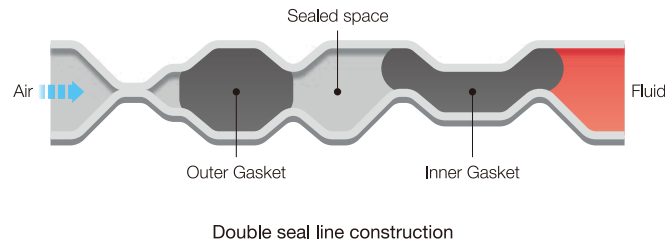
Applications

- 1 Heat recovery in the high temperature range
- 2 Indirect heat exchanger for binary power generation
- 3 Replacement of multi-tube heat exchanger, etc

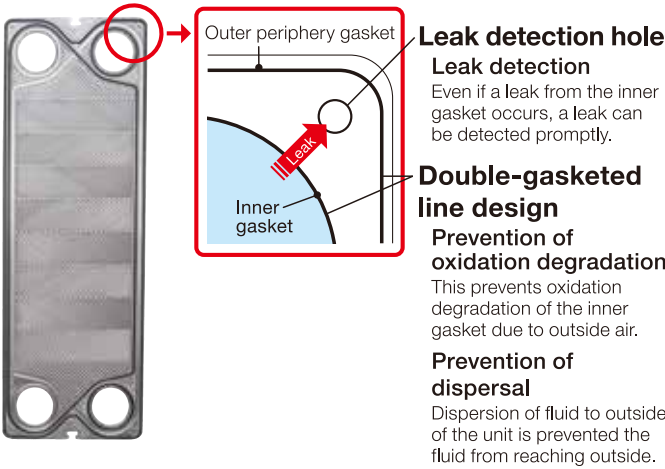


Scope of application

Plate Material	SUS316, SU316L, TP270, NW2200
Gasket Material	NBR, EPDM, FPM
Maximum design temperature	180°C
Maximum design pressure	3.2MPaG
Equipment size (reference)	L712~3912xW710xH1916



Double-lined Gasket Plate Hestia NX-50



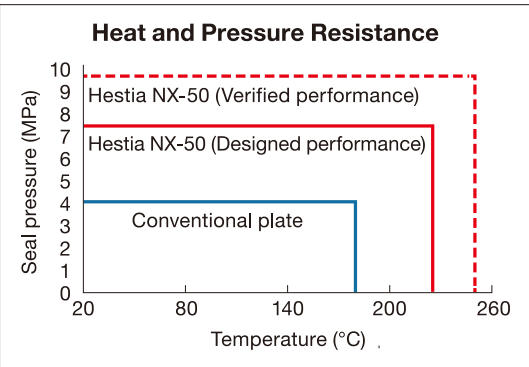
Characteristics

- 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

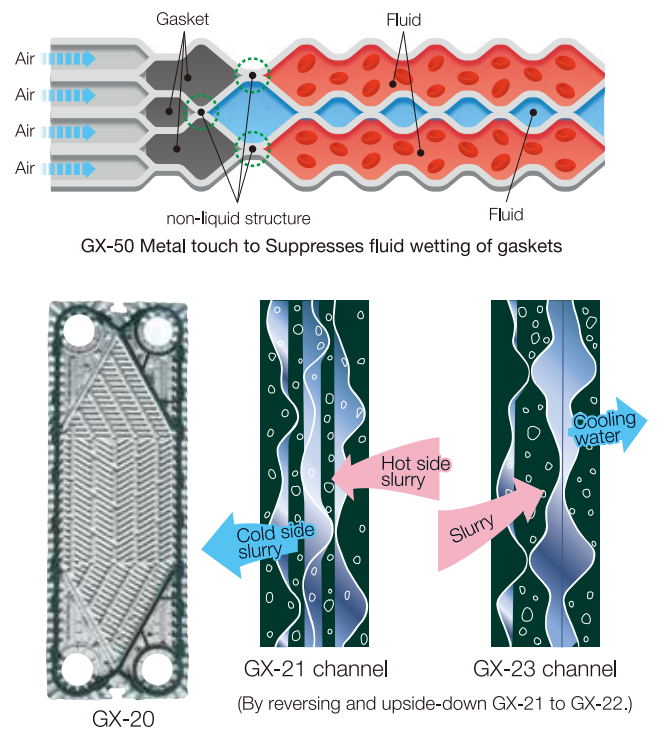


* The Hestia NX-50 was developed jointly with Hitachi-GE Nuclear Energy, Ltd.
* Patent pending

Plate Heat Exchanger Lineup

Multi Gap Plate EXOLUTION(GX)

Clearing away clogging concerns and taking on the challenge of new heat recovery areas

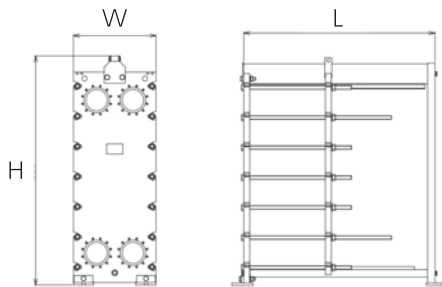


Characteristics

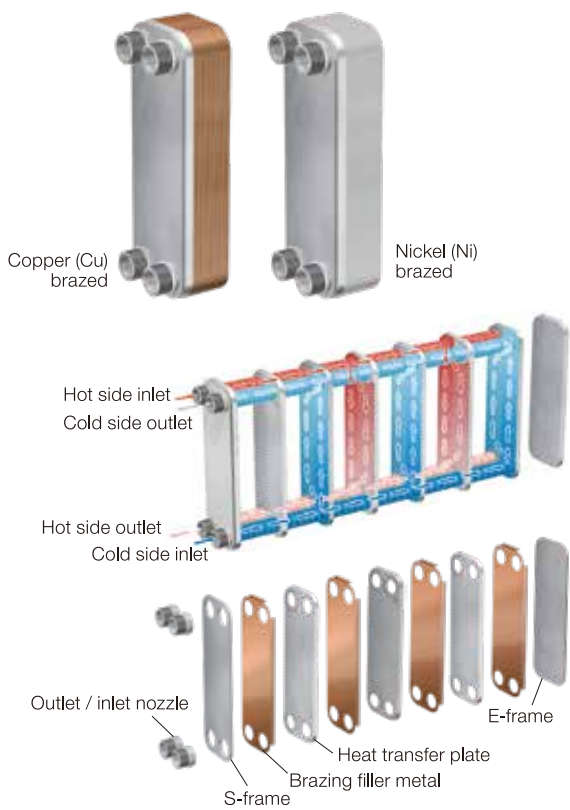
- 1 Smooth, stress-free flow for fluids containing solids.
- 2 The maximum gap is 20 mm for the GX-20 and 16 mm for the GX-50, which expands the range of applications for fluids containing solids.
- 3 GX-20 can be configured with three different flow gaps using a single plate combination, allowing the user to select the appropriate flow gap for the fluid.
- 4 GX-50 is also suited to increasing the service life of gaskets by reducing wetting of the gasket to almost zero.
- 5 Economical design is possible for specifications for the replacement of Shell & Tube heat exchangers with flow differences.

•Scope of application for GX-50

Plate Material	SUS316, SU316L, TP270, NW2200, HC276
Gasket Material	NBR, EPDM, FPM
Maximum design temperature	130°C
Maximum design pressure	1.2MPaG
Equipment size (reference)	L913~4913×W820×H2281



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 temperature 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.



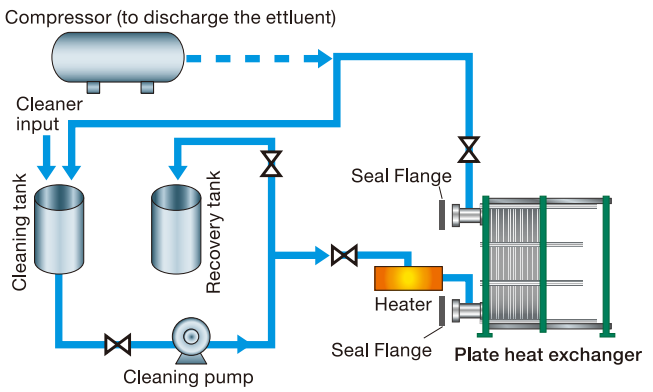
On-site Maintenance

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 disassemble and assemble the PHE and high temperature hot water jet cleaning to remove 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 special cleaner for PHEs. By circulating the cleaner inside the PHE, stubborn scale that forms on the cooling water, warm water, and steam sides can be easily removed by cleaning and dissolving without disassembling the unit. Customers are no longer required to perform the hard work of removing scale.

Cleaner and Target Scale

	Product Name	Target Scale
Cleaner	Plate-Clean C	Calcium carbonate
	Plate-Clean S	Slime, mud
	Plate-Clean F	Iron rust

Plate-Clean Series



* Each type of Plate-Clean is also sold separately.

SEA WATER APPLICATIONS

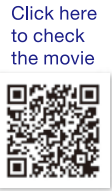
A reliable solution for Sea water Application delivered by professional manufacturer of plate heat exchangers.

When sea water is utilized with plate heat exchanger, the adherence of marine organisms, algae, shellfish, and dust in sea water into the plate heat exchanger and cause clogging, increased pressure drop, decreased flow rate, and insufficient performance. Therefore, stable long-term operation of plate heat exchangers can be achieved by taking anti-fouling measures to prevent adhesion of marine organisms and anti-debris measures to prevent clogging due to foreign materials in sea water.

Anti-debris measures | Hi-TORNEDE

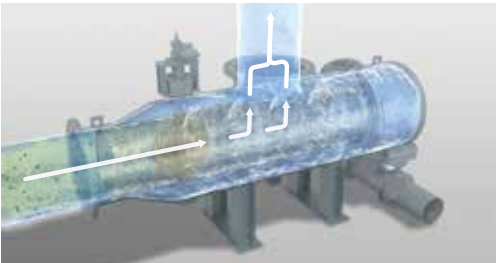
Strainer provided by plate heat exchanger manufacturers

HAS series Automatic back-flushing type strainer
Automatic back-flushing mechanism that switches the sea water flow direction in the strainer element and discharges foreign materials

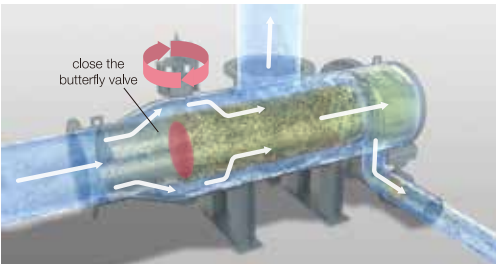


Structure
Punching metal elements remove foreign materials such as algae, shellfish, and dust in sea water.
By switching the sea water flow direction in the element with a butterfly valve, foreign materials in the sea water accumulated in the element are discharged by back-flushing.

- Features**
- 1 Use of cylindrical punching metal allows a larger filtration area.
 - 2 Back-flushing is automatically performed using the differential pressure and timer setting.
 - 3 Back-flushing requires 10% of the flow rate of sea water required for normal operation, allowing back-flushing to be performed during normal operation.
 - 4 The element can be opened and cleaned without removing the main pipe during maintenance.



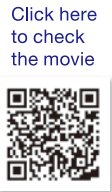
Foreign materials in sea water are removed by the element, and the filtered sea water flows out from inside to outside of element and is delivered to the plate heat exchanger.



Subsequently, the internal butterfly valve closes, removing foreign materials accumulated in the element from the outside to the inside.

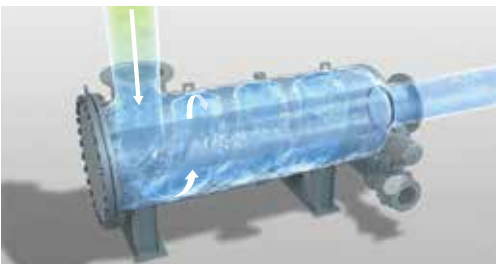
HCS series Cyclone type strainer

A self-ejection mechanism, foreign materials are discharged only by opening the discharge valve

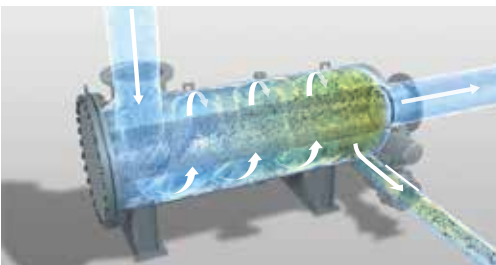


Structure
By sea water is flow from the contact direction of the shell body, a cyclone flow is generated outside the punching metal element, and foreign materials in sea water are removed by centrifugal force.
Foreign materials accumulated in the shell are discharged by opening the discharge valve.
Approximately 10% of the total flow rate can be discharged at all times and it can be improved the operating performance of discharging foreign materials.

- Features**
- 1 Use of cylindrical punching metal allows a larger filtration area.
 - 2 Cyclone flow reduces adhesion of foreign materials on the element due to its self-cleaning effect.
 - 3 Since the drive unit is only the discharge valve, the risk of drive failure due to damage or foreign materials adherence is reduced.
 - 4 The element can be opened and cleaned without removing the main pipe during maintenance.



Sea water containing foreign materials flows into the strainer and swirling the outside of the element.



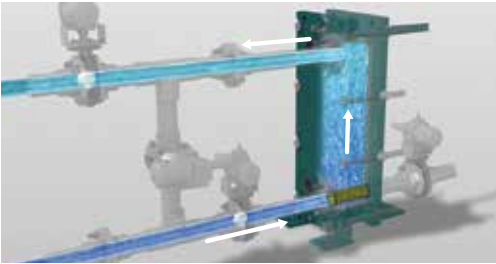
Foreign materials have been swirling inside are to be discharged from discharge port together with some sea water

HRS

HISAKA Automatic Back-flushing Blow System

Foreign materials inside the inner strainer are removed by switching the valve.

By inserting an inner strainer into the port hole of the plate heat exchanger, foreign materials such as sea water dust and algae is removed. During operation of the plate heat exchanger, the sea water inlet and outlet are reversed by operating the valve to reverse the normal sea water flow, thereby blowing out foreign materials accumulated in the inner strainer.

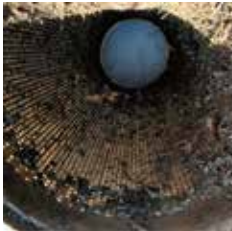


The inner strainer inserted in the port hole of the plate heat exchanger removes dust and foreign materials in sea water.

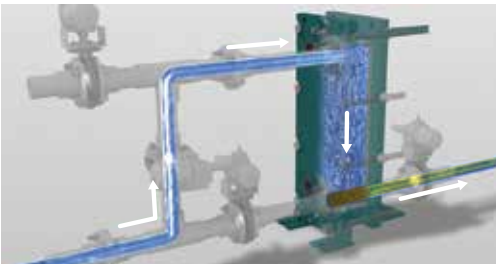
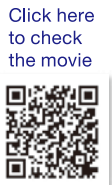
Comparison of the inside of the strainer before and after installing HRS



Before installation



After installation



Foreign materials in the inner strainer are discharged by switching the valve to switch the normal flow to the back-flushing flow.

Anti-fouling measures | Hot Water Circulation System

Fungi and juvenile shells are killed when the environmental temperature rises due to the circulation of hot water, and even mussels, which are highly heat-resistant, are killed in 10 minutes at 45°C and in a few seconds at 50°C. Using this effect, 60°C hot water is kept in the plate heat exchanger for a certain period of time to prevent fouling by marine organisms.

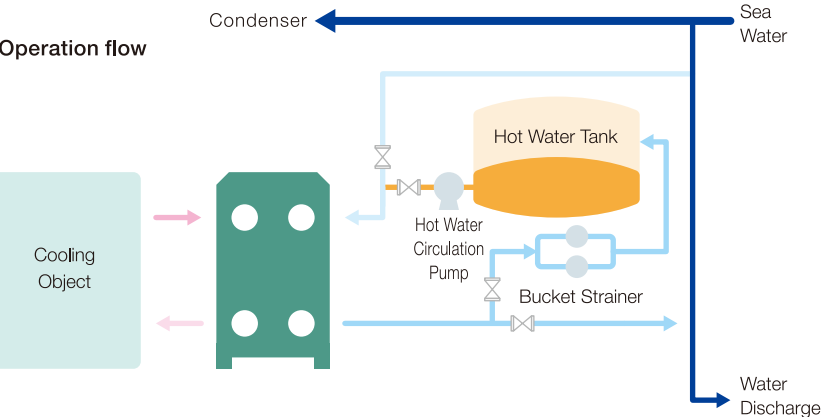
Features

This is an environmentally friendly and pollution-free antifouling treatment, as no chemicals are used, eliminating the need for chemical control.



Hot Water Circulation System

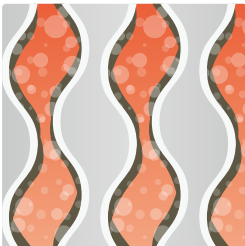
Easy	The required utilities are water, compressed air, steam, and electricity only, and there is no need for concentration control or replenishment processing required for chemical injection.
Economical	Regular cleaning leads to reduction of disassembly and cleaning work, which can reduce downtime of operation.
Ecology	Environmentally friendly and non-polluting.



Image



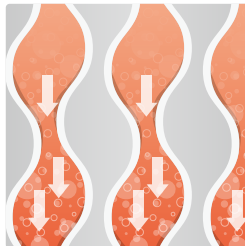
Seawater is discharged after the operation is stopped.



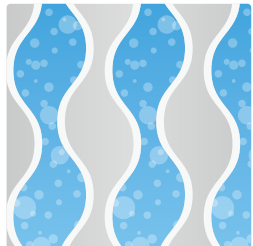
Warm water is heated to 60°C and circulated for 60 minutes to kill marine organisms such as fungi and juvenile shellfish.



Bubbling floats attached marine organisms up to the surface.



The contaminated warm water in the vessel is discharged.



Seawater is returned to the vessel and operation is restored.

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



CO₂ recovery, desulfurization plant solution heat exchange

Metal and Mining



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 and Distillation



Brewing, alcohol fermentation process such as for bioethanol

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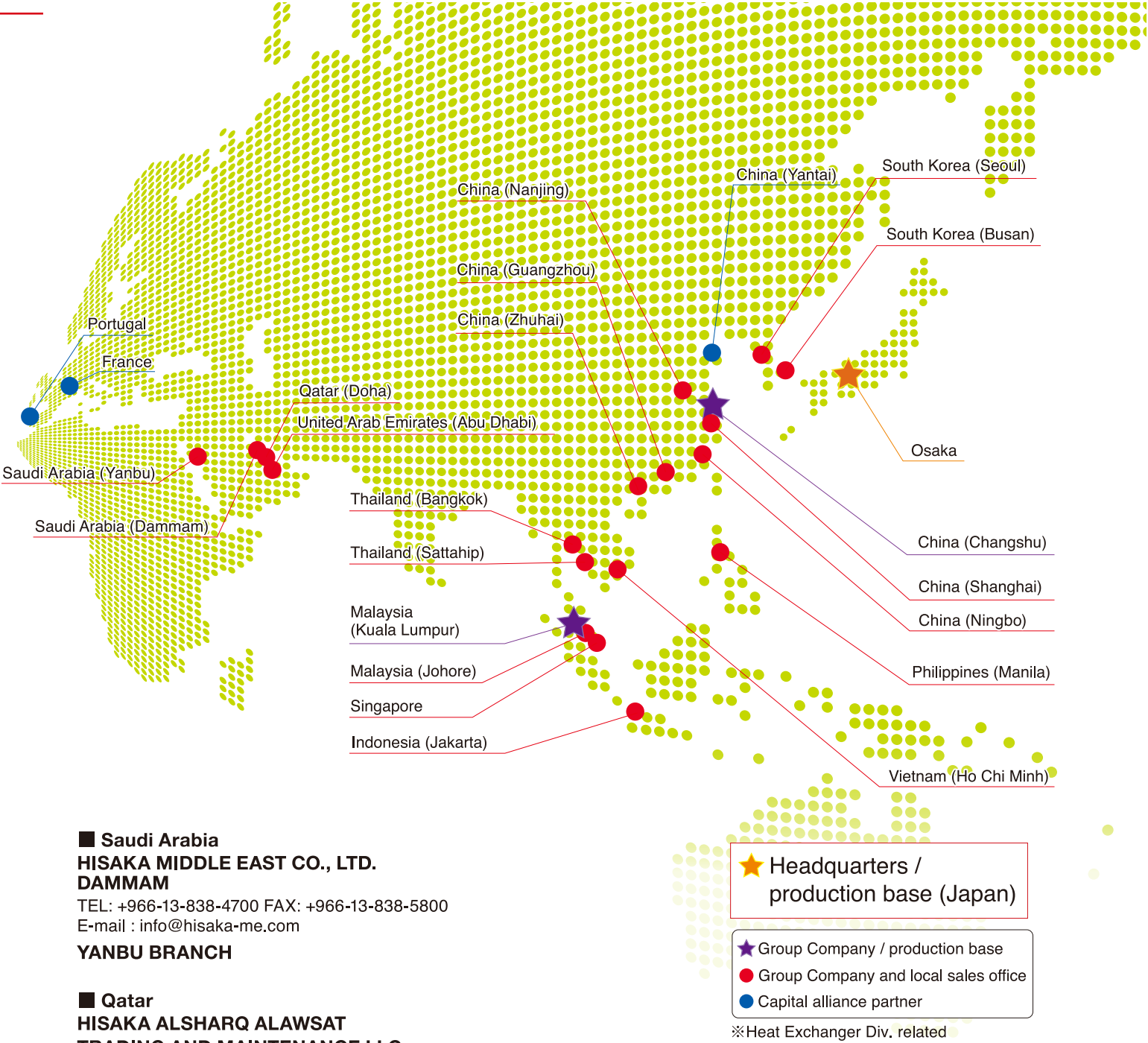
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