

# FULLY WELDED PLATE HEAT EXCHANGER

— Create the future with heat  
**The Thermal Solution Company**



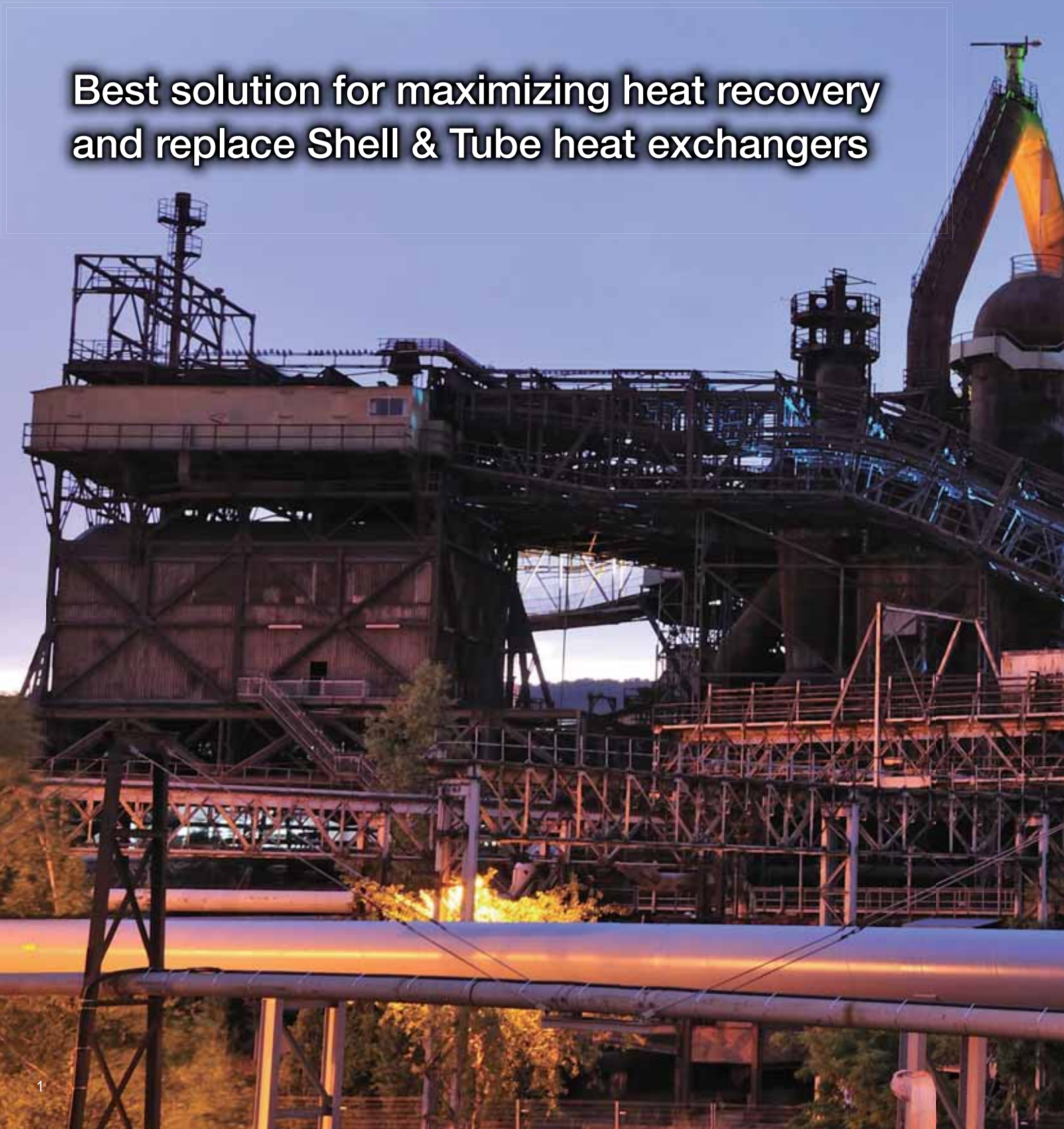
 **HISAKA**

Heat Exchanger Division



# EXPAND WIDER USAGE RANGE PLATE HEAT EXCHANGER

Best solution for maximizing heat recovery  
and replace Shell & Tube heat exchangers



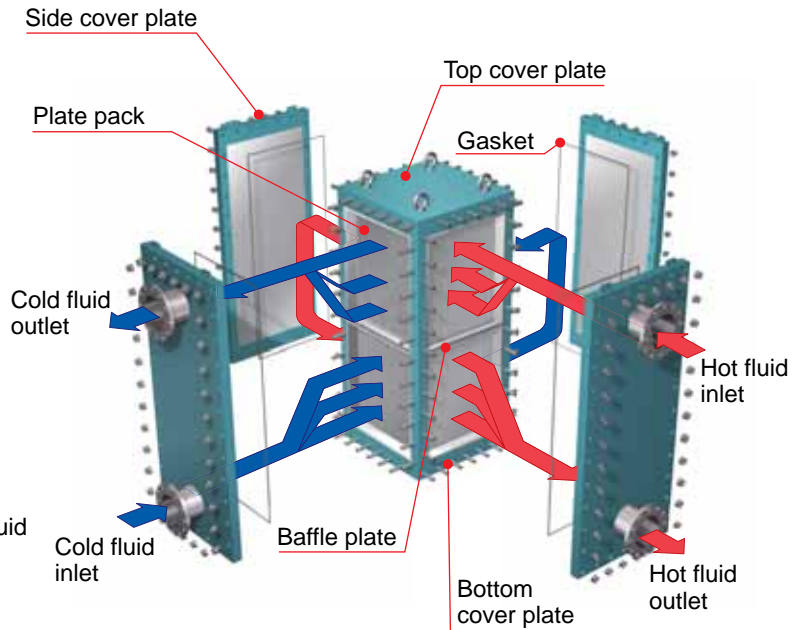
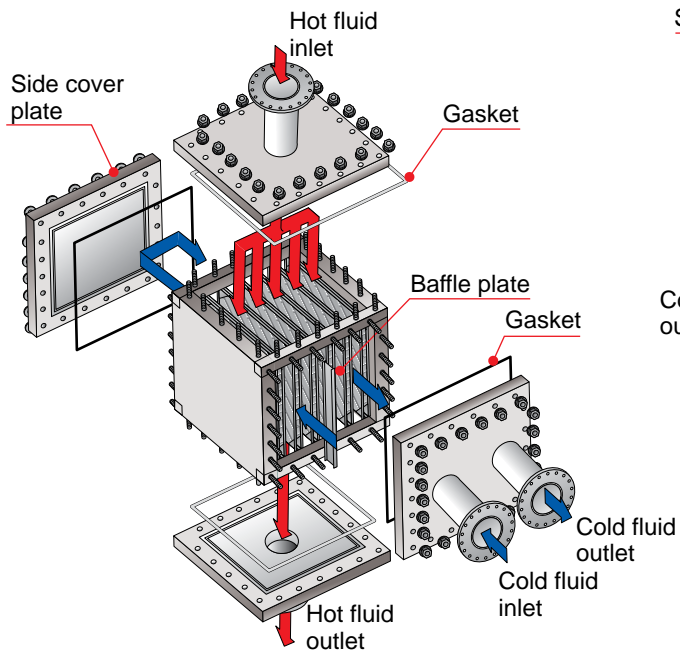


# GE WITH FULLY WELDED

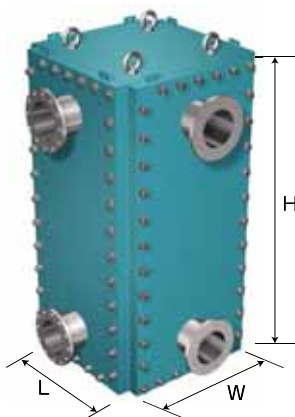


## ■ Structure

- The plates are stacked to each other & side cover plates are affixed to the four directions of the plate pack
- Hot & cold fluids flows in a cross flow section
- Multi-pass design is optional by adding baffle plate depending on the design condition
- Fully Welded Heat Exchanger can support large different fluid flow rate
- The nozzle bore selection is flexible based on operating condition



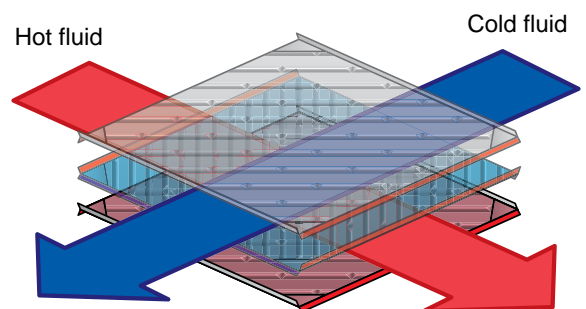
## ■ Dimension (HXC)



Heat Transfer area (m <sup>2</sup> )	W(mm)	L(mm)	H(mm)
10	700	700	900
50	1100	1100	1500
100	1500	1500	1600

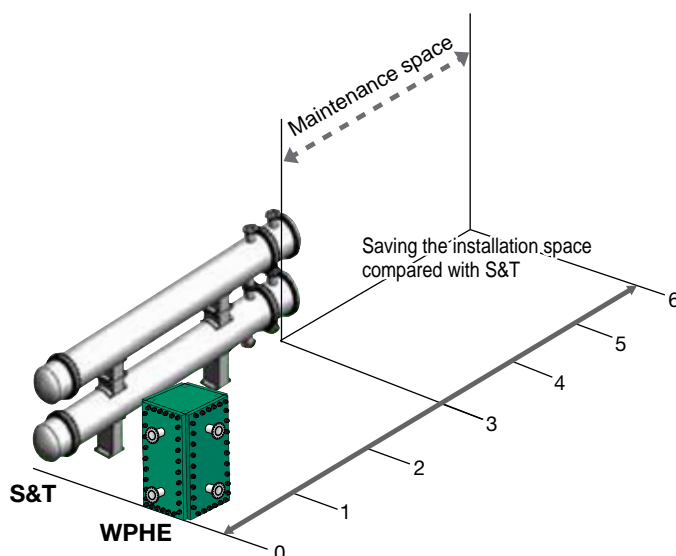
## ■ Flow channel

The hot fluid and cold fluid flow through the respective flow channel in a cross flow.



## ■Features

- (1) High transfer coefficient due to corrugated plates
- (2) Smaller size and compact design compared to Shell & Tube heat exchanger
- (3) Support high temperature and high pressure condition
- (4) Only require gasket on side covers which reduces the material cost
- (5) Support multi-pass design by installing baffles on plate
- (6) Low CIP detergent used due to small holding volume in the device which improves productivity and maintenance time
- (7) Easy maintenance cleaning due to cross flow channel structure



## ■Variety of Plate Channels

Select from a variety of plate gap depending on the fluid properties.

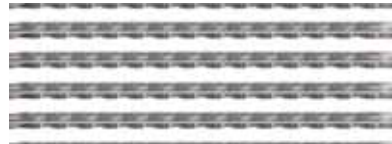
- (1) HXC : Both sides are corrugated channels  
Suitable for clean media for both sides to achieve higher heat recovery
- (2) HXC FF : One side is corrugated free-flow channels and the other side is corrugated channels  
Suitable if one side is dirty media and one side is clean media
- (3) HXE : One side is free-flow channels and one side is dimpled channels  
Suitable for dirty media for both sides or low pressure drop requirement
- (4) HXS : Both sides are studded pin on flat plate  
Suitable for same media with dirt for both sides

\*Free flow channel: Plate channel with wide gap and no contact between the heat transfer plates

HXC



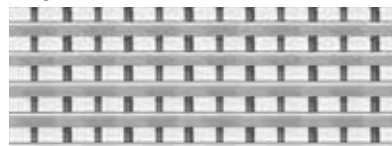
HXC FF



HXE



HXS



## ■Applications

- Heat transfer process for higher efficiency than Shell & Tube heat exchangers
- Heat recovery in high temperature / high pressure applications
- Condensers
- Vaporizers
- Heat transfer process where Gasketed PHE cannot be used  
They are also able to replace Shell & Tube heat exchanger in other cases as well.

Operation pressure(MAX.)	3.5MPaG
Operation temperature(MAX.)	350°C
Heat transfer area(MAX.)	700 m <sup>2</sup> per unit
Plate material	Stainless steel, Duplex stainless steel, High nickle alloy, Titanium

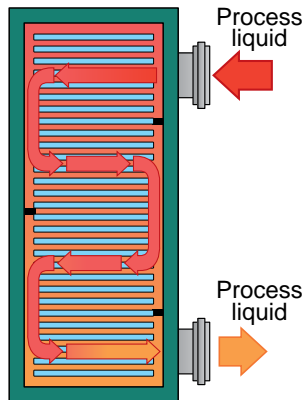
\*The above mentioned varies depending on the operating conditions. Please inquire with our company when planning.



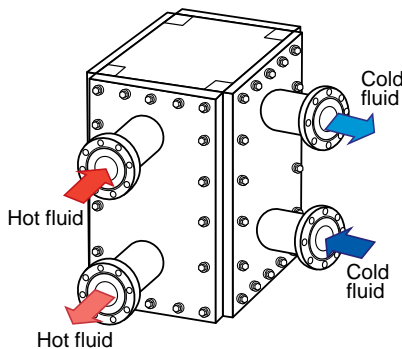
# EXAMPLE of INSTALLATION

Fully welded plate heat exchangers can employ flexible design and piping layouts depending on the usage conditions. We meet our customers' needs with a variety of installations.

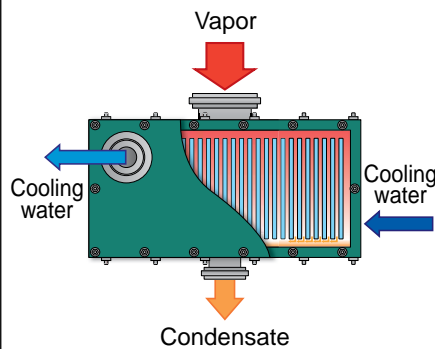
## Liquid-liquid heatexchanger



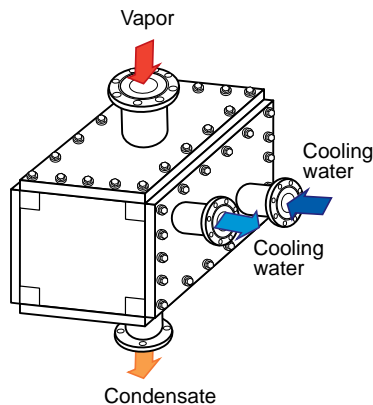
It can be installed for vertical use, like the figure above. Draining is performed from the nozzle on the bottom side of the cover panel or the bottom drainage nozzle. Air in the unit can be discharged from the nozzle on the upper side of the cover panel or the upper vent nozzle. This installation can even be used in cases for absorbent interchangers, and the case of gas vaporizing from the absorbent as well.



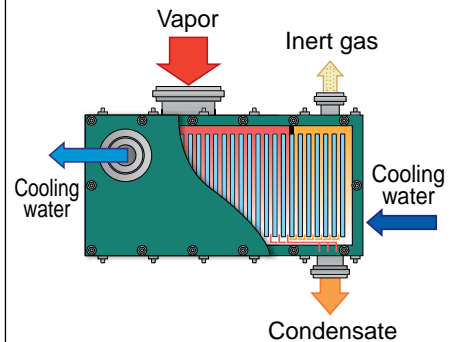
## Condenser I



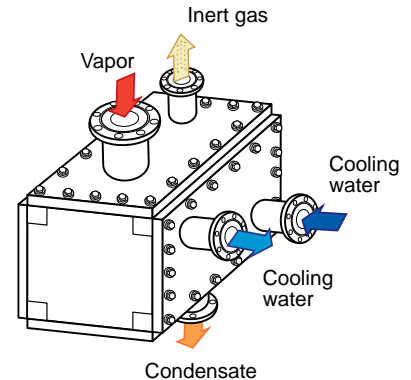
Condensers are usually used horizontally. If the vapor does not contain Inert gas, the vapor carried in from the top nozzle is condensed in the heat transfer section and discharged through the bottom nozzle. Cooling water comes out through the side nozzle. By using an even number of passes on the cooling water side, the nozzles can be placed only on one panel.



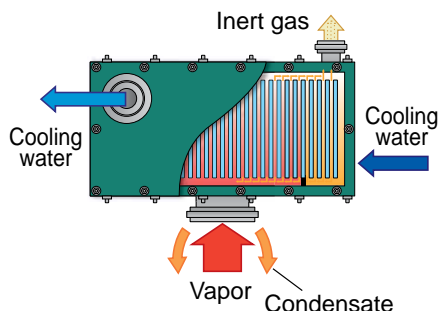
## Condenser II



If the vapor contains inert gas, an outlet nozzle is installed to discharge the inert gas on the upper side cover plate. Vapor carried in from the inlet nozzle is mostly condensed as it falls through the heat transfer section. The remaining vapor and inert gas rises through the heat transfer section near the cooling water inlet, and part of the vapor condenses. The condensate is drained from the bottom nozzle.

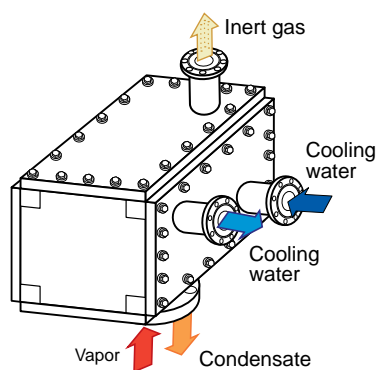


### Condenser III

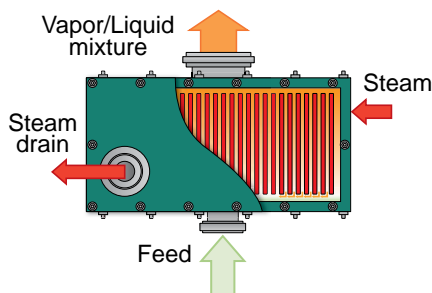


If using it as a reflux condenser like the overhead condenser of a reactor, the vapor inlet is installed on the bottom side cover plate. Condensate that condensed in the heat transfer section returns to the column or the reactor from the vapor inlet nozzle.

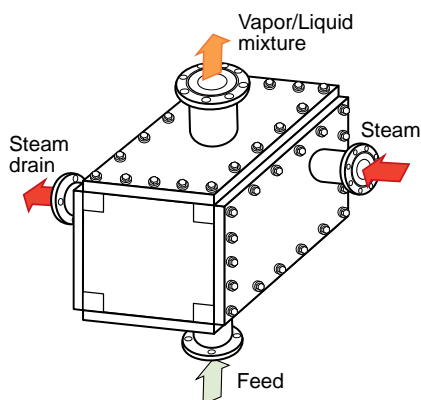
Inert gas is emitted outside from the upper nozzle.



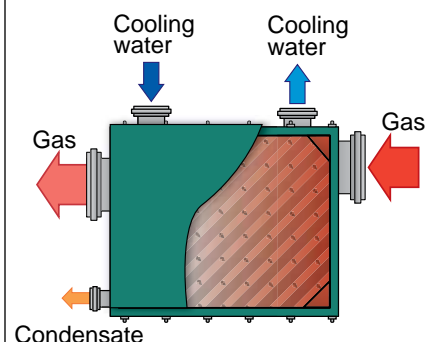
### Reboiler



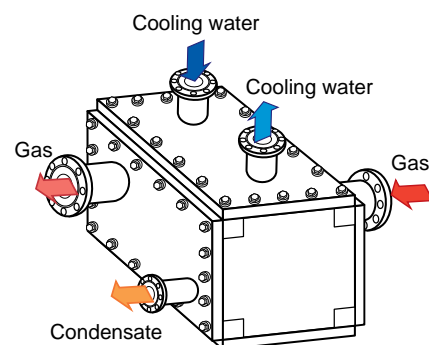
In reboiler applications, the feed enters from the bottom inlet nozzle. The feed is vaporized in the plate pack and the vapor/liquid mixture is sent to bottom of the tower through the top outlet nozzle. Steam is supplied from the side nozzle and drained out the opposite side nozzle. The pressure loss on the vaporized side is lower than S&T due to short plate length.



### Gas cooler



This is used in cooling for large flow rate of gas including condensable vapor in inert gas. Designing the gas side with one pass allows for even large flow rate of gas to be efficiently cooled with low pressure drop. This is perfect as a gas cooler including solvents or for high temperature / high pressure gas that could not be used rubber gaskets. The cooled, condensable vapor is emitted from the condensate outlet.



"Kitto"\*

Sure to fit your applications by excellent performance

"Motto"\*

More applications by versatile products line up

"Zutto"\*

Longer life time by high quality maintenance service

Providing reliable heat exchangers, HISAKA has delivered to numerous processes and plants, and has helped improve the profitability of customer plants. From those numerous experiences, here we introduce welded plate heat exchanger that can be used "Motto" applications.

\*

"Kitto (きっと)" means "surely" in Japanese.

"Motto (もっと)" means "more" in Japanese.

"Zutto(ずっと)" means "long" in Japanese.

## Steelworks & COG



COG (Coke Oven Gas), a by-product made when carbonizing coal to create coke, contains many components and must be refined. A welded plate heat exchanger with high temperature and pressure resistance is perfect for each heat transfer process required in each step. By selecting from a variety of plate gaps to match the fluid's properties, even fluids containing slurry can be supported.

### ■Applications

- Circulated water cooler for direct cooler or primary cooler
- Circulated water cooler for final cooler
- Heat recovery for debenzolized oil / benzolized oil
- Rich / lean heat exchanger for desulfurization plant.
- Heater for ammonium sulfate mother liquid



## Petrochemical



There are many heat transfer processes in the separation and refining or chemical reaction processes at petrochemical plants, and there is demand for efficient heat exchange. That's why a compact, high performance welded plate heat exchanger with high temperature and pressure resistance is perfect for effective energy usage.

### ■Applications

- Liquid-liquid applications  
PCW cooler, rich / lean amine heat exchanger for gas sweetening process, heater for chemical processing liquid, cooler and heat recovery
- Vapor condensation, gas cooling applications  
Vacuum vapor condenser, organic solvent vapor condenser, overhead condenser, cooler condenser for gas with condensable vapor





## Pharmaceutical / Fine chemical



Due to the compact structure with no dead space, it is used in various kinds of vapor recovery from reactors for pharmaceuticals or fine chemicals and water treatment plants.

### ■Applications

- Vapor condenser from reactors
- Vapor condenser for solvent recovery
- Vacuum steam condenser



## Waste Water Treatment



Select from a variety of plate gap depending on the fluid properties. At water treatment plants for effluent or sewage, there are often foreign materials such as fluids with powder or slurry. Perfect solution will be given those applications by flexible flow channel section.

### ■Applications

- Sludge cooling / heating at sewage plants
- Cooling / heating of industrial effluent
- Cooling / heating of factory waste liquid including metal particle or fiber material



## Sugar



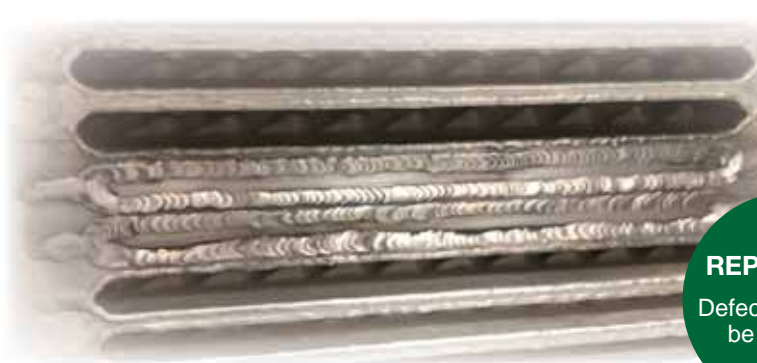
The sugar refining process requires many heat transfer process to turn raw juice extracted from cane or beets into sugar. In order to effectively utilize the heat energy used in the sugar refining process without waste, a welded plate heat exchanger with outstanding performance is perfect for the heat exchanging of sugar liquid including fiber content.

### ■Applications

- Heating / cooling raw juice
- Heat recovery from processing effluent
- Processing steam condenser



# MAINTENANCE and HISA



## REPAIRABLE

Defect plates can be replaced



## CLEANABILITY

Visual internal inspection possible



## WASTE WATER TREATMENT

Easy cleaning by free flow channel structure



## SPACE SAVING

Compact construction



## MAINTENANCE

## OPERATION



# KA ORIGINAL OPTIONS

PROPOSAL

INSTALLATION

## HINGE

Maintenance  
load reduction



## SIGHT GLASS

Easy to check  
internal parts



## PIPING CONNECTION

Flexible unique  
design



## INSTALLATION WORK

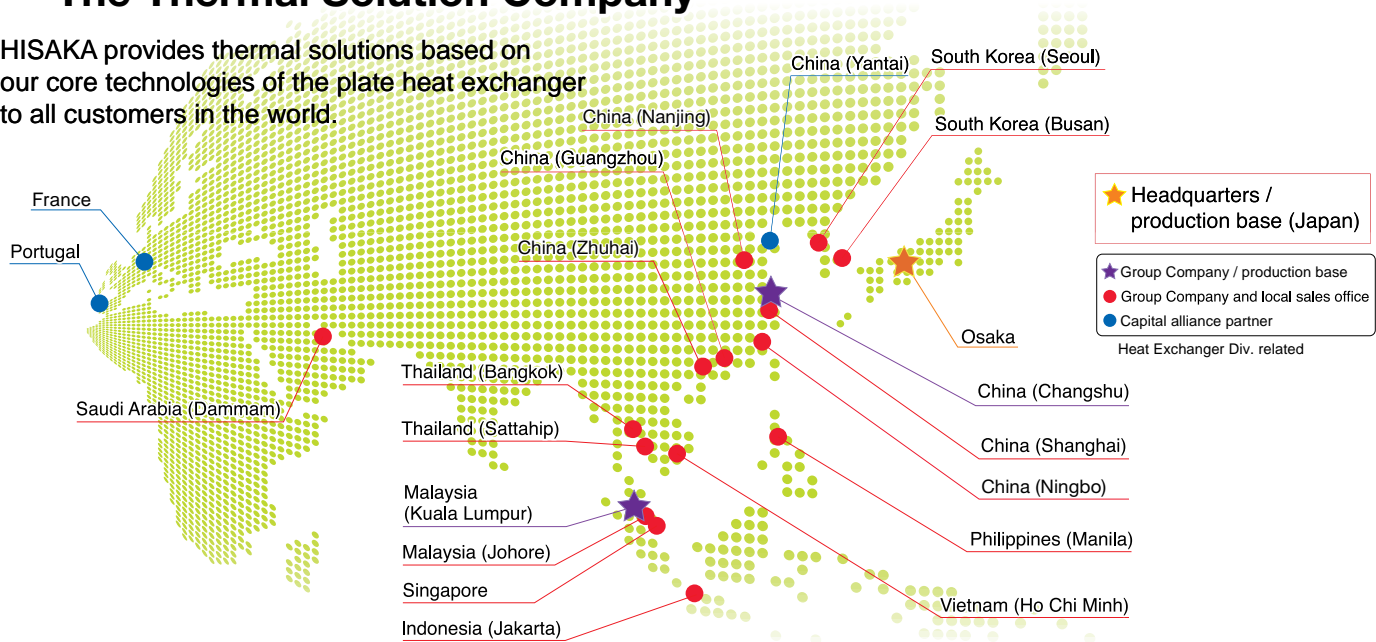
Easy  
handling



# Global Network

## — The Thermal Solution Company —

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



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— Create the future with heat

**The Thermal Solution Company**

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

HISAKAWORKS S.E.A Sdn Bhd are both ISO9001 and ISO45001 certified.

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