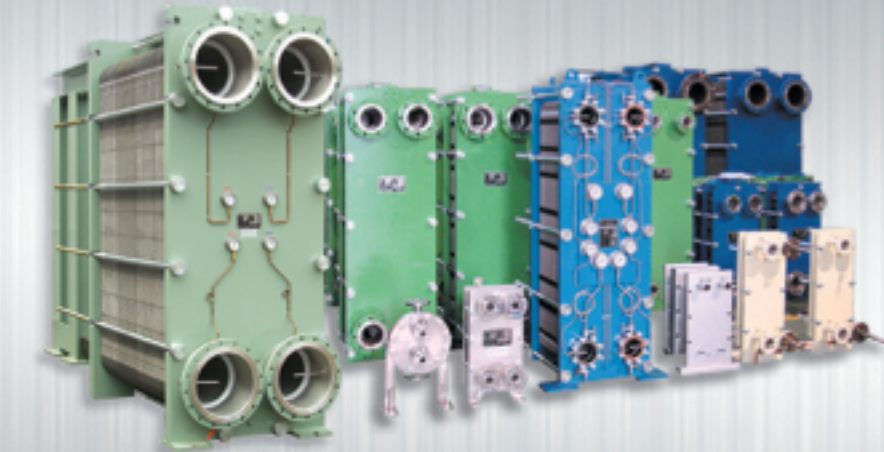


<http://www.daewon-phe.co.kr>  
<http://www.dhpeng.com>

# Plate

## Heat Exchanger



DHP Engineering Co., Ltd.

>> HEAD QUARTER / FACTORY  
경남 김해시 주촌면 선지리 265  
TEL : +82-55-338-4300  
FAX : +82-55-338-4305

>> SEOUL BRANCH OFFICE  
TEL : +82-2-2625-1266  
FAX : +82-2-2625-1268

>> ULSAN BRANCH OFFICE  
TEL : +82-52-268-4301  
FAX : +82-52-268-4303

>> AUSTRALIA  
TEL : +61-2-9418-1450  
FAX : +61-2-9498-1585

>> TAIWAN  
TEL : +886-2-292-13998  
FAX : +886-2-292-55324

>> THAILAND  
TEL : +662-892-5997-8  
FAX : +662-892-2695

>> MALAYSIA  
TEL : +60-4-890-3839  
FAX : +60-4-890-4331

>> CHINA  
TEL : +86-451-8235-3691  
FAX : +86-451-8232-0093

>> ITALY  
TEL : +39-2-4547-9118  
FAX : +39-2-4547-9451

>> INDONESIA  
TEL : +62-21-544-4393  
FAX : +62-21-543-98266

>> E-mail : [dhpeng@daewon-phe.com](mailto:dhpeng@daewon-phe.com)

>> Internet homepage : <http://www.daewon-phe.co.kr>  
<http://www.dhpeng.com>



# DHP Engineering for Industrial Applications

DHP(Daewon Heat Plate) has been engaged in the fields of energy, environmental and process technology since 1978.

With the development of the first Plate Heat Exchangers in 1979, wide range of experience in many different applications followed.

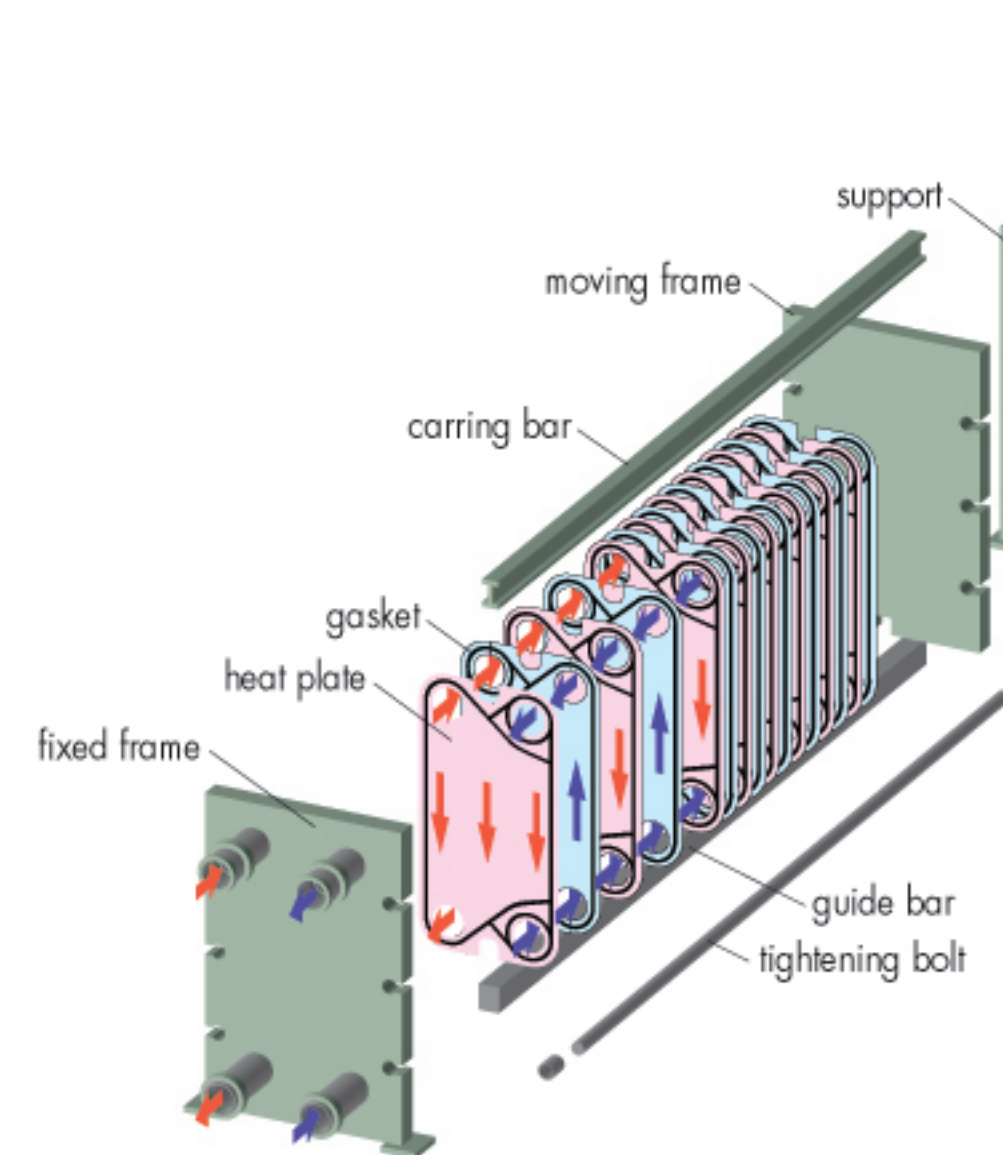
Today, DHP offers the largest selection of designs of Plate Heat Exchangers available with different surface areas, corrugations, plate materials, plate thickness and gaskets.

Our Plate Heat Exchangers meet the needs of virtually every industry requiring heat transfer including,

- Chemical
- Power Station
- HVAC
- Food and Beverage
- Marine Application
- Off Shore
- Engine Cooler

With knowledgeable staff for the design, application and manufacture of Plate Heat Exchangers and thermal systems, DHP is the best choice for your heat transfer needs.

## Design & Operation



### Design

The main components of the DHP Plate Heat Exchangers :

- The plate pack comprises of a number of heat plates, according to the heat transfer surface required.
- Gaskets on the plates ensure that the flow channels are securely sealed from each other. The gasket also determine the direction of flow within the exchanger.
- The frame enclosing the plate pack is held together with tightening bolts.
- Connections for incoming and outgoing fluids are usually in the fixed frame of the heat exchanger. In the case of multi pass flow, connections have to be in the fixed frame and the movable frames.

### Operation

Adjacent plates form flow channels carrying alternately hot and cold fluids throughout the plate pack.

Normally, single pass heat exchangers are used, permitting 100% counterflow of both products.

All port connections are located in the fixed frame plate providing a low maintenance installation.

In cases of low temperature differences, or where these differences are to be fully utilized, multi pass Plate Heat Exchangers become more economical.

Provided the number of passes is the same for both fluids nearly 100% counterflow will be achieved.



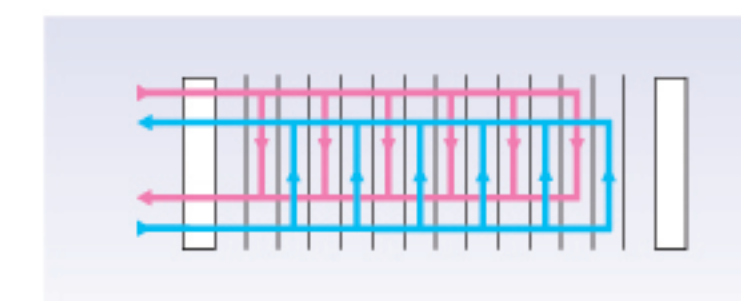
ISO 9001



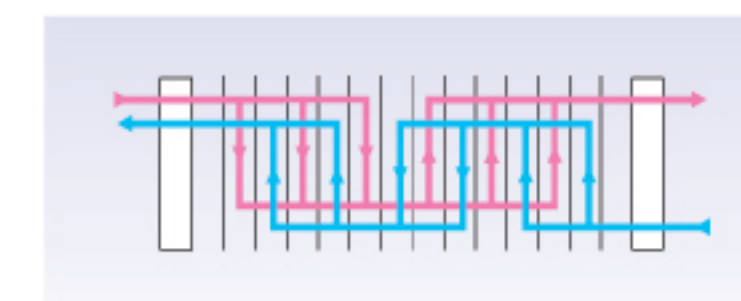
ASME 'U' STAMP



CE / PED



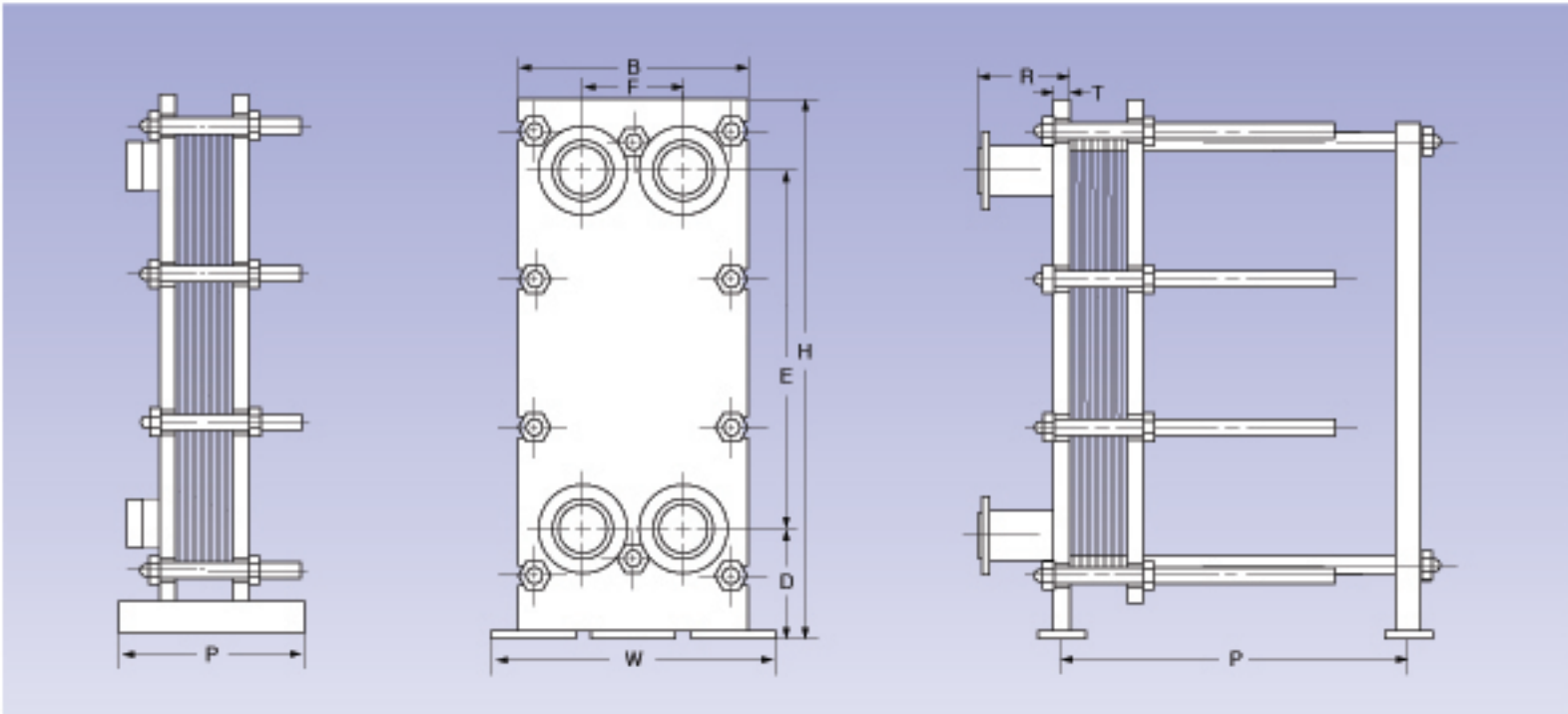
Single pass



Multi pass



# Variety of Plate Heat Exchanger



Connection Options

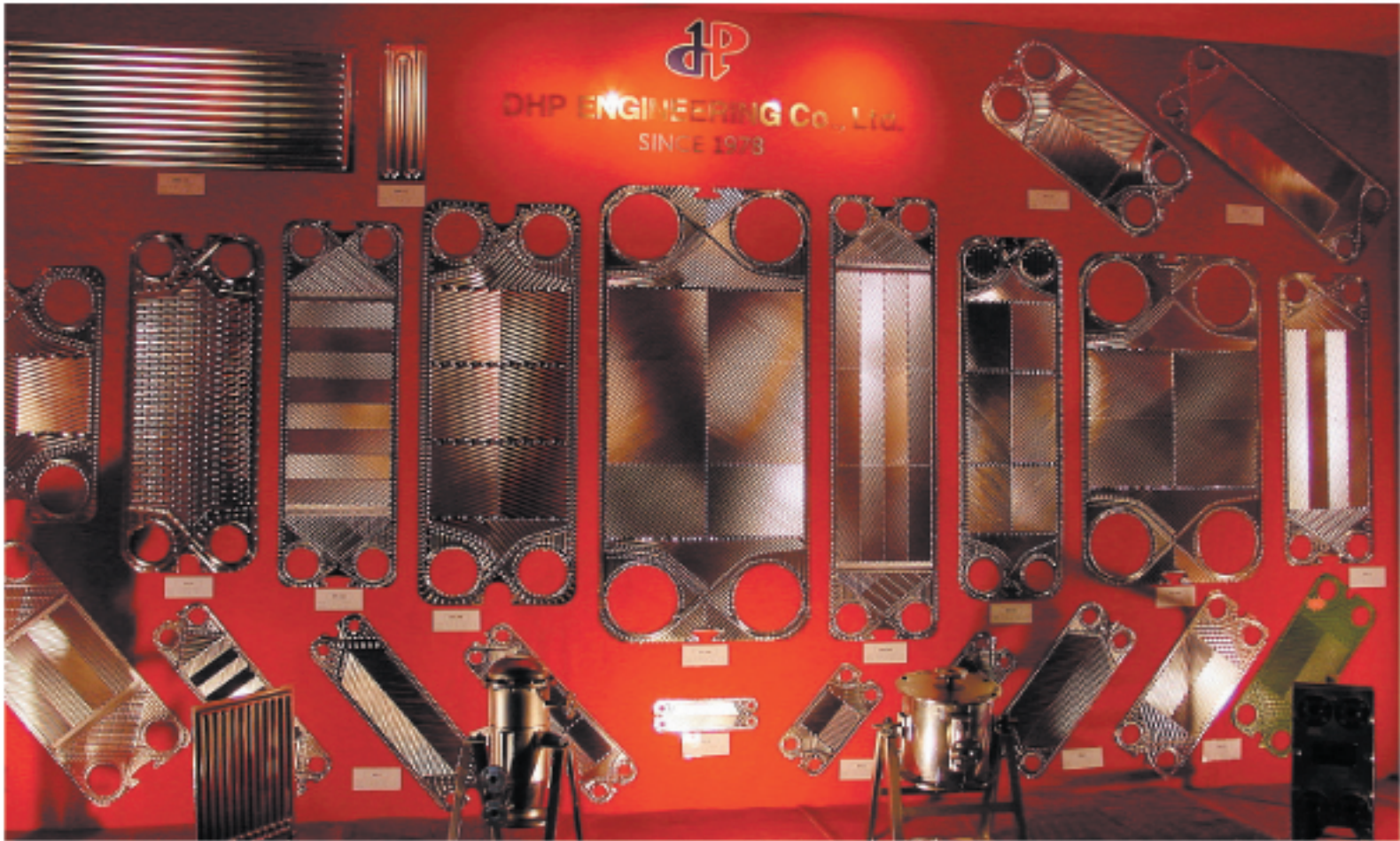
threaded connection with alloy nozzle

Standard studded connection

Studded connection with alloy lining

Flanged connection

Sanitary Quick-Disconnect nozzle

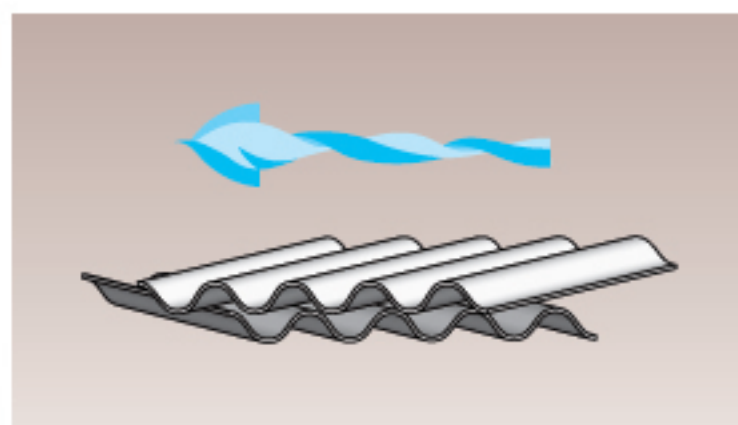


TYPE	MAX. F. RATE (M <sup>3</sup> /hr)	CONN. SIZE mm(A)	FRAME SIZE (mm)						NUMBER OF SIZE (P)				
			B	H	W	F	E	D	50	100	200	400	600
DX-1	10	25A	200	540	300	70	377	100	300	-	-	-	-
DX-2	40	50A	320	648	440	142	392	171	400	-	-	-	-
DX-3	40	50A	320	844	440	142	588	171	400	-	-	-	-
DX-4	40	50A	320	1040	440	142	784	171	400	-	-	-	-
DX-5	40	50A	400	1172	600	163	830	247	640	990	-	-	-
DX-17	90	80A	350	1052	350	150	800	170	720	1000	1550	-	-
DX-6	90	80A	420	990	630	194	694	173	640	990	-	-	-
DX-7	90	80A	550	1475	750	257	1010	325	860	1285	2135	-	-
DX-8	160	100A	600	1500	800	300	1100	280	860	1160	1760	2360	-
DX-22	350	100A	470	1084	470	231	719	215	720	1000	1550	-	-
DX-9	350	150A	700	1760	900	319	1200	224	1050	1475	2325	3900	-
DX-143	640	150A	580	1346	580	292	936	210	840	1010	1760	-	-
DX-55	350	125A	580	1647	580	310	1237	210	900	1200	1800	3000	-
DX-161	350	150A	600	1860	800	260	1424	240	900	1250	1950	3350	-
DX-146	640	150A	580	1778	580	292	1368	210	900	1200	1800	3000	-
DX-163	350	150A	600	1260	800	260	784	240	900	1250	1950	3350	-
DX-20S	500	200A	780	1415	950	370	790	315	900	1250	1950	3350	-
DX-20M	500	200A	780	1745	950	370	1120	315	900	1250	1950	3350	-
DX-20L	500	200A	780	2075	950	370	1450	315	900	1250	1950	3350	-
DX-148	640	150A	580	2210	580	292	1800	210	950	1250	1850	3050	4250
DX-30S	1500	300A	1040	1878	1200	540	1178	350	1300	1650	2350	3700	4500
DX-30L	1500	300A	1040	2328	1200	540	1628	350	1300	1650	2350	3700	4500
DX-36S	2000	400A	1115	2040	1115	570	1340	380	1200	1500	2100	3300	4500
DX-36M	2000	400A	1115	2660	1115	570	1960	380	1350	1650	2250	3450	4650
DX-36L	2000	400A	1115	3280	1115	570	2580	380	1500	1800	2400	3600	4800

MAX. OPERATING TEMP.	250°C
MAX. OPERATING PRESS.	20 Kg/cm <sup>2</sup> / NEW MODEL(50bar)
PLATE MATERIAL	STS 304, 304L, 316, 316L, 317, AVESTA, 254SMO, HASTELLOY-B, C, TITANIUM, TI-PD, NLCP(NICKEL), AL-BRASS
GASKET MATERIAL	NITRILE(NBR), HNBR, HYPALON, BUTYL, FPM, FPM-G, EPDM(Ethylene Propylene Diene Methylene), SILICONE, NEOPRENE
FRAME MATERIAL	CARBON STEEL, STS 304, 316, STS LINING



## Advantages of Using DHP Plate Heat Exchangers.



### Cost Savings

DHP Plate Heat Exchangers save costs, with their high efficiency, low investment, compact installation and simple maintenance.

### High Heat Transfer Coefficients

DHP Plate Heat Exchangers provide high rates of heat transfer, due to the turbulence inducing shape of the plates.

The special gasket configuration of the plates prevents any mixing of the media being processed. In the port area both fluids are separated by double gaskets. Additional safety is ensured by the leakage gap.

### Adhesive-Free Gasket

DHP developed adhesive-free gaskets. The optimum gasket setting in the gasket groove and the fixing of the gaskets by pressed indentations, allow high resistance against pressure and enable a quick and simple gasket replacement.

### Flexibility

DHP Plate Heat Exchangers can be adapted to changing process conditions. If process conditions change plates can be added or removed easily. This eliminates the need for costly re-investment.

### Low Product Content

This small volume of liquid in the Plate Heat Exchangers is the reason for the low weight of the equipment.

It enables a faster start up and shut down of the complete plant, than conventional heat exchangers.

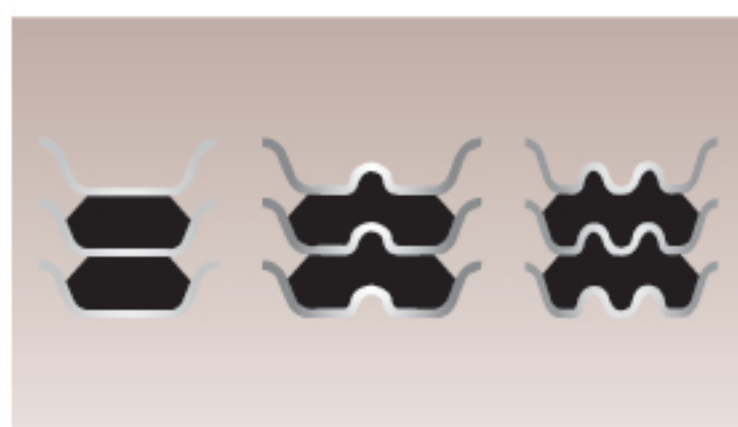
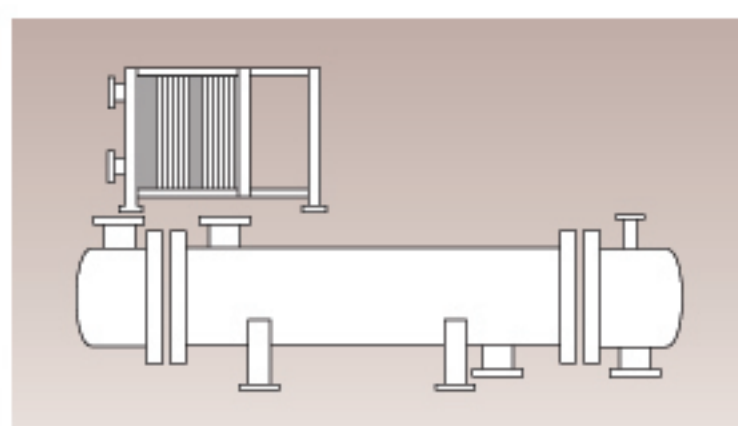
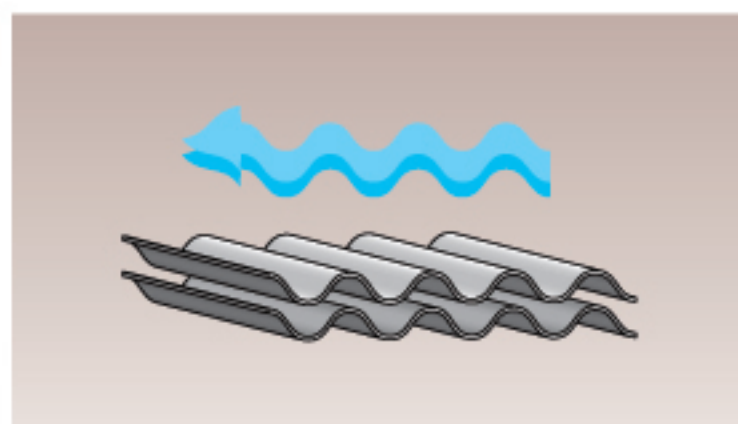
### Compact Design

DHP Plate Heat Exchangers are of compact design.

For example, 200m<sup>2</sup> of heat exchange surface require a Plate Heat Exchanger of only approx. 3m length, 2m height and 1m width. For a shell and tube heat exchanger to achieve the same duty, some 600m<sup>2</sup> of heat exchange surface would be necessary.

### Reliable Gasket Structure

DHP's new development of 'Tri-Seal' gasket system overcomes the limitation of ordinary plate heat exchanger.(3 times high-pressure endurance).



## Maintenance & Materials



### Maintenance

Any maintenance of DHP Plate Heat Exchangers can be carried out easily. For inspection and manual cleaning simply release the movable frame to allow the plate pack to be taken apart. Other forms of cleaning such as back flushing or chemical cleaning can be done keeping the exchanger assembled.

### Material

DHP Plate Heat Exchangers are manufactured from a wide range of materials, depending on individual applications.

### Plate Materials

Stainless steel :

- STS 304
- STS 316
- STS 316L
- STS 317
- STS 316Ti
- AVESTA SMO 254

### Special Materials

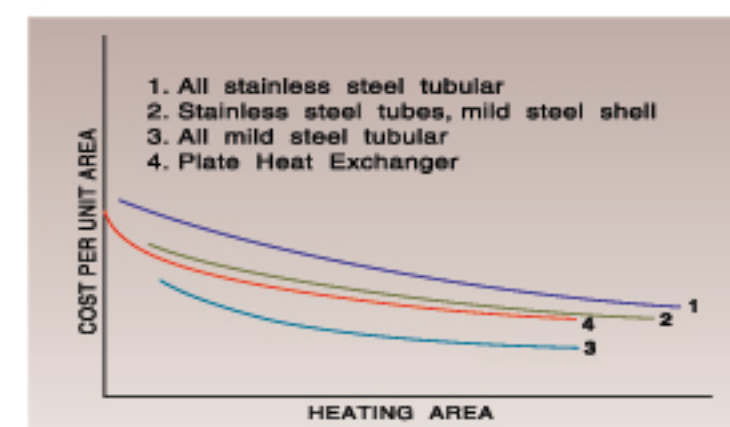
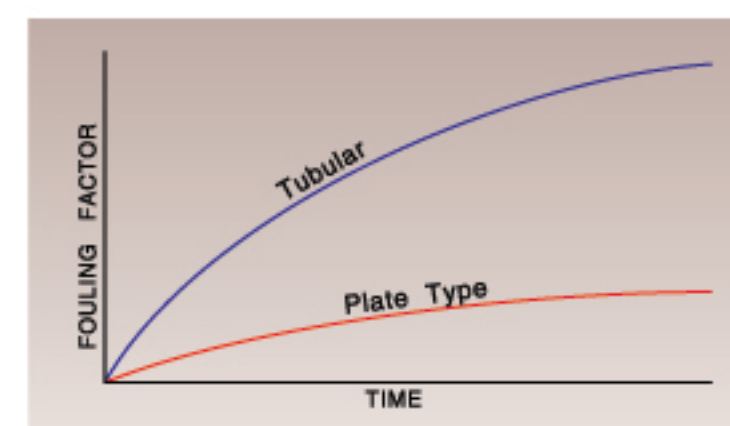
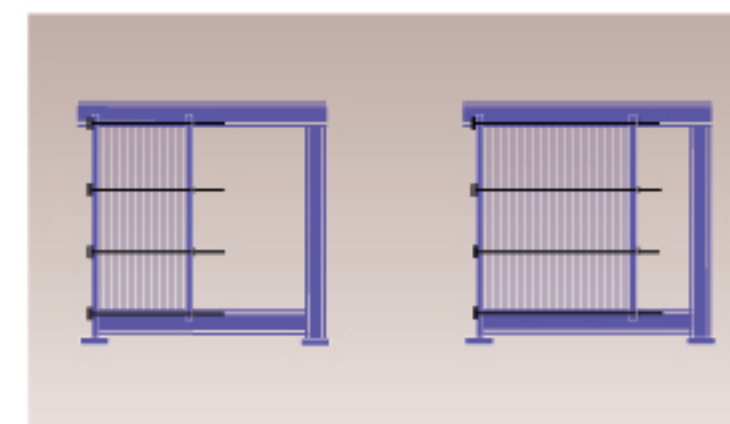
- Hastelloy - B,C
- Incoloy

### High Grades of

- Titanium
- Titanium, stabilized with Palladium
- Nickel
- Tantalum

### Gasket Materials

- Nitrile Rubber(NBR)  
temperature range up to 140°C
- Butyl Rubber(Butyl)  
temperature range up to 140°C
- Ethylene Propylene Rubber(EPDM)  
temperature range up to 170°C
- Silicone Rubber  
temperature range up to 175°C
- FPM(Viton)  
temperature range up to 180°C
- Hard Gaskets, asbestos-free,  
temperature range up to 220°C





# Applications of DHP Plate Heat Exchangers

## Automotive Industry

- cooling quenching oil
- cooling paint
- cooling phosphating solutions

## Chemical Industry

- cooling lyes
- cooling acids
- cooling sulphuric acids
- process cooling
- cooling circulating water
- cooling kerosene
- cooling salt solutions
- condensation of ethanol
- drying chlorine gas

## Edible Oil Processing

- heating edible oils
- cooling edible oils
- cooling for winterization
- cooling fatty acids

## HVAC

- district heating
- underfloor heating
- heating treatment water
- heating swimming pools
- heat pump installations
- heat recovery installations
- preheating heating water
- geothermal installations
- solar energy installations
- central cooling systems in
- airconditioning plants

## Marine Appl. and Engines

- central cooling
- lubricating oil cooling
- cooling piston coolant
- cooling transmission oil
- pre-heating heavy fuel oil
- pre-heating diesel oil
- heating-up of sea water

## Mechanical Engineering

- cooling machinery
- cooling emulsions
- cooling hydraulic oil
- cooling grinding oil
- cooling kiln water
- cooling transmission oil
- cooling autoclave water
- cooling engine coolant
- heat recovery

## On-and Off-Shore

- central cooling
- lubricating oil cooling
- process cooling



## Pharmaceutical Industry

- cooling emulsions
- heating suspensions
- heating blood plasma
- heating citric acid
- cooling infusion liquids

## Piston and Turbine Machines

- cooling engines
- heat recovery from diesel power plants
- cooling gas turbines
- cooling steam turbines
- cooling compressors

## Power Stations

- cooling circulating water
- cooling flusing coolant
- cooling transmission oil

## Pulp and Paper Industry

- cooling waste water
- cooling wash water
- waste water evaporation

## Steel Industry

- mould cooling
- continuous casting plant cooling
- hydraulic oil cooling
- furnace water cooling
- cooling coking plant water
- emulsion cooling
- cooling NH3 solutions
- cooling machine coolants
- cooling compressor coolants
- cooling feed water

## Sugar Industry

- heating raw juice
- heating pulp press water
- heating extraction water
- heating carbonated juice
- heating thick juice
- heating syrups
- heating thin juice
- juice concentration

## Surface Treatment

- cooling electrolyte
- cooling paint
- cooling electroplating baths
- heating degreasing baths
- heating phosphating baths

## Textile Industry

- heat recovery from textile washing agents
- heating wool washing liquids
- cooling dyeing plant effluent
- heating dyeing liquors
- cooling liquor water

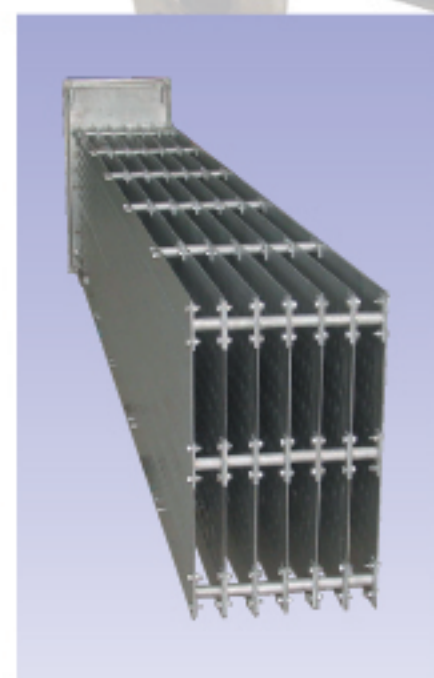


## PLATE COIL

DHP's versatile, highly efficient prime surface heat exchanger replaces costly, unwieldy pipe coil, steam sparging or expensive resistance heating or cooling elements.

DHP series for heating units are designed to uniformly deliver steam to all levels of the units through zoned headers as shown in the figure below.

High internal flow velocities of DPC & DPH heat exchangers provide effective heat transfer rates. Single and double embossed styles may be flat, bent or rolled as immersion heaters, banked for tanks, used in mixers, cryogenic shrouds, jacketed vessels, clamp on panels and variety of other configurations.



DPC Series DPH Series



TYPE			SIZE (mm)			Heat Trans.A. (m <sup>2</sup> /Sheet)	NOZZLE (IN/OUT)inch	Remarks
			Width	Height	Flow R./ SH			
COOLING TYPE	DPC-	62	200	600	5.0m <sup>3</sup> /h	0.280	Variable 1/2" 1" 1 1/4" 1 1/2"	
		65	550	600	"	0.760		
	DPC-	92	200	900	"	0.414		
		95	550	900	"	1.140		
	DPC-	122	200	1200	"	0.552		
		125	550	1200	"	1.520		
	DPC-	152	200	1500	"	0.690		
		155	550	1500	"	1.900		
	HEATING TYPE	62	200	600	"	0.280		
		65	550	600	"	0.760		
		92	200	900	"	0.414		
		95	550	900	"	1.140		
		122	200	1200	"	0.552		
		125	550	1200	"	1.520		
		152	200	1500	"	0.690		
		155	550	1500	"	1.900		

REMARKS : PANEL COIL SIZE CAN VARY CUSTOMER'S REQUIREMENTS.  
MATERIALS : STS 304 ,304L ,STS 316 ,316L ,TITANIUM , HASTELLOY-B ,C ,AVESTA 254 SMO

## DESIGN CONDITION

### ◆ LIQUID : LIQUID (HEATER OR COOLER)

DESCRIPTION	UNIT	HOT SIDE	COLD SIDE
FLUID NAME			
FLOW RATE	m <sup>3</sup> /hr or kg/hr		
TEMPERATURE	°C	IN → OUT	IN → OUT
MAX. PRES. DROP	kg/cm <sup>2</sup>		
OPERATION PRES.	kg/cm <sup>2</sup>		
SPECIFIC GRAVITY			
SPECIFIC HEAT			
THERM. CONDUCT.	mm		
VISCOSITY (C.P)			
NOZZLE DIAMETER			

### ◆ PLATE COIL DATA (HEATING OR COOLING)

DESCRIPTION	UNIT	HEATING 용	COOLING 용
FLUID NAME			
TANK CAPACITY	m <sup>3</sup> or kg		
TANK TEMPER.	± °C	± ( ) °C	± ( ) °C
COUNTER FLUID FLOW RATE		STEAM ( )kg/cm <sup>2</sup> or H.W ( )kg/hr	C.W. or CHILLED WT ( )kg/hr
REMARKS			

♣ If you give us your design data, we will suggest you the best solution for your needs.