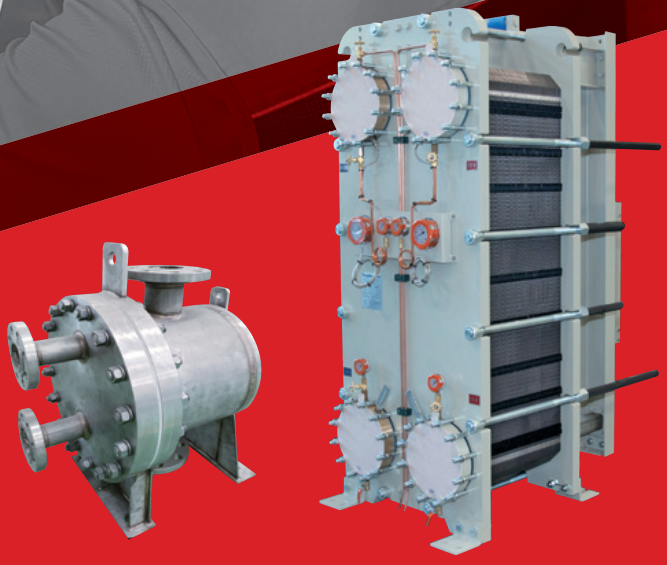
Gasketed and Welded
Plate Heat Exchangers
for our customer's application



DongHwa PHE
Plate Heat Exchanger

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DongHwa Plate Heat Exchanger

Company Profile

- Company Name: DongHwa PHE Co.,ltd.
- CEO: Goh Yeong-Hyun
- Company Size: Mid-sized Businesses
- Establishment: Oct. 2001 (Corporate conversion Nov. 2011)

DongHwa PHE aspires towards becoming a world wide company with Heat transfer Technology.

Welcome to DongHwa PHE.

We are making ceaseless effort to realize Customer Satisfaction with production line, flexible payment, customer service, and follow-up service considering optimized design and cost reduction to satisfy Customer Satisfaction based on many years of experience in manufacturing of Plate Heat Exchangers.

We keep the slogan "**once be customer, always be customer**" in our mind, in a preparation for our future success, DongHwa PHE places top priority on "**customer**" as and external determinant.

We will exert ourselves to fulfill customer's "**need**", touch customer's heat and keep in tune with customer throughout manufacturing, delivery and follow-up service of all products.

Experienced product Know-how based on thermal fluid technology provides high efficiency. We provide world class products to a wide range of customers, and in order to provide better products and satisfactory service, We will do our best for research and development.

Apr. 2020	Developed two model of Shell & plate type Heat Exchanger
Dec. 2019	Developed one model of Gasketed Plate type Heat Exchanger (350A)
Apr. 2017	Installation of 10,000 ton Hydraulic Press Machine
Dec. 2016	Installation of 15,000 ton Hydraulic Press Mach
Apr. 2016	Installation of Mold Machining Center
Feb. 2014	Registration of the Research & Development Center
Jan. 2014	Registration of the Venture Business Enterprise through Kibo
Nov. 2012	Registration of Korea Gas Safety Corporation
Mar. 2012	Achieved ISO 9001 certificate by ABS Q.E.
Oct. 2008	Registration of Strategic Industry by Busan Metropolitan City
July 2007	Registration of Korea Shipbuilding Ind. Co., Ltd.
Nov. 2001	Registration of Subcontractor by Donghwa Entec Co., Ltd.
Oct. 2001	Established our company

Heat transfer solutions that match your requirements

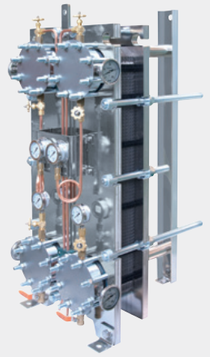
Core Value throughout the entire process

Donghwa PHE is with you at every step of the process from selecting our product to after-sales service.

Product selection | **Installation and commissioning** | **Optimized for your application** | **Product lifetime** | **After-sales service**

Main Products

- Gasketed Plate Heat Exchanger
- Welded Plate Heat Exchanger (Shell & Plate type)
- Mold Machining



Gasketed Plate Heat Exchangers for our customer's application

Meaning of Type designation

Plate model Frame type No. of plate

RX-146A-TNHJR-24

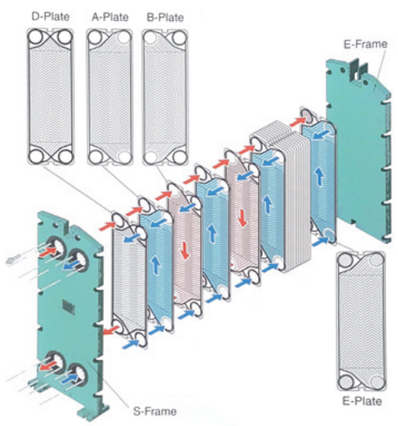


Plate Cooler is making wrinkled-thin metal plates to transfer heat between two fluids using gaskets and this cooler can exchange large amount of heat in short period of time.

The covers prevent the plates bended from the difference of pressure. In the assembly of plate, the surface with gasket is directed to the fixed cover and each plate is hanged in opposite direction alternately. Gasket is attached to the heat plate which forms flow channel and acts seal up the fluid not to leak to the outside. And two fluids cannot be mixed and separated by a thin plate.

One fluid always flows in "A" channel and the other fluid always flow in "B" channel. One simply turned upside-down becomes to the other so as to obtain a different flow channel by the gasket ine. Further, by the start plate (D-plate) having its portholes with double seal gaskets and the blind last plate (E-plate), the construction is such that the fluids do not directly contact the frames. The number of the heat plate is determined according to the amount of fluid, physical properties of fluid, the pressure drop and thermal condition.

DongHwa PHE
Plate Heat Exchanger

Let us help you **lower your expenses** and **increase the performance** of your entire system

Application

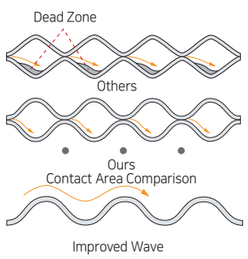
Chemical	Caustic Soda, Fertilizer, Petrochemical, Oil Refinery, Oil & Fat, Pharmaceutical
Food	Sugar, Starch, Sauce, Ketchup, Sodium glutamate
HVAC	Air-conditioning, Tap water heating
Steel Mill	Blast Furnace, Continuous Casting, C.O.G, Plating & Galvanizing
Metal	Plating, Quenching, Anodizing, Painting
Pulp & Paper	Black Liquor, White Liquor, Digester, Heat Recovery
Textile	Synthetic Fiber, Spinning, Dyeing

Central Cooling System (by Sea water / Fresh water),
Power Station, Co-generation, Marine andmany others.

The DongHwa PHE'S heat exchangers can be adapted to a wide variety of applications. The benefit of the gasketed plate heat exchanger is that it can easily be expanded or adapted, by adding or replacing plates when conditions change.

Experience the benefit of a heat transfer solution that perfectly matches your requirements and lowers your energy consumption.

The design results in a compact solution with a small footprint, simple installation, and easy access for maintenance.



Characteristics

Wide contact area

The strength of the plate is excellent, compared with other companies' products with the point contact type, as the metal contact point has the surface contact feature when the plates are assembled. And the durability and corrosion resistance are greatly improved by minimizing deformation and stress concentration.

Easy disassembly and assembly

Even the biggest model also can be assembled or disassembled by 1 or 2 persons. As it is designed to have a dual fixing method of the insert-typed plate and insert-typed gasket, there is no sliding on the plates. It prevents sliding and an assembling failure.

Anti Vibration Design

Designed to prevent loosening the tightening bolts and nuts during continuing operation which secure to prolong the equipment's operation lifetime and prevent leakages.

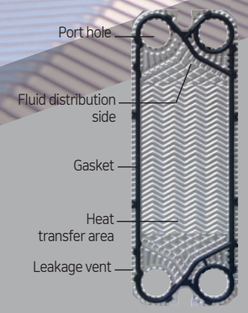
Clip Gasket

The gasket can be fixed tightly and quickly on the heat plate in the optimum condition with the dual fixing device (snap on type), and is designed and manufactured to have the glue type and non-glue type so that it can be selected according to the usage.

Temperature Approach

The turbulent flow, promoted by the wave pattern of the heat plates, enables a very high heat transfer coefficient. Proximity Limit: 1℃

We do all our own tooling and have our own hydraulic presses **in-house.**



Heat Transfer Plates

Each heat transfer plate is corrugated to various patterns to increase its strength and heat transfer area. Furthermore, the corrugation creates high turbulence and thereby achieve high heat transfer coefficient. The plate is provided with passage hole on each corner. Each plate is tight-sealed with a gasket fitted in its peripheral groove.

Channel Combination

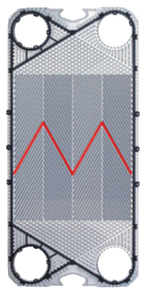
There classes of channel with high theta plate and low theta plate are possible.

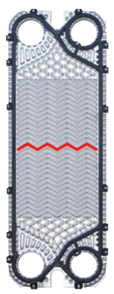
- **H** (High Channel) : Combination of two high-theta heat plate
- **L** (Low Channel) : Combination of two low-theta heat plate
- **M** (Medium Channel) : Combination of one high-theta plate & one low-theta plate

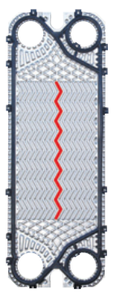
Type of Heat Plate

- **HIGH -THETA PLATE**
  - High turbulent flow
  - High heat transfer coefficient
  - Perfect temperature approach
  - High pressure drop
- **LOW -THETA PLATE**
  - Low turbulent flow
  - Low heat transfer coefficient
  - High temperature approach
  - Low pressure drop


High-theta Plate


Low-theta Plate


High-theta Plate


Low-theta Plate

DongHwa PHE
Plate Heat Exchanger

Plate Heat Exchanger Technical Data

Model		HT03	HT061	HT062	HT064	HT081	HT082	HT083	HT101	HT102	HT103
Max. Flow	(m^3/hr)	17	80	80	80	140	140	140	200	200	200
Area of Plate	(m^2)	0.03	0.08	0.12	0.23	0.25	0.35	0.5	0.16	0.26	0.36
Plate Hole Dia.	(mm)	18.4	65	65	65	85	85	85	105	105	105
Max.Conn.Dia.	(mm)	40	65	65	65	100	100	100	100	100	100
Dimension - A	(mm)	180	328	328	328	456	456	456	464	464	464
Dimension - B	(mm)	490	668	823	1223	1158	1485	1899	880	1120	1409
Dimension - C	(mm) ±1.5%	(2.5+t) x n	(3.05+t) x n	(3.05+t) x n	(3.05+t) x n	(2.7+0.5) x n	(2.7+0.5) x n	(2.7+0.5) x n	(3.3+t) x n	(3.3+t) x n	(3.3+t) x n

Model		HT104	HT121	HT122	HT123	HT150	HT151	HT152	HT153	HT154	HT200
Max. Flow	(m^3/hr)	200	250	250	250	420	420	420	420	420	730
Area of Plate	(m^2)	0.46	0.34	0.55	0.71	0.25	0.55	0.85	1.15	1.45	0.2
Plate Hole Dia.	(mm)	105	115	115	115	150	150	150	150	150	200
Max.Conn.Dia.	(mm)	100	125	125	125	150	150	150	150	150	200
Dimension - A	(mm)	464	614	614	614	720	720	720	720	720	720
Dimension - B	(mm)	1649	1399	1805	2119	1189	1663	2137	2611	3085	1189
Dimension - C	(mm) ±1.5%	(3.3+t) x n	(3.9+t) x n	(3.9+t) x n	(3.9+t) x n	(2.95+t) x n	(2.95+t) x n	(2.95+t) x n	(2.95+t) x n	(2.95+t) x n	(2.95+t) x n

Model		HT201	HT202	HT203	HT204	HT231	HT232	HT233	HT234	HT235	HT301
Max. Flow	(m^3/hr)	730	730	730	730	950	950	950	950	950	1700
Area of Plate	(m^2)	0.5	0.8	1.1	1.4	0.55	0.86	1.02	1.35	1.85	0.63
Plate Hole Dia.	(mm)	200	200	200	200	224	224	224	224	224	300
Max.Conn.Dia.	(mm)	200	200	200	200	250	250	250	250	250	300
Dimension - A	(mm)	720	720	720	720	886	886	886	886	886	998
Dimension - B	(mm)	1663	2137	2611	3085	1605	1980	2168	2543	3105	1925
Dimension - C	(mm) ±1.5%	(2.95+t) x n	(2.95+t) x n	(2.95+t) x n	(2.95+t) x n	(3.05+t) x n	(3.05+t) x n	(3.05+t) x n	(3.05+t) x n	(3.05+t) x n	(3.05+t) x n

Model		HT302	HT303	HT304	HT305	HT351	HT352	HT353	HT354	HT451	HT452
Max. Flow	(m^3/hr)	1700	1700	1700	1700	2400	2400	2400	2400	3400	3400
Area of Plate	(m^2)	1.1	1.34	1.58	2.05	1.09	1.75	2.45	3.15	1.23	2.0
Plate Hole Dia.	(mm)	300	300	300	300	355	355	355	355	430	430
Max.Conn.Dia.	(mm)	300	300	300	300	400	400	400	400	500	500
Dimension - A	(mm)	998	998	998	998	1115	1115	1115	1115	1390	1390
Dimension - B	(mm)	2405	2645	2885	3347	2292	2912	3532	4152	2698	3264
Dimension - C	(mm) ±1.5%	(3.05+t) x n	(3.05+t) x n	(3.05+t) x n	(3.05+t) x n	(3.35+t) x n	(3.35+t) x n	(3.35+t) x n	(3.35+t) x n	(3.7+t) x n	(3.7+t) x n

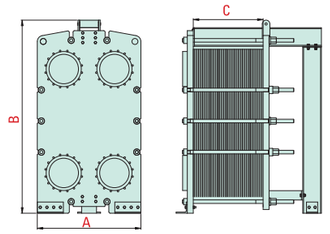
Model		HT453	HT454	HT501	HT502	HT503
Max. Flow	(m^3/hr)	3400	3400	4000	4000	4000
Area of Plate	(m^2)	2.15	2.8	2.38	3.36	4.02
Plate Hole Dia.	(mm)	430	430	485	485	485
Max.Conn.Dia.	(mm)	500	500	550	550	550
Dimension - A	(mm)	1390	1390	1540	1540	1540
Dimension - B	(mm)	3373	3830	3230	3950	4310
Dimension - C	(mm) ±1.5%	(3.7+t) x n	(3.7+t) x n	(3.6+t) x n	(3.6+t) x n	(3.6+t) x n

Working Condition

Description	Specifications
Heat transfer area(m^2/set)	11 ~ 3,000
Design temperature(˚C)	-35 - 2001
Design pressure(barg)	Full vacuum - 26
Application code	ASME, KS, JIS, PED

Material

Application		Materials
Heat transfer plate	Stainless steel	S,5304. SS316L, 254SMO, 904L
	Nickel	NI.200
	Nickel alloy	C-276., 825, 625. Incooy
	Titanium	Ti.Gr.1, Ti. Gr.11
Gasket	NER, EPDM, Neoprene, IIR. Butyls Silicone, Teflon, Viton	



Welded Plate Heat Exchangers for our customer's application

DongHwa PHE
Plate Heat Exchanger

A fully welded plate pack makes the heat exchangers **well-suited for handling aggressive media** as well as high pressure levels and temperatures.

An excellent choice for handling condensation duties, especially duties without condensate sub-cooling. They are also perfect steam heaters of clean fluids, demineralized water, and clean thermal oils.

Application

Chemical industry → VOC condenser / Etharol condensert / Savent recavery system
→ Recovery system for high temperatures and high pressures
→ EO/EGIEthylene Oxide/Ethylene Glycol) heat exchanger

Marne Marne → HFO heater / Stearm heater / Oil cooler / Vacuum condenser / LPG condenser

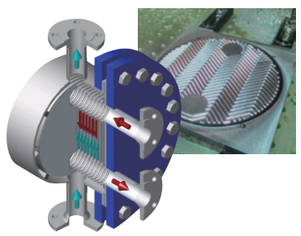
HVAC → District heating / Hot water supply / Heating, ventilation and air conditioning
→ Cooling and neating system / Steam heater

Refrigeration → Evaprator / Condenser

Characteristics

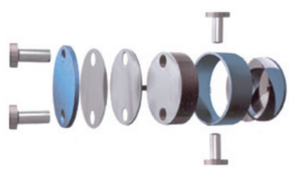
A fully welded plate pack makes the heat exchangers well-suited for handling aggressive media as well as high pressure levels and temperatures. Less space demanding and much lighter in weight, they are good replacements for shell and tube heat exchangers.

Available in both bolted and fully welded designs. The fully welded types can handle higher temperatures and pressure levels than the bolted types, but cannot be opened for cleaning. This can instead be done with CIP (Cleaning in Place) systems.



Features

Plale and Shell Heat Exchanger combines the advantages of plate heat exchanger and shell & tube heat exchanger. Since there is no gasket to be replaced, it is suitable for use at high pressure and high temperature and minimizes maintenance costs. A fully welded plate pack makes the heat exchangers well-suited for handling aggressive media as well as high pressure levels and temperatures, Less space demanding and much lighter in weight, they are good replacements for shell and tube heat exchangers.



Structures

The main components of Plate and Shell Heat Exchanger are plate pack, shell front & rear covers, connections, lifting lug and stand.

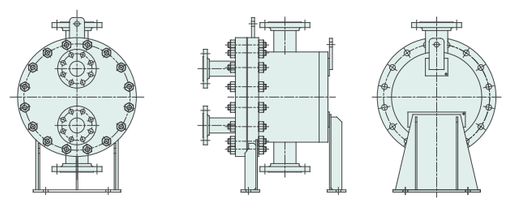
Hot fluid and cold fluid exchange heat cach other as they flow through channels formed with heat transfer plates. Since heat transfer take place through very thin transfer plates. Plate and Shell Heat Exchanger has a very high heat exchange efficiency.

Welded Plate Heat Exchanger Technical Data

Model		HSP25	HSP50	HSP100	HSP150	HSP300
Plate side connection	JIS	25	50	100	150	300
		1"	2"	4"	6"	12"
Shell side connection		25-50	50-100	50-200	100-250	100-300
		1"-2"	2"-4"	2"-8"	4"-10"	4"-12"

Working Condition & Material

Max. design pressure	25bar (bolted) / 40bar (welded)
Max. design temperature	250℃ (bolted) / 400℃ (welded)
Min. design temperature	-30℃
Plate material	SUS316L, SUS304, Titanium
Shell material	SS275(SS400), SUS316L, SUS304



Quality Assurance

We perform well planned and systemic quality assurance activity in every aspect including design, manufacturing, delivry and A/S, upon ISO 9001 Quality Management System.

Well established QMS conforming to ISO9001, We conform to the most stringent quality assurance program as demanded by our international clients

Our products meet with the highest engineering standards and of the highest quality As such we conform to various international standards such as ASME, JIS, CE, etc

ISO 9001

ASME

DNVGL

LR

KR

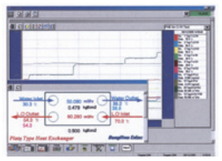
Design, R&D

Closed-loop production. In-house tooling and **hydraulic presses** for increased **quality control**

Effective utilization of resources, energy-saving and high production efficiency.

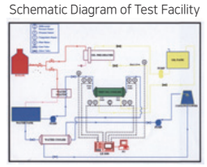
That's DongHwa PHE's concept of research and development.

Performance Test

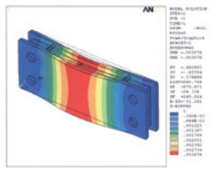


Performance Test Facility

Schematic Diagram of Test Facility

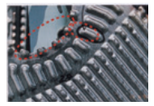


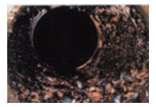
FEM Analysis of PHE



Maintenance

In order to extend the lifetime of the plate heat exchanger, it is important to watch changes in conditions. Frequently observed faults and causes are summarized.
If those faults are detected,
please contact our company.





Faults

Decreasing of performance

1. Heat transfer performance
It is necessary to clean the plates and remove scale, because of supposing scaling on the heat transfer surface.

2. Flow performance
Clogging of the port holes inlet and/or scale deposition on the heat transfer surfaces may be supposed. It is necessary to clean the unit and remove scale.

Leakage of fluids

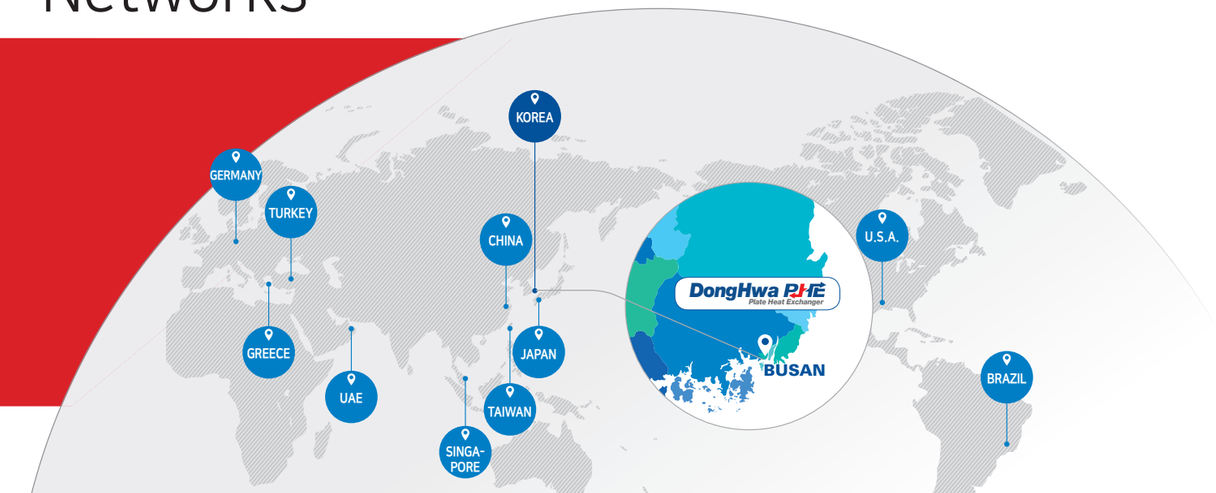
3. From plate pack
Insufficient tightening the plate pack, damage or deterioration of gaskets, plate gasket groove or double seal area corrosion, wrong plate arrangement, foreign object caught between gasket seal surfaces, gasket twisting or overlapping from the groove may be the supposed. Correct each fault or replace gaskets and/or plate

4. From S-Frame
The D-plate gasket, rubber boots, D plate or S-nozzle may be damaged. Replace the damaged part.

5. From E-Frame
The E-nozzle gasket, E-nozzle, rubber boots, or E plate may be damaged. Replace the damaged part

6. Intermixing of two media
It is possible that corrosion or damage to the intermediate plate has penetrated the plate. Replace the damaged plate.

Networks



Maintenance team provides solutions and service either directly to the customer or through multiple partners.

We contact our customers through a variety of channels and global network.

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DongHwa Plate Heat Exchanger

DongHwa PHE
Plate Heat Exchanger

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