challenge for innovation

Marine

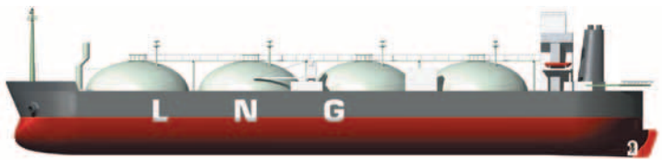
Plate Heat Exchanger

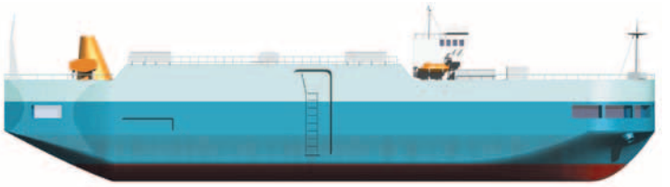
HISAKA

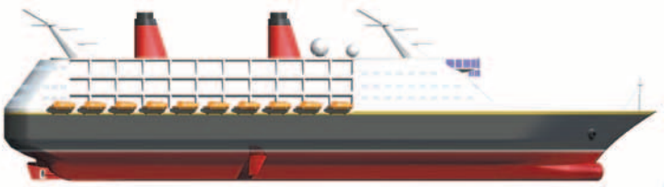
Various types of vessels are supported by HISAKA plate heat exchangers with high levels of safety and reliability.

Ever since developing the first plate heat exchanger in Japan in 1953, HISAKA WORKS, LTD. has received high levels of praise from all manufacturing fields.
HISAKA plate heat exchangers are used on a wide variety of ships including tankers and LNG ships, as well as container ships, automobile carriers and even luxury cruise ships.
All of our products have an important role onboard the ship such as the "Lubricating Oil Cooler" for the main engine, the "Fresh Water Cooler" for generator, and the "Central Cooler" for the main engine and auxiliary equipment.
Hisaka plate heat exchanger is used all over the marine world by high quality and reliability of product.

Various types of shipping activities support worldwide industry and economic activities.







High efficiency heat transfer

Plate Heat Exchanger

Construction

The heat transfer plated are thin sheets of corrosion resistant metal such as stainless steel or titanium that are press-formed with a concavo-convex corrugated pattern on their surfaces and have their peripheries sealed with molded synthetic rubber gaskets. Such plates are suspended from guide bars in a successive, aligned formation and secured by tightening bolts and nuts between a fixed and a movable frame. The exchanger will have as many of these plates as is necessary for requested heat duty. The plate are fixed with a gasket which seals the flow channel and directs the fluids into alternate channels.

Features

High performance

The plates' press-formed patterns yield a high heat transfer coefficient.

Less weight and compact

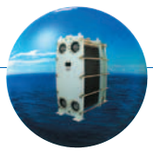
The thin heat transfer plates, the small holding volume in the heat exchanger, and the small heat transfer area means less weight and compact size. These features give cost savings and make installation work simple.

Quick startup

Since the holding volume in the heat exchanger is very small, quick startup of the plant can be possible.

Easy maintenance

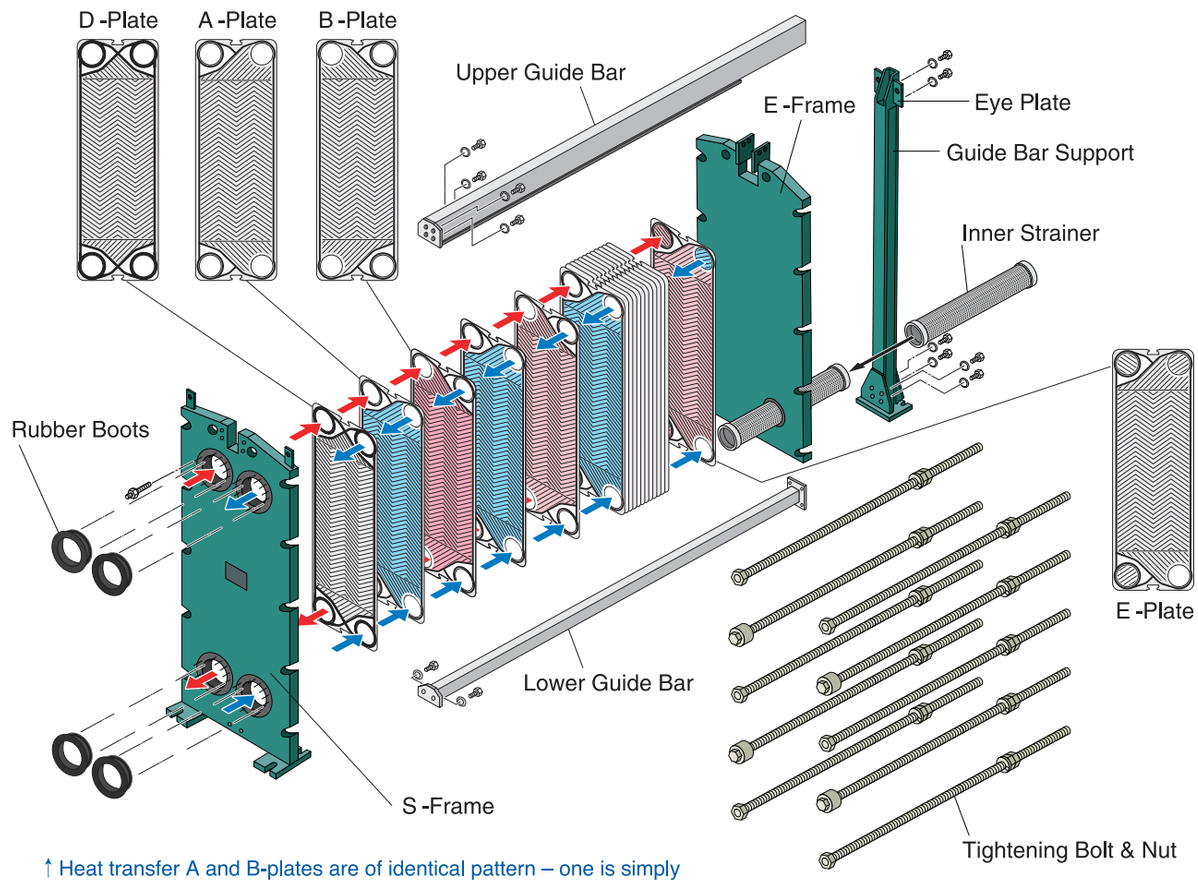
The plate heat exchanger can be easily opened for inspection and maintenance by loosening the tightening bolts and nuts. Assembly and opening of the unit are also easily performed.



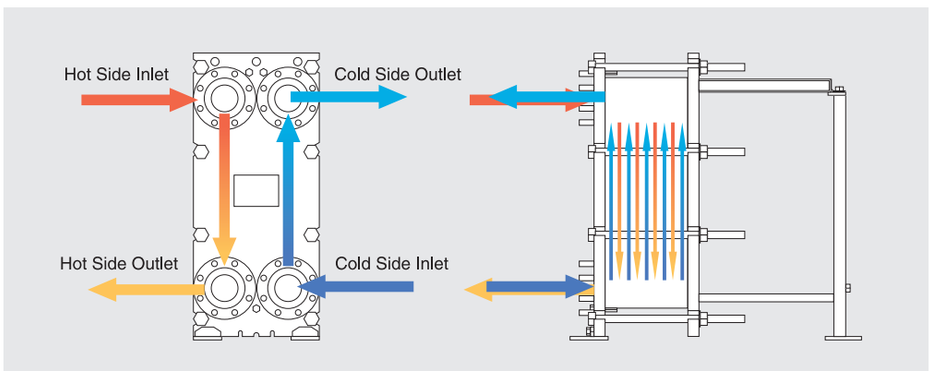
For every operating condition of the ship

Plate Heat Exchanger for Marine

Basic construction of plate heat exchange



↑ Heat transfer A and B-plates are of identical pattern – one is simply turned upside-down vertically relative to the other so as to obtain a different flow channel of its gaskets. Further, the final plate (E-Plate) does not have the porthole in any of its four corners and hence the construction is such that the fluids do not directly contact the E-frame.



↑ The counter-current arrows indicate each flow direction of the hot and cold fluid.

Description of Model Symbols

Type of Plate | Frame Model | Number of Plates

UX-995 -NHPM -233

Plate Type
LX・UX・RX・SX・FX・EX・GX・YX

Plate Size
00 (Small) - 10 (Large)

Plate Pattern
1～6…Single pattern plate arrangement
7～9…Mixed with 2 different pattern plates arragement(Common Name:MIX)

Plate Thickness
5…0.5mm
6…0.6mm
8…0.8mm
0…1.0mm

How to Fix the Gasket
A… Slit in Type (Glue free)
B… Slit in Type (Glued)
None… Glued Type

Number of plates

Other Symbols
R… Steam heater
L … with L Frame

Standard Frame Type
J … For small sized frame and fewer no. of plates
P… For common use other than the above
Add “M” for Marine use case (example: JM, PM)

Max Operating pressure
None… For 0.5MPaG or less
H… For 1.0MPaG or less
U… For 1.6MPaG or less
S … For 1.6MPaG and above

Nozzle
N… without Nozzle (synthetic rubber connection)
TN・KN… without Nozzle (Metal connection)
None… with Nozzle (UX-01, only UX-005 Type)

For every operating condition of the ship

Plate Heat Exchanger for Marine

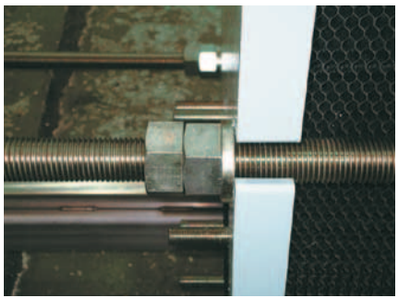
The following considerations are made regarding the plate heat exchanger for ships.

Glued Gaskets

The plate gaskets are glued-fixed to shut out any leaking by preventing dust particles from entering between the back of the gasket and the plate, even during disassembly and cleaning.
Replacement of the gasket is easy and can be performed on board the ship (slit-in type available, if needed).

Installation Stability

The base plate of the heat exchanger is firmly fixed, and vibration of whole equipment is prevented by fixing the eye plates.
In addition, double nuts for tightening bolts prevent loosing the screw by vibration.

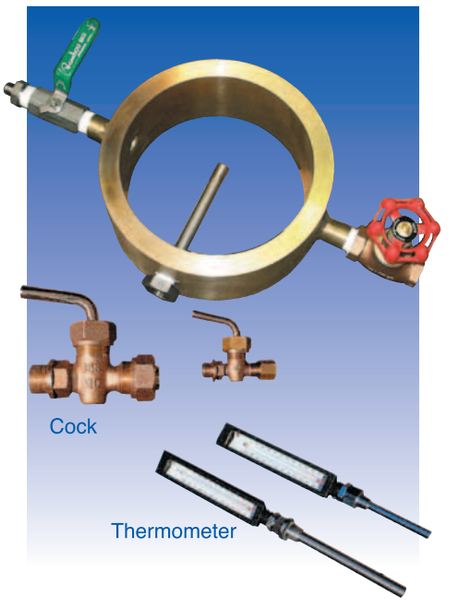


Option

An extensive array of optional parts are adoptable for the specific use conditions of the ship.

Instrument Ring

The Instrument Ring can hold thermometers, air vents, drains, and differential manometers.



Inner strainer

The 2-3 mm diameter, perforated strainer is inserted into the seawater inlet port of the plate heat exchanger to prevent clogging.

Cleaning equipment

This simple seawater cleaning unit with casters is designed to clean plate heat exchangers, removing fouling deposit.

MGO COOLER

(Rear side)

■MGO COOLER with Pressure Buffer Device

●Free from plate cracking trouble

The Pressure Buffer Device protects the PHE from severe pulsation.

●Select optimal thickness of PHE for the operating conditions

HISAKA can give excellent PHE solutions based on our durability test data.

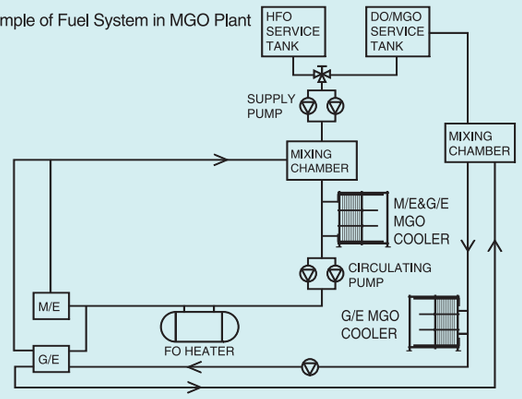
●Optimal sizing of Pressure Buffer Device

HISAKA can also give optimal solutions for Pressure Buffer Device based on our durability test data.

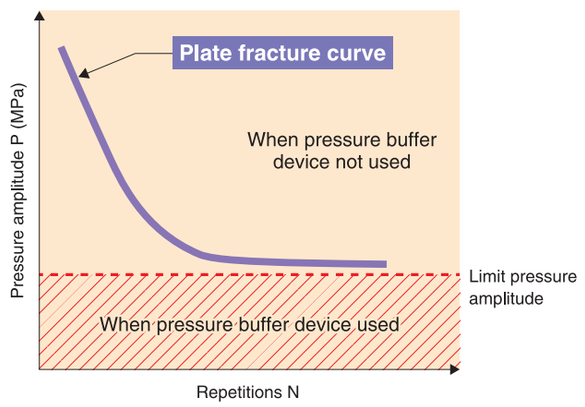
●Reassuring Pressure Buffer Mechanism

When a PHE is used as an MGO COOLER, fracturing of the plates due to engine pulsation can be anticipated. If plate fracturing resulted in mixing of the two fluids, the ship might become unable to sail. One method to counter this is duplex structure (double walls) for the plates, which averts mixture of the two fluids. However, there is still the risk of plate fracturing due to engine pulsation with this method. Accordingly, HISAKA has developed the MGO COOLER, which is equipped with a ressure buffer mechanism to maintain safety. Our PHE with a Pressure Buffer Device for protection against plate fracturing is optimal for use as an MGO COOLER.

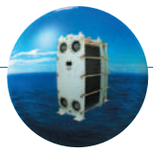
Example of Fuel System in MGO Plant



●PN Curves



By dint of repeated tests to find the limit values for plate fracturing due to pulsation, and analysis of the resulting data, HISAKA developed an optimal buffer device. This device has now been added to a PHE to bring you a cooler strongly resistant to pulsation fracturing – the MGO COOLER. The optimal specifications for the buffer device will vary with the required plate type, heat transfer surface area and so on, so please consult us when selecting.



The Comprehensive Maintenance Program for Ship Sailing

After Service System

The plate heat exchanger is highperformance and trouble-free, but fouling on the plate surface, and deterioration of the gasket may occur over long-term operation.
Hisaka assists our customers to obtain optimum efficiency through our rapid supply of spare parts, on-board maintenance work and consultation of maintenance services.
For example, the "Comprehensive parts stock program" which make speed response of parts exchange, the "On-board maintenance work" for on-site maintenance, and "Plate Rotation" to replace a whole set of plate elements of the plate heat exchanger all at once aboard ship during short layovers.
The above programs offer our customers several options to select the required service depending on their requirements and circumstances.

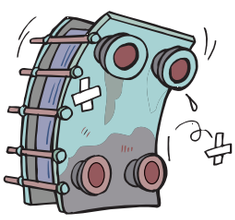
a comprehensive maintenance program for PHE

"Full Service Package"

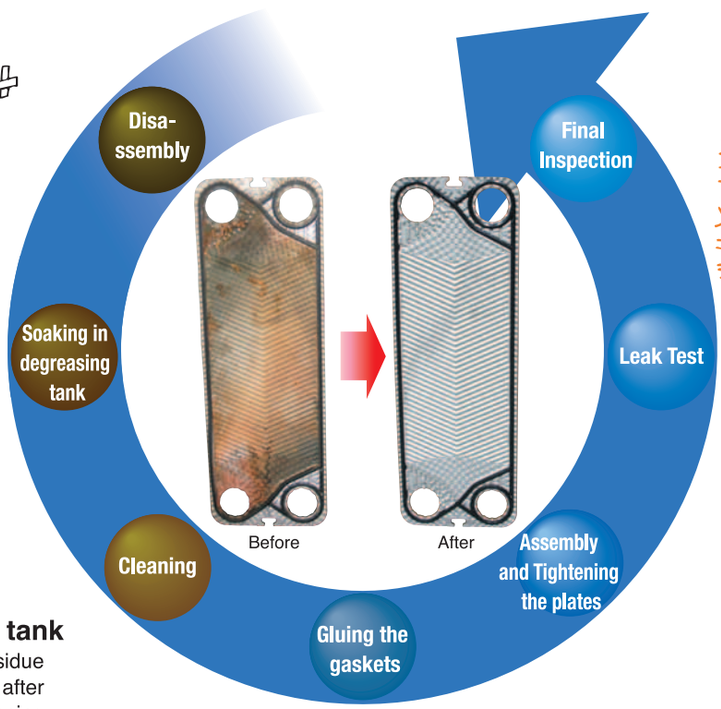
"Full Service Package" offers a comprehensive maintenance program to restore the original performance at HISAKA authorized service facilities. We can offer the maintenance program to match various operating conditions, enabling operation to be sustained in many processes.

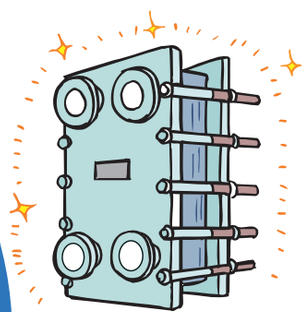
frames are given an overhaul

washed away with water jet



Before "Full Service Package"





After "Full Service Package"

❶ Disassembly

After visual inspection of the PHE, the unit is disassembled; this is followed by the cleaning process of the plates while the frames are given an overhaul.

❷ Disassembly

The overhaul of frame is an important to secure the plates firmly. Inspecting the connection parts and replacing the stud bolts nut, etc., if they are damaged.

❸ Soaking in degreasing tank

The old gaskets and adhesive residue on the gasket groove are removed after soaking the plates in the degreasing tank.

❹ Cleaning

The plates are soaked in a cleaning chemical tank to remove the scale, sediment and dirt on the plate surface and finally washed away with water jet.

❺ Gluing the gaskets

After cleaning the plates, new gaskets are glued to the plates. At the same time, we ensure the new gaskets are firmly adhering to the groove in the collect position.

❻ Assembly and Tightening the plates

Now that the maintenance is completed the plates are mounted onto the frames, which have been overhauled separately. Using a specially designed tightening device for PHE, the plate pack is tightened to the collect dimension. The dedicated tightening device can handle large number of plates in a short time.

❼ Leak Test

After tightening, the unit is pressure tested using air to ensure that all plates in the unit are defect free. This leak test confirms all plates are defect free. (DPT inspection is an option)

Arattaro,
our motional charactor

❽ Final Inspection

Upon completion of all the above maintenance processes, the assembled unit is pressure tested hydraulically to ensure no leakage.
After the final inspection, a certified sticker is fixed on the unit.

cluing the gaskets

Duty	Guideline for regasketing
L.O. cooler	3-7 years
Central cooler	3-7 years
Jacket cooler	3-7 years

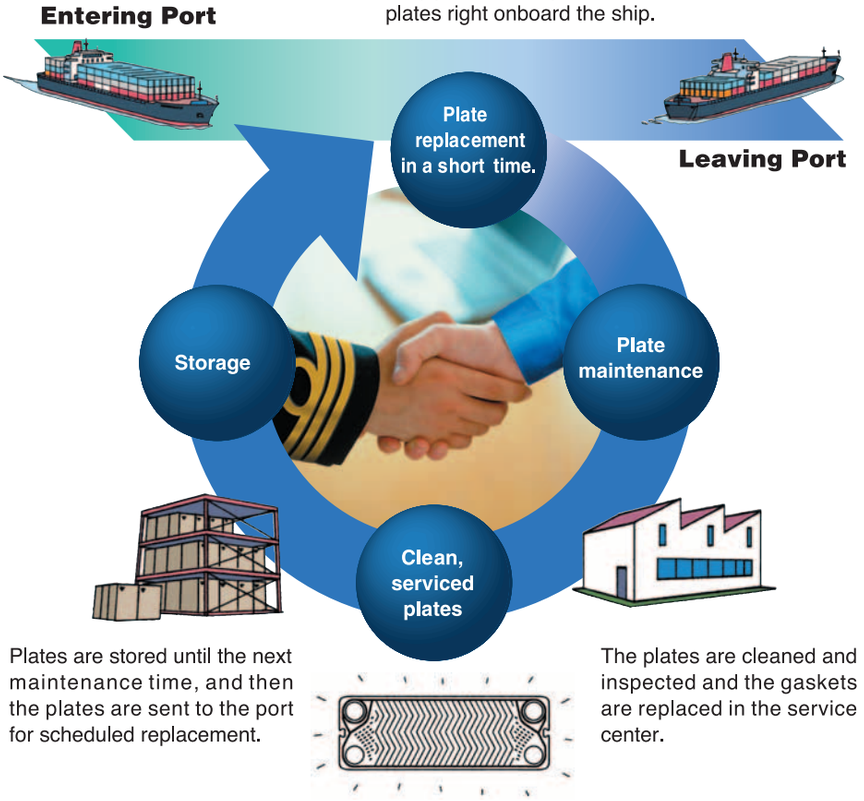
We recommend regasketting for the plates every 5 years.

Plate replacement in a short time

"Plate Rotation contract service program"

In this convenient "Plate rotation contract service program", the currently used plates of the customer are exchanged with plates of the customer held in our warehouse.
The removed plates are then taken to our service center to be cleaned and regasketed and then checked to confirm there is nothing wrong with the plates. After which these plates are held in stock until the nex tmaintenance time of the plate heat exchanger.
This program saves gasketing as well as cleaning time for the plates, therefore the turn around time is short and the plate heat exchanger can be put back into the operation quickly. It is most suitable for ships in port for relatively short time.

Dirty plates are replaced with clean plates right onboard the ship.



Plates are stored until the next maintenance time, and then the plates are sent to the port for scheduled replacement.

The plates are cleaned and inspected and the gaskets are replaced in the service center.

HISAKA PHEs work together with ships on seas worldwide

Trust and Performance

HISAKA PHEs support safe voyaging in ships of all kinds, from LNG tankers to luxury liners. This widespread use is itself proof of the trust we enjoy and of our performance results. We will be continuing as before to support with all our capability the global business expansion of our customer companies.

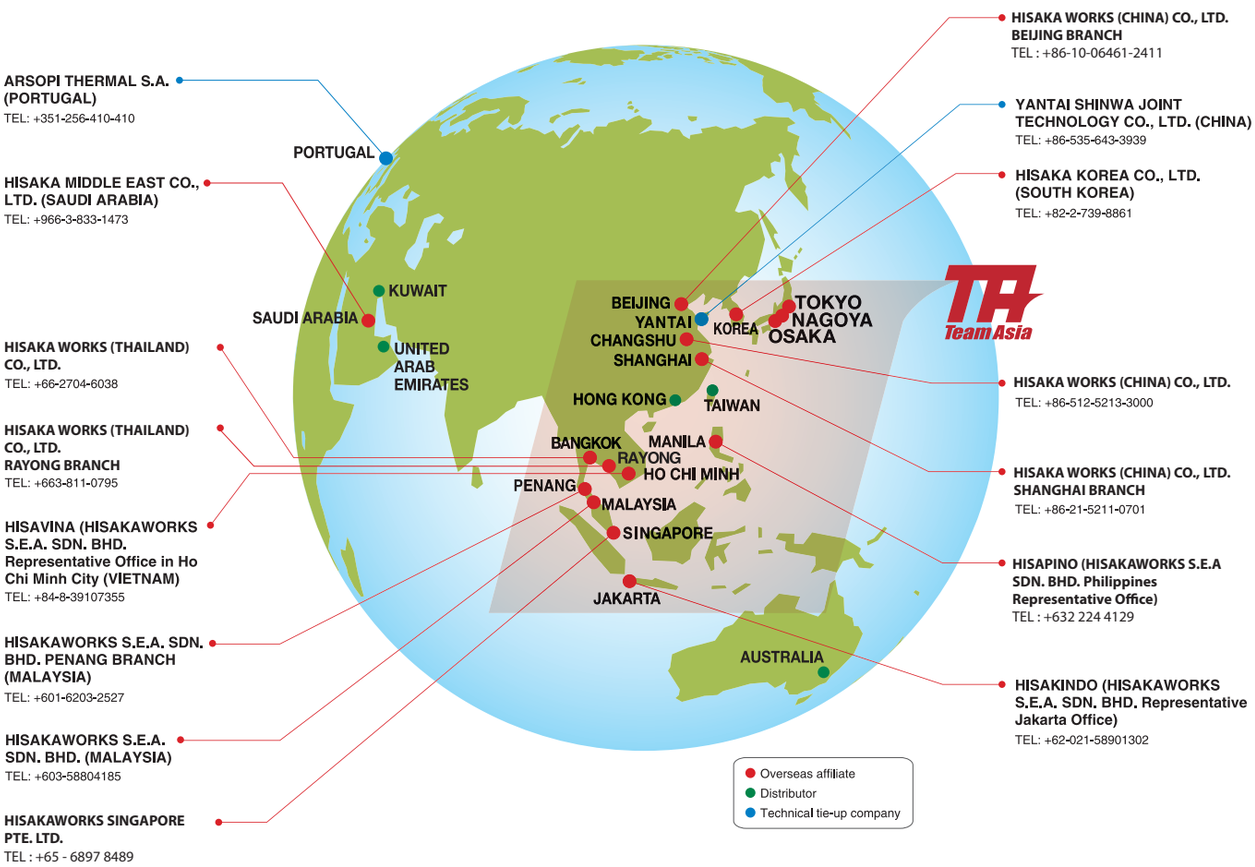
Making our credo of “Sincerity” bear fruit in customer satisfaction

Pioneer to challenge for innovation

Under the slogan of “Challenge for innovation – HISAKA disseminates the latest plate technology across the world”, the Heat Exchanger Division of HISAKA WORKS, LTD. has put in place a total quality control and service system that extends from development through production and marketing to after-delivery follow-up. Via that system, we strive to provide satisfaction for our customers all over the world.
We have established a global network and created the structures to respond to the confidence that is placed in our products.

Hisaka Works, Ltd. Konoike Plant (Osaka, Japan)

HISAKA Global Network



Team Asia In order to offer you globally strategic proposals, our Asia business network is tied in with HISAKA Japan more strongly than ever before. Through this network we provide quality and service of equal levels with those inside Japan.

www.hisaka-asia.com

HISAKAWORKS S.E.A SDN BHD
Company No. 671059-K
(South East Asia Headquarters)
No 2, Jalan TP 2, Taman Perindustrian SIME UEP,
47600 Subang, Selangor Darul Ehsan, Malaysia
Tel : +603 5880 4185
Fax : +603 8081 7185
Email : heatexc@hisaka-asia.com

HISAKA WORKS CO., LTD
OSAKA : 2-1-48, Higashi-konoike-cho
Higashi-Osaka, Osaka, 578-0973, Japan
Tel : +81 72 966 9600
Fax : +81 72 966 8923

TOKYO : Kyobashi Om Bldg., 1-19-8,
Kyobashi Chuo-Ku, Tokyo, 104-0031, Japan
Tel : +81 3 5250 0760
Fax : +81 3 3362 2759

HISAKAWORKS THAILAND CO., LTD.
BANGKOK
Phairojkijja Tower, 15th Floor Zone C,
825 Bangna-Trad Road, Kwang Bangna,
Khet Bangna, Bangkok 10260
Tel : +66 2744 3287
Fax : +66 2744 3286
Email : heatexc@hisaka-thai.com

RAYONG
Eastiny Park 5 Village, 222/36, Moo 10
T. Bangsarey A. Sattahip, Chonbouri
Province, 20250
Tel : +66 3811 0795
Fax : +66 3811 0796
Email : heatexc@hisaka-thai.com

HISAKAWORKS SINGAPORE PTE LTD *(Sales Office)*
No. 18, Boon Lay Way, #02-118 Trade Hub 21
Singapore 609966
Tel : +65 6897 8489
Fax : +65 6686 4579
Email : heatexc@hisaka-sing.com

PT HISAKA WORKS INDONESIA
Ruko Puri Botanical, Kl., Raya Joglo, Blok I 10 No 29,
Kebun Jeruk, Jakarta Barat 11640, Indonesia
Tel : +62 51 5890 0090
Fax : +62 51 5890 0091
Email : hisakindo@hisaka-asia.com

HISAVINA *(Vietnam Representative Office)*
HO CHI MINH CITY
Hoang Dan Building, 47-49, Hoang Sa Street,
Da Kao Ward, District 1, Ho Chi Minh City, Vietnam
Tel : +84 8 3910 7355
Fax : +84 8 3910 7356
Email : hisavina@hisaka-asia.com

IBOPJ
9ui Gtpps, Tboobn Cvjtejoh, 89 Evz Ubo Tw/,
Ejdi Wpoh Ibv Xbse, Dbv Hjbz Ejtw/, Ibopj
Uft ; +95 5 48:6 ::11
Gby ; +95 5 48:6 ::22
Fnbjm ; ijtbwjobAijtbIb-btjb/dpn

HISAPINO *(Philippines Representative Office)*
One Global Place, 20th Floor, Office Business
Center, 25th Street & 5th Avenue, Bonifacio Global
City, Taguig 1632, Philippines
Tel : +632 224 4129
Fax : +632 224 4130
Email : hisapino@hisaka-asia.com

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