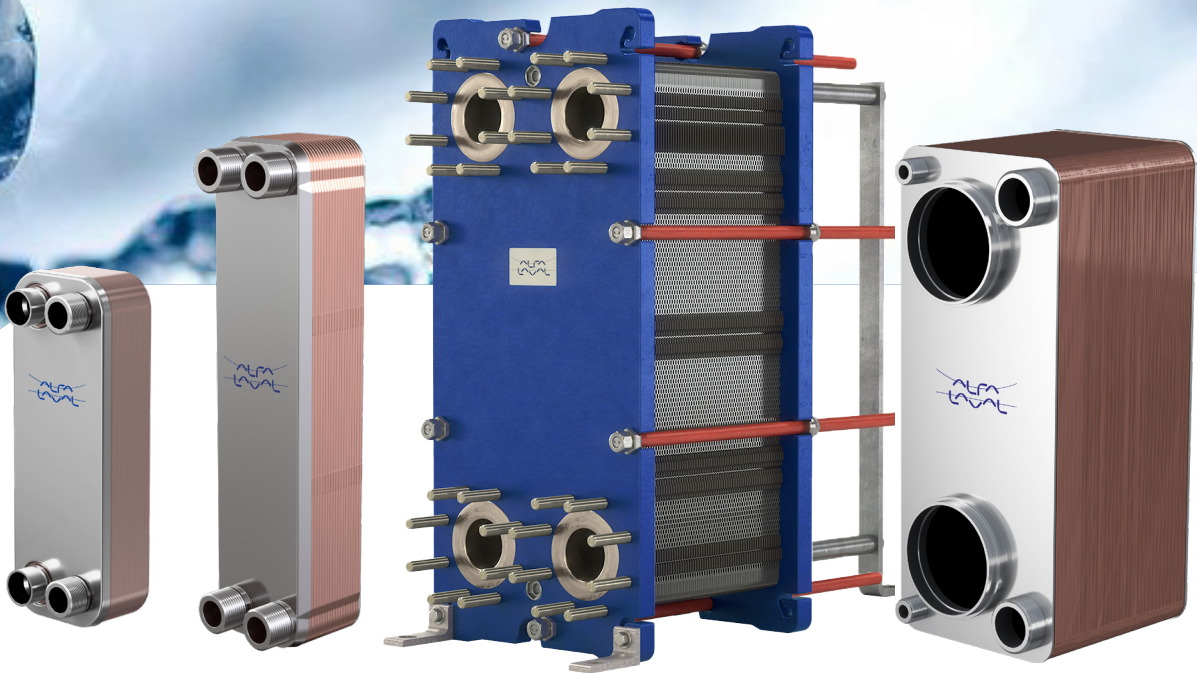


ALFA  
LAVAL

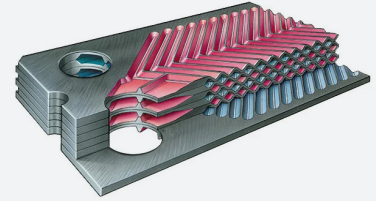


## Plate Heat Exchangers



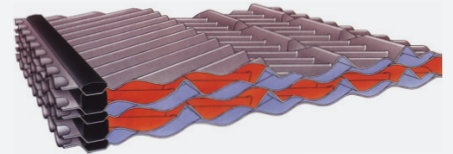
## Diabon Graphite® Nonmetallic

A composite of fused graphite and fluoroplastic, this unit provides excellent resistance to hydrochloric acid,  $AlCl_3$ , and other corrosive materials. Unlike traditional graphite, Diabon F® has no porosity or permeability. It resists cracking and breakage during handling and use.



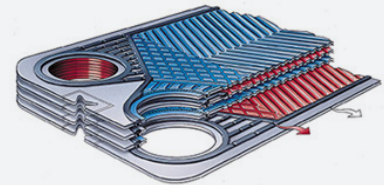
## Wide-Gap Plate

With 17 mm channels free of contact points, this plate is ideal for fluids containing fibres or coarse particles. Each channel has been designed to eliminate bridging of solids in the entrance area.



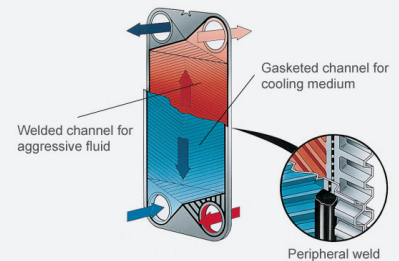
## Double-Wall Plate

Composed of plates pressed simultaneously and laser welded at the port, this is designed for applications where additional reliability against intermixing is necessary to prevent catastrophe. Failure of one plate results in external detection without interleakage. The second wall provides a double barrier between fluids, meeting local health code regulations.



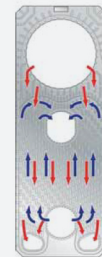
## Semi-Welded Plate

Welded channels for process fluids allow aggressive and difficult fluids to be handled in a plate heat exchanger and expands the pressure range. The gasket exposure is minimal on the welded side.



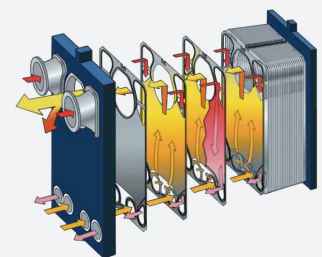
## Plate Condenser

Compact design plate condenser replaces traditional large units. Customized connections for large volumes of vapour, specific plate pattern, asymmetric plate gap to optimize heat transfer and minimize pressure drop make it suitable for condensation.



## Plate Evaporator

Compact and economically efficient, the plate evaporator/condenser replaces conventional large and expensive falling film units. Its deep channels, large ports and laser welding allow vacuum and low pressure evaporation and condensing for both aqueous and organic systems.





# Applications

## HVAC Applications



District Heating



District Cooling



HVAC Cooling



Air Conditioning & Heat Pump Solutions

## Refrigeration Applications



Commercial Refrigeration



Industrial Refrigeration

## Other Applications



Beverage Processing



Fluid Power

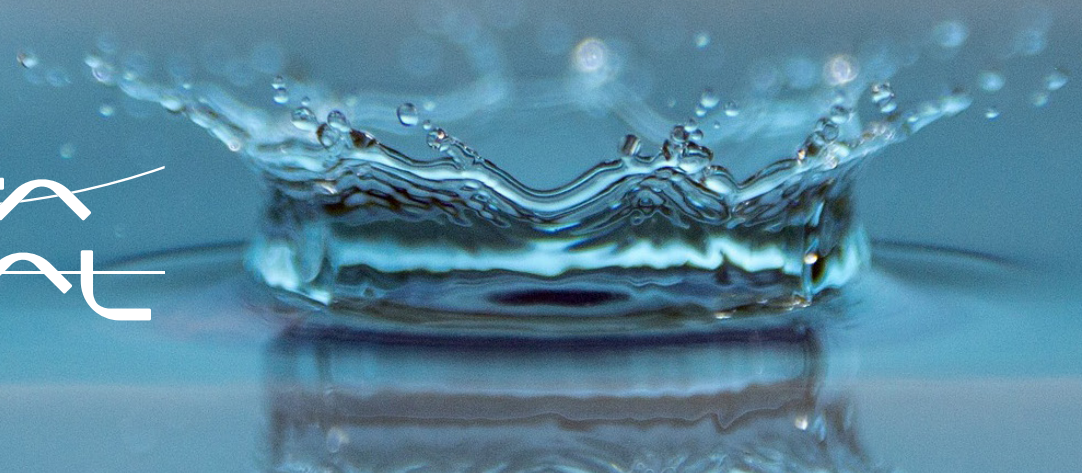


Metal Working



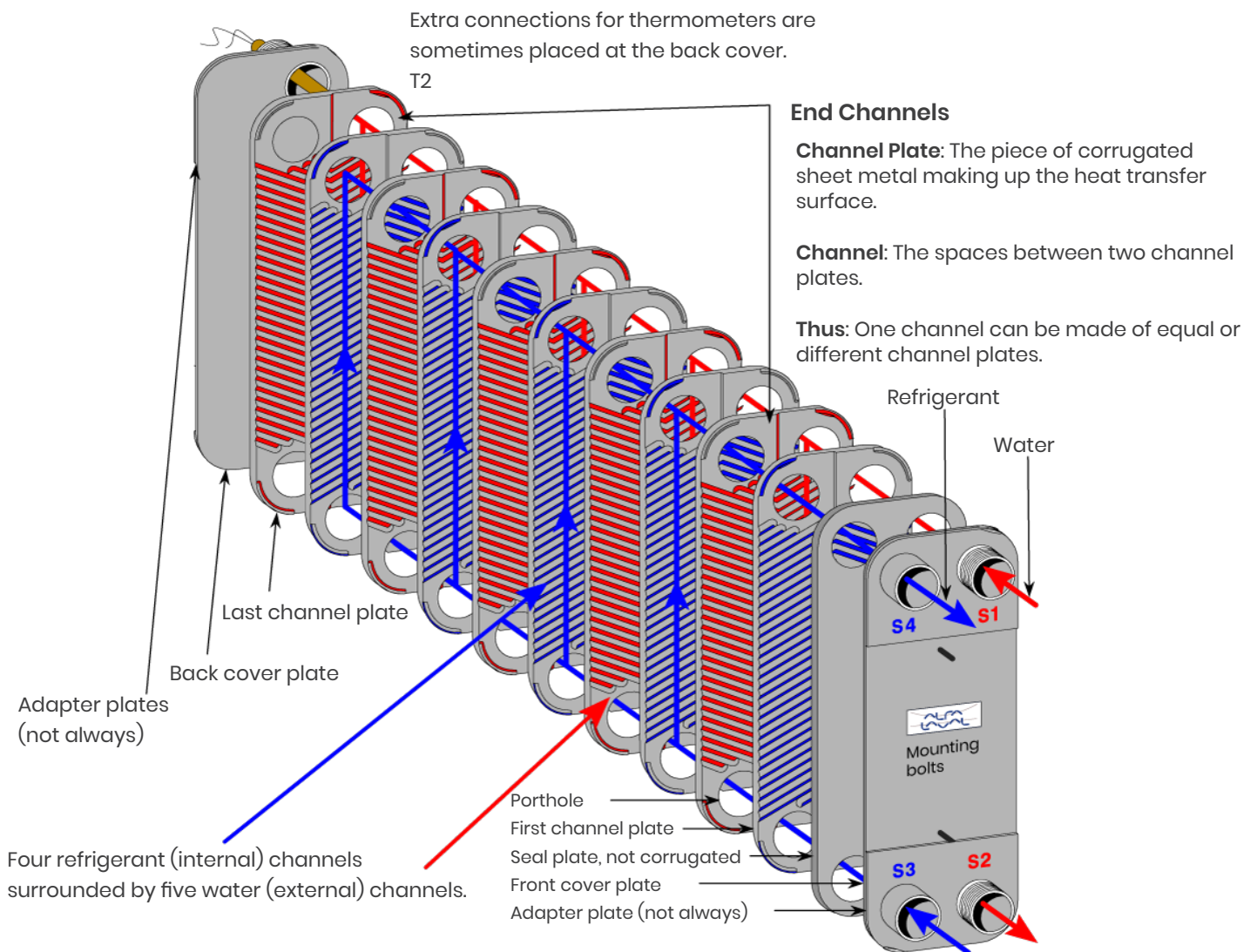
Marine





# Overview of Brazed Plate Heat Exchangers

Exploded view of a brazed plate heat exchanger.





# AC | Alfa Chill

Built with Alfa Laval’s flexible DynaStatic distribution system, which our experts optimize according to your specific application and choice of refrigerant, our AC line of heat exchangers offers top thermal

performance in evaporation duties. Combined with the unique FlexFlow asymmetric channel plates, you get the maximum possible efficiency for your system.

## AC Features



### PressureSecure

Unparalleled strength for demanding duties



### ValuePlus

Total support – with value-adding options to fit your needs



### REFuture

A future-proof investment for tomorrow’s refrigerants



### DynaStatic

Flexible refrigerant distribution



### FlexFlow™

Superior thermal performance



### IceSafe

Controlled, non-destructive freezing

## AC Pressure and Temperature Limits

- Maximum design pressure is 32 bar/464 psi for AC. The AC product line include ACH with allowed pressure up to 48 bar/696 psi.
- Design temperature range is: -196 to 225°C/ -321 to 437°F.

## AC Examples of Connections

Alfa Laval offers a wide range of connections to fit every need.



External Threaded



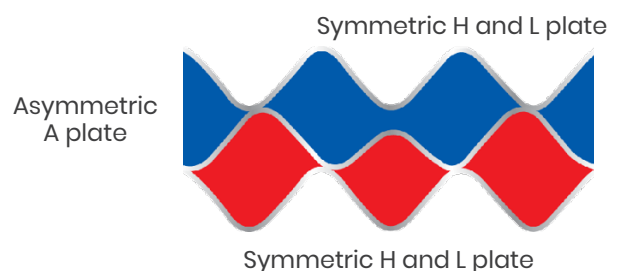
Internal Threaded



Soldering

## Asymmetric Channels

The blue colored side has a larger channel volume than the red side. The channels are created between one symmetric and one asymmetric channel plate.



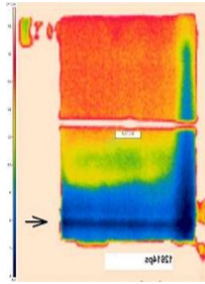
## AC Examples of Application Areas

Evaporator or condenser for heat pumps and chillers, Economizers, Air conditioning

# AC Refrigerant distribution system

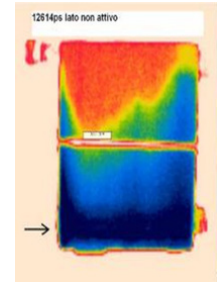
## Standard brazed plate heat exchanger

Some channels receive more liquid refrigerant than others. This results in reduced performance.



## Alfa Laval AC-series brazed plate heat exchanger

The fluid distribution system creates an even fluid pattern and maximized performance.



## AC Nomenclature

AlfaChill



**1 Family** Brazed plate heat exchangers (BHE)

AC AlfaChill

**2 Pressures Dedicated to**

**3 Capacity (kW)**

**4 Hole Units**

**DQ or EQ** 6 hole units, Double or Single ref circuit

**EQ or X** 4 hole units, Integrated ref distributor

Note! The unit may include a ref distributor even if without EQ or X.

**5 Number of plates**

**6 Channel type**

H, L, M Symmetric channels

A, AH, AM Asymmetric channels

**7 Material combination**

Channel plate	Frame/ Pressure plate	Connection	Suffix
316	316	316	None
316	304	304	-F
304	304	304	-G

# AC Specification

Model	Cooling Capacity		Condensing Capacity		Flowrate (kg/h)		Dimension (mm)			Connection (inch) In/Out		Net Weight (kg)
	RT	kW	RT	kW	Water		W	H	L	Refrigerants	Water	
					Evaporator	Condenser				Soldering	External Threaded	
ACH43-24AH-F	3.0	10.55	2.70	9.50	1,807	1,636	121	333	49.7	1/2" / 7/8"	PT 1"	4.3
ACH43-26AH-F	3.5	12.31	3.00	10.55	2,108	1,817	121	333	52.8			4.5
ACH43-34AH-F	4.5	15.82	4.20	14.77	2,710	2,545	121	333	65.2			5.4
ACH43-36AH-F	5.0	17.59	4.70	16.53	3,012	2,848	121	333	68.3			5.7
ACH43-50AH-F	7.0	24.62	6.80	23.91	4,216	4,120	121	333	90			7.2
ACH43-54AH-F	7.5	26.37	7.30	25.67	4,516	4,423	121	333	96.2			7.7
ACH43-58AH-F	8.0	28.14	7.80	27.43	4,818	4,726	121	333	102.4			8.1
ACH74-38AH-F	10.0	35.17	10.00	35.17	6,023	6,060	162	496	86.5	1/2" / 1 3/8"	G 1-1/2"	11.7
ACH74-48AH-F	12.5	43.96	12.50	43.96	7,529	7,574	162	496	106.1			13.8
ACH74-58AH-F	15.0	52.76	15.00	52.76	9,035	9,091	162	496	125.7			16.0
ACH74-84AH-F	20.0	70.34	21.00	73.85	12,046	12,724	162	496	176.6			21.7
ACH74-110AH-F	25.0	87.93	25.50	89.68	15,058	15,452	162	496	227.6			27.5
ACH240EQ-90AH-F	30.0	105.51	39.00	137.18	18,069	23,636	289	525	204.3	5/8" / 1 3/8"	G 2"	45.4
ACH240EQ-104AH-F	35.0	123.10	44.00	154.75	21,081	26,663	289	525	234.1			51.4

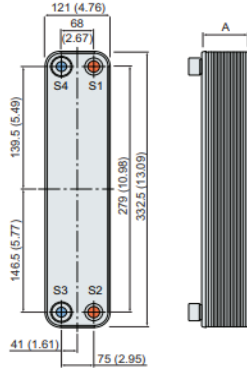
Remark 1 : Evaporator Temperature @ 2.0 °C, Water Inlet/Outlet Temperature @ 12/7°C  
 Condensing Temperature @ 45 °C, Water Inlet/Outlet Temperature @ 32/37 °C

Remark 2 : Standard PED, ACH43 : 45 bar (Max.225 °C s3-s4), 30 bar (Max. 225 °C s1-s2)

Remark 3 : Base on R410A

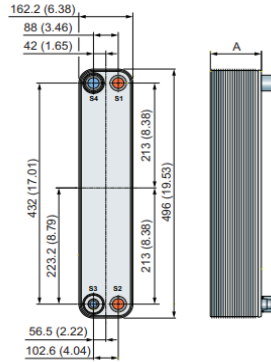
# AC Technical Data

## AC43 / ACH43 / ACP43



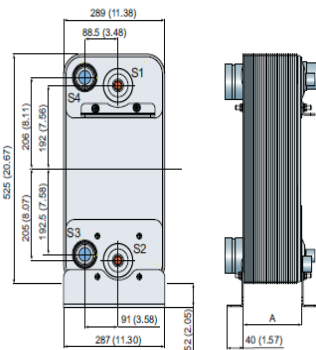
Volume per channel, litres (gal)	(S1-S2): 0.048 (0.0127) (S3-S4): 0.041 (0.0108)
Max. particle size, mm (inch)	0.6 (0.024)
Max. flowrate kg/h (gpm)	8,800
Flow direction	Paralle
Min. number of plates	4
Max. number of plates	120
Applications : Evaporator, Condenser, Cascade systems	

## ACH74 / ACK74



Volume per channel, litres (gal)	(S1-S2) 0.148 (0.0391) (S3-S4) 0.11 (0.0291)
Max. particle size, mm (inch)	1.0 (0.039)
Max. flowrate kg/h (gpm)	27,000
Flow direction	Paralle
Min. number of plates	10
Max. number of plates	180
Applications : Evaporator, Condenser, Cascade systems	

## ACH240EQ / ACK240EQ



Volume per channel, litres (gal)	(S1-S2): 0.27 (0.0713) (S3-S4): 0.24 (0.0634)
Max. particle size, mm (inch)	0.9 (0.035)
Max. flowrate kg/h (gpm)	51,000
Flow direction	Paralle
Min. number of plates	10
Max. number of plates	256
Applications : Compact, Easy to install, Self-cleaning, Low level of service and maintenance is required	





# CB | Copper Brazed



The thin, corrugated stainless steel plates used in the CB design are brazed together with copper. This forms a self-contained unit that can handle both high pressures and high temperatures. And unlike traditional designs, the brazed plate heat exchanger consists solely of surfaces that actively contribute to heat transfer, resulting in

significant increases in overall efficiency. Units in the CB range are available in many different sizes and capacities, with varying plate patterns and connections for particular duties and performance specifications. CB units can be configured as single-pass, dual-pass or multi-pass installations, according to project requirements.

## CB Features



### PressureSecure

Unparalleled strength for demanding duties



### ValuePlus

Total support – with value-adding options to fit your needs

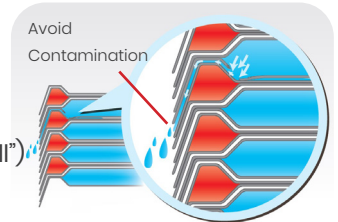


### FlexFlow™

Superior thermal performance

## CBDW Portfolio

(Double Wall)

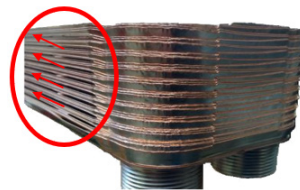


### Features :

- Leak-proof (“Real Double Wall”)
- High efficiency design

### Target :

- DHW applications -> Avoid contamination
- Flammable refrigerants -> Safety feature



### Real Double Wall

Leakages are free to be vented outside from external flank

## CB Examples of Connections

Alfa Laval offers a wide range of connections to fit every need.



External Threaded



Internal Threaded



Soldering

## CB Examples of Application Areas

- HVAC Heating & Cooling
- Industrial Heating & Cooling
- Refrigeration
- Oil Cooling
- Solar Heating



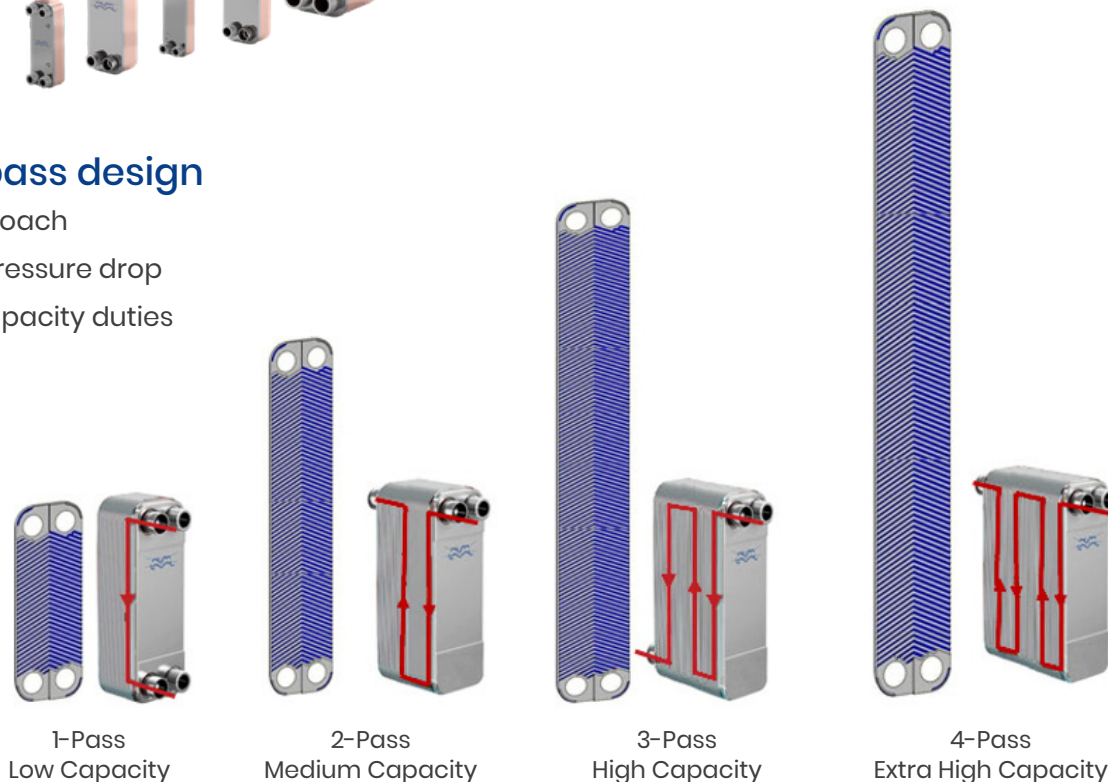


## CB Pressure and temperature limits

- Maximum design pressure is 32 bar/464 psi for CB. The CB product line include CBH and CBXP with allowed pressures up to 85 bar/1,232 psi.
- Design temperature range is: -196 to 225°C / -321 to 437°F.

## CB Multi-pass design

- Close approach
- Increase pressure drop
- For high capacity duties



1-Pass  
Low Capacity

2-Pass  
Medium Capacity

3-Pass  
High Capacity

4-Pass  
Extra High Capacity

## CB Nomenclature

Copper Brazed

**CB** **H** **60** - **80** **AH** **DS** - **F**

### 1 Family

Brazed plate heat exchangers (BHE)

<b>CB</b>	Copper brazed for general purpose
<b>CBAQ</b>	CBAQ-AHRI certified
<b>CBDW</b>	CBDW-Double wall
<b>CBM</b>	CBM- Marine approvals

### 2 Pressure & Dedicated to

<b>H or HP</b>	High Pressure
<b>K</b>	High pressure, dedicated to R32
<b>P</b>	"Plus" Pressure, dedicated to CO <sub>2</sub>
<b>XP</b>	Extra high pressure, dedicated to CO <sub>2</sub>

### 3 Capacity (kW)

### 4 Number of plates

### 5 Channel type

<b>H, L, M</b>	Symmetric channels
<b>A, AH, AM</b>	Asymmetric channels

### 6 DS AlfaDist distributor included

### 7 Material combination

Channel plate	Frame/Pressure plate	Connection	Suffix
316	316	316	None
316	304	304	-F
304	304	304	-G

# CB Specification

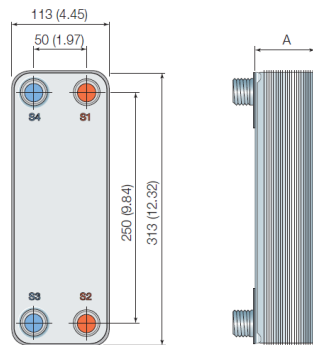
Model	Cooling Capacity		Condensing Capacity		Flowrate (Kg/s)		Dimension (mm)			Connection (inch) In/Out		Weight (kg)
	RT	kW	RT	kW	Refrigerant		Width	Height	Length	Refrigerants	Water	
					Evaporator	Condenser				Soldering	Soldering	
CB30-16H-F	0.90	3.165	2.00	7.03	99.8	160.0	113	313	74	1 1/8"	1 1/8"	3.3
CB30-22H-F	1.35	4.75	3.20	11.25	150.0	256.0	113	313	88			4.0
CB30-36H-F	1.90	6.68	5.50	19.34	211.0	440.0	113	313	120			5.6
CB30-40H-F	2.00	7.03	6.20	21.80	222.0	497.0	113	313	129			6.0
CB60-48H-F	10.00	35.17	11.00	38.69	1,134.0	880.0	113	527	124.4	1 3/8"	1 3/8"	10.7

Remark 1 : Evaporator Temperature @ 2.0 °C, Water Inlet/Outlet Temperature @ 12/7°C  
Condensing Temperature @ 45 °C, Water Inlet/Outlet Temperature @ 32/37 °C

Remark 2 : Base on R404A

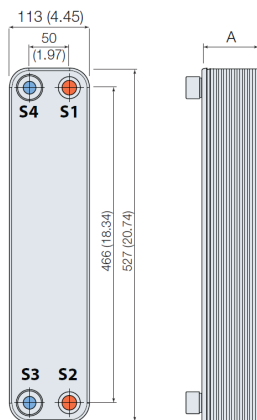
## CB Technical Data

### CB30 /CBH30 /CBP30



Volume per channel, litres (gal)	0.054 (0.0143)
Max. particle size, mm (inch)	1 (0.039)
Max. flowrate m <sup>3</sup> /h (gpm)	14,000
Flow direction	Parallel
Min. number of plates	4
Max. number of plates	150
Applications : HVAC heating and cooling, Refrigeration, Oil cooling, Industrial heating and cooling	

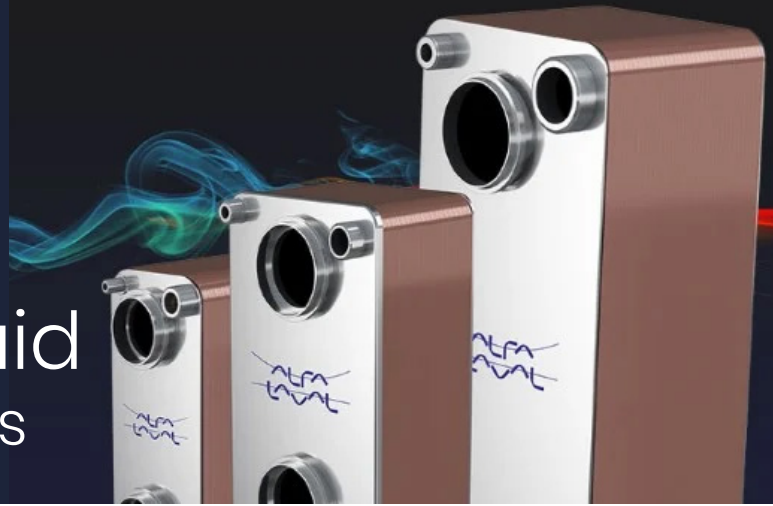
### CB60 /CBH60 /CBP60



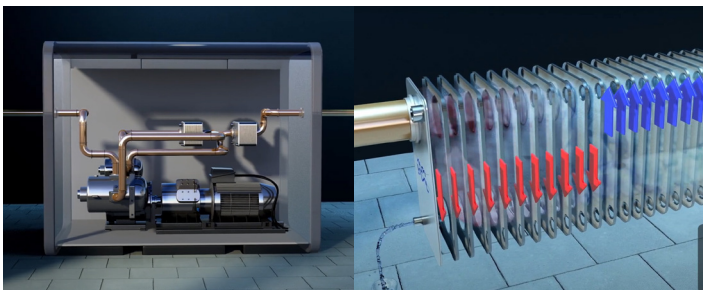
Volume per channel, litres (gal)	0.103 (0.0272)
Max. particle size, mm (inch)	1 (0.039)
Max. flowrate m <sup>3</sup> /h (gpm)	14,000
Flow direction	Parallel
Min. number of plates	4
Max. number of plates	150
Applications : HVAC heating and cooling, Refrigeration, Oil cooling, Industrial heating and cooling	



# GTL | Gas-to-Liquid Plate Heat Exchangers



The ultra-compact Alfa Laval GL product line ensures maximum heat transfer and efficiency in asymmetric gas applications.



## GTL Features

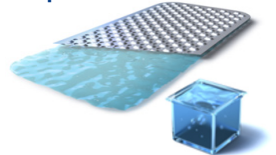
- Gas-to-liquid technology focuses on asymmetric heat transfer, typically heat transfer between one gaseous media and one liquid media
- Plate heat exchangers are more efficient than tubular heat exchangers

### Gas Side



- High volume flow
- Low density

### Liquid side



- Low volume flow
- High density

## GTL Benefit

### Exceptional Performance

- High heat recovery potential
- Handles very high gas temperatures without risk of fatigue
- Less cooling water required
- Low pressure drop (gas side)
- High condensing capacity

### Compact design

(normally ¼ of shell-and-tube size)

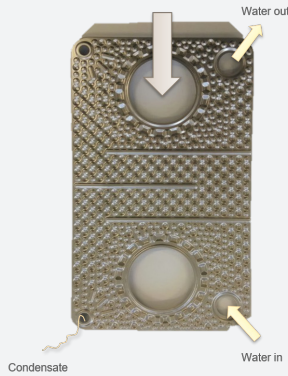
- Lightweight solution
- Easy to integrate into existing system design
- Low transportation costs





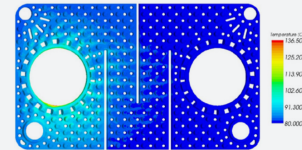
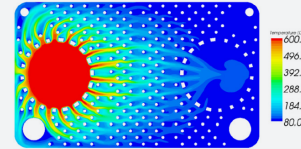
## GTL The Unique Design

- Dimple design for low pressure drop
- For large asymmetry
  - Gas-to-liquid
  - Extremely small volume channels
  - Extremely large volume channels
- Integrated barriers
  - High gas temperatures
  - Sub-cooling section in condensers
  - Other features for special applications



## CFD Study on High Temperature Application

Gas : 600°C → 110°C



Water : 80°C → 90°C



## GTL Applications : General

### General Applications

- All applications where a gas (or air) needs to be heated or cooled by means of a liquid
- Speciality:
  - Extremely high gas temperatures (boilers)
  - Low pressure systems
  - When high condensing capacity is required (VOC recovery)

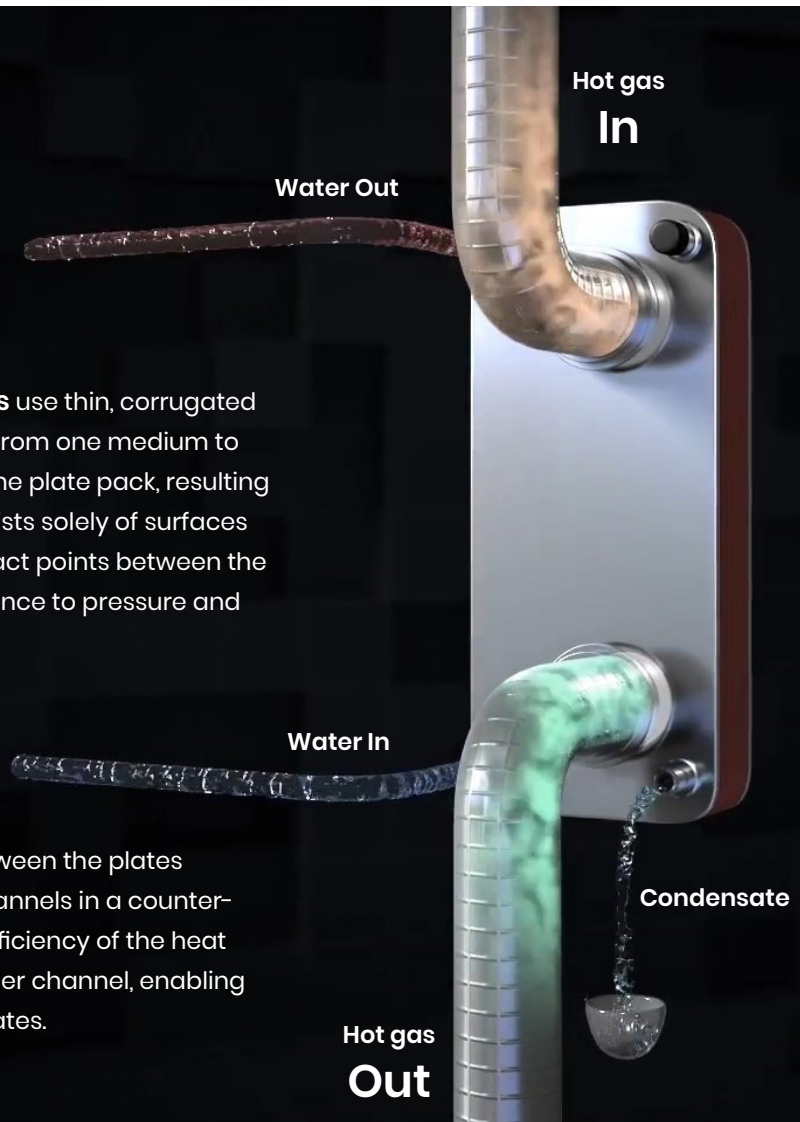
### Product Specifics

- Maximum pressure (gas side): 17 bar(g)
- Maximum pressure (liquid side): 26 bar(g)
- Maximum temperature: 750°C  
(max plate temp: 190°C)  
(Special applications, max temp: 1,550°C)

## How it works

**Alfa Laval Gas-to-Liquid Heat Exchangers** use thin, corrugated stainless steel plates to provide heat transfer from one medium to the other. Copper brazing seals the media in the plate pack, resulting in a high-efficiency heat exchanger that consists solely of surfaces that actively contribute to heat transfer. Contact points between the plates are also brazed, which improves resistance to pressure and temperature fatigue.

The arrangement of the channels formed between the plates ensures that media flow through alternate channels in a counter-current pattern, which further optimizes the efficiency of the heat transfer. One channel is far larger than the other channel, enabling the unit to handle very large volumetric flow rates.



## GTL Product Families

### GLX

Extremely low pressure drop  
Open gas side (cross-flow arrangement)  
Modules for assembly to larger systems

### GL

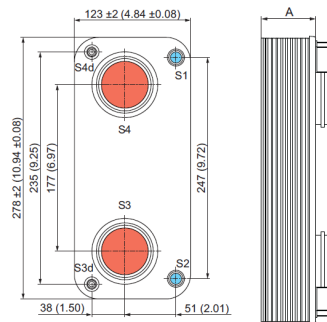
Large heat transfer area within a small footprint  
All connections integrated (gas, liquid and condensate)

**Plate Material** : Stainless steel (SS316)  
**Method** : Brazing (cost efficient)  
**Brazing Material** : Copper (standard)  
Nickel (corrosive applications)



## GTL Technical Data

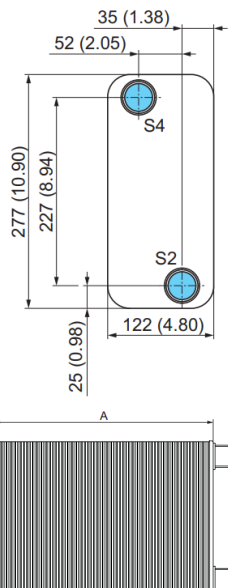
### GL50 / GLH50



Volume per channel, litres (gal)	AM (S1-S2): 0.094 (0.0248) AM (S3-S4): 0.154 (0.0407)
Max. particle size, mm (inch)	1 (0.039)
Flow direction	Parallel
Min. number of plates	6
Max. number of plates	80

Applications : Xhaust gas heat recovery, Compressed air cooling, Charge air cooling, Condenser

### GLX30

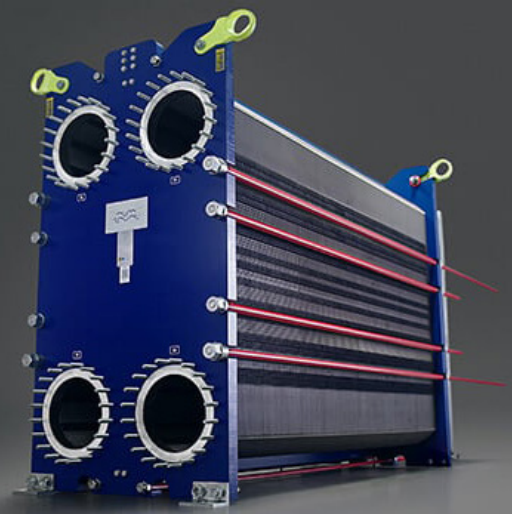


Volume per channel, litres (gal)	AM (S1-S2): 0.094 (0.0248) AM (S3-S4): 0.154 (0.0407)
Max. particle size, mm (inch)	1 (0.039)
Flow direction	Parallel
Min. number of plates	6
Max. number of plates	80

Applications : Xhaust gas heat recovery, Compressed air cooling, Charge air cooling, Condenser



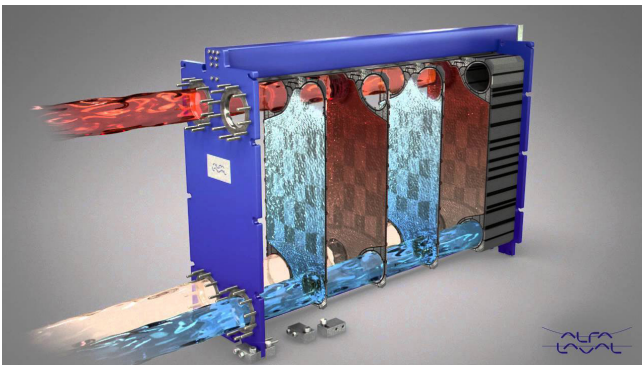
# GPHE | Gasketed Plates-and-Frame Heat Exchangers



## GPHE Industrial Line

Our wide range of industrial gasketed plate heat exchangers is suitable for all types of industry and multiple applications from heating, cooling and heat recovery to condensation and evaporation. We are

constantly looking to extend and upgrade the range, adding new performance criteria and greater flexibility. What's termed 'next-generation' today will soon be standard for the entire Alfa Laval Industrial line.



**Towards new standards  
in efficiency, reliability and  
serviceability**

Our industrial plate heat exchangers are energy efficient, compact, simple to maintain, easy to adjust for capacity changes and represent a relatively low capital investment. The vast range of options when it comes to size, plate and gasket material and add-ons means they can be specifically designed and configured for your application, from the simplest of duties to the most demanding where requirements on both performance and documentation are high.

## GPHE Benefits

- High energy efficiency – low operating cost
- Flexible configuration – heat transfer area can be modified
- Easy to install – compact design
- High serviceability – easy to open for inspection and cleaning and easy to clean by CIP
- Access to Alfa Laval's global service network

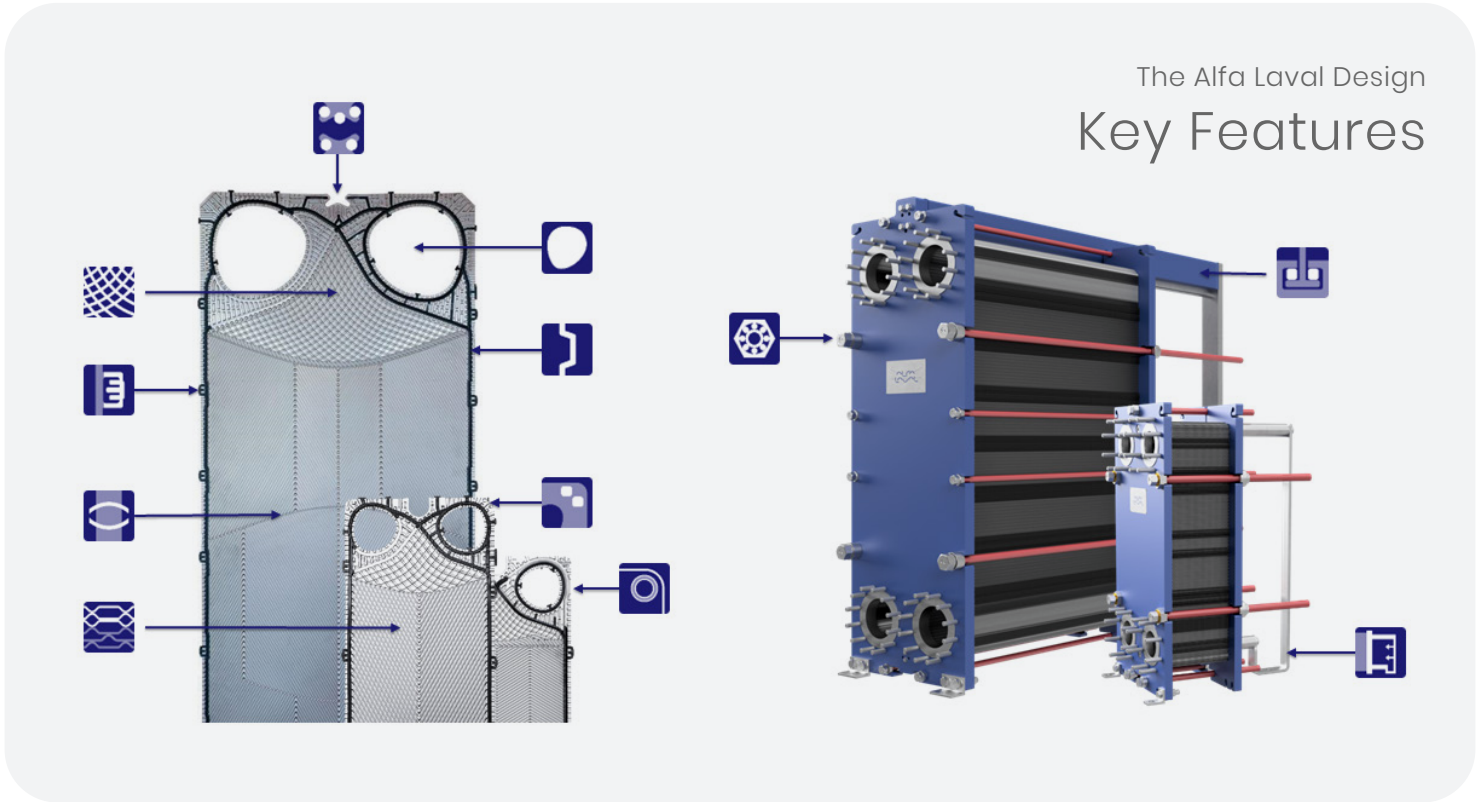
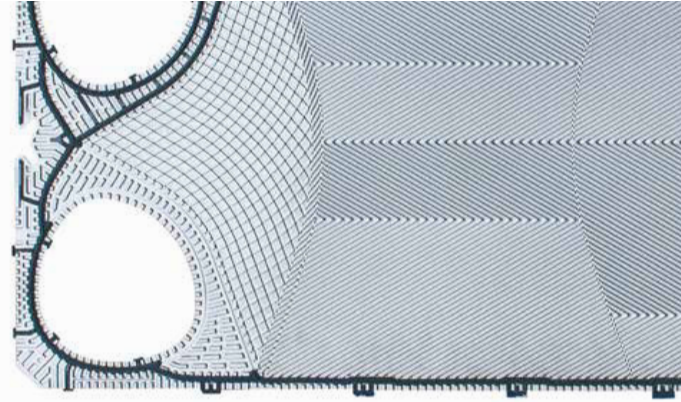
**Highest Heat Exchange  
Efficiency, Compact size  
Maximum uptime and Flexible**





# GPHE Features

Every detail is carefully designed to ensure optimal performance, maximum uptime and easy maintenance. Selection of available features, depending on configuration some features may not be applicable:



The Alfa Laval Design  
Key Features

## Efficiency



### CurveFlow™ Distribution Area

Improves media flow and minimizes the risk of fouling



### OmegaPort™ Noncircular Port Holes

Enhances media flow and thermal efficiency.



### Offset Gasket Groove

Ensures plate utilization for maximum heat transfer efficiency.



### FlexFlow™ Plate Design

Improves thermal efficiency and optimizes pressure drop utilization

## Reliability



### Five-Point Alignment

Ensures reliable plate positioning and easy to service for large units.



### SteerLock™ Plate Alignment

Ensures reliable plate positioning and easy service.



### PowerArc™ Plate Pattern Divider

Improves plate rigidity for longer lifetime.

## Serviceability



### ClipGrip™ Gasket Attachment

Ensures perfect seal and trouble-free maintenance.



### T-bar Roller

Provides a lower unit that is easy to service.



### Bearing Boxes

Guarantees an easy-to-open unit for smoother, more efficient maintenance.

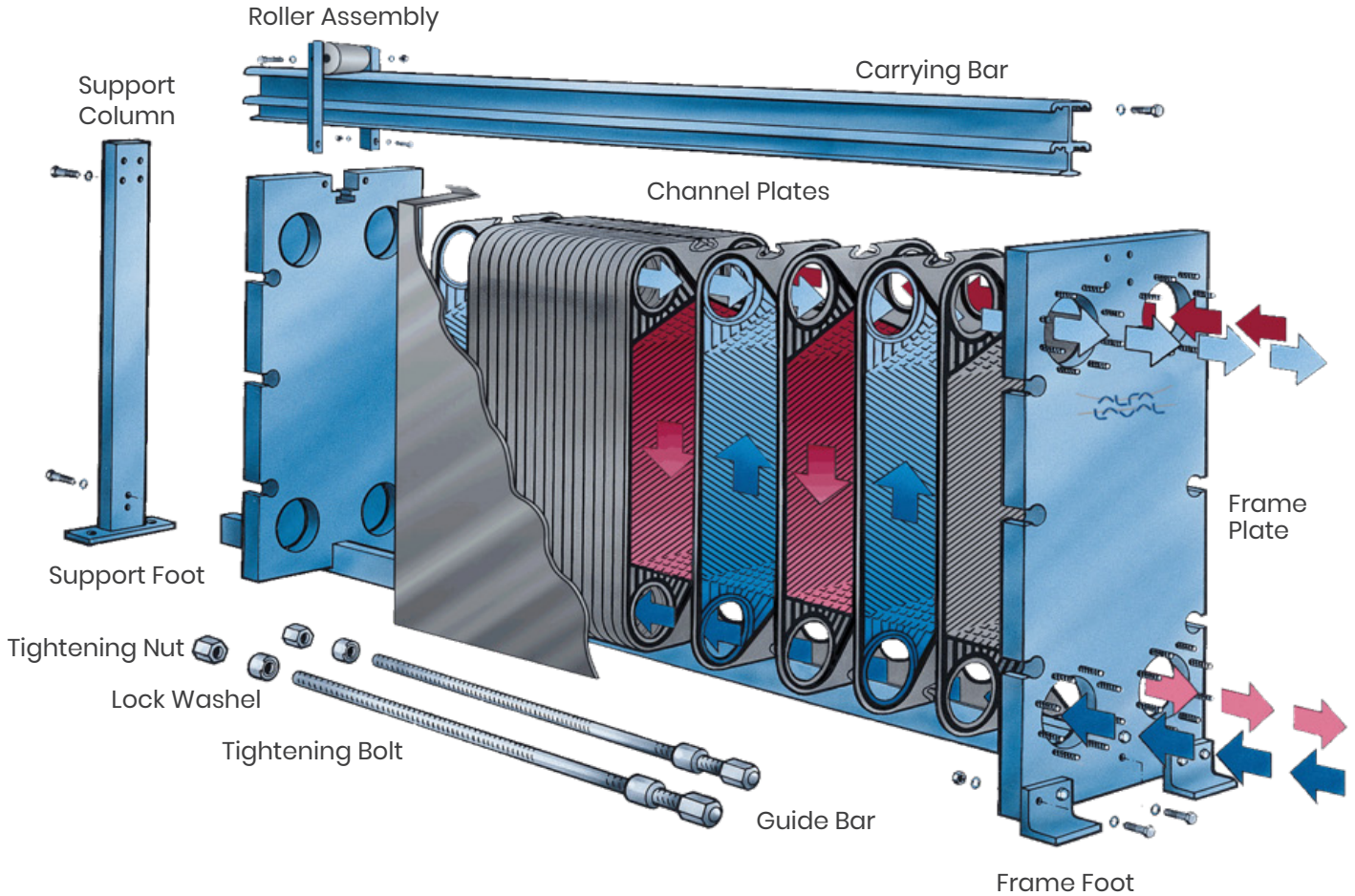


### Compact frame

Facilitates maintenance and minimizes service area requirement.

# GPHE Components

All gasketed plate-and-frame heat exchangers have a similar construction



## GPHE Heat Exchanger Kits

Kits for Gasketed Plate Heat Exchangers

### Key Benefits

- Increased availability and reduced delivery times
- Easy ordering through web shop 24/7
- Fast and simple assembly, all components included
- Easy to tailor make solutions according to customer needs

## GPHE Applications

- Biotech & Pharmaceutical
- Chemicals
- Energy & Utilities
- Food & Beverages
- Home & Personal care
- HVAC & Refrigeration
- Machinery & Manufacturing
- Marine & Transportation
- Mining, Minerals & Pigments
- Pulp & Paper
- Semiconductor & Electronics
- Steel
- Water & Waste treatment

# GPHE Model Series (PHE Ranges)

Gasketed Plate-and-Frame Heat Exchangers



## T-series PHE

Next generation of PHEs - introduced in 2005  
One standard platform for plate types with same connection size



## M-series PHE

The majority of our range Modern types introduced mainly during the 1990s



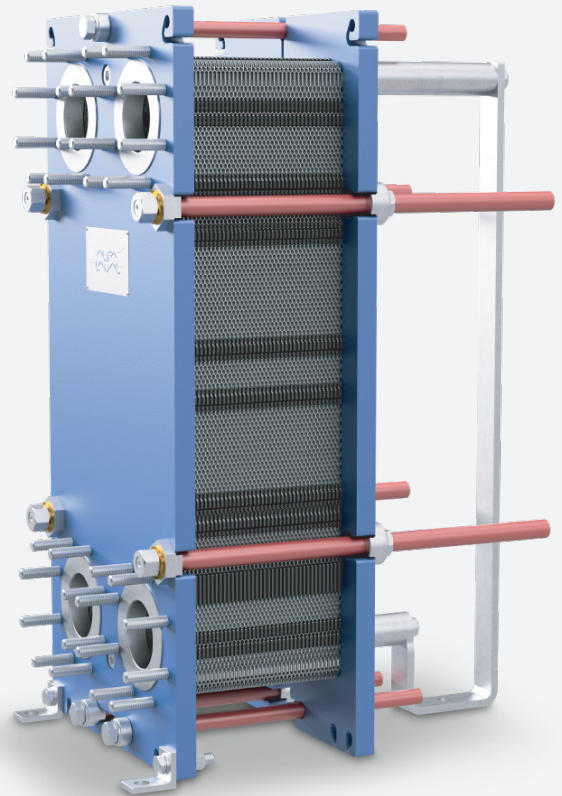
## V-series (obsolete)

Came through the Vicarb acquisition  
Different concept than above models



## A-series PHE (obsolete)

Some units remaining from an old series  
Introduced during the 1970s and 1980s



## GPHE Nomenclature

Gasketed Plates-and-Frame Heat Exchangers



### 1 Generation Name

- T The Latest generation of Plate Heat Exchanger
- M The Previous generation

### 2 Frame Height

- L Long                      X Also Long
- S Short                     K Short

### 3 Connection Size (cm.)

The numbers tells about the connection size in centimetres.

### 4 Channel type

- B Small Pressing Depth (~2 mm.)
- P Medium Pressing Depth (~3 mm.)
- M Large Pressing Depth (~4 mm.)

### Plate type

- Regular Gasketed Plates
- D Double Wall Unit
- W Semi -Welded Unit
- S,SM,X Widegap Unit

### 5 Frame type

The last letters tells about the frame type.

- |    |          |    |          |
|----|----------|----|----------|
| FM | 100 PSIG | FD | 300 PSIG |
| FG | 150 PSIG | FS | 400 PSIG |



# GPHE Technical Data

## Materials

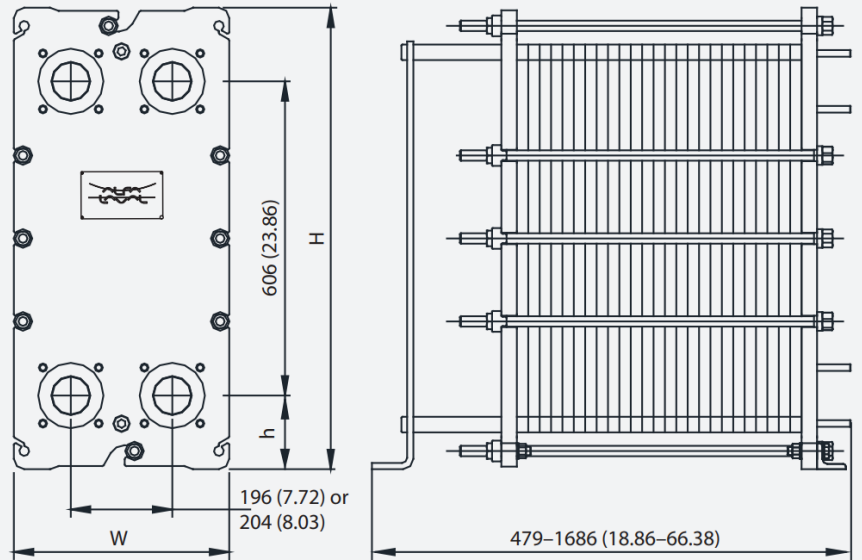
Heat Transfer Plates	304, 316, 254, C276, 904L, C2000, D-205, Ni, TiPd, G30, Ti
Field Gaskets	NBR, EPDM, FKM, HNBR, HeatSea
Flange Connections	Metal lined: Stainless steel, Titanium
Frame & Pressure Plate	Carbon Steel, Epoxy Painted Plate

## Pressure and temperature limits

- The maximum design pressure for fully gasketed plate heat exchangers is about 30 bar (435 psi).
- For semi-welded gasketed plate heat exchangers the limit is about 60 bar (870 psi).
- The limitation is imposed by the plate thickness and the frame size.
- The design temperature range is about -50°C to 180 °C (58 °F to 356 °F).

## GPHE Dimensional Drawing

Measurements mm (inches)



## GPHE Operational Data

Frame type	Max. design	
	Pressure (barg/psig)	Temperature (°C/°F)
FM, pvcALS	12.0/174	200/392
FG, pvcALS	18.0/261	200/392
FG, ASME	11.2/162	250/482
FG, PED	20.0/290	200/392
FG, Marine*	18.0/261	180/356

Frame type	Max. design	
	Pressure (barg/psig)	Temperature (°C/°F)
FD, pvcALS	31.0/449.5	200/392
FD, ASME	23.8/345	250/482
FD, PED	31.0/449.5	200/392
ZM, pvcALS	10.0/145	100/212

\* Marine standard includes the standards: ABS, BV, CCS, ClassNK, DNV, KR, LR, RINA, and RMRS.



# Project Reference



## ITC Sonar

**System Type** : 01 Chiller

**System Size** : ACCS 8"

**Building Type** : Hotel



## Hyatt Regency

**System Type** : 04 Chiller

**System Size** : ACCS 10", 08"

**Building Type** : Hotel



## Godrej Industries

**System Type** : 02 Chiller

**System Size** : ACCS 4"

**Building Type** : Industry



## Medanta – The Medicity

**System Type** : 05 Chiller

**System Size** : ACCS 14"

**Building Type** : Hospital



## Teva Pharma

**System Type** : 04 Chiller

**System Size** : ACCS 8"

**Building Type** : Pharma



## Cipla Pharma

**System Type** : 01 Chiller

**System Size** : ACCS 3"

**Building Type** : Pharma



## Inorbit Mall

**System Type** : 01 Chiller

**System Size** : ACCS 12"

**Building Type** : Shopping Mall



## Machine Coolant

Induction Heating Machine




## MC Donald

Project Service

& many more...





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