



Brazed plate heat exchangers

Greater efficiency. Longer lifecycle.

Compact condensers, evaporators,
economizers/subcoolers,
desuperheaters and oil coolers.

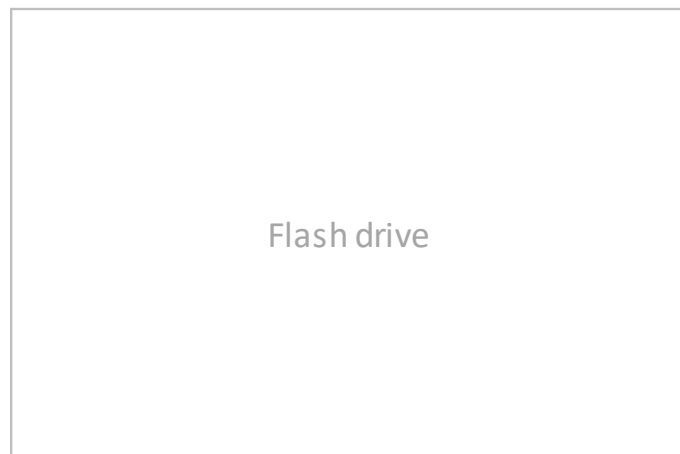


Table of contents

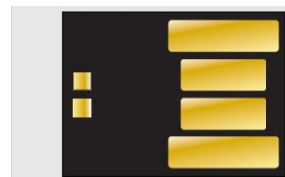
Digital sales materials

Insert the USB flash drive below into your computer to access the following support materials:

- 2020 Catalog (interactive version)
- 2020 Price list
- Alfa Laval and rep contacts
- Terms and Conditions
- Lock box and wiring instructions



Flip out the USB drive and insert this side up



About Alfa Laval	4-5	Installation and maintenance instructions.	37-44
Applications	6	Installation	38
Alfa Laval brazed heat exchanger features	7-8	Operation	41
Construction of a brazed plate heat exchanger	9-10	Maintenance	43
How to read Alfa Laval part numbers	11	Fault tracing	44
Manufacturer cross reference	12-13	Brazing tubes to brazed plate heat exchangers guidelines	45-50
DX Evaporators/Chillers	14-16	Terms and conditions of sale	51-53
DX Evaporators/Chillers - single circuit	15	Product Data Sheets	PDS-1-41
DX Evaporators/Chillers - dual circuit	16	Product Data AC16 / ACH16	PDS-1
Water-cooled condensers	17-18	Product Data AC18 / ACH18	PDS-3
Water-Cooled Condensers - Single Circuit	18	Product Data AC30EQ / ACH30EQ	PDS-5
Water-Cooled Condensers - Dual Circuit	19	Product Data AC70X / ACH70X / ACP70X	PDS-7
Economizer/Sub-Coolers	20-21	Product Data AC232DQ / ACH232DQ	PDS-9
General purpose - liquid to liquid	22-24	Product Data ACH240DQ	PDS-11
General purpose - liquid to liquid cooling	22	Product Data AC500EQ / ACH500EQ / ACP500EQ	PDS-13
General purpose - liquid to liquid heating	23-24	Product Data AC220EQ / ACH220EQ	PDS-15
Domestic heating	25-26	Product Data AC502DQ / ACH502DQ	PDS-17
Radiant heat & snow melt	27-30	Product Data AlfaNova 27 / HP 27 / XP 27	PDS-19
Radiant Floor Heating	28	Product Data AlfaNova 14	PDS-21
Snow Melt	29-30	Product Data AlfaNova 52 / HP 52 / XP 52	PDS-23
Hydraulic oil coolers	31	Product Data AlfaNova 76 / HP 76	PDS-25
Double wall	32	Product Data APX52	PDS-27
100% Stainless Steel AlfaNova	33-35	Product Data CB30 / CBH30 / CBP30	PDS-29
AXP - high pressure	36	Product Data CB60 / CBH60 / CBP60	PDS-31
		Product Data CB110 / CBH110 / CBP110	PDS-33
		Product Data CB16 / CBH16	PDS-35
		Product Data CBH18DWAQ	PDS-37
		Product Data CB90DWAQ	PDS-39
		Product Data CBH18DW	PDS-41

About Alfa Laval

Global strength. Local commitment.

Alfa Laval is the world leader in heat transfer, separation and fluid handling. Since 1883, we've been committed to serving our customers with product innovations that create better everyday conditions for people.

- 17,000 employees
- More than 40 major production units
- Supporting customers in nearly 100 countries



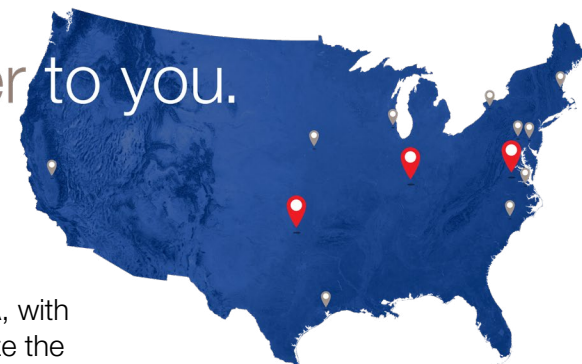
Alfa Laval in the USA

For more than 130 years, Alfa Laval in the USA has been dedicated to bringing our global innovations to the local market.

- Separation technology since 1885
- Heat transfer technology added in the 1930's
- Fluid handling technology included in the 1960's

Today, Alfa Laval is closer to you than ever with 14 sales, manufacturing, service and distribution sites spanning the USA, with 1,055 employees dedicated to fulfilling our mission—to optimize the performance of our customers' processes. Time and time again.

closer to you.



New production facility in Richmond, Virginia

By expanding our Richmond factory in 2019, we're now producing brazed heat exchangers in the United States. You benefit with:

- Enhanced and streamlined supply chain—stable and predictable
- Faster service and order fulfillment—rapid response for urgent demands



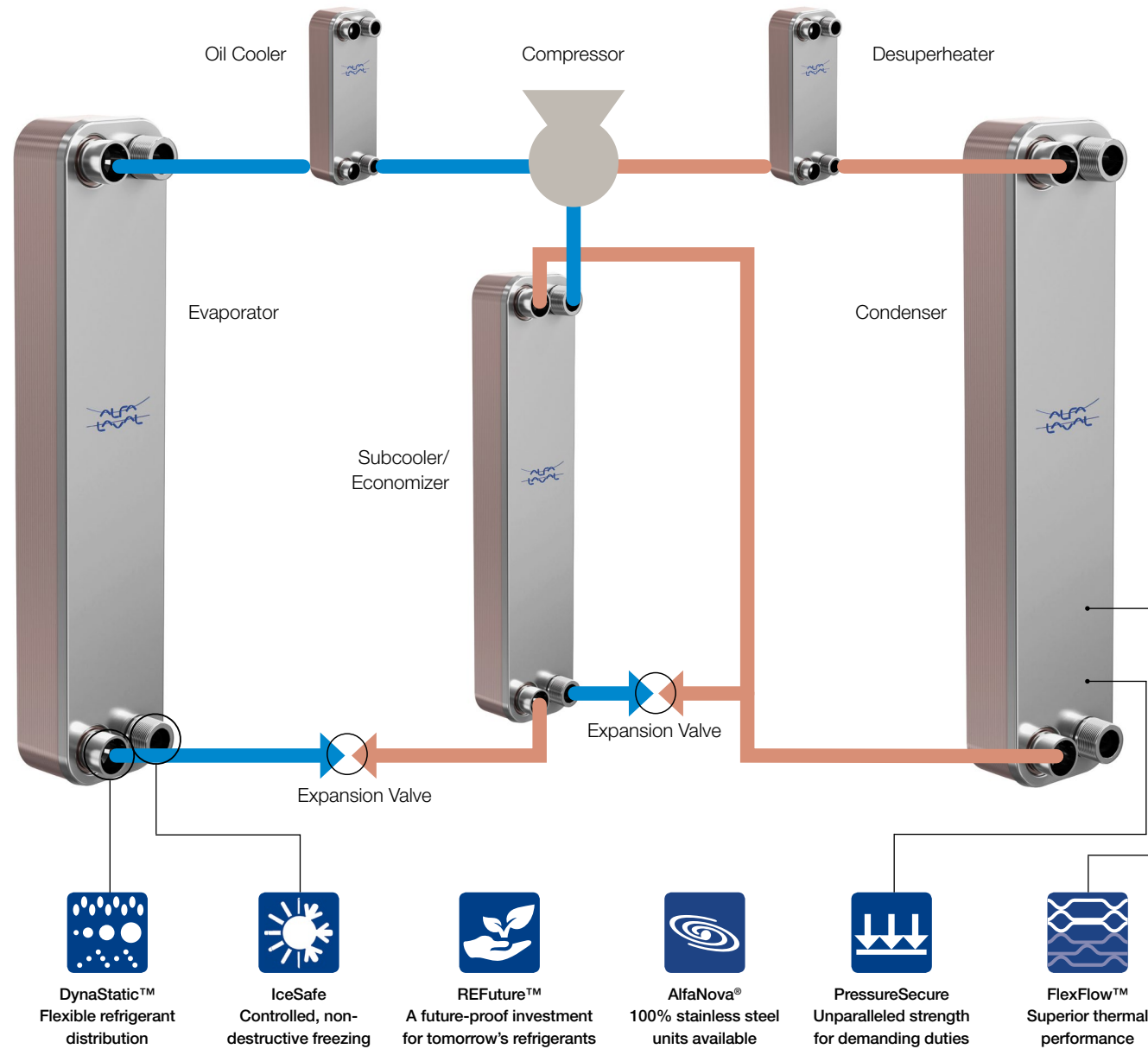
Watch the BHE factory grand opening video!

[Click here](#) (digital catalog) or scan the QR code to watch the grand opening event video.



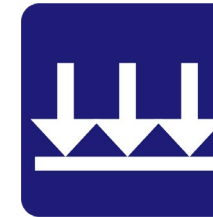
Brazed plate heat exchangers

Greater efficiency. Longer lifecycle.



Alfa Laval advantage

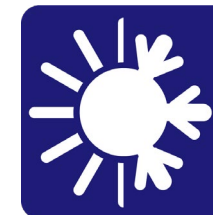
Innovative product features



PressureSecure

Unparalleled strength for demanding duties

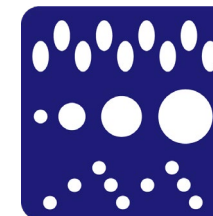
Our innovative plate designs support the widest range of high-temperature and high-pressure applications. Units can run using thinner plates and fewer plates, which translates to less raw material, lower energy consumption, reduced refrigerant charge and a longer equipment lifecycle.



IceSafe

Controlled, non-destructive freezing

For applications that require it, Alfa Laval can supply plate heat exchangers designed to allow ice crystals to form under certain operating conditions, but displaced from sensitive areas. This ensures both reliable performance and a long product life.



DynaStatic™

Flexible refrigerant distribution

This breakthrough production method makes it possible to fully tailor the placement, size and number of inlets to fit the specific application, ensuring the optimal refrigerant distribution system for the product. The result is higher efficiency with the flexibility to use low-GWP refrigerants.



FlexFlow™

Superior thermal performance

Alfa Laval's patented asymmetrical plate design is one of the many unique innovations that gives improved thermal efficiency thanks to optimized pressure drop and increased turbulence. In addition to cutting energy consumption, that means reducing refrigerant volumes and raw materials.



AlfaNova®

100% stainless steel

Built with 100% stainless steel, AlfaNova® is a solution that Alfa Laval offers for applications that use media not compatible with traditional heat exchanger materials. Not only is this advanced design optimized for use with natural refrigerants, it's also completely recyclable.



REFUTURE

A future-proof investment for tomorrow's refrigerants

As an innovative drive to the development of solutions for natural refrigerants, Alfa Laval brings years of experience with products that enable the use of new-generation and low-GWP refrigerants to help meet sustainability goals and legislative requirements.

Innovation that boosts performance

Alfa Laval brazed plate heat exchangers (BHEs) feature the Equalancer system and Dualaced technology – patented innovations which ensure high heat transfer performance. There are numerous design options to choose from.

Alfa Laval R&D has developed innovative solutions for the refrigerant fluid distribution inside a BHE. These have been laboratory tested using HCFC and HFC refrigerants with excellent results.

Equalancer system “EQ”

The two phase flow coming into the evaporators is mixed by the patented Equalancer distribution system “EQ”, which stabilizes the flow and increases performance.



Using the Equalancer it is possible to obtain a double mixing of refrigerant into two

successive volumes. This ensures a more balanced distribution system through all the plate channels, reducing fluctuations in the super-heating effect.

Pressed into the plate, the Equalancer system guarantees high quality and repeatability of plate design and performance.

The Equalancer system does not have an adverse effect on the BHE operating as condenser since the pressure drop is negligible.

Dualaced technology “DQ”

The real dual circuit patented by Alfa Laval is a solution with diagonal flow.

BHEs using Dualaced technology have two independent refrigerant circuits. The special design ensures that each refrigerant circuit is in contact with the entire water flow. The main advantage is that at partial load (only one compressor running) water cooling is uniform and performance is maximized.



Why choose Alfa Laval Brazed plate heat exchangers?

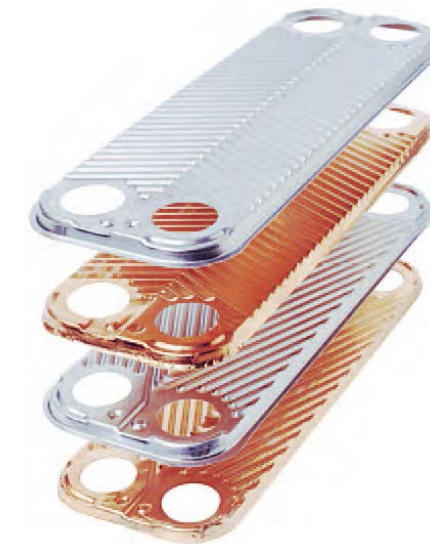
- Compact, durable designs with consistently high quality; ease of installation.
- Extensive range of BHE models providing cooling capacities from 0.5 to 600 kW.
- Equalancer system provides a substantial saving in heat transfer surface compared to BHEs with traditional distribution system.
- Cost efficient: space savings due to the compact design of BHEs compared to shell-and-tube heat exchangers.
- Rapid response to temperature changes due to small hold-up volume and lower refrigerant charge.
- Optimized design for every duty with customized BHE configuration to customer's own specifications.
- All widely recognized pressure vessel codes available as standard.
- Every BHE is pressure and leak tested before delivery, ensuring top quality products.
- Alfa Laval offers first-class manufacturing facilities, global presence and high product availability.
- Alfa Laval's continuous investments in R&D ensure the most competitive solutions.

Construction of a brazed plate heat exchanger

The first Alfa Laval brazed plate heat exchangers (BHEs) were developed in the seventies. Today they are well-established components in refrigeration systems due to their compactness, durable designs, ease of installation and cost efficient operation.

Material

The brazed plate heat exchanger (BHE) consists of thin corrugated stainless steel plates vacuum brazed together using copper as the brazing material.



Design

Brazing the stainless steel plates together eliminates the need for sealing gaskets and thick frame plates. As well as holding the plates together at their contact points, the brazing material seals the package. Alfa Laval's BHEs are brazed at all contact points, ensuring optimal heat transfer efficiency and pressure resistance. The plates are designed to provide the longest possible lifetime.

Since virtually all surfaces of the brazed plate heat exchanger actively contribute to heat transfer, the BHE is very compact in size, and it has a low weight and a low hold-up volume.

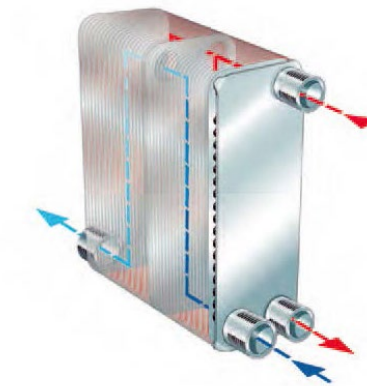
Alfa Laval offers a wide range of standard heat exchanger models and sizes, tailor-made for a wide scope including refrigeration applications. Standard configurations are available from stock and customer-specific designs are available on request.

Flow principle

The basic flow principle in a brazed plate heat exchanger for refrigeration applications is parallel or diagonal flow to achieve the most efficient heat transfer process.

In a single pass design, all connections are located on one side of the heat exchanger, making installation very easy.

Multipass design and different types of connections are available. Optionally, the location of connections can be chosen.



The two phase refrigerant (vapour and liquid) enters the bottom left of the exchanger with a vapour quality depending on the operating condition of the plant. Evaporation of the liquid phase takes place inside the channels and some degrees of superheat are always requested, which is the reason why the process is called “dry expansion”.

In the illustration of an evaporator the dark and light blue arrows show the location of the refrigerant connections. The water (brine) to be cooled flows counter current in the opposite channel; the dark and light red arrows show the location of the water (brine) connections.

Flow principle in Condenser design

The main components are the same as for the evaporator. The refrigerant enters at top left of the exchanger as hot gas and starts to condense on the surface of the channels until fully condensed, and is then slightly subcooled. The process is called “free condensation”.

In the illustration of a condenser the light and dark blue arrows show the location of the brine connections.

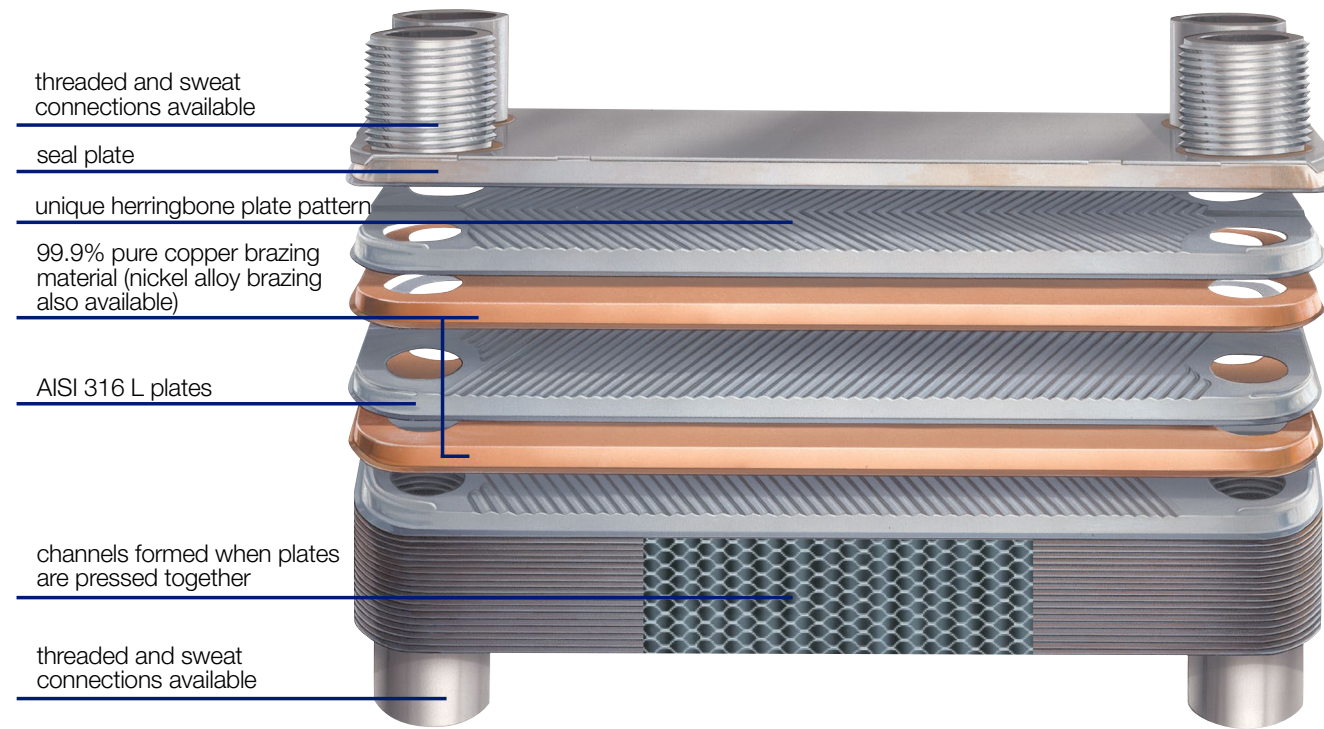
The refrigerant flows counter current in the opposite channel and is cooled. The light and dark red arrows indicate the locations of the refrigerant connections.

Evaporator, showing flow principle.

Flow principle in Evaporator design The channels formed between the corrugated plates and corners are arranged so that the two media flow through alternate channels, always in opposite directions (counter current flow).



The brazed heat exchanger – less is more



The brazed plate heat exchanger is the most compact heat exchanger on the market today. Its high heat transfer efficiency in combination with its compact design equals a compact heat exchanger for a wide range of heating, cooling, evaporating and condensing duties.

The brazed heat exchanger consists of thin corrugated stainless steel plates brazed together with copper to form a self-contained unit. Brazing the plates together eliminates the need for a frame, gaskets, bolts and the carrying bar. The result is a heat exchanger that costs less, weighs less, holds less refrigerant and takes up less space.

How to read Alfa Laval part numbers

Example: Part # CB30-44HX2 S52

Model Series	# of Plates	Channel Type	Special Features	# of Passes or Circuits	Connection Types	Connection Combinations
CB30	44	H	X	2	S	52
<p>Brazing Material: "AC" = Copper Brazed (AlfaChill™) "CB" = Copper Brazed "AN" = Alfa Nova</p> <p>Model type indicated by the numbers 14, 27, 30, 50, 52, 70, 76, 80, 120, 130, 250, 350</p> <p>A = Combination Extra High and High Theta E = Extra High Theta H = High Theta L = Low Theta M = Medium Theta (combination High and Low Theta)</p> <p>A = ASME "UM" certification (DB52 and CB76 models only) B = Frame & Press Plate Stud Bolt Mounting with Integral Distributor C = Fram & Press Plate Stud Bolt Mounting without Integral Distributor Q = Equalancer™ Refrigerant Distribution System S = Fram Plate Stud Bolt Mounting without Integral Distributor T = Pressure Plate Stud Bolt Mounting without Integral Distributor U = Without Integral Distributor and without Mounting Feet X = Integral Distributor for Evaporative Duties Y = Frame Plate Stud Bolt Mounting with Integral Distributor Z = Pressure Plate Stud Bolt Mounting with Integral Distributor</p> <p># of Passes: (Denoted by Letters) D = Dual Pass M = Multi-pass (3 or more)</p> <p># of Circuits: (Denoted by Numbers) 2 = Two Refrigerant Circuits with plate packs equally split between circuits 3 = Two Refrigerant Circuits with plate packs unequally split between circuits</p> <p>Connection Types: Side S3, S4 Side S1, S2 C = Sweat MNPT D = MNPT Sweat S = Sweat Sweat T = MNPT MNPT V = Sweat Victaulic®</p> <p>*Customer-specific connections available including flange, Roto Lock™, weld neck, FNPT.</p> <p>This number refers to a specific combination of connections.</p>						

Victaulic is a registered trademark of Victaulic Company of America. Roto Lock is a trademark of Southco, Inc.

Manufacturer cross reference

CAUTION:

Please note that Alfa Laval's product offering is not identical to other manufacturers portfolio, but in most cases can be used as a suitable drop in replacement. Dimensional size, capacity rating and connection sizes may differ. Check product specifications for suitability prior to installation. If you need assistance, please contact our factory and we will gladly assist you in making a product selection.

SWEP Model	Alfa Laval Model	Data Sheet page	Application
B5	ACH16	PDS-1	Condenser
B8T	ACH18	PDS-3	
BX8T	ACH18	PDS-3	
B12	CBH30	PDS-29	
B28	CBH60	PDS-31	
B57	ACH500EQ	PDS-13	
DB200	ACH232DQ	PDS-9	Evap Dual Circuit
D300	ACH232DQ	PDS-9	
DB400	ACH502DQ	PDS-9	
B10T	ACH30	PDS-7	Evap Single Circuit
B25T	ACH70X	PDS-7	
B80	ACH70X	PDS-7	
B400T	ACH500EQ	PDS-13	
B427	ACH500EQ	PDS-13	

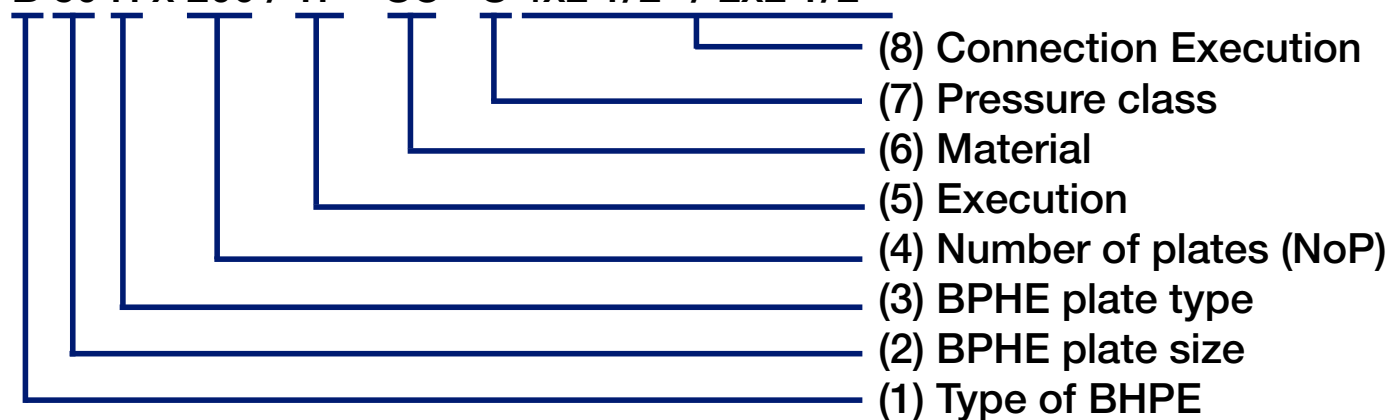
Note: To use cross reference table, match the SWEP model to the corresponding Alfa Laval model shown to the right of table. Plate counts are to be matched like for like. If the plate count can't be matched like for like, go to the next largest plate count size.

Example: B5 crosses to an Alfa Laval ACH16. If the plate count of the unit being replaced was 10, the appropriate Alfa Laval model would be ACH16-10H-F. If the plate count was 12, the appropriate Alfa Laval model would be ACH16-14-F. Refer to the corresponding application data tables (Evaporator & Condenser) to locate specific model number with the the closest plate count to that of the unit being replaced.

SWEP Denomination

A BPHE should, in principle, always be denominated as shown in figure 1. The different groups (1) to (8) are explained below.

B 50 H x 200 / 1P - SC - S 4x2 1/2" / 2x2 1/2"



Manufacturer cross reference

CAUTION:

Please note that Alfa Laval's product offering is not identical to other manufacturers portfolio, but in most cases can be used as a suitable drop in replacement. Dimensional size, capacity rating and connection sizes may differ. Check product specifications for suitability prior to installation. If you need assistance, please contact our factory and we will gladly assist you in making a product selection.

Example: To cross to an Alfa Laval model, use the table to match the appropriate manufacturers model (column furthest to the left of table), to the Alfa Laval Model (center column). For instance, a CH1/2AG crosses to an Alfa Laval ACH18-10H-F

FlatPlate Model	Alfa Laval Model	Data Sheet page	Application
C1/2AG	ACH16-14H-F	PDS-1	Condenser Single Circuit
C3/4AG	ACH18-10H-F	PDS-3	
C1AG	CBH30-12H	PDS-29	
C1-1/2AG	CBH30-18H	PDS-29	
C2AG	CBH30-24H	PDS-29	
C2-1/2AG	CBH30-24H	PDS-29	
C3AG	CBH30-24H	PDS-29	
C3-1/2AG	CBH30-34H	PDS-29	
C4AG	CBH30-34H	PDS-29	
C5AG	CBH30-44H	PDS-29	
C6G	CBH30-54H	PDS-29	
C7-1/2AG	CBH30-64H	PDS-29	
C10G	CBH60-48H-F	PDS-31	
C12G	CBH60-62H-F	PDS-31	
C15G	CBH110-34H	PDS-33	
C20G	CBH110-44H	PDS-33	
C25G	CBH110-56H	PDS-33	
C30G	CBH110-66H	PDS-33	
C35G	CBH110-66H	PDS-33	
C40G	CBH110-84H	PDS-33	
C50G	CBH110-104H	PDS-33	
C60G	ACH-500EQ-80H-F	PDS-13	Condenser Dual Circuit
C70G	ACH-500EQ-80H-F	PDS-13	
C80G	ACH-500EQ-100H-F	PDS-13	
C40-2C	ACH240DQ-42AH-F	PDS-11	
C50-2C	ACH240DQ-70AH-F	PDS-11	
C60-2C	ACH240DQ-90AH-F	PDS-11	
C70-2C	ACH240DQ-110AH-F	PDS-11	
C80-2C	ACH240DQ-110AH-F	PDS-11	

FlatPlate Model	Alfa Laval Model	Data Sheet page	Application
CH1/2AG	ACH18-10H-F	PDS-3	Evap Single Circuit
CH3/4AG	ACH-30EQ-10H-F	PDS-5	
CH1AG	ACH-30EQ-10H-F	PDS-5	
CH1-1/2AG	ACH-30EQ-20H-F	PDS-5	
CH2AG	ACH-30EQ-20H-F	PDS-5	
CH2-1/2AG	ACH-30EQ-30H-F	PDS-5	
CH3AG	ACH-30EQ-30H-F	PDS-5	
CH3-1/2AG	ACH-30EQ-30H-F	PDS-5	
CH4AG	ACH-30EQ-40H-F	PDS-5	
CH5AG	ACH-30EQ-40H-F	PDS-5	
CH6G	ACH-30EQ-50H-F	PDS-5	
CH7-1/2AG	ACH-30EQ-60H-F	PDS-5	
CH10G	ACH-30EQ-100H-F	PDS-5	
CH12G	ACH-70X-42M-F	PDS-7	
CH15G	ACH-70X-62M-F	PDS-7	
CH20G	ACH-70X-90M-F	PDS-7	
CH25G	ACH220EQ-44AM-F	PDS-15	Evap Dual Circuit
CH30G	ACH220EQ-56AM-F	PDS-15	
CH35G	ACH220EQ-70AM-F	PDS-15	
CH40G	ACH220EQ-86AM-F	PDS-15	
CH50G	ACH220EQ-86AM-F	PDS-15	
CH60G	ACH220EQ-116AM-F	PDS-15	
CH70G	ACH-500EQ-100H-F	PDS-13	
CH80G	ACH-500EQ-130H-F	PDS-13	
CH8-2C	ACH232DQ-30H-F	PDS-9	
CH10-2C	ACH232DQ-30H-F	PDS-9	
CH12-2C	ACH232DQ-30H-F	PDS-9	
CH15-2C	ACH232DQ-50H-F	PDS-9	
CH20-2C	ACH232DQ-50H-F	PDS-9	
CH25-2C	ACH232DQ-50H-F	PDS-9	
CH30-2C	ACH232DQ-70H-F	PDS-9	
CH35-2C	ACH232DQ-70H-F	PDS-9	
CH40-2C	ACH232DQ-70H-F	PDS-9	
CH50-2C	ACH232DQ-90H-F	PDS-9	
CH60-2C	ACH232DQ-110H-F	PDS-9	
CH70-2C	ACH232DQ-138H-F	PDS-9	
CH80-2C	ACH232DQ-170H-F	PDS-9	

Basic refrigeration cycle

The function of the refrigeration plant is to remove heat from a process fluid or air at a low temperature and transfer to a recipient fluid such as water or air.

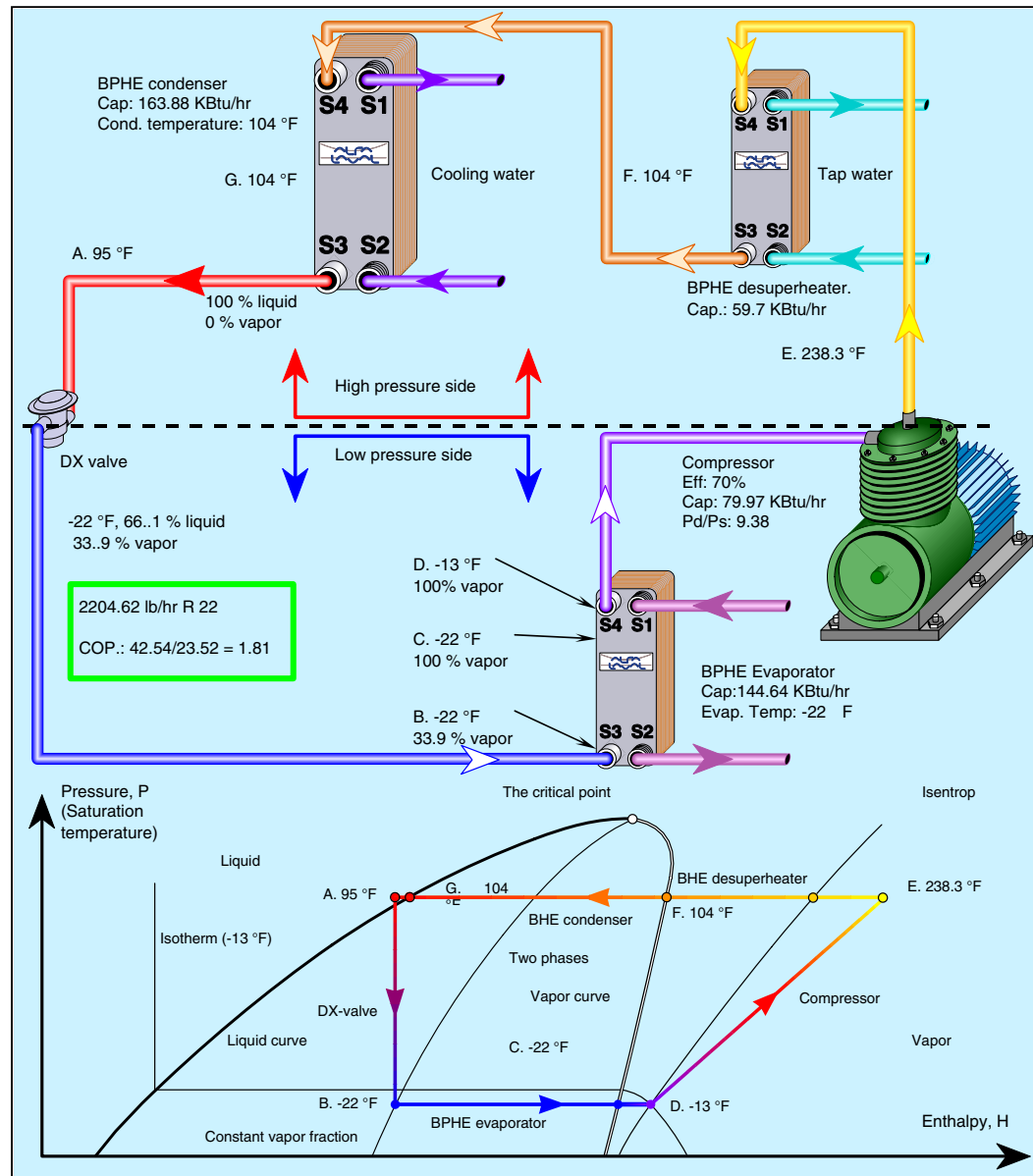
The figure shows a schematic cooling plant, composed of an evaporator, a compressor, a condenser, an expansion device and connecting pipes. These are the minimum components necessary in the basic compression refrigeration cycle.

The pressure is shown as a function of the enthalpies of liquid and vapor. To the left of the liquid line is liquid and to the right of the vapor line, vapor. Between the two lines is a two-phase area. The lines meet at the critical point.

Other properties can then be plotted as parameters, e.g. isotherms, lines of constant temperature. In the figure, the -13 °F isotherm is shown. It is almost vertical in the liquid area, mirroring the fact that the liquid specific heat is little pressure dependent. In the vapor area it is curved and inclined, i.e. the vapor specific heat is strongly pressure (and temperature) dependent.

The figure also shows an isentrop, a line expressing a change of state, but where no heat energy is exchanged between the fluid and the surroundings. An ideal compression would follow this line (D - E), but because of the inevitably released friction energy, a real compression is (D - E), i.e. to a higher final temperature.

DX Evaporators/Chillers



DX Evaporators/Chillers - single circuit



Agency Code Approval: UL, CRN

Product Specification: Refer to Product Data Sheet section for details

Construction: Stainless Steel Plates & Connections

Installation & Maintenance: Refer to Installation section, page 37, for details

Selection Notes: Units sized based on the following conditions of service

- Nominal tons: 12,000 BTUH/ton
- 35°F Evaporating Temperature
- 54°F Entering Water Temperature (EWT)
- 8°F Superheat
- 44°F Leaving Water Temperature (LWT)
- 24 GPM/ton

Nominal Tons (R410A)	Nominal Tons (R22)	Denomination	Part Number	Ref Inlet/Outlet (S3,S4)	Fluid Inlet/Outlet (S1,S2)	Plate Width (in.)	Plate Height (in.)	Plate Pack Depth (in.)	Stud Bolt / Mtg Feet	Data Sheet page	
0.75	0.5	ACH18-10H-F	3287130117	3/8" Sweat	5/8" Sweat	5/8" Sweat	2.89	12.4	0.85	Stud bolts	PDS-3
1	1	ACH-30EQ-10H-F	3287084893	3/8" Sweat	7/8" Sweat	7/8" Sweat	3.7	12.8	0.95	Stud bolts	PDS-5
2	2	ACH-30EQ-20H-F	3287084894	3/8" Sweat	7/8" Sweat	7/8" Sweat	3.7	12.8	1.55	Stud bolts	PDS-5
4	3.5	ACH-30EQ-30H-F	3287084895	1/2" Sweat	7/8" Sweat	7/8" Sweat	3.7	12.8	2.1	Stud bolts	PDS-5
5	5	ACH-30EQ-40H-F	3287084896	1/2" Sweat	7/8" Sweat	7/8" Sweat	3.7	12.8	2.7	Stud bolts	PDS-5
6	6	ACH-30EQ-50H-F	3287084897	5/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	3.7	12.8	3.3	Stud bolts	PDS-5
7.5	7	ACH-30EQ-60H-F	3287084898	5/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	3.7	12.8	3.9	Stud bolts	PDS-5
8	7.5	ACH-30EQ-70H-F	3075028542	5/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	3.7	12.8	4.54	Stud bolts	PDS-5
9	8	ACH-30EQ-80H-F	3075028543	5/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	3.7	12.8	5.14	Stud bolts	PDS-5
10	9	ACH-30EQ-100H-F	3075028544	5/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	3.7	12.8	6.34	Stud bolts	PDS-5
3.5	3	ACH-70X-14M-F	3287126488	5/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	1.7	Stud bolts	PDS-7
5	4	ACH-70X-18M-F	3287126487	5/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	2.1	Stud bolts	PDS-7
6	5	ACH-70X-22M-F	3287083717	5/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	2.4	Stud bolts	PDS-7
7	6	ACH-70X-26M-F	3287083718	5/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	2.8	Stud bolts	PDS-7
8	7	ACH-70X-32M-F	3287083719	5/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	3.3	Stud bolts	PDS-7
10	9	ACH-70X-42M-F	3287083720	5/8" Sweat	1-3/8" Sweat	1-1/8" Sweat	4.4	20.7	4.2	Stud bolts	PDS-7
10	9	ACH-70X-42M-F	3287141325	5/8" Sweat	1-5/8" Sweat	1-5/8" Sweat	4.4	20.7	4.2	Stud bolts	PDS-7
12	10	ACH-70X-50M-F	3287083721	5/8" Sweat	1-3/8" Sweat	1-1/8" Sweat	4.4	20.7	5	Stud bolts	PDS-7
15	12.5	ACH-70X-62M-F	3287083723	5/8" Sweat	1-3/8" Sweat	1-3/8" Sweat	4.4	20.7	6.1	Stud bolts	PDS-7
15	12.5	ACH-70X-62M-F	3287141326	5/8" Sweat	1-5/8" Sweat	1-5/8" Sweat	4.4	20.7	6.1	Stud bolts	PDS-7
18	15	ACH-70X-78M-F	3287083725	7/8" Sweat	1-3/8" Sweat	1-3/8" Sweat	4.4	20.7	7.5	Stud bolts	PDS-7
22	16.5	ACH-70X-90M-F	3287083726	7/8" Sweat	1-3/8" Sweat	1-3/8" Sweat	4.4	20.7	8.6	Stud bolts	PDS-7
25	18	ACH-70X-100M-F	3287083727	7/8" Sweat	1-3/8" Sweat	1-3/8" Sweat	4.4	20.7	10.4	Stud bolts	PDS-7
25	18	ACH-70X-100M-F	3287141327	7/8" Sweat	1-5/8" Sweat	1-5/8" Sweat	4.4	20.7	10.4	Stud bolts	PDS-7
16	10.5	ACH220EQ-30AM-F	3287155302	1-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	3.06	Stud bolts	PDS-15
25	17	ACH220EQ-44AM-F	3287155306	1-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	4.2	Stud bolts	PDS-15
30	20	ACH220EQ-56AM-F	3287156485	1-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	5.17	Stud bolts	PDS-15
40	25	ACH220EQ-70AM-F	3287155309	1-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	6.31	Stud bolts	PDS-15
50	30	ACH220EQ-86AM-F	3287155310	1-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	7.61	Stud bolts	PDS-15
55	35	ACH220EQ-100AM-F	3287155311	1-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	8.74	Stud bolts	PDS-15
65	42	ACH220EQ-116AM-F	3287155312	1-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	10	Stud bolts	PDS-15
75	50	ACH220EQ-140AM-F	3287155313	1-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	11.98	Stud bolts	PDS-15
80	55	ACH220EQ-168AM-F	3287155314	1-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	14.25	Stud bolts	PDS-15
50	50	ACH-500EQ-70H-F	3287084411	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.7	29.1	7.7	Feet	PDS-13
60	60	ACH-500EQ-80H-F	3287084412	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.7	29.1	8.7	Feet	PDS-13
75	75	ACH-500EQ-100H-F	3287084414	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.7	29.1	10.8	Feet	PDS-13
100	80	ACH-500EQ-130H-F	3287084415	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.7	29.1	13.8	Feet	PDS-13

*** If your conditions vary significantly from these listed above, please consult factory for product sizing and selection. ***

DX Evaporators/Chillers - dual circuit

Agency Code Approval: UL, CRN
Product Specification: Refer to Product Data Sheet section for details
Construction: Stainless Steel Plates & Connections
Installation & Maintenance: Refer to Installation section, page 37, for details

Selection Notes:
 Units sized based on the following conditions of service except for model ***ACH24D0DQ-"X"-AH-F*** which was rated at 39°F Evaporating Temperature

- Nominal tons: 12,000 BTUH/ton
- 35°F Evaporating Temperature
- 54°F Entering Water Temperature (EWT)
- 8°F Superheat
- 44°F Leaving Water Temperature (LWT)
- 24 GPM/ton



Nominal Tons (R410A)	Nominal Tons (R22)	Denomination	Part Number	Ref Inlet/Outlet (S3,S4)	Fluid Inlet/Outlet (S1,S2)	Plate Width (in.)	Plate Height (in.)	Plate Pack Depth (in.)	Stud Bolt / Mtg Feet	Data Sheet page	
15	8	ACH232DQ-30H-F	3075019821	7/8" Sweat	1-1/8" Sweat	2" Victualic Clamp	9.8	19.3	3.04	Stud bolts	PDS-9
25	15	ACH232DQ-50H-F	3075019823	7/8" Sweat	1-3/8" Sweat	2" Victualic Clamp	9.8	19.3	4.72	Stud bolts	PDS-9
40	25	ACH232DQ-70H-F	3075019824	7/8" Sweat	1-3/8" Sweat	2" Victualic Clamp	9.8	19.3	6.4	Stud bolts	PDS-9
50	33	ACH232DQ-90H-F	3075019820	7/8" Sweat	1-5/8" Sweat	2-1/2" Victualic Clamp	9.8	19.3	8	Stud bolts	PDS-9
60	40	ACH232DQ-110H-F	3075019825	1-1/8" Sweat	1-5/8" Sweat	2-1/2" Victualic Clamp	9.8	19.3	9.77	Stud bolts	PDS-9
70	55	ACH232DQ-138H-F	3075019826	1-1/8" Sweat	2-1/8" Sweat	2-1/2" Victualic Clamp	9.8	19.3	12.1	Stud bolts	PDS-9
80	68	ACH232DQ-170H-F	3075019827	1-1/8" Sweat	2-1/8" Sweat	2-1/2" Victualic Clamp	9.8	19.3	14.8	Stud bolts	PDS-9
85	80	ACH232DQ-202H-F	3075019828	1-1/8" Sweat	2-1/8" Sweat	2-1/2" Victualic Clamp	9.8	19.3	17.5	Stud bolts	PDS-9
15	N/A	***ACH-240DQ-42AH-F***	3075004364	5/8" Sweat	1-3/8" Sweat	2" Victualic Clamp	11.3	20.7	4	Stud bolts	PDS-11
20	N/A	***ACH-240DQ-50AH-F***	3075004365	5/8" Sweat	1-3/8" Sweat	2" Victualic Clamp	11.3	20.7	4.68	Stud bolts	PDS-11
30	N/A	***ACH-240DQ-70AH-F***	3075004366	5/8" Sweat	1-3/8" Sweat	2" Victualic Clamp	11.3	20.7	6.36	Stud bolts	PDS-11
38	N/A	***ACH-240DQ-90AH-F***	3075004368	5/8" Sweat	1-5/8" Sweat	2-1/2" Victualic Clamp	11.3	20.7	8	Stud bolts	PDS-11
45	N/A	***ACH-240DQ-110AH-F***	3075004369	5/8" Sweat	1-5/8" Sweat	2-1/2" Victualic Clamp	11.3	20.7	9.72	Stud bolts	PDS-11
55	N/A	***ACH-240DQ-138AH-F***	3075004370	5/8" Sweat	2-1/8" Sweat	2-1/2" Victualic Clamp	11.3	20.7	12	Stud bolts	PDS-11
70	N/A	***ACH-240DQ-170AH-F***	3075004371	5/8" Sweat	2-1/8" Sweat	2-1/2" Victualic Clamp	11.3	20.7	14.75	Stud bolts	PDS-11
85	N/A	***ACH-240DQ-202AH-F***	3075004372	5/8" Sweat	2-1/8" Sweat	2-1/2" Victualic Clamp	11.3	20.7	17.4	Stud bolts	PDS-11
115	65	ACH502DQ-102AH-F	3075015516	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.68	29.09	10.59	Feet	PDS-17
140	80	ACH502DQ-126AH-F	3075015517	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.68	29.09	12.97	Feet	PDS-17
165	100	ACH502DQ-150AH-F	3075015518	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.68	29.09	15.35	Feet	PDS-17
185	115	ACH502DQ-170AH-F	3075015519	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.68	29.09	17.3	Feet	PDS-17
200	130	ACH502DQ-190AH-F	3075015522	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.68	29.09	19.3	Feet	PDS-17
210	145	ACH502DQ-222AH-F	3075015521	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.68	29.09	22.5	Feet	PDS-17
140	80	ACH502DQ-126AH-F	3075015517	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.68	29.09	12.97	Feet	PDS-17
165	100	ACH502DQ-150AH-F	3075015518	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.68	29.09	15.35	Feet	PDS-17
185	115	ACH502DQ-170AH-F	3075015519	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.68	29.09	17.3	Feet	PDS-17
200	130	ACH502DQ-190AH-F	3075015522	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.68	29.09	19.3	Feet	PDS-17
210	145	ACH502DQ-222AH-F	3075015521	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.68	29.09	22.5	Feet	PDS-17

*** If your conditions vary significantly from these listed above, please consult factory for product sizing and selection. ***

Basic refrigeration cycle

The function of the refrigeration plant is to remove heat from a process fluid or air at a low temperature and transfer to a recipient fluid such as water or air.

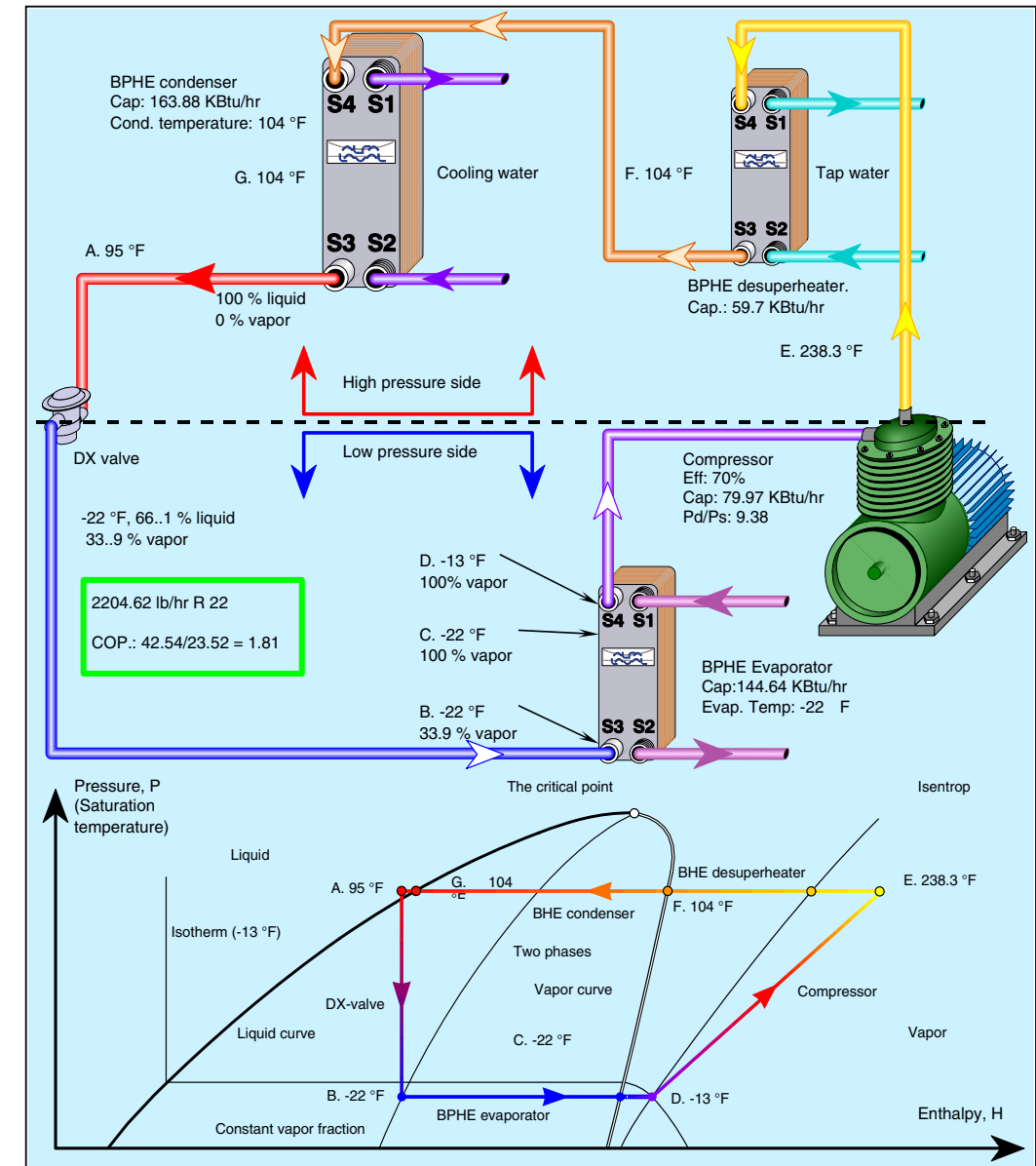
The figure shows a schematic cooling plant, composed of an evaporator, a compressor, a condenser, an expansion device and connecting pipes. These are the minimum components necessary in the basic compression refrigeration cycle.

The pressure is shown as a function of the enthalpies of liquid and vapor. To the left of the liquid line is liquid and to the right of the vapor line, vapor. Between the two lines is a two-phase area. The lines meet at the critical point.

Other properties can then be plotted as parameters, e.g. isotherms, lines of constant temperature. In the figure, the -13 °F isotherm is shown. It is almost vertical in the liquid area, mirroring the fact that the liquid specific heat is little pressure dependent. In the vapor area it is curved and inclined, i.e. the vapor specific heat is strongly pressure (and temperature) dependent.

The figure also shows an isentrop, a line expressing a change of state, but where no heat energy is exchanged between the fluid and the surroundings. An ideal compression would follow this line (D - E'), but because of the inevitably released friction energy, a real compression is (D - E), i.e. to a higher final temperature.

Water-cooled condensers



Water-cooled condensers - single circuit

Agency Code Approval: UL, CRN
Product Specification: Refer to Product Data Sheet section for details
Construction: Stainless Steel Plates & Connections
Installation and Maintenance: Refer to Installation section, page 37, for details

Selection Notes:
 Units sized based on the following conditions of service

- Nominal tons: 15,000 BTUH/ton
- 95°F Leaving Water Temperature (LWT)
- 85°F Entering Water Temperature (EWT) If EWT is 75°F, multiply the capacity of the selected unit
- 105°F Evaporating Temperature
- 5°F Superheat
- 3 gpm/ton



Nominal Tons (R410A)	Nominal Tons (R22)	Denomination	Part Number	Ref Inlet/Outlet (S3,S4)		Fluid Inlet/Outlet (S1,S2)	Plate Width (in.)	Plate Height (in.)	Plate Pack Depth (in.)	Stud Bolt / Mtg Feet	Data Sheet page
0.25	0.25	ACH16-10H-F	3287133204	5/8" Sweat	5/8" Sweat	5/8" Sweat	2.89	8.25	0.85	Stud bolts	PDS-1
0.4	0.4	ACH16-14H-F	3287133205	5/8" Sweat	5/8" Sweat	5/8" Sweat	2.89	8.25	1.19	Stud bolts	PDS-1
1	0.5	ACH18-10H-F	3287130117	3/8" Sweat	5/8" Sweat	5/8" Sweat	2.89	12.4	0.85	Stud bolts	PDS-3
1	0.75	CBH30-12H	3075018618	5/8" Sweat	5/8" Sweat	5/8" Sweat	4.4	12.3	1.6	Stud bolts	PDS-29
1.5	1.5	CBH30-18H	3075018619	7/8" Sweat	7/8" Sweat	7/8" Sweat	4.4	12.3	2.14	Stud bolts	PDS-29
3	2.5	CBH30-24H	3075018620	7/8" Sweat	7/8" Sweat	7/8" Sweat	4.4	12.3	2.69	Stud bolts	PDS-29
4.5	4	CBH30-34H	3287144642	1-1/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	4.4	12.3	3.6	Stud bolts	PDS-29
5	5	CBH30-44H	3287144643	1-1/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	4.4	12.3	4.51	Stud bolts	PDS-29
7	6	CBH30-54H	3287144644	1-1/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	4.4	12.3	5.42	Stud bolts	PDS-29
8	6.5	CBH30-64H	3287144645	1-1/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	4.4	12.3	6.33	Stud bolts	PDS-29
4	4	CBH60-16H-F	3287103910	1-1/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	1.97	Stud bolts	PDS-31
6	6	CBH60-24H-F	3287103911	1-1/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	2.7	Stud bolts	PDS-31
7	7	CBH60-30H-F	3287103912	1-1/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	3.25	Stud bolts	PDS-31
9	9	CBH60-40H-F	3287103913	1-1/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	4.17	Stud bolts	PDS-31
11	11	CBH60-48H-F	3287103914	1-1/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	4.9	Stud bolts	PDS-31
13	13	CBH60-62H-F	3287103915	1-1/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	6.17	Stud bolts	PDS-31
13	10	CBH110-24H	3287133774	2-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	3	Stud bolts	PDS-33
18	15	CBH110-34H	3287133775	2-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	4.02	Stud bolts	PDS-33
24	20	CBH110-44H	3287133776	2-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	5.02	Stud bolts	PDS-33
31	25	CBH110-56H	3287133777	2-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	6.24	Stud bolts	PDS-33
36	30	CBH110-66H	3287133778	2-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	7.24	Stud bolts	PDS-33
45	42	CBH110-84H	3287133779	2-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	9.06	Stud bolts	PDS-33
54	54	CBH110-104H	3287133780	2-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	11.1	Stud bolts	PDS-33
65	50	ACH-500EQ-70H-F	3287084411	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.7	29.1	7.7	Feet	PDS-13
70	60	ACH-500EQ-80H-F	3287084412	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.7	29.1	8.7	Feet	PDS-13
90	75	ACH-500EQ-100H-F	3287084414	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.7	29.1	10.8	Feet	PDS-13
110	100	ACH-500EQ-130H-F	3287084415	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.7	29.1	13.8	Feet	PDS-13

*** If your conditions vary significantly from these listed above, please consult factory for product sizing and selection. ***

Water-cooled condensers - dual circuit

Agency Code Approval: UL, CRN
Product Specification: Refer to Product Data Sheet section for details
Construction: Stainless Steel Plates & Connections
Installation and Maintenance: Refer to Installation section, page 37, for details

Selection Notes:
 Units sized based on the following conditions of service

- Nominal tons: 15,000 BTUH/ton
- 95°F Leaving Water Temperature (LWT)
- 85°F Entering Water Temperature (EWT) If EWT is 75°F, multiply the capacity of the selected unit
- 105°F Evaporating Temperature
- 5°F Superheat
- 3 gpm/ton



Nominal Tons (R410A)	Nominal Tons (R22)	Denomination	Part Number	Ref Inlet/Outlet (S3,S4)		Fluid Inlet/Outlet (S1,S2)	Plate Width (in.)	Plate Height (in.)	Plate Pack Depth (in.)	Stud Bolt / Mtg Feet	Data Sheet page
40	N/A	ACH240DQ-42AH-F	3075004364	5/8" Sweat	1-3/8" Sweat	2" Victualic Clamp	11.3	20.7	4	Stud bolts	PDS-11
45	N/A	ACH240DQ-50AH-F	3075004365	5/8" Sweat	1-3/8" Sweat	2" Victualic Clamp	11.3	20.7	4.68	Stud bolts	PDS-11
50	N/A	ACH240DQ-70AH-F	3075004366	5/8" Sweat	1-3/8" Sweat	2" Victualic Clamp	11.3	20.7	6.36	Stud bolts	PDS-11
65	N/A	ACH240DQ-90AH-F	3075004368	5/8" Sweat	1-5/8" Sweat	2-1/2" Victualic Clamp	11.3	20.7	8	Stud bolts	PDS-11
85	N/A	ACH240DQ-110AH-F	3075004369	5/8" Sweat	1-5/8" Sweat	2-1/2" Victualic Clamp	11.3	20.7	9.72	Stud bolts	PDS-11
90	N/A	ACH240DQ-138AH-F	3075004370	5/8" Sweat	2-1/8" Sweat	2-1/2" Victualic Clamp	11.3	20.7	12	Stud bolts	PDS-11
120	120	ACH502DQ-126AH-F	3075015517	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.68	29.09	12.97	Feet	PDS-17
140	140	ACH502DQ-150AH-F	3075015518	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.68	29.09	15.35	Feet	PDS-17
150	150	ACH502DQ-170AH-F	3075015519	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.68	29.09	17.3	Feet	PDS-17
160	160	ACH502DQ-190AH-F	3075015522	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.68	29.09	19.3	Feet	PDS-17
170	170	ACH502DQ-222AH-F	3075015521	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.68	29.09	22.5	Feet	PDS-17
160	160	ACH502DQ-190AH-F	3075015522	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.68	29.09	19.3	Feet	PDS-17
170	170	ACH502DQ-222AH-F	3075015521	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.68	29.09	22.5	Feet	PDS-17

*** If your conditions vary significantly from these listed above, please consult factory for product sizing and selection. ***

The Economizer/Sub-Cooler refrigeration cycle

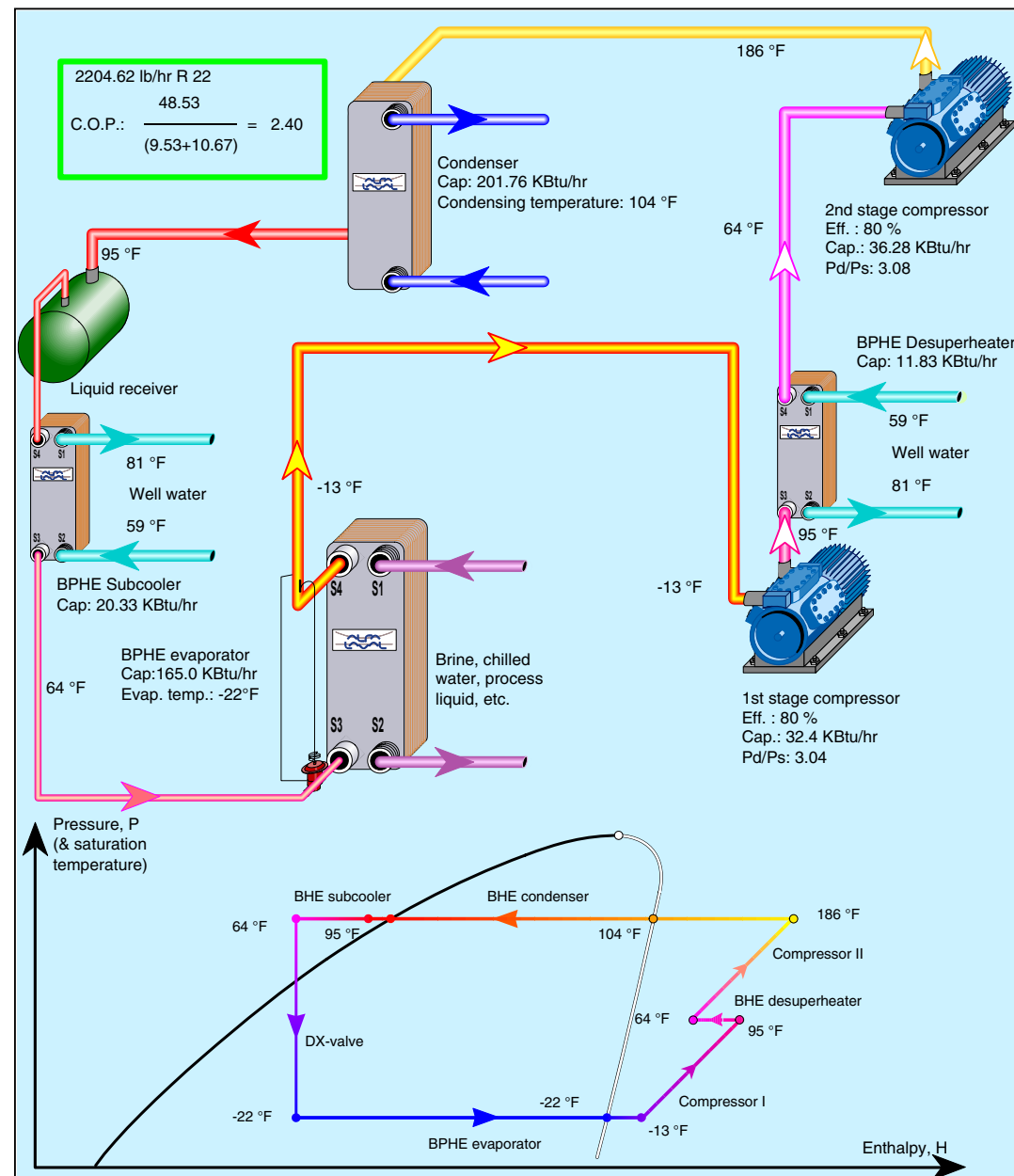
This is principally the basic refrigeration cycle, but with a sub-cooler added to the main condenser.

A BPHE condenser is used to de-superheat and condense the refrigerant. The refrigerant leaves condenser at 95°F. It is then further subcooled to 64°F with well water of 59°F in the BPHE. Furthermore, the system efficiency and capacity are enhanced due to these effects.

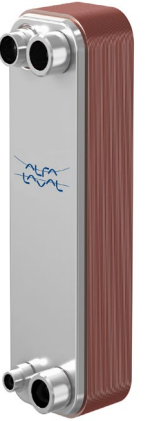
- The lower temperature to the expansion valve means that less refrigerant has to evaporate in order to reach the evaporation temperature.

- Consequently, more liquid refrigerant is available in the evaporator, and its capacity increases. The increased efficiency of the compressor means that less compressor power is necessary.

The actual performance of the cycle obviously depends on the total required capacity, the efficiency of the compressor for the actual operating conditions, type of condenser and evaporator, availability of water, available space, etc. This kind of refrigeration cycle layout is very useful for low temperature applications such as super-market and food processing.



Economizer/Sub-Cooler



Agency Code Approval: UL, CRN
Product Specification: Refer to Product Data Sheet section for details
Construction: Stainless Steel Plates & Connections
Installation and Maintenance: Refer to Installation section, page 37, for details

- Selection Notes:**
 Units sized based on the following conditions of service
- Nominal tons: 12,000 BTUH/ton
 - Liquid refrigerant subcooled from 100°F to 50°F
 - 8°F Superheat
 - 35°F Evaporating Temperature

Nominal Tons (R22)	Denomination	Part Number	Ref Inlet/Outlet (S3,S4)		Fluid Inlet/Outlet (S1,S2)	Plate Width (in.)	Plate Height (in.)	Plate Pack Depth (in.)	Stud Bolt / Mtg Feet	Data Sheet page
1	ACH-30EQ-10H-F	3287084893	3/8" Sweat	7/8" Sweat	7/8" Sweat	3.7	12.8	0.95	Stud bolts	PDS-5
2	ACH-30EQ-20H-F	3287084894	3/8" Sweat	7/8" Sweat	7/8" Sweat	3.7	12.8	1.55	Stud bolts	PDS-5
4	ACH-30EQ-30H-F	3287084895	1/2" Sweat	7/8" Sweat	7/8" Sweat	3.7	12.8	2.1	Stud bolts	PDS-5
6	ACH-30EQ-40H-F	3287084896	1/2" Sweat	7/8" Sweat	7/8" Sweat	3.7	12.8	2.7	Stud bolts	PDS-5
7	ACH-30EQ-50H-F	3287084897	5/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	3.7	12.8	3.3	Stud bolts	PDS-5
8	ACH-30EQ-60H-F	3287084898	5/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	3.7	12.8	3.9	Stud bolts	PDS-5
10	ACH-30EQ-70H-F	3075028542	5/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	3.7	12.8	4.54	Stud bolts	PDS-5
12	ACH-30EQ-80H-F	3075028543	5/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	3.7	12.8	5.14	Stud bolts	PDS-5
15	ACH-30EQ-100H-F	3075028544	5/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	3.7	12.8	6.34	Stud bolts	PDS-5
4	ACH-70X-14M-F	3287126488	5/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	1.7	Stud bolts	PDS-7
5	ACH-70X-18M-F	3287126487	5/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	2.1	Stud bolts	PDS-7
6	ACH-70X-22M-F	3287083717	5/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	2.4	Stud bolts	PDS-7
8	ACH-70X-26M-F	3287083718	5/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	2.8	Stud bolts	PDS-7
10	ACH-70X-32M-F	3287083719	5/8" Sweat	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	3.3	Stud bolts	PDS-7
12	ACH-70X-42M-F	3287083720	5/8" Sweat	1-3/8" Sweat	1-1/8" Sweat	4.4	20.7	4.2	Stud bolts	PDS-7
12	ACH-70X-42M-F	3287141325	5/8" Sweat	1-5/8" Sweat	1-5/8" Sweat	4.4	20.7	4.2	Stud bolts	PDS-7
15	ACH-70X-50M-F	3287083721	5/8" Sweat	1-3/8" Sweat	1-1/8" Sweat	4.4	20.7	5	Stud bolts	PDS-7
20	ACH-70X-62M-F	3287083723	5/8" Sweat	1-3/8" Sweat	1-3/8" Sweat	4.4	20.7	6.1	Stud bolts	PDS-7
20	ACH-70X-62M-F	3287141326	5/8" Sweat	1-5/8" Sweat	1-5/8" Sweat	4.4	20.7	6.1	Stud bolts	PDS-7
21	ACH-70X-78M-F	3287083725	7/8" Sweat	1-3/8" Sweat	1-3/8" Sweat	4.4	20.7	7.5	Stud bolts	PDS-7
26	ACH-70X-90M-F	3287083726	7/8" Sweat	1-3/8" Sweat	1-3/8" Sweat	4.4	20.7	8.6	Stud bolts	PDS-7
30	ACH-70X-100M-F	3287083727	7/8" Sweat	1-3/8" Sweat	1-3/8" Sweat	4.4	20.7	10.4	Stud bolts	PDS-7
30	ACH-70X-100M-F	3287141327	7/8" Sweat	1-5/8" Sweat	1-5/8" Sweat	4.4	20.7	10.4	Stud bolts	PDS-7
15	ACH220EQ-30AM-F	3287155302	1-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	3.06	Stud bolts	PDS-15
25	ACH220EQ-44AM-F	3287155306	1-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	4.2	Stud bolts	PDS-15
30	ACH220EQ-56AM-F	3287156485	1-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	5.17	Stud bolts	PDS-15
40	ACH220EQ-70AM-F	3287155309	1-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	6.31	Stud bolts	PDS-15
45	ACH220EQ-86AM-F	3287155310	1-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	7.61	Stud bolts	PDS-15
50	ACH220EQ-100AM-F	3287155311	1-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	8.74	Stud bolts	PDS-15
60	ACH220EQ-116AM-F	3287155312	1-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	10	Stud bolts	PDS-15
75	ACH220EQ-140AM-F	3287155313	1-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	11.98	Stud bolts	PDS-15
85	ACH220EQ-168AM-F	3287155314	1-1/8" Sweat	2-1/8" Sweat	2-1/8" Sweat	7.5	24.3	14.25	Stud bolts	PDS-15
50	ACH-500EQ-70H-F	3287084411	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.7	29.1	7.7	Feet	PDS-13
60	ACH-500EQ-80H-F	3287084412	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.7	29.1	8.7	Feet	PDS-13
70	ACH-500EQ-100H-F	3287084414	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.7	29.1	10.8	Feet	PDS-13
90	ACH-500EQ-130H-F	3287084415	1-3/8" Sweat	2-5/8" Sweat	3" Victualic Clamp	12.7	29.1	13.8	Feet	PDS-13

*** If your conditions vary significantly from these listed above, please consult factory for product sizing and selection. ***

General purpose - liquid to liquid cooling

Agency Code Approval: UL, CRN
Product Specification: Refer to Product Data Sheet section for details
Construction: Stainless Steel Plates & Connections
Installation and Maintenance: Refer to Installation section, page 37, for details



Selection Notes:
 Units sized based on the following conditions of service

- Side A media: 40% Propylene Glycol
- 35°F Side A Entering Temperature
- 45°F Side A Leaving Temperature
- Side B Media: Water
- 60°F Side B Entering Temperature
- 50°F Side B Leaving Temperature

Cooling Capacity (kBtu/hr)	Denomination	Part Number	Inlet/Outlet (S1,S2)	Inlet/Outlet (S3,S4)	Plate Width (in.)	Plate Height (in.)	Plate Pack Depth (in.)	Stud Bolt / Mtg Feet	Data Sheet page
9	CBH16-11H	3287120469	3/4" Male NPT	3/4" Male NPT	2.9	8.2	1.17	no	PDS-35
12	CBH16-13H	3287119753	3/4" Male NPT	3/4" Male NPT	2.9	8.2	1.34	no	PDS-35
17	CBH16-17H	3287119754	3/4" Male NPT	3/4" Male NPT	2.9	8.2	1.68	no	PDS-35
18	CB30-10H	3287099216	1" Male NPT	1" Male NPT	4.4	12.3	1.42	Stud bolts	PDS-29
27	CBH16-25H	3287119755	3/4" Male NPT	3/4" Male NPT	2.9	8.2	2.36	no	PDS-35
40	CB30-18H	3287099217	1" Male NPT	1" Male NPT	4.4	12.3	2.15	Stud bolts	PDS-29
55	CB60-20H	3287102155	1" Male NPT	1" Male NPT	4.4	20.7	2.34	Stud bolts	PDS-31
60	CB30-24H	3287099218	1" Male NPT	1" Male NPT	4.4	12.3	2.69	Stud bolts	PDS-29
70	CB110-16L	3287133291	2" Male NPT	2" Male NPT	7.5	24.3	2.2	Stud bolts	PDS-33
85	CB60-30H	3287102156	1" Male NPT	1" Male NPT	4.4	20.7	3.25	Stud bolts	PDS-31
90	CB30-34H	3287099219	1" Male NPT	1" Male NPT	4.4	12.3	3.6	Stud bolts	PDS-29
90	CB110-20L	3287133286	2" Male NPT	2" Male NPT	7.5	24.3	2.61	Stud bolts	PDS-33
105	CB110-16H	3287133276	2" Male NPT	2" Male NPT	7.5	24.3	2.2	Stud bolts	PDS-33
110	CB60-40H	3287102157	1" Male NPT	1" Male NPT	4.4	20.7	4.17	Stud bolts	PDS-31
110	CB110-24L	3287133287	2" Male NPT	2" Male NPT	7.5	24.3	3.01	Stud bolts	PDS-33
120	CB30-44H	3287099220	1" Male NPT	1" Male NPT	4.4	12.3	4.51	Stud bolts	PDS-29
130	CB60-50H	3287102158	1" Male NPT	1" Male NPT	4.4	20.7	5.08	Stud bolts	PDS-31
140	CB30-50H	3287099211	1" Male NPT	1" Male NPT	4.4	12.3	5.06	Stud bolts	PDS-29
155	CB60-60H	3287102159	1" Male NPT	1" Male NPT	4.4	20.7	5.99	Stud bolts	PDS-31
155	CB110-24H	3287133277	2" Male NPT	2" Male NPT	7.5	24.3	3.01	Stud bolts	PDS-33
155	CB110-32L	3287133288	2" Male NPT	2" Male NPT	7.5	24.3	3.81	Stud bolts	PDS-33
160	CB30-60H	3287099210	1" Male NPT	1" Male NPT	4.4	12.3	5.97	Stud bolts	PDS-29
190	CB110-30H	3287133278	2" Male NPT	2" Male NPT	7.5	24.3	3.61	Stud bolts	PDS-33
195	CB60-80H	3287102160	1" Male NPT	1" Male NPT	4.4	20.7	7.82	Stud bolts	PDS-31
215	CB60-100H	3287102161	1" Male NPT	1" Male NPT	4.4	20.7	9.65	Stud bolts	PDS-31
230	CB110-46L	3287133289	2" Male NPT	2" Male NPT	7.5	24.3	5.23	Stud bolts	PDS-33
240	CB110-38H	3287133279	2" Male NPT	2" Male NPT	7.5	24.3	4.42	Stud bolts	PDS-33
300	CB110-46H	3287133280	2" Male NPT	2" Male NPT	7.5	24.3	5.23	Stud bolts	PDS-33
300	CB110-58L	3287133290	2" Male NPT	2" Male NPT	7.5	24.3	6.44	Stud bolts	PDS-33
350	CB110-54H	3287133281	2" Male NPT	2" Male NPT	7.5	24.3	6.03	Stud bolts	PDS-33
390	CB110-76L	3287141403	2" Male NPT	2" Male NPT	7.5	24.3	8.25	Stud bolts	PDS-33
400	CB110-64H	3287133282	2" Male NPT	2" Male NPT	7.5	24.3	7.04	Stud bolts	PDS-33
480	CB110-76H	3287133283	2" Male NPT	2" Male NPT	7.5	24.3	8.25	Stud bolts	PDS-33
540	CB110-90H	3287133284	2" Male NPT	2" Male NPT	7.5	24.3	9.66	Stud bolts	PDS-33
670	CB110-110H	3287133285	2" Male NPT	2" Male NPT	7.5	24.3	11.7	Stud bolts	PDS-33
740	CB110-124H	3287144762	2" Male NPT	2" Male NPT	7.5	24.3	13.1	Stud bolts	PDS-33

*** If your conditions vary significantly from these listed above, please consult factory for product sizing and selection. ***

General purpose - liquid to liquid heating

Agency Code Approval: UL, CRN
Product Specification: Refer to Product Data Sheet section for details
Construction: Stainless Steel Plates & Connections
Installation and Maintenance: Refer to Installation section, page 37, for details



Selection Notes:
 Units sized based on the following conditions of service

- 180°F Side A Entering Temperature
- 160°F Side A Leaving Temperature
- 140°F Side B Entering Temperature
- 160°F Leaving Temperature

Capacity (kBtu/hr)	Denomination	Part Number	Inlet/Outlet (S1,S2)	Inlet/Outlet (S3,S4)	Plate Width (in.)	Plate Height (in.)	Plate Pack Depth (in.)	Stud Bolt / Mtg Feet	Data Sheet page
10	CB30-10L	3287099365	1" Male NPT	1" Male NPT	4.4	12.3	1.42	Stud bolts	PDS-29
22	CB30-18L	3287099366	1" Male NPT	1" Male NPT	4.4	12.3	2.15	Stud bolts	PDS-29
33	CB30-24L	3287099367	1" Male NPT	1" Male NPT	4.4	12.3	2.69	Stud bolts	PDS-29
50	CB30-34L	3287099368	1" Male NPT	1" Male NPT	4.4	12.3	3.6	Stud bolts	PDS-29
50	CB30-34L	3287138993	1" Male NPT	1" Male NPT	4.4	12.3	3.6	no	PDS-29
55	CBH16-11H	3287120469	3/4" Male NPT	3/4" Male NPT	2.9	8.2	1.17	no	PDS-35
70	CBH16-13H	3287119753	3/4" Male NPT	3/4" Male NPT	2.9	8.2	1.34	no	PDS-35
75	CB30-50L	3287099369	1" Male NPT	1" Male NPT	4.4	12.3	5.06	Stud bolts	PDS-29
80	CB30-10H	3287099216	1" Male NPT	1" Male NPT	4.4	12.3	1.42	Stud bolts	PDS-29
90	CBH16-17H	3287119754	3/4" Male NPT	3/4" Male NPT	2.9	8.2	1.68	no	PDS-35
100	CBH16-25H	3287119755	3/4" Male NPT	3/4" Male NPT	2.9	8.2	2.36	no	PDS-35
100	CB30-70L	3287099370	1" Male NPT	1" Male NPT	4.4	12.3	6.88	Stud bolts	PDS-29
135	CB60-20H	3287102155	1" Male NPT	1" Male NPT	4.4	20.7	2.34	Stud bolts	PDS-31
150	CB30-100L	3287099371	1" Male NPT	1" Male NPT	4.4	12.3	9.61	Stud bolts	PDS-29
160	CB30-18H	3287099217	1" Male NPT	1" Male NPT	4.4	12.3	2.15	Stud bolts	PDS-29
200	CB60-30H	3287102156	1" Male NPT	1" Male NPT	4.4	20.7	3.25	Stud bolts	PDS-31
220	CB30-24H	3287099218	1" Male NPT	1" Male NPT	4.4	12.3	2.69	Stud bolts	PDS-29
240	CB110-16H	3287133276	2" Male NPT	2" Male NPT	7.5	24.3	2.2	Stud bolts	PDS-33
270	CB60-40H	3287102157	1" Male NPT	1" Male NPT	4.4	20.7	4.17	Stud bolts	PDS-31
300	CB30-34H	3287099219	1" Male NPT	1" Male NPT	4.4	12.3	3.6	Stud bolts	PDS-29
300	CB110-16L	3287133291	2" Male NPT	2" Male NPT	7.5	24.3	2.2	Stud bolts	PDS-33
330	CB60-50H	3287102158	1" Male NPT	1" Male NPT	4.4	20.7	5.08	Stud bolts	PDS-29

*** If your conditions vary significantly from these listed above, please consult factory for product sizing and selection. ***

Continued

General purpose - liquid to liquid heating Continued

Agency Code Approval: UL, CRN
Product Specification: Refer to Product Data Sheet section for details
Construction: Stainless Steel Plates & Connections
Installation and Maintenance: Refer to Installation section, page 37, for details

Selection Notes:
 Units sized based on the following conditions of service

- 180°F Side A Entering Temperature
- 140°F Side B Entering Temperature
- 160°F Side A Leaving Temperature
- 160°F Leaving Temperature

Capacity (kBtu/hr)	Denomination	Part Number	Inlet/Outlet (S1,S2)	Inlet/Outlet (S3,S4)	Plate Width (in.)	Plate Height (in.)	Plate Pack Depth (in.)	Stud Bolt / Mtg Feet	Data Sheet page
380	CB30-44H	3287099220	1" Male NPT	1" Male NPT	4.4	12.3	4.51	Stud bolts	PDS-29
380	CB60-60H	3287102159	1" Male NPT	1" Male NPT	4.4	20.7	5.99	Stud bolts	PDS-31
380	CB110-24H	3287133277	2" Male NPT	2" Male NPT	7.5	24.3	3.01	Stud bolts	PDS-33
400	CB110-20L	3287133286	2" Male NPT	2" Male NPT	7.5	24.3	2.61	Stud bolts	PDS-33
430	CB30-50H	3287099211	1" Male NPT	1" Male NPT	4.4	12.3	5.06	Stud bolts	PDS-29
450	CB30-60H	3287099210	1" Male NPT	1" Male NPT	4.4	12.3	5.97	Stud bolts	PDS-29
450	CB30-60H	3287138694	1" Male NPT	1" Male NPT	4.4	12.3	5.97	no	PDS-29
450	CB60-80H	3287102160	1" Male NPT	1" Male NPT	4.4	20.7	7.82	Stud bolts	PDS-31
480	CB110-30H	3287133278	2" Male NPT	2" Male NPT	7.5	24.3	3.61	Stud bolts	PDS-33
500	CB110-24L	3287133287	2" Male NPT	2" Male NPT	7.5	24.3	3.01	Stud bolts	PDS-33
620	CB110-38H	3287133279	2" Male NPT	2" Male NPT	7.5	24.3	4.42	Stud bolts	PDS-33
700	CB110-32L	3287133288	2" Male NPT	2" Male NPT	7.5	24.3	3.81	Stud bolts	PDS-33
730	CB110-46H	3287133280	2" Male NPT	2" Male NPT	7.5	24.3	5.23	Stud bolts	PDS-33
860	CB110-54H	3287133281	2" Male NPT	2" Male NPT	7.5	24.3	6.03	Stud bolts	PDS-33
1000	CB110-64H	3287133282	2" Male NPT	2" Male NPT	7.5	24.3	7.04	Stud bolts	PDS-33
1000	CB110-46L	3287133289	2" Male NPT	2" Male NPT	7.5	24.3	5.23	Stud bolts	PDS-33
1200	CB110-76H	3287133283	2" Male NPT	2" Male NPT	7.5	24.3	8.25	Stud bolts	PDS-33
1200	CB110-58L	3287133290	2" Male NPT	2" Male NPT	7.5	24.3	6.44	Stud bolts	PDS-33
1400	CB110-90H	3287133284	2" Male NPT	2" Male NPT	7.5	24.3	9.66	Stud bolts	PDS-33
1400	CB110-76L	3287141403	2" Male NPT	2" Male NPT	7.5	24.3	8.25	Stud bolts	PDS-33
1700	CB110-110H	3287133285	2" Male NPT	2" Male NPT	7.5	24.3	11.7	Stud bolts	PDS-33
1800	CB110-124H	3287144762	2" Male NPT	2" Male NPT	7.5	24.3	13.1	Stud bolts	PDS-33

*** If your conditions vary significantly from these listed above, please consult factory for product sizing and selection. ***

Domestic heating

Agency Code Approval: UL, CRN
Product Specification: Refer to Product Data Sheet section for details
Construction: Stainless Steel Plates & Connections
Installation and Maintenance: Refer to Installation section, page 37, for details

Selection Notes:
 Units sized based on the following conditions of service

- Boiler: 180°F Supply, 150°F Return
- Domestic: 50°F Return, 140°F Supply



Capacity (kBtu/hr)	Denomination	Part Number	Inlet/Outlet (S1,S2)	Inlet/Outlet (S3,S4)	Plate Width (in.)	Plate Height (in.)	Plate Pack Depth (in.)	Stud Bolt / Mtg Feet	Data Sheet page
110	CBH16-11H	3287120469	3/4" Male NPT	3/4" Male NPT	2.9	8.2	1.17	no	PDS-35
130	CBH16-13H	3287119753	3/4" Male NPT	3/4" Male NPT	2.9	8.2	1.34	no	PDS-35
170	CBH16-17H	3287119754	3/4" Male NPT	3/4" Male NPT	2.9	8.2	1.68	no	PDS-35
240	CBH16-25H	3287119755	3/4" Male NPT	3/4" Male NPT	2.9	8.2	2.36	no	PDS-35
120	CB30-10H	3287099216	1" Male NPT	1" Male NPT	4.4	12.3	1.42	Stud bolts	PDS-29
240	CB30-18H	3287099217	1" Male NPT	1" Male NPT	4.4	12.3	2.15	Stud bolts	PDS-29
330	CB30-24H	3287099218	1" Male NPT	1" Male NPT	4.4	12.3	2.69	Stud bolts	PDS-29
460	CB30-34H	3287099219	1" Male NPT	1" Male NPT	4.4	12.3	3.6	Stud bolts	PDS-29
580	CB30-44H	3287099220	1" Male NPT	1" Male NPT	4.4	12.3	4.51	Stud bolts	PDS-29
650	CB30-50H	3287099211	1" Male NPT	1" Male NPT	4.4	12.3	5.06	Stud bolts	PDS-29
720	CB30-60H	3287099210	1" Male NPT	1" Male NPT	4.4	12.3	5.97	Stud bolts	PDS-29
45	CB30-10L	3287099365	1" Male NPT	1" Male NPT	4.4	12.3	1.42	Stud bolts	PDS-29
100	CB30-18L	3287099366	1" Male NPT	1" Male NPT	4.4	12.3	2.15	Stud bolts	PDS-29
140	CB30-24L	3287099367	1" Male NPT	1" Male NPT	4.4	12.3	2.69	Stud bolts	PDS-29
200	CB30-34L	3287099368	1" Male NPT	1" Male NPT	4.4	12.3	3.6	Stud bolts	PDS-29
300	CB30-50L	3287099369	1" Male NPT	1" Male NPT	4.4	12.3	5.06	Stud bolts	PDS-29
370	CB30-70L	3287099370	1" Male NPT	1" Male NPT	4.4	12.3	6.88	Stud bolts	PDS-29
200	CB60-20H	3287102155	1" Male NPT	1" Male NPT	4.4	20.7	2.34	Stud bolts	PDS-31
300	CB60-30H	3287102156	1" Male NPT	1" Male NPT	4.4	20.7	3.25	Stud bolts	PDS-31
400	CB60-40H	3287102157	1" Male NPT	1" Male NPT	4.4	20.7	4.17	Stud bolts	PDS-31

*** If your conditions vary significantly from these listed above, please consult factory for product sizing and selection. ***

Continued

Domestic heating Continued

Agency Code Approval: UL, CRN
Product Specification: Refer to Product Data Sheet section for details
Construction: Stainless Steel Plates & Connections
Installation and Maintenance: Refer to Installation section, page 37, for details
Selection Notes:

Units sized based on the following conditions of service

- Boiler: 180°F Supply, 150°F Return
- Domestic: 50°F Return, 140°F Supply

Capacity (kBtu/hr)	Denomination	Part Number	Inlet/Outlet (S1,S2)	Inlet/Outlet (S3,S4)	Plate Width (in.)	Plate Height (in.)	Plate Pack Depth (in.)	Stud Bolt / Mtg Feet	Data Sheet page
500	CB60-50H	3287102158	1" Male NPT	1" Male NPT	4.4	20.7	5.08	Stud bolts	PDS-31
580	CB60-60H	3287102159	1" Male NPT	1" Male NPT	4.4	20.7	5.99	Stud bolts	PDS-31
670	CB60-80H	3287102160	1" Male NPT	1" Male NPT	4.4	20.7	7.82	Stud bolts	PDS-31
360	CB110-16H	3287133276	2" Male NPT	2" Male NPT	7.5	24.3	2.2	Stud bolts	PDS-33
570	CB110-24H	3287133277	2" Male NPT	2" Male NPT	7.5	24.3	3.01	Stud bolts	PDS-33
700	CB110-30H	3287133278	2" Male NPT	2" Male NPT	7.5	24.3	3.61	Stud bolts	PDS-33
900	CB110-38H	3287133279	2" Male NPT	2" Male NPT	7.5	24.3	4.42	Stud bolts	PDS-33
1100	CB110-46H	3287133280	2" Male NPT	2" Male NPT	7.5	24.3	5.23	Stud bolts	PDS-33
1300	CB110-54H	3287133281	2" Male NPT	2" Male NPT	7.5	24.3	6.03	Stud bolts	PDS-33
1500	CB110-64H	3287133282	2" Male NPT	2" Male NPT	7.5	24.3	7.04	Stud bolts	PDS-33
1800	CB110-76H	3287133283	2" Male NPT	2" Male NPT	7.5	24.3	8.25	Stud bolts	PDS-33
2100	CB110-90H	3287133284	2" Male NPT	2" Male NPT	7.5	24.3	9.66	Stud bolts	PDS-33
2500	CB110-110H	3287133285	2" Male NPT	2" Male NPT	7.5	24.3	11.7	Stud bolts	PDS-33
2800	CB110-124H	3287144762	2" Male NPT	2" Male NPT	7.5	24.3	13.1	Stud bolts	PDS-33
900	CB110-16L	3287133291	2" Male NPT	2" Male NPT	7.5	24.3	2.2	Stud bolts	PDS-33
1200	CB110-20L	3287133286	2" Male NPT	2" Male NPT	7.5	24.3	2.61	Stud bolts	PDS-33
1500	CB110-24L	3287133287	2" Male NPT	2" Male NPT	7.5	24.3	3.01	Stud bolts	PDS-33
2000	CB110-32L	3287133288	2" Male NPT	2" Male NPT	7.5	24.3	3.81	Stud bolts	PDS-33
2700	CB110-46L	3287133289	2" Male NPT	2" Male NPT	7.5	24.3	5.23	Stud bolts	PDS-33
3000	CB110-58L	3287133290	2" Male NPT	2" Male NPT	7.5	24.3	6.44	Stud bolts	PDS-33

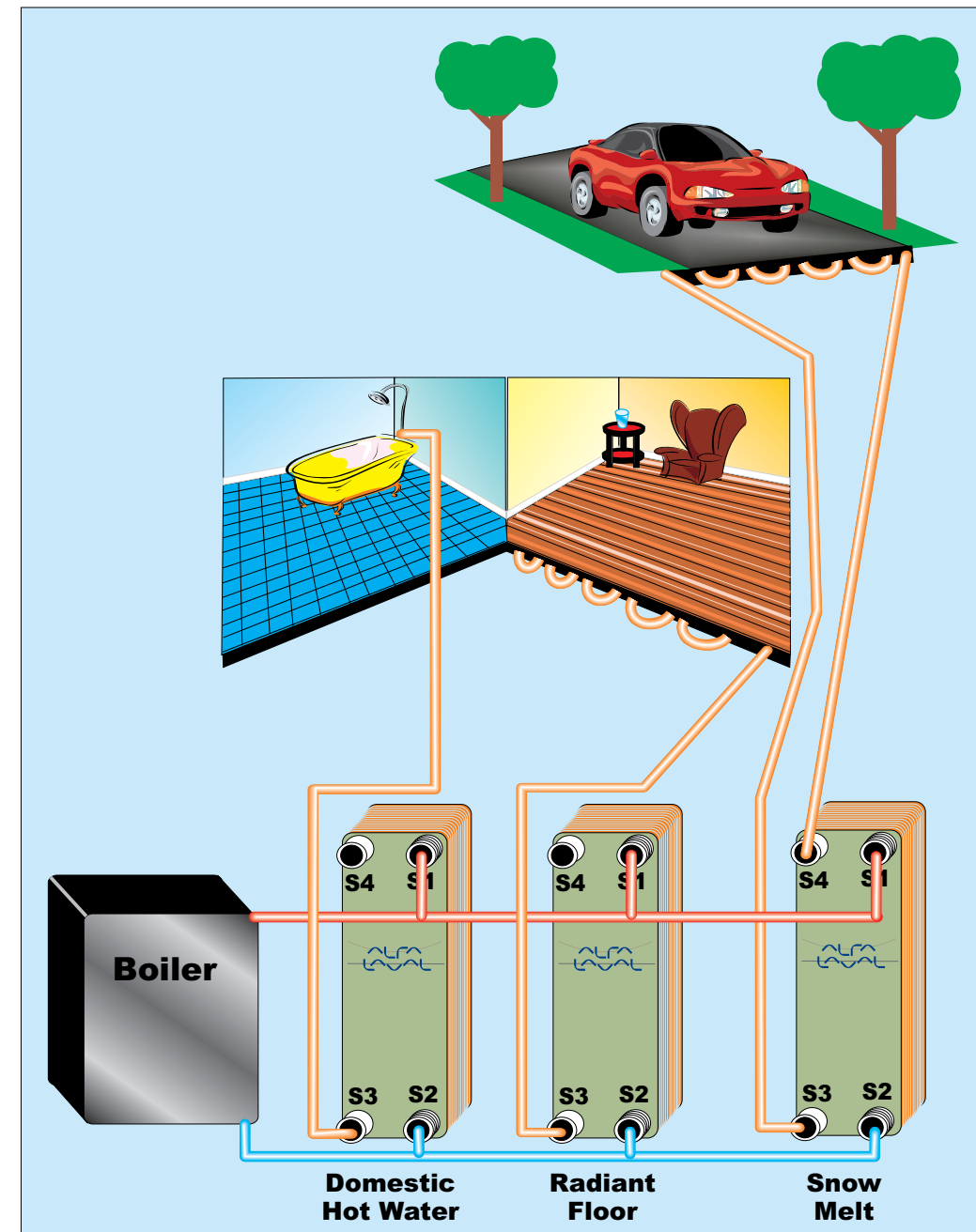
*** If your conditions vary significantly from these listed above, please consult factory for product sizing and selection. ***

Radiant heat & snow melt

The basic heating system illustrated here includes various brazed heat exchanger applications including domestic hot water supply, radiant floor heating, snow melt for outdoor parking areas and walkways. This system offers one of the newest and most efficient methods to provide comfort heating. This heating system is very popular in Northern Europe but is quickly catching on in colder climates in North America.

Boiler water at 180 °F is used to heat the water that is pumped to the various applications. Due to safety concerns, many hospitals and commercial building pump warm glycol to heat the sidewalks and entryway rather than utilize water to melt snow and ice.

Radiant floor/snow melt heat exchangers



Radiant floor heating

Agency Code Approval: UL, CRN
Product Specification: Refer to Product Data Sheet section for details
Construction: Stainless Steel Plates & Connections
Installation and Maintenance: Refer to Installation section, page 37, for details
Selection Notes:

Units sized based on the following conditions of service

- Radiant Floor: 120°F Supply, 100°F Return
- Boiler: 180°F Supply, 160°F Return



Capacity (kBtu/hr)	Denomination	Part Number	Inlet/Outlet (S1,S2)	Inlet/Outlet (S3,S4)	Plate Width (in.)	Plate Height (in.)	Plate Pack Depth (in.)	Stud Bolt / Mtg Feet	Data Sheet page
70	CBH16-11H	3287120469	3/4" Male NPT	3/4" Male NPT	2.9	8.2	1.17	no	PDS-35
80	CB30-10H	3287099216	1" Male NPT	1" Male NPT	4.4	12.3	1.42	Stud bolts	PDS-29
85	CBH16-13H	3287119753	3/4" Male NPT	3/4" Male NPT	2.9	8.2	1.34	no	PDS-35
115	CBH16-17H	3287119754	3/4" Male NPT	3/4" Male NPT	2.9	8.2	1.68	no	PDS-35
135	CB60-20H	3287102155	1" Male NPT	1" Male NPT	4.4	20.7	2.34	Stud bolts	PDS-31
160	CBH16-25H	3287119755	3/4" Male NPT	3/4" Male NPT	2.9	8.2	2.36	no	PDS-35
160	CB30-18H	3287099217	1" Male NPT	1" Male NPT	4.4	12.3	2.15	Stud bolts	PDS-29
180	CB30-10L	3287099365	1" Male NPT	1" Male NPT	4.4	12.3	1.42	Stud bolts	PDS-29
200	CB60-30H	3287102156	1" Male NPT	1" Male NPT	4.4	20.7	3.25	Stud bolts	PDS-31
220	CB30-24H	3287099218	1" Male NPT	1" Male NPT	4.4	12.3	2.69	Stud bolts	PDS-29
240	CB110-16H	3287133276	2" Male NPT	2" Male NPT	7.5	24.3	2.2	Stud bolts	PDS-33
270	CB60-40H	3287102157	1" Male NPT	1" Male NPT	4.4	20.7	4.17	Stud bolts	PDS-31
300	CB30-34H	3287099219	1" Male NPT	1" Male NPT	4.4	12.3	3.6	Stud bolts	PDS-29
330	CB60-50H	3287102158	1" Male NPT	1" Male NPT	4.4	20.7	5.08	Stud bolts	PDS-31
380	CB30-44H	3287099220	1" Male NPT	1" Male NPT	4.4	12.3	4.51	Stud bolts	PDS-29
380	CB30-18L	3287099366	1" Male NPT	1" Male NPT	4.4	12.3	2.15	Stud bolts	PDS-29
380	CB110-24H	3287133277	2" Male NPT	2" Male NPT	7.5	24.3	3.01	Stud bolts	PDS-33
390	CB60-60H	3287102159	1" Male NPT	1" Male NPT	4.4	20.7	5.99	Stud bolts	PDS-31
430	CB30-50H	3287099211	1" Male NPT	1" Male NPT	4.4	12.3	5.06	Stud bolts	PDS-29
450	CB60-80H	3287102160	1" Male NPT	1" Male NPT	4.4	20.7	7.82	Stud bolts	PDS-31
470	CB30-60H	3287099210	1" Male NPT	1" Male NPT	4.4	12.3	5.97	Stud bolts	PDS-29
470	CB110-30H	3287133278	2" Male NPT	2" Male NPT	7.5	24.3	3.61	Stud bolts	PDS-33
620	CB110-38H	3287133279	2" Male NPT	2" Male NPT	7.5	24.3	4.42	Stud bolts	PDS-33
650	CB110-16L	3287133291	2" Male NPT	2" Male NPT	7.5	24.3	2.2	Stud bolts	PDS-33
750	CB110-46H	3287133280	2" Male NPT	2" Male NPT	7.5	24.3	5.23	Stud bolts	PDS-33
850	CB110-20L	3287133286	2" Male NPT	2" Male NPT	7.5	24.3	2.61	Stud bolts	PDS-33
880	CB110-54H	3287133281	2" Male NPT	2" Male NPT	7.5	24.3	6.03	Stud bolts	PDS-33
1000	CB110-64H	3287133282	2" Male NPT	2" Male NPT	7.5	24.3	7.04	Stud bolts	PDS-33
1000	CB110-24L	3287133287	2" Male NPT	2" Male NPT	7.5	24.3	3.01	Stud bolts	PDS-33
1200	CB110-76H	3287133283	2" Male NPT	2" Male NPT	7.5	24.3	8.25	Stud bolts	PDS-33
1350	CB110-32L	3287133288	2" Male NPT	2" Male NPT	7.5	24.3	3.81	Stud bolts	PDS-33
1400	CB110-90H	3287133284	2" Male NPT	2" Male NPT	7.5	24.3	9.66	Stud bolts	PDS-33
1600	CB110-110H	3287133285	2" Male NPT	2" Male NPT	7.5	24.3	11.7	Stud bolts	PDS-33
1800	CB110-124H	3287144762	2" Male NPT	2" Male NPT	7.5	24.3	13.1	Stud bolts	PDS-33
1800	CB110-46L	3287133289	2" Male NPT	2" Male NPT	7.5	24.3	5.23	Stud bolts	PDS-33
2200	CB110-58L	3287133290	2" Male NPT	2" Male NPT	7.5	24.3	6.44	Stud bolts	PDS-33

*** If your conditions vary significantly from these listed above, please consult factory for product sizing and selection. ***

Snow melt

Agency Code Approval: UL, CRN
Product Specification: Refer to Product Data Sheet section for details
Construction: Stainless Steel Plates & Connections
Installation and Maintenance: Refer to Installation section, page 37, for details
Selection Notes:

Units sized based on the following conditions of service

- Snow Melt: 100°F Return, 120°F Supply (40% Propylene Glycol)
- Boiler: 180°F Supply, 150°F Return



Capacity (kBtu/hr)	Denomination	Part Number	Inlet/Outlet (S1,S2)	Inlet/Outlet (S3,S4)	Plate Width (in.)	Plate Height (in.)	Plate Pack Depth (in.)	Stud Bolt / Mtg Feet	Data Sheet page
50	CB30-10L	3287099365	1" Male NPT	1" Male NPT	4.4	12.3	1.42	Stud bolts	PDS-29
65	CBH16-11H	3287120469	3/4" Male NPT	3/4" Male NPT	2.9	8.2	1.17	no	PDS-35
75	CBH16-13H	3287119753	3/4" Male NPT	3/4" Male NPT	2.9	8.2	1.34	no	PDS-35
90	CB30-10H	3287099216	1" Male NPT	1" Male NPT	4.4	12.3	1.42	Stud bolts	PDS-29
100	CBH16-17H	3287119754	3/4" Male NPT	3/4" Male NPT	2.9	8.2	1.68	no	PDS-35
120	CB30-18L	3287099366	1" Male NPT	1" Male NPT	4.4	12.3	2.15	Stud bolts	PDS-29
130	CB60-20H	3287102155	1" Male NPT	1" Male NPT	4.4	20.7	2.34	Stud bolts	PDS-31
140	CBH16-25H	3287119755	3/4" Male NPT	3/4" Male NPT	2.9	8.2	2.36	no	PDS-35
165	CB30-18H	3287099217	1" Male NPT	1" Male NPT	4.4	12.3	2.15	Stud bolts	PDS-29
170	CB30-24L	3287099367	1" Male NPT	1" Male NPT	4.4	12.3	2.69	Stud bolts	PDS-29
190	CB60-30H	3287102156	1" Male NPT	1" Male NPT	4.4	20.7	3.25	Stud bolts	PDS-31
210	CB30-24H	3287099218	1" Male NPT	1" Male NPT	4.4	12.3	2.69	Stud bolts	PDS-29
240	CB110-16H	3287133276	2" Male NPT	2" Male NPT	7.5	24.3	2.2	Stud bolts	PDS-33
250	CB30-34L	3287099368	1" Male NPT	1" Male NPT	4.4	12.3	3.6	Stud bolts	PDS-29
250	CB60-40H	3287102157	1" Male NPT	1" Male NPT	4.4	20.7	4.17	Stud bolts	PDS-31
295	CB30-34H	3287099219	1" Male NPT	1" Male NPT	4.4	12.3	3.6	Stud bolts	PDS-29
300	CB60-50H	3287102158	1" Male NPT	1" Male NPT	4.4	20.7	5.08	Stud bolts	PDS-31
350	CB30-44H	3287099220	1" Male NPT	1" Male NPT	4.4	12.3	4.51	Stud bolts	PDS-29
350	CB60-60H	3287102159	1" Male NPT	1" Male NPT	4.4	20.7	5.99	Stud bolts	PDS-31
350	CB110-24H	3287133277	2" Male NPT	2" Male NPT	7.5	24.3	3.01	Stud bolts	PDS-33
400	CB30-50H	3287099211	1" Male NPT	1" Male NPT	4.4	12.3	5.06	Stud bolts	PDS-29
420	CB60-80H	3287102160	1" Male NPT	1" Male NPT	4.4	20.7	7.82	Stud bolts	PDS-31
450	CB30-60H	3287099210	1" Male NPT	1" Male NPT	4.4	12.3	5.97	Stud bolts	PDS-29
450	CB110-30H	3287133278	2" Male NPT	2" Male NPT	7.5	24.3	3.61	Stud bolts	PDS-33

*** If your conditions vary significantly from these listed above, please consult factory for product sizing and selection. ***

Continued

Snow melt Continued

Agency Code Approval: UL, CRN
Product Specification: Refer to Product Data Sheet section for details
Construction: Stainless Steel Plates & Connections
Installation and Maintenance: Refer to Installation section, page 37, for details
Selection Notes:

Units sized based on the following conditions of service

- Snow Melt: 100°F Return, 120°F Supply (40% Propylene Glycol)
- Boiler: 180°F Supply, 150°F Return

Capacity (kBtu/hr)	Denomination	Part Number	Inlet/Outlet (S1,S2)	Inlet/Outlet (S3,S4)	Plate Width (in.)	Plate Height (in.)	Plate Pack Depth (in.)	Stud Bolt / Mtg Feet	Data Sheet page
550	CB110-38H	3287133279	2" Male NPT	2" Male NPT	7.5	24.3	4.42	Stud bolts	PDS-33
630	CB110-16L	3287133291	2" Male NPT	2" Male NPT	7.5	24.3	2.2	Stud bolts	PDS-33
680	CB110-46H	3287133280	2" Male NPT	2" Male NPT	7.5	24.3	5.23	Stud bolts	PDS-33
780	CB110-20L	3287133286	2" Male NPT	2" Male NPT	7.5	24.3	2.61	Stud bolts	PDS-33
800	CB110-54H	3287133281	2" Male NPT	2" Male NPT	7.5	24.3	6.03	Stud bolts	PDS-33
900	CB110-64H	3287133282	2" Male NPT	2" Male NPT	7.5	24.3	7.04	Stud bolts	PDS-33
940	CB110-24L	3287133287	2" Male NPT	2" Male NPT	7.5	24.3	3.01	Stud bolts	PDS-33
1100	CB110-76H	3287133283	2" Male NPT	2" Male NPT	7.5	24.3	8.25	Stud bolts	PDS-33
1200	CB110-32L	3287133288	2" Male NPT	2" Male NPT	7.5	24.3	3.81	Stud bolts	PDS-33
1250	CB110-90H	3287133284	2" Male NPT	2" Male NPT	7.5	24.3	9.66	Stud bolts	PDS-33
1500	CB110-110H	3287133285	2" Male NPT	2" Male NPT	7.5	24.3	11.7	Stud bolts	PDS-33
1600	CB110-46L	3287133289	2" Male NPT	2" Male NPT	7.5	24.3	5.23	Stud bolts	PDS-33
1650	CB110-124H	3287144762	2" Male NPT	2" Male NPT	7.5	24.3	13.1	Stud bolts	PDS-33
1900	CB110-58L	3287133290	2" Male NPT	2" Male NPT	7.5	24.3	6.44	Stud bolts	PDS-33

*** If your conditions vary significantly from these listed above, please consult factory for product sizing and selection. ***

Hydraulic oil coolers

Agency Code Approval: UL, CRN
Product Specification: Refer to Product Data Sheet section for details
Construction: Stainless Steel Plates & Connections
Installation and Maintenance: Refer to Installation section, page 37, for details
Application: Oil cooling

Benefits:

- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free



Design

The brazing material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and longest possible service life.

Denomination	Oil Inlet/Outlet (S1,S2)	Inlet/Outlet (S3,S4)	Plate Width (in.)	Plate Height (in.)	Stud Bolt / Mtg Feet	Data Sheet page
CB30	1-1/16, 12 UN Female NPT	3/4" Male NPT	4.4	12.3	Stud bolts	PDS-29
CB60	1-1/16, 12 UN Female NPT	3/4" Male NPT	4.4	20.7	Stud bolts	PDS-31
CB110	1-5/8, 12 UN Female NPT	1-1/2" Male NPT	7.5	24.3	Stud bolts	PDS-33

*** Please consult factory for product sizing and selection. ***

Double wall

Introduction

Alfa Laval CBAQ is AHRI Certified® through the Liquid to Liquid Brazed & Fusion-bonded Plate Heat Exchangers (LLBF) Certification Program which ensures thermal performance in accordance with the product specifications.

Alfa Laval CB brazed plate heat exchangers provide efficient heat transfer with a small footprint.

Double wall plates are used as an extra precaution to avoid intermixing of fluids.

- Agency Code Approval:** UL/CUL, CRN
- Product Specification:** Refer to Product Data Sheet section for details
- Construction:** Stainless Steel Plates & Connections
- Installation and Maintenance:** Refer to Installation section, page 37, for details
- Application:** HVAC heating and cooling
- Selection Notes:** Units sized based on the following conditions of service
 - 180°F > 140°F primary side; 60°F secondary side

Benefits:

- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free
- Leak detection
- No fluid contamination

Design

The brazing material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and longest possible service life.

The double wall construction provides external leak detection and minimizes the risk of mixing the fluids. The thermal performance is similar to single wall heat exchanger

Capacity (kBtu/hr)	Denomination	Part Number	Inlet/Outlet (S1,S2)	Inlet/Outlet (S3,S4)	Plate Width (in.)	Plate Height (in.)	Plate Pack Depth (in.)	Stud Bolt / Mtg Feet	Data Sheet page
74	CBH18DWAQ-10H-F	3075012707	3/4" Male NPT	3/4" Male NPT	3	12.4	1.37	no	PDS-37
101	CBH18DWAQ-14H-F	3075012708	3/4" Male NPT	3/4" Male NPT	3	12.4	1.73	no	PDS-37
142	CBH18DWAQ-20H-F	3075012709	3/4" Male NPT	3/4" Male NPT	3	12.4	2.26	no	PDS-37
168	CBH18DWAQ-24H-F	3075012710	3/4" Male NPT	3/4" Male NPT	3	12.4	2.62	no	PDS-37
206	CBH18DWAQ-30H-F	3075012711	3/4" Male NPT	3/4" Male NPT	3	12.4	3.16	no	PDS-37
263	CBH18DWAQ-40H-F	3075012712	3/4" Male NPT	3/4" Male NPT	3	12.4	4	no	PDS-37
318	CBH18DWAQ-52H-F	3075012713	3/4" Male NPT	3/4" Male NPT	3	12.4	5.12	no	PDS-37

*** If your conditions vary significantly from these listed above, please consult factory for product sizing and selection. ***



100% Stainless Steel AlfaNova

Alfa Laval AlfaNova fusion-bonded plate heat exchangers are made of 100% stainless steel. They are suitable for applications which place high demand on cleanliness, applications where aggressive media like ammonia are used or where copper and nickel contamination is unacceptable.

AlfaNova provides efficient heat transfer with a small footprint, has an extreme pressure fatigue resistance and covers high temperature ranges.

Application:

Suitable for a wide range of applications, such as:

- HVAC heating and cooling
- Refrigeration
- Oil cooling
- Industrial heating and cooling
- Process heating and cooling

Benefits:

- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free
- Copper free



100% Stainless Steel AlfaNova

Agency Code Approval: Varies by model, consult factory or refer to product leaflet
Product Specification: Refer to Product Data Sheet section for details
Construction: Stainless Steel Plates & Connections
Installation and Maintenance: Refer to Installation section, page 37, for details



Denomination	Part Number	Inlet/Outlet (S1,S2)	Inlet/Outlet (S3,S4)	Plate Width (in.)	Plate Height (in.)	Plate Pack Depth (in.)	Stud Bolt / Mtg Feet	Data Sheet page
AlfaNova 14-10H	3287050860	3/4" Male NPT	3/4" Male NPT	3	8.2	1.29	no	PDS-21
AlfaNova 14-20H	3287050861	3/4" Male NPT	3/4" Male NPT	3	8.2	2.27	no	PDS-21
AlfaNova 14-30H	3287050862	3/4" Male NPT	3/4" Male NPT	3	8.2	3.24	no	PDS-21
AlfaNova 14-40H	3287050863	3/4" Male NPT	3/4" Male NPT	3	8.2	4.22	no	PDS-21
AlfaNova 27-20H	3287000874	1" Male NPT	1" Male NPT	4.4	12.2	2.34	no	PDS-19
AlfaNova 27-30H	3287000875	1" Male NPT	1" Male NPT	4.4	12.2	3.29	no	PDS-19
AlfaNova 27-40H	3287000876	1" Male NPT	1" Male NPT	4.4	12.2	4.24	no	PDS-19
AlfaNova 27-50H	3287000877	1" Male NPT	1" Male NPT	4.4	12.2	5.2	no	PDS-19
AlfaNova 27-70H	3287000878	1" Male NPT	1" Male NPT	4.4	12.2	7.1	no	PDS-19
AlfaNova 27-100H	3287000879	1" Male NPT	1" Male NPT	4.4	12.2	9.96	no	PDS-19
AlfaNova 27-20H	3287000880	1-1/8" Sweat	1-1/8" Sweat	4.4	12.2	2.34	no	PDS-19
AlfaNova 27-30H	3287000882	1-1/8" Sweat	1-1/8" Sweat	4.4	12.2	3.29	no	PDS-19
AlfaNova 27-40H	3287000884	1-1/8" Sweat	1-1/8" Sweat	4.4	12.2	4.24	no	PDS-19
AlfaNova 27-50H	3287000885	1-1/8" Sweat	1-1/8" Sweat	4.4	12.2	5.2	no	PDS-19
AlfaNova 27-60H	3287000998	1-1/8" Sweat	1-1/8" Sweat	4.4	12.2	6.15	no	PDS-19
AlfaNova 27-70H	3287000999	1-1/8" Sweat	1-1/8" Sweat	4.4	12.2	7.1	no	PDS-19
AlfaNova 27-80H	3287001000	1-1/8" Sweat	1-1/8" Sweat	4.4	12.2	8.06	no	PDS-19
AlfaNova 52-20H	3287000896	1" Male NPT	1" Male NPT	4.4	20.7	2.39	no	PDS-23
AlfaNova 52-30H	3287000897	1" Male NPT	1" Male NPT	4.4	20.7	3.36	no	PDS-23
AlfaNova 52-40H	3287000898	1" Male NPT	1" Male NPT	4.4	20.7	4.34	no	PDS-23
AlfaNova 52-50H	3287000899	1" Male NPT	1" Male NPT	4.4	20.7	5.31	no	PDS-23
AlfaNova 52-70H	3287000900	1" Male NPT	1" Male NPT	4.4	20.7	7.27	no	PDS-23
AlfaNova 52-100H	3287000901	1" Male NPT	1" Male NPT	4.4	20.7	10.2	no	PDS-23
AlfaNova 52-20H	3287000902	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	2.39	no	PDS-23
AlfaNova 52-30H	3287000904	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	3.36	no	PDS-23
AlfaNova 52-40H	3287000906	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	4.34	no	PDS-23
AlfaNova 52-50H	3287000907	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	5.31	no	PDS-23
AlfaNova 52-60H	3287001003	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	6.29	no	PDS-23

*** Please consult factory for product sizing and selection. ***

Continued

100% Stainless Steel AlfaNova Continued

Denomination	Part Number	Inlet/Outlet (S1,S2)	Inlet/Outlet (S3,S4)	Plate Width (in.)	Plate Height (in.)	Plate Pack Depth (in.)	Stud Bolt / Mtg Feet	Data Sheet page
AlfaNova 52-70H	3287001004	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	7.27	no	PDS-23
AlfaNova 52-80H	3287001005	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	8.24	no	PDS-23
AlfaNova 52-90H	3287001006	1-1/8" Sweat	1-1/8" Sweat	4.4	20.7	9.22	no	PDS-23
AlfaNova 76-20H	3287000886	2" Male NPT	2" Male NPT	7.5	24.3	2.68	**Mtg Studs for feet	PDS-25
AlfaNova 76-30H	3287000887	2" Male NPT	2" Male NPT	7.5	24.3	3.8	**Mtg Studs for feet	PDS-25
AlfaNova 76-40H	3287000888	2" Male NPT	2" Male NPT	7.5	24.3	4.92	**Mtg Studs for feet	PDS-25
AlfaNova 76-50H	3287000889	2" Male NPT	2" Male NPT	7.5	24.3	6.04	**Mtg Studs for feet	PDS-25
AlfaNova 76-60H	3287000890	2" Male NPT	2" Male NPT	7.5	24.3	7.17	**Mtg Studs for feet	PDS-25
AlfaNova 76-70H	3287000891	2" Male NPT	2" Male NPT	7.5	24.3	8.29	**Mtg Studs for feet	PDS-25
AlfaNova 76-80H	3287000892	2" Male NPT	2" Male NPT	7.5	24.3	9.41	**Mtg Studs for feet	PDS-25
AlfaNova 76-90H	3287000893	2" Male NPT	2" Male NPT	7.5	24.3	10.5	**Mtg Studs for feet	PDS-25
AlfaNova 76-100H	3287000894	2" Male NPT	2" Male NPT	7.5	24.3	11.7	**Mtg Studs for feet	PDS-25
AlfaNova HP 76-30H	3287000916	2" Welded	2" Welded	7.5	24.3	3.96	**Mtg Studs for feet	PDS-25
AlfaNova HP 76-40H	3287000917	2" Welded	2" Welded	7.5	24.3	5.08	**Mtg Studs for feet	PDS-25
AlfaNova HP 76-50H	3287000918	2" Welded	2" Welded	7.5	24.3	6.2	**Mtg Studs for feet	PDS-25
AlfaNova HP 76-60H	3287000919	2" Welded	2" Welded	7.5	24.3	7.32	**Mtg Studs for feet	PDS-25
AlfaNova HP 76-80H	3287000921	2" Welded	2" Welded	7.5	24.3	9.57	**Mtg Studs for feet	PDS-25
AlfaNova HP 76-90H	3287000922	2" Welded	2" Welded	7.5	24.3	10.7	**Mtg Studs for feet	PDS-25
AlfaNova HP 76-100H	3287000923	2" Welded	2" Welded	7.5	24.3	11.8	**Mtg Studs for feet	PDS-25
AlfaNova 76L-40L	3287082938	2" Welded	2" Welded	7.5	24.3	5	**Mtg Studs for feet	PDS-25
AlfaNova 76L-60L	3287082939	2" Welded	2" Welded	7.5	24.3	7.24	**Mtg Studs for feet	PDS-25
AlfaNova HP 76-20H	3287132651	2" Welded	2" Welded	7.5	24.3	2.83	**Mtg Studs for feet	PDS-25
AlfaNova HP 76-40H	3287132652	2" Welded	2" Welded	7.5	24.3	5.07	**Mtg Studs for feet	PDS-25
AlfaNova HP 76-60H	3287132653	2" Welded	2" Welded	7.5	24.3	7.32	**Mtg Studs for feet	PDS-25
AlfaNova HP 76-80H	3287132654	2" Welded	2" Welded	7.5	24.3	9.56	**Mtg Studs for feet	PDS-25
AlfaNova HP 76-100H	3287132655	2" Welded	2" Welded	7.5	24.3	11.8	**Mtg Studs for feet	PDS-25
AlfaNova HP 76-120H	3287132656	2" Welded	2" Welded	7.5	24.3	14	**Mtg Studs for feet	PDS-25
AlfaNova HP 76-140H	3287132657	2" Welded	2" Welded	7.5	24.3	16.2	**Mtg Studs for feet	PDS-25

**Mounting feet kit AN76 can be ordered under item number 3456544501

*** Please consult factory for product sizing and selection. ***

AXP - high pressure

Alfa Laval AXP is specifically designed to work in air conditioning and other refrigeration applications, where the pressure requirements are extremely high.

- Agency Code Approval:** UL/CUL, CRN
- Product Specification:** Refer to Product Data Sheet section for details
- Construction:** Stainless Steel Plates & Connections
- Installation and Maintenance:** Refer to Installation section, 37, for details
- Selection Notes:** Please consult factor for sizing and selection



Design

The brazing material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and .longest possible service life.

AXP are brazed plate heat exchangers with thin external frames in carbon steel that are able to withstand extremely high operating pressures. The unit can be supplied with a refrigerant distribution system for optimal evaporator performance. Always delivered with lifting lugs for easy handling.

Benefits:

- Tolerates extremely high operating pressures
- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket-free

Denomination	Part Number	Inlet/Outlet (S1,S2)	Inlet/Outlet (S3,S4)	Plate Width (in.)	Plate Height (in.)	Plate Pack Depth (in.)	Stud Bolt / Mtg Feet	Data Sheet page
AXP52-30L-F	3287132494	1-3/8" Sweat	33.7 mm Welded	6.3	22.9	3.35	Order feet separate Item Number 3456429001	PDS-27
AXP52-45L-F	3287132495	1-3/8" Sweat	33.7 mm Welded	6.3	22.9	4.75	Order feet separate Item Number 3456429001	PDS-27
AXP52-60L-F	3287132496	1-3/8" Sweat	33.7 mm Welded	6.3	22.9	6.1	Order feet separate Item Number 3456429001	PDS-27

*** Please consult factory for product sizing and selection. ***

Installation and maintenance instructions

Preface

This manual provides information needed to install, operate and carry out the maintenance of the plate heat exchanger.

Intended use The plate heat exchanger has been designed to meet the requirement for a wide range of heat transfer applications such as refrigeration, comfort heating, industrial heating and cooling, and the process industry.

Safety considerations

The plate heat exchanger must be used and maintained in accordance with the instructions in this manual. Faulty handling of the plate heat exchanger may result in serious with injuries and/or property damage. Alfa Laval will not accept responsibility for any damage or injury caused as a result of not following the instructions in this manual.

The plate heat exchanger must be used in accordance with the specified configuration of material, media, temperatures and pressure for the specific plate heat exchangers.

Prior knowledge

The plate heat exchanger must be operated by individuals who have studied the instructions in this manual and have knowledge of the process. This includes knowledge of the precautions

regarding media, pressures, the temperatures in the plate heat exchanger as well as specific precautions required for the process.

Maintenance and installation of the plate heat exchanger must be performed by individuals who have knowledge and authorization according to the local regulations. This includes performance work such as piping, welding and maintenance.



For maintenance work not described in this manual, please contact an Alfa Laval Representative for advice.

Definitions of expressions



Warning!

Type of hazard
WARNING indicates a potentially hazardous situation that, if not avoided, may result in death or serious injury.



Caution!

Type of hazard
CAUTION indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury.

Note!

NOTE indicates a potentially hazardous situation that, if not avoided, may result in property damage.

Environmental compliance

Alfa Laval endeavours to perform its own operations as cleanly and efficiently as possible. Environmental aspects are taken into consideration when developing, designing, manufacturing, servicing and marketing the company's products.

Brazed Plate Heat Exchangers (BHE) consist of stainless steel channel plates and frame elements and bonded stainless steel or carbon steel connections. Bolts, which are stainless steel or carbon steel with different surface treatments, are usually welded onto the product. Additionally, feet and lifting lugs can be mounted on demand.

Unpacking

Packing material consists of wood, plastics, cardboard boxes and, in some cases, metal straps.

Packing materials can be reused, recycled or used for energy recovery, according to local legislations.

Disposal

Heat exchangers must be recycled according to relevant, local regulations. Any hazardous residues from the process liquid must be considered and dealt with in a properly. When in doubt, or in absence of local regulations, please contact the local Alfa Laval representative.

Restricted substances

All plate heat exchangers are in compliance with REACH (Registration, Evaluation, Authorization and Restriction of Chemicals) and RoHS Directive.

Warranty conditions

Unless altered by written agreement, Alfa Laval standard warranty applies.

Storage of the plate heat exchangers

Alfa Laval delivers the plate heat exchanger ready for operation, unless agreed otherwise. Keep the plate heat exchanger in the packing box until it is ready to be installed.

If there is any uncertainty with regard to the storage of the plate heat exchanger, please consult an Alfa Laval Representative.

For longer storage periods, keep the heat exchanger in a protective environment away from corrosive substances and dust which may affects its performance.

Keep the plastic plugs or caps for the connections in place during storage.

Instructions

Description

Function

Plate heat exchangers consist of a pack of corrugated metal plates with ports for the passage of the two fluids between which the heat transfer will take place.

The media in the heat transfer are led into the plate pack through portholes at the corners and are distributed into the passages between the corrugated plates.

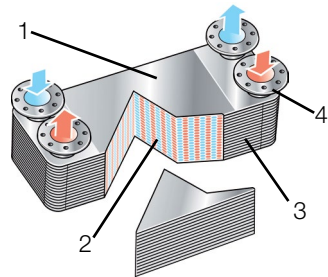


Figure 1. Function: Cover plate (1), corrugated plates (2), seal (3) and ports (4).

Installation

Unpacking

Carefully open the package containing the plate heat exchanger. Check that all items are included according to the specifications and that all parts are undamaged.

Before installing the plate heat exchanger, remove the plastic plugs or caps in the connections.

Lifting

Warning!
Never lift only by the connections or any of the studs. Use straps when lifting and place them according to the figure below.

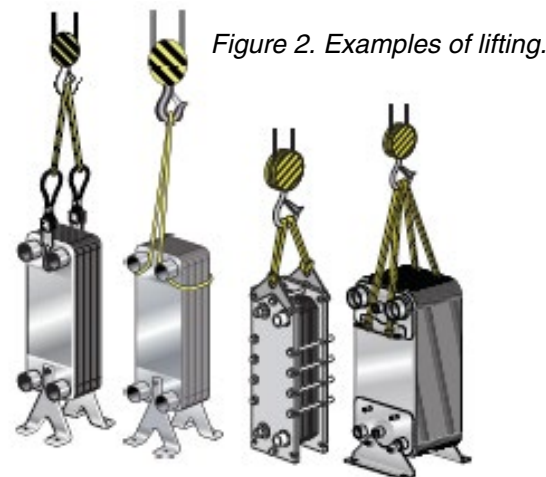


Figure 2. Examples of lifting.

Warning!
The heat exchanger must not be opened.

Name plates

Warning!
The mechanical design pressures and temperatures are marked on the name plate. These must not be exceeded.

The unit type, manufacturing number and year along with the pressure vessel details in accordance with applicable pressure vessel code can be found on the name plate. The name plate is fixed to the cover plate (usually on the same side as the connections).

Name plate differs depending on the type of pressure vessel approval.

Note!
When using lifting lugs, keep the angle of the straps as close as possible to 90° but never less than 60°.

Warning!
Be careful and keep clear of the heat exchanger during lifting to avoid personal injuries.

Warning!
Plate heat exchangers with large plate packs may be difficult to lift without lifting lugs because the center of gravity may cause the plate heat exchanger lean too much. If in doubt, use lifting lugs.

Installation

Requirements

Warning!
The plate heat exchanger must be installed and operated so that no risk of injury to personnel or damage to property.

Warning!
Protective gloves should always be worn when handling the plate heat exchanger to avoid hand injuries caused by sharp edges.

Note!
Unless otherwise specified, product data for normal refrigerants, i.e. HFC and HCFC, are applicable to refrigeration applications. The manufacturer must be consulted before the heat exchanger is used for flammable, toxic or dangerous liquids (e.g. hydrocarbons). Relevant safety rules must be followed for handling such liquids. For further information, please refer to the supplier's website.

Protection against loads on connections during operation The piping must be well supported so that no loads are transferred to the heat exchanger during operation. Also refer to "Mounting" on 39.

Connection loads at installation

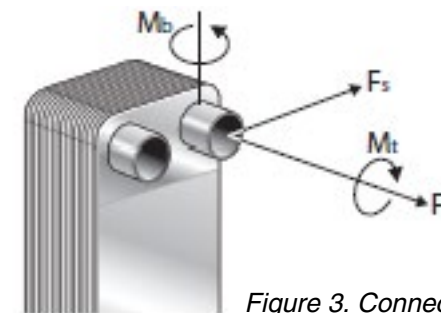


Figure 3. Connection loads

With reference to definitions in figure, the loads during installation should not exceed the limits specified in table below.

Maximum recommended connection loads during installation

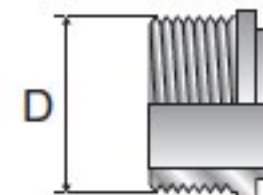


Figure 4. Outer diameter of the connection (D).

Outer diameter Torque	Tension force	Bending moment	Shear force ¹	Torque
	F_t kN (lbf)	M_b Nm (lbf*ft)	F_s kN (lbf)	M_t Nm (lbf*ft)
15 - 28 (0.6 - 1.1")	2.4 (539)	14 (10.3)	0.7 (157)	38 (28.0)
29 - 35 (1.1 - 1.4")	4.0 (899)	45 (33.2)	1.2 (269)	120 (88.5)
36 - 45 (1.4 - 1.8")	6.5 (1461)	110 (81.1)	2.5 (562)	240 (177.0)
46 - 55 (1.8 - 2.2")	7.0 (1573)	120 (88.5)	4.8 (1079)	440 (324.5)
56 - 76 (2.2 - 3.0")	12.0 (2697)	250 (184.4)	5.2 (1169)	600 (442.5)
77 - 99 (3.0 - 3.9")	13.0 (2922)	310 (228.6)	5.8 (1303)	1200 (885.0)
100 - (3.9" -)	28.0 (6294)	800 (590)	5.8 (1303)	2500 (1843)

1. Shear force (Fs) is calculated assuming that the force is applied at the end of the longest standard connection.

Mounting

It is recommended to mount the plate heat exchanger on the floor, on feet or on the wall.



Larger heat exchangers should be secured with support mountings (ordered as accessory) intended for a specific heat exchanger, or be secured with straps or by means of mounting bolts.

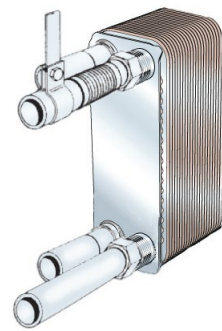
Note!
Regardless of the mounting method minimize the pipe loads at installation.

Maximum tightening torques for the mounting bolts according to table below.

Installation

Bolt dimension	Torque	
	Nm	lbf*ft
M5	2.3	1.7
M6	3.8	2.8
M8	9.5	7.0
M8 (Extra small units)	8.0	5.9
M10	19.0	14.0
M12	33.0	24.3
UNC 1/4"	3.8	2.8
UNC 5/16"	8.6	6.4
UNC 3/8"	15.6	11.5

In a rigid pipe system, small heat exchangers can be suspended directly in the pipework. To avoid vibrations, use anti-vibration mounting according to picture below.



Installation in general

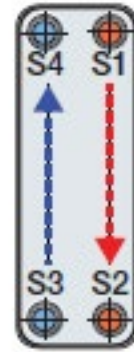
Warning!
Safety valves must be installed according to pressure vessel regulations.

Note!
Before connecting any piping, make sure all foreign objects have been flushed out of the system.

The installation must be installed with equipment that protects it against pressures and temperatures outside the approved minimum and maximum values shown on the name plate.

For vibration risks, install anti-vibration mountings as shown in picture for rigid pipe system in section Mounting at page "Mounting" on page 39.

Normally the plate heat exchanger is connected so that the media flows through the plate heat exchanger in opposite directions (in counter-current flow) and in most cases this provides the best heat transfer performance.



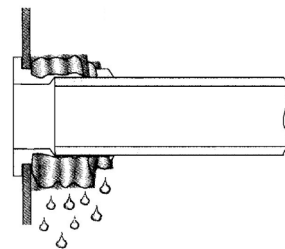
Take into account the risk of fire during installation, i.e. bear in mind the distance from flammable substances.

Connections

Threaded connections – Use a torque wrench when connecting the pipe and observe the specified limits. Refer to table on page "Torque" on page 39.

Brazed connections – Clean by rubbing down and degreasing the various surfaces. Use the correct brazing temperature and brazing metal grade.

Welded connections – To minimize the heat impact of the heat exchanger it is recommended to use TIG or MIG welding methods. Preparation for welding: Grind inside and outside of the pipe and, if bevelled, also the bevelled edge at least 25 mm from the pipe edge and inward. This should be done to avoid contamination of copper in the welded area, which might cause the weld to crack.



Note!
Before connecting the heat exchanger to the system consider valve set-up and access points for example to be prepared to perform cleaning.
Protect the heat exchanger from overheating by wrapping a piece of wet cloth around the connection while soldering or welding. Excessive heating could melt the internal soldering metal inside the heat exchanger.

Installation

Note!

- Use an anti-freeze thermostat and flow monitor to ensure a constant water flow before, during, and at least two minutes after the compressor has been running.
- Avoid "pump-down", i.e. emptying the evaporator by running the compressor after shut-down until a preset refrigerant pressure is reached. The temperature could then drop below the brine freezing point, which could damage the evaporator.

Note!

- Use a flow switch and a low-pressure switch.
- Make sure only media from the heat exchanger can pass the flow switch. The low-pressure switch should assure a minimum pressure drop of 5 - 10 kPa (0.73 - 1.45 PSI).

Installation as evaporator or condenser

In applications where a phase change of media occurs, the heat exchanger must be installed vertically.

For refrigeration applications – Figure A shows the installation of an evaporator, which the connections may be either on the front or on the rear. Figure B shows a condenser.

Operation

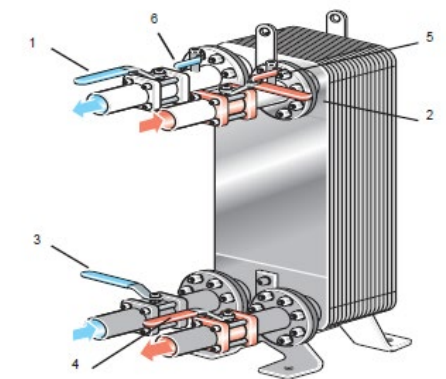
Start-up

Note!
If several pumps are included in the system, make sure you know which one should be activated first.

Note!
Adjustments of flow rates should be made slowly in order to avoid the risk of water hammer.
Water hammer is a short-lasting pressure peak that can appear during start-up or shut-down of a system, which causing liquids to travel along a pipe as a wave at the speed of sound. This can cause considerable damage to the equipment.

Step 1

Check that the inlet valve (2) is closed between the pump and the unit controlling the system flow rate. Inlet valve (2, 3) for both fluids should be closed, the outlet valves (1, 4) opened and the vent valve (5, 6) closed.



Step 2

If there is a outlet valve (4), make sure that it is fully open.

Step 3

Open the vent valve (5) and start the pump.

Step 4

Open the inlet valve (2) slowly.

Step 5

When all air is expelled, close the vent valve (5).

Step 6

Repeat steps 1–5 for the second media.

Operation

Unit in operation

Note!
Adjustments of flow rates should be made slowly in order to protect the system against sudden and extreme variations of temperature and pressure.

During operation, check that:

- media temperatures and pressures are within the limits stated on the name plate
- no leakages appear due to faulty tightening of the connections.

Protection against connection loads

Make sure that the heat exchanger is fastened to avoid or minimize connection loads during operation.

Protection against freezing

Bear in mind the risk of freezing at low temperatures. Plate heat exchangers that are not in operation should be emptied and blown dry whenever there is a risk of freezing.

Note!
To avoid damage due to freezing, the medium used must include an anti-freeze agent when operating conditions are below 5 °C (41 °F) and/or when the evaporating temperature is below 1 °C (34 °F).

Protection against clogging

Use a filter as protection against the possible occurrence of foreign particles. If you have any doubt concerning the maximum particle size, please consult your Alfa Laval Representative.

Protection against thermal or/and pressure fatigue

Sudden temperature and pressure changes could cause fatigue damage to the heat exchanger. Therefore, the following must be taken into consideration to ensure that the heat exchanger operates without fluctuating pressures/temperatures.

Warning!
The plate heat exchanger is not intended for cyclic processes, please contact an Alfa Laval Representative for advice.

- Locate the temperature sensor as close as possible to the outlet from the heat exchanger.

- Choose valves and regulation equipment which give stable temperatures/pressures for the heat exchanger.
- To avoid water hammer, quick-closing valves must not be used, e.g. on/off valves.
- In automated installations, stopping and starting of the pumps and actuation of valves must be programmed so that the amplitude and frequency of the pressure variation are as low as possible.

Protection against corrosion

Caution!
Do not use the heat exchanger for de-ionized water as this media can chemically affect the copper brazing material.

Do not use the heat exchanger for installations with galvanized pipes that chemically or electrochemically could affect or be affected by the stainless steel plates and the copper brazing material.

Note!
Copper may generate corrosion in installation with mixed materials.

Caution!
Avoid ammonia or other media that could be corrosive to stainless steel and copper.

Recommended limits for Chloride ions, Cl ⁻ at pH 7.5 ^{1 2}		
	Alloy 304	Alloy 316
at 25 °C / 77 °F	100 ppm	1000 ppm
at 65 °C / 149 °F	50 ppm	200 ppm
at 80 °C / 176 °F	20 ppm	100 ppm

1. Lower levels of chloride ions may cause corrosion due to other factors.
2. Halogens, e.g. bromides and fluorides may also cause corrosion.

Insulation

If the heat exchanger will be operated at very hot or very cold temperature, take protective actions, such as insulation, to avoid injuries. Be certain to follow all local regulations.

Heating and cooling insulations are available as accessories.

Be aware that temperature limits of insulation and the heat exchanger can be different.

Operation

Shut-down

Note!
If several pumps are included in the system, make sure you know which one should be stopped first.

1. Slowly reduce the flow rate in order to avoid water hammer.
2. When the valve is closed, stop the pump.
3. Repeat steps 1–2 for the other medium/media.

Maintenance

Maintenance

Cleaning can improve the performance of the plate heat exchanger. Cleaning intervals depends on factors such as media and temperatures.

General guidelines regarding maintenance

Plate Sheet material

Stainless steel can corrode. Chloride ions are hazardous. Avoid cooling brines containing chloride salts as NaCl and, most harmful, CaCl₂.

Chlorine as a growth inhibitor

Note!
Chlorine, commonly used as a growth inhibitor in cooling water systems, reduces the corrosion resistance of stainless steels.

Chlorine weakens the passive layer of these steels making them more susceptible to corrosion. This is dependent on exposure time and concentration of chlorine.

In every case where the chlorination of the plate heat exchanger cannot be avoided, consult an Alfa Laval Representative for advice.

Cleaning-In-Place

Cleaning-In-Place (CIP) equipment permits cleaning of the plate heat exchanger.

CIP performs:

- By regular CIP, the dissolution of fouling helps to restore the original thermal performance of the unit.
- The passivating effect by the CIP procedure can help to maintain the original corrosion resistance of the plate material.

4. If the plate heat exchanger is shut down for a long period, it should be drained.

Also, drain the heat exchanger if the process is shut down and the ambient temperature is below the freezing temperature of the media.

Depending on the media processed, rinse and dry the heat exchanger and its connections.

Type of cleaning:

- Acidic cleaning removes inorganic deposits such as limestone.
- Alkaline cleaning removes organic deposits. During the process it is important to control the pH value and the recommended pH value is 7.5 - 10. Higher pH values increase risk of the copper oxidizing.
- Neutralization of cleaning liquids before draining and flushing the unit with potable water.


Follow the instructions of the CIP equipment.

Consult an Alfa Laval Representative for appropriate advice on selecting CIP equipment.

Warning!
Use proper protective equipment, such as safety boots, safety gloves and eye protection, when using cleaning agents.



Warning!
Corrosive cleaning liquids can cause serious injuries to skin and eyes!



For detailed information regarding Cleaning liquids and procedure, refer to the CIP manual.

Rinse well with fresh water after cleaning.

Caution!
Make sure that the handling of residuals after using cleaning liquids follows the local environmental regulations.

Fault tracing

Pressure drop problems

If the pressure drop has increased.

Action	
1. Check that all valves are open including non-return valves.	
- Measure the pressure and the flow rate directly in front of the inlet and after the outlet of the heat exchanger. For viscous media use a membrane manometer with a diameter of at least 30 mm.	
- Measure or estimate the flow rate if possible. A bucket and a watch showing seconds may be sufficient for small flow rates.	
For larger flow rates, use a flowmeter.	
Correction	
YES	-
NO	-

Action	
2. Compare the pressure drop observed with the specified flow rate (see data printout). Is the pressure drop higher than specified?	
Correction	
YES	Check the temperature program, see step 3
NO	If the pressure drop corresponds to the specifications, there is no need for action. If the pressure drop is lower than specified, the pump capacity is probably too small or the observation may be wrong. See pump instruction manual.

Action	
3. Check the thermometer readings. Do the readings correspond to those specified?	
Correction	
YES	The heat transfer surface is probably clean enough, but the inlet to the heat exchanger may be clogged by some objects. Check the port area.
NO	Heat transfer is obviously dropping below specifications, because of deposits on the heat transfer surface, which at the same time also increases the pressure drop, since the passage becomes narrower. If a Cleaning-In-Place (CIP) system is available, follow the instructions and use it to wash out the deposits.

Heat transfer problems

The heat transfer capacity is dropping.

Action	
1. Measure temperatures at inlets and outlets. Also measure flow rates on both media, if possible. On at least one of the media, both temperatures and the flow rate must be measured.	
Check to see if the transferred amount of heat energy corresponds to the specifications.	
If great precision is important, it will be necessary to use laboratory thermometers with an accuracy of 0.1 °C, and also to use the best equipment available for flow measurement.	
Has the heat transfer capacity of the unit dropped below specified values?	
Correction	
YES	Clean the heat transfer surface. Use the Cleaning-In-Place (CIP) system.
NO	-

Brazing tubes to brazed plate heat exchangers guidelines

Guidelines

Brazing tubes to Brazed Plate Heat Exchangers

Introduction

Brazed plate heat exchangers can be mounted in several ways to a system. Depending on situation customers to Alfa Laval choose to use connections of various types such as

- welded, flanged
- quick couplings such as "hydro blocks"
- threaded
- brazed pipes/tubes

This document describes some aspects of brazing of pipes or tubes to the heat exchanger. Apart from relevant standards which should be known by all personnel executing

brazing operations this document highlights some special features to be taken under consideration.

Personnel working with process, component/material development, quality assurance or application engineering of e.g. installations should be familiar with most of the issues discussed in this document.

A BHE consists of stainless steel plates brazed together in a vacuum furnace process with a copper filler, while a FHE is constituted by the same plates but brazed with an iron based braze filler. It is common to use either copper based or stainless tubes for connections. This means that brazed pipe/tube joints can be either:

- copper to copper
- stainless to stainless
- stainless to copper

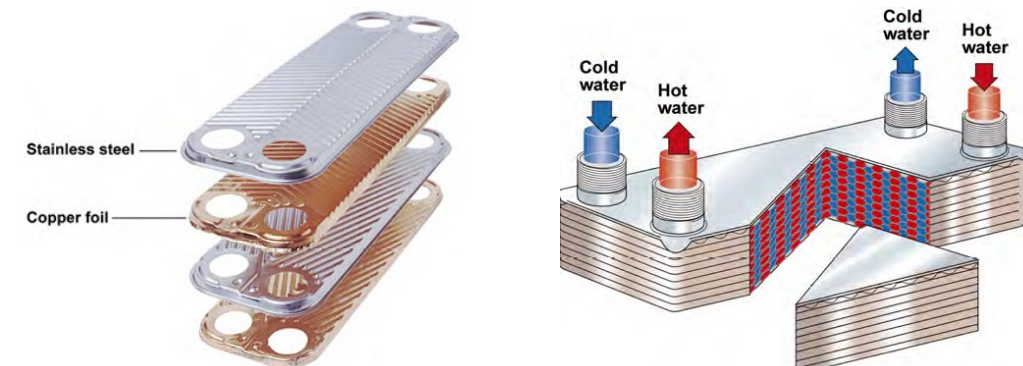


Figure 1: Copper brazed plate heat exchanger (BHE) consisting of stainless steel plates and copper brazed in a vacuum furnace.

Relevant standards

Standard no.*	Name	Content description
EN 1044	Brazing - Filler metals	Classification and composition of braze filler materials
EN 1045	Brazing - Fluxes for brazing	Classification and brief description of constituent materials in fluxes
EN 13133	Brazing - Brazer approval	How to approve brazing personnel according to brazing standard
EN 13134	Brazing - Procedure approval	How to approve a brazing process according to standard
EN ISO 18279	Brazing - Imperfections in brazed joints	How to classify and judge brazing imperfections in general

Table 1: Examples of relevant European standards for brazing of pipes/tubes

Brazing tubes to brazed plate heat exchangers guidelines

The tube brazing process

Many different processes can be applied in order to heat the parts to be brazed and melt the braze filler. The method considered here is flame brazing with hand-held filler or pre-placed filler

All methods are constituted by following key process steps:

- 1 cleaning the parts prior to brazing
- 2 fluxing (when appropriate) and application of filler (if pre-placed filler)
- 3 assembling the parts
- 4 heating for brazing and brazing (applying hand-held filler if appropriate)
- 5 post-braze cooling
- 6 post-braze cleaning

They are all described in standard brazing instructions and standards For copper tube brazing flux is not necessary in some cases (refer to "Material considerations and corrosion effects" on 48.

However prior to brazing also proper design and material selection must be done in order to avoid early failures in service of the brazed joint.

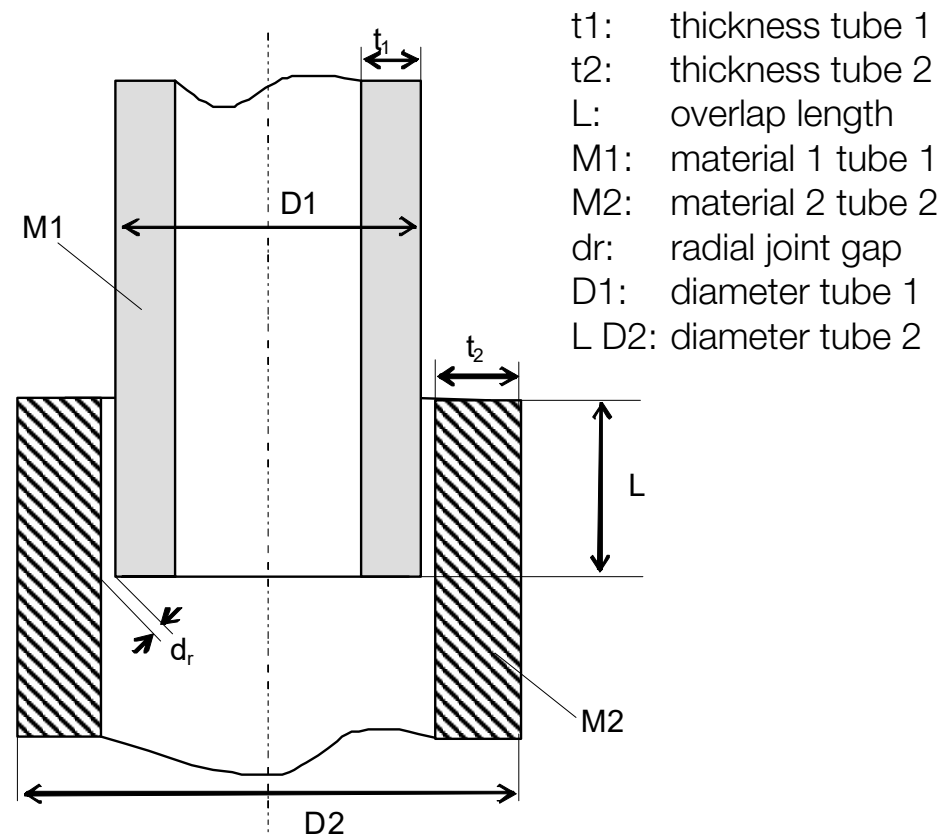


Figure 2: Schematics of a tube joint and geometrical parameters affecting quality. More details in "Design and process considerations" on page 48.

Brazing tubes to brazed plate heat exchangers guidelines

Material considerations and corrosion effects

For joining of stainless steel silver based filler alloys are commonly used (standard denomination; BAg (American standard) or AG-series in Europe). These materials are also suited for joining copper to stain-less. For copper-copper joints the BCuP-alloys (Copper-Phosphorus) are mostly used due to the lower cost compared to silver (the corresponding Europe-an designation is CP) and the "self fluxing" ability.

For "air" brazing stainless steel flux is always necessary (BAg fillers). For wrought copper tubes and BCuP-fillers flux is normally not needed. It's recommended to use for wrought brass and cast copper using BCuP-fillers.

Typical considerations when choosing a filler and flux material are:

- corrosion and environmental issues
- melting range and thermal impact on material and process
- mechanical strength
- joint gap size and geometry
- (cost)

In many heat exchanger applications fresh water is in contact with the joint. In those cases it is important to choose materials (both filler and flux) with sufficient corrosion resistance in as-brazed condition. Although the alloys of especially BAg-type materials "per se" have a good corrosion resistance the interaction with base material and geometries are crucial. It is important to understand the "as-brazed" condition.

The most important corrosion mechanism for stainless materials in a tube joint is crevice corrosion, interfacial corrosion and intergranular corrosion. Crevice corrosion is a localised corrosion attack induced by geometrical crevices, which means this attack can be avoided by proper joint filling. A special case of crevices can form chemically by interfacial corrosion. This corrosion type is induced in a diffusion layer of the brazed joint which has a lower corrosion resistance compared to the rest of the material. To be sure to avoid this type of corrosion filler materials should be chosen with as low Zinc and Cadmium content as possible (this more or less excludes the "AG 300-series" of the European standard). In fact Cadmium should be excluded by environmental reasons and the potentially negative effect of Zn minimised. Other ways of minimising this risk is to avoid excessive filler material deposits. Talk to your filler suppliers to find a suitable Cd-free filler, maybe also a Zn-free, to avoid these potential risks.

In the case of austenitic stainless steel (AISI 316 or 304 type) the materials seem less prone to interfacial corrosion in general compared to ferritic steels.

Intergranular corrosion of stainless steel is induced by that Cr-rich compounds precipitate in the grain boundaries and consumes Cr from the metal matrix, thus lowering corrosion resistance. Cr-compounds can be formed by e.g. carbon (carbides) during brazing or by reactions with the flux. To reduce the carbide precipitation risks, lower carbon contents in the tube material is needed (<0.05 % C), and to be on the safe side e.g. 316 L ("weldable grades") can be used (<0.03% C). Carbide precipitation risk is highest between 650 and 850°C. Other potential risks of Cr-rich compounds to form are from e.g. boron in the flux. It is recommended to use type FH10 fluxes for stainless steels with less boron than other types (FH12 etc). Still, flux residues are potentially corrosive and care should be taken to avoid residues and remove them after brazing.

The most important mechanism of corrosion on copper materials in fresh water systems is general corrosion (although crevices accelerate corrosion which means joint filling is equally important for copper tubes). Copper is a fairly noble metal but in some water qualities copper will corrode. Alfa Laval's recommendations to avoid corrosion on copper are to fulfil following spec on the water:

- 1 pH should be more than 7,5 and less than 9,0
- 2 c(SO4²⁻) should be less than 1 mmol/l (0,1 g/l)
- 3 c(HCO3⁻) / c(SO4²⁻) should be more than 1,5
- 4 c(HCO3⁻) should be more than 1 mmol/l (0,06 g/l) and less than 5 mmol/l (0,3 g/l)
- 5 c(Ca+Mg) / c(HCO3⁻) should be more than 0,5
- 6 the water should not be marble aggressive (surplus of carbon dioxide)

Maximum levels of chloride ions

pH=7	pH=8
1000 mg/l at 25 °C	2000 mg/l at 25 °C
300 mg/l at 50 °C	500 mg/l at 50 °C
100 mg/l at 80 °C	200 mg/l at 80 °C

Table 2: Maximum level of chloride ions, Cl⁻, allowed for a corrosion free performance of 316 steel under aerated conditions at pH 7 and 8.

Brazing tubes to brazed plate heat exchangers guidelines

Design and process considerations

Good joint filling is necessary to make sure that the joint is mechanically sound, avoid crevices and pock-ets where corrosion can be initiated, and make it eas-ier for flux to escape and be cleaned-off. This can be provided by:

- 1 adding proper amount of filler (analyse geometry at brazing temperature (@BT), refer to table "Gaps width")
- 2 using proper overlap length (L in "Figure 2:" on 48 should be 3-4 times t1 for copper and stainless)
- 3 that material M2 in "Figure 2:" on 48 should always be the stainless steel if copper and stainless steel is to be joined
- 4 that radial joint gaps dr in "Figure 2:" on 38 are in the range presented in "Gaps width" for capillary brazing (0.05-0.2 mm)
- 5 heating is provided in a manner to ideally let the filler metal flow in and through the joint pushing out the flux residues to the outside for easy cleaning

Gaps width

Gap width@BT	Suitability brazing
<0.05 mm	Gap too small for brazing in air with flux
0.05-0.2 mm	Gap size range suitable for all types of capillary brazing procedures
0.2-0.5 mm	Gap size suitable only for manual flame brazing
>0.5 mm	Gap too wide for capillary flow

Table 3: Rules of thumb at which gap width brazing is suitable

Note!
Please note that this is NOT valid for e.g. vacuum brazing or any furnace brazing procedure

The thermal expansion will demand that a gap width analysis is made at brazing temperature. Especially for dissimilar metals like copper tubes connected to stainless tubes this must be taken under consideration. Below in table "Radial joint gap" on page 4 de-scribes the approximate radial joint gaps at room temperature and brazing temperature.

Radial joint gap

Stainless steel (M2, D2)				Copper (M1, D1)				Result
Imperial size	Size	Increase @ BT	Tot	Imperial size	Size	Increase @ BT	Tot	Radial joint gap @BT
(inch)	(mm)	(mm)	(mm)	(inch)	(mm)	(mm)	(mm)	
3.00	76.20	1.2192	77.419	2.996	76.098	0.837	76.935	0.242
2.75	69.85	1.1176	70.968	2.746	69.748	0.767	70.516	0.226
2.50	63.50	1.016	64.516	2.496	63.398	0.697	64.096	0.210
2.25	57.15	0.9144	58.064	2.246	57.048	0.628	57.676	0.194
2.00	50.80	0.8128	51.613	1.996	50.698	0.558	51.256	0.178
1.75	44.45	0.7112	45.161	1.746	44.348	0.488	44.836	0.162
1.50	38.10	0.6096	38.710	1.496	37.998	0.418	38.416	0.147
1.25	31.75	0.5080	32.26	1.246	31.648	0.348	31.997	0.131
1.00	25.40	0.4064	25.806	0.996	25.298	0.278	25.577	0.115

Table 4: Approximate radial joint gaps at room temperature and brazing temperature for joining a copper tube inside a stainless tube assuming a joint gap at room temperature of 0.05 mm (0.002 inch) (following rule 3 above and the nomenclature in "Figure 2:" on page 2)

Brazing tubes to brazed plate heat exchangers guidelines

Heating should be applied to allow indirect heating of the filler and make sure the filler is drawn to and through the gap. Below in "Figure 4:" describes preferred configurations for heating during brazing by heating from the exterior (such as torch/ flame brazing).

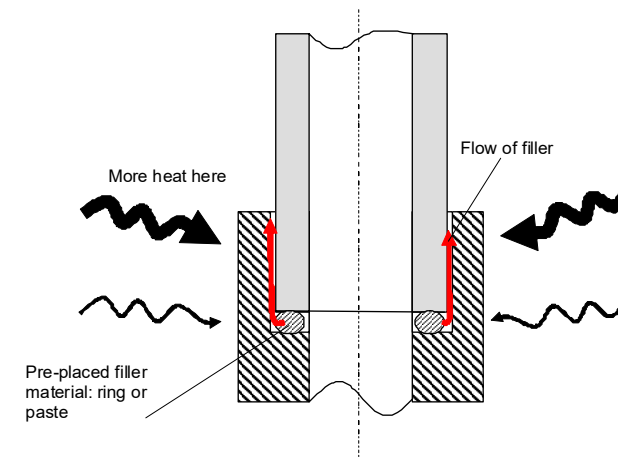


Figure 3: Heating configuration on a pre-placed filler using any heat source that transfers heat to the brazing object by radiation or convection (flame/torch). The filler melts and is drawn towards the more heat-ed area (also against gravity). Here it can push flux residues outside the joint where it is easily cleaned-off.

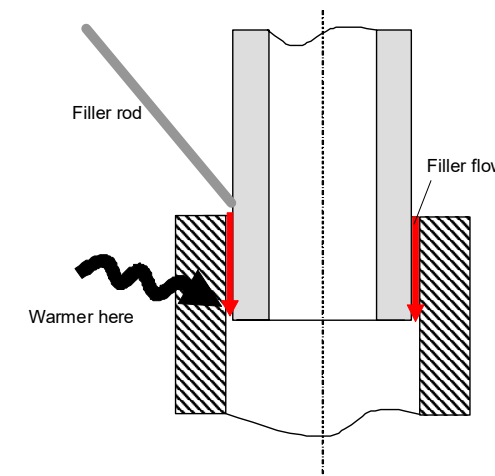


Figure 4: Heating configuration using hand-held filler rod with flame/torch brazing. The filler flow pushes flux residues inside the tube which might make it more difficult to clean.

This means that the configuration and alignment of the induction coils are an important optimisation parameter for the heating and brazing process.

Heat affecting the heat exchanger during tube brazing. When brazing tubes to the heat exchanger the heat source might affect the heat exchanger. Since the heat exchanger consists of a low carbon AISI 316 quality (<0.05% C) and pure copper, the situation is similar as for the pipes to be brazed as described in "Material considerations and corrosion effects" on page "Material considerations and corrosion effects" on page 47.

In the rare event that copper melting temperatures are close to being reached (1083°C) the heat ex-changer should not be taken in service.

Thermal impact is also shown as oxidation where blue, brown and eventually black surfaces are formed on the stainless steel. The oxidation means that mainly Cr and other elements with high affinity to oxygen diffuse to the surface and react with oxygen. Thus depleting the metal matrix of the Cr, hence the corrosion resistance is lower. The oxidised surface outside the heat exchanger can always be ground and polished taking away the outmost layer of oxides and low-Cr metal. BUT is it possible to make sure the interior is still OK? Light oxidation will not affect the corrosion performance significantly. But heavy oxidation (depending on time and temperature) might.

A good rule of thumb could be to only accept bluish oxidation on the outside of the heat exchanger, which can be polished off, hence it is likely to be less inside.

If heating affects the heat exchanger in a negative way it is possible to use longer connections to in-crease the distance between the braze joint and the heat exchanger.

Brazing tubes to brazed plate heat exchangers guidelines

Summary

By following above recommendations the fulfilment of the "six rules of brazing" can be achieved:

- 1 The provision of a clean surface at the joint interface at brazing temperature.

Keep components free from grease, oil and foreign matter. Maybe grind.

- 2 The need to heat the components of the joint evenly to brazing temperature.

Brazer skill important. Let the braze filler flow through the joint with help of a small temperature increase in one end. Refer to "Design and process considerations" on PDS-1.

- 3 The selection of the 'right' alloy for the job in question.

Avoid Cd-alloys. Minimise Zn-content but use as low melting range as possible to avoid thermal impact. Recommendations in "Material considerations and corrosion effects." on 47.

- 4 The selection of the most appropriate method of removing the oxide skin from the surfaces of the joint.

Use FH10 type of fluxes when needed (stainless

steel joints - AG-fillers). Recommendations in "Material considerations and corrosion effects" on 47.

- 5 The use of an appropriately dimensioned joint gap.

Use recommendations in "Design and process considerations" on 48.

- 6 The application of the filler material to the appropriate part of the joint Recommendations in "Design and process considerations" on 48.

References and information sources

This document was compiled by Jens Rassmus for Alfa Laval May 2010 from information in following documents:

"The brazing of connecting tubes to stainless steel copper-brazed plate heat exchangers" by Philip M. Roberts for Alfa Laval 2010 and "Copper Brazed and Fusion Bonded Compact Plate Heat Exchangers in Water Applications-Material aspects and life time limiting factors-", edited by Jens Rassmus for Alfa Laval 2008.

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These Terms and Conditions of Sale ("Terms and Conditions") apply to all quotations, orders, and contracts for Alfa Laval Inc. products (hereafter "Equipment") and associated services ("Services") As used in these Terms and Conditions, the word "Equipment" includes all hardware, parts, components, software and options.

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2. **PRICES:** Unless otherwise specified in writing, all quoted prices are in U.S. Dollars and are firm for thirty (30) days from the date of offer. Prices quoted are exclusive of taxes, freight and insurance, and you agree to pay any and all sales, revenue, excise or other taxes (exclusive of taxes based on our net income) applicable to the purchase of Equipment. If you claim an exemption from any such taxes you shall provide us with a tax exemption certificate acceptable to the taxing authorities.

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5. **CREDIT AND PAYMENT:** Payment terms are (30) days net, unless agreed otherwise by us in writing. Pro rata payments shall become due with partial shipments. Any discount period which may be granted by us begins on the invoice date and all payments are due 30 days after the invoice date. All payments shall be made without deduction, deferment, set-off, lien or counterclaim of any nature. All amounts due not paid within 30 days after the date such amounts are due and payable shall bear interest at the lesser of 1.5 percent per month or the maximum rate of interest allowed by law. We reserve the right at any time to suspend credit or to change credit terms provided herein, when, in our sole opinion, your financial condition so warrants. Failure to pay invoices when such invoices are due and payable, at our election, shall make all subsequent invoices immediately due and payable irrespective of terms, and we may withhold all subsequent deliveries until the full account is settled. We shall not, in such event, be liable for delay of performance or nonperformance of contract in whole or in part subsequent to such event.

6. **SECURITY AGREEMENT:** You hereby grant us a security interest in the Equipment, including a purchase money security interest, and in such materials, proceeds and accessories thereof, to secure payment of the purchase price of the Equipment. You authorize us to file or record a purchase order or copy thereof or any UCC financing statement showing our interest in the Equipment in all jurisdictions where we may determine filing to be appropriate, and you agree to sign all such documents reasonably related thereto promptly following our request. You will not encumber the Equipment with any mortgage, lien, pledge or other attachment prior to payment in full of the price therefor.

7. **CANCELLATIONS AND CHANGES:** Orders which have been accepted by us are not subject to cancellation or changes in specification except upon prior written agreement by us and upon terms that will indemnify us against all losses resulting from or arising out of such cancellation or change in specifications. In the absence of such indemnification, we shall be entitled to recover all damages and costs of whatever nature permitted by the Uniform Commercial Code.

8. **DEFERRED SHIPMENT:** If shipment is deferred at your request, payment of the contract price shall become due when you are notified that the Equipment is ready for shipment. If you fail to make payment or furnish shipping instructions we may either extend the time for so doing or cancel the contract. In case of deferred shipment at your request, storage and other reasonable expenses attributable to such delay shall be payable by you.

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9. EQUIPMENT WARRANTY AND REMEDY:

(a) For new Equipment only, we warrant to you that the Equipment that is the subject of this sale is free from defects in design (provided that we have design responsibility), material and workmanship. The duration of this warranty is twelve (12) months from start-up or eighteen (18) months from delivery to you, whichever occurs first (the "Warranty Period"). If you discover within the Warranty Period a defect in design, material or workmanship, you must promptly notify us in writing. Within a reasonable time after such notification, we shall repair, replace, or, at our option, refund you the price of the defective Equipment or part thereof.

(b) For repairs, parts and Services provided by us, we warrant to you that the repairs, parts and Services we provide to you will be free from defects in material and workmanship. The duration of this warranty is ninety (90) days from as applicable (i) the date the Equipment which required the repairs, parts or Services is returned to you by us, (ii) the date of your receipt of the part, or (iii) the date of completion of the repair or other Services, if performed at your facility. If during this ninety day period you discover a defect in the repairs, parts or Services you must promptly notify us in writing and we shall correct such defect with either new or used replacement parts or reperform the Services as applicable. If we are unable to correct the defect after a reasonable number of attempts, we will provide a refund of the price paid for the defective repair, parts or Services.

(c) All warranty service is subject to our prior examination and approval and will be performed by us at your facility or at service centers designated by us. All transportation to and from the designated service center will be at our expense. The remedies set forth above are your exclusive remedies for breach of warranty. Unless otherwise agreed in writing by us, our warranty extends only to you and is not assignable to or assumable by any subsequent purchaser, in whole or in part, and any such attempted transfer shall render all warranties provided hereunder null and void and of no further force or effect.

(d) The warranties set forth above are inapplicable to and exclude any product, components or parts not manufactured by us or covered by the warranty of another manufacturer. We shall have no responsibility for defects, loss or damage to the extent caused by (i) normal wear and tear, (ii) your failure to follow all installation and operation instructions or manuals or to provide normal maintenance, (iii) repairs or modifications by you or by others not under our direct supervision, or (iv) a product or component part which we did not design, manufacture, supply or repair.

(e) **DISCLAIMER OF IMPLIED WARRANTIES. THE WARRANTIES SET FORTH ABOVE AND IN SECTION 12 BELOW ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR**

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10. **LIMITATION OF LIABILITY:** In no event shall we be liable, and you hereby waive any claims against us and release us from liability to you, for any indirect, special, punitive, incidental, or consequential damages whatsoever based upon breach of warranty, breach of contract, negligence, strict tort, or any other legal theory. In no circumstance, shall we be liable for, however such damages are characterized, loss of profits, loss of savings or revenue, loss of use of the Equipment or any associated equipment, cost of capital, cost of any substitute Equipment, facilities or services, downtime, or loss of prospective economic advantage. **OUR AGGREGATE LIABILITY FOR FAILURE TO PERFORM, BREACH OF WARRANTY OR BREACH OF OTHER CONTRACTUAL OBLIGATIONS SHALL NOT EXCEED THE TOTAL PRICE PAID TO US FOR THE EQUIPMENT AND SERVICES THAT ARE THE SUBJECT OF ANY CLAIM BY YOU.**

11. **OWNERSHIP:** All drawings, designs, specifications, data and other proprietary rights supplied by us (including without limitation in connection with the Equipment) have been prepared or assembled by us and are (and shall remain) exclusively your property, and upon our request you agree to execute any additional documents needed to give effect to the foregoing. Such drawings, designs and specifications have been furnished in order to provide full documentation and on the condition that they shall not be disclosed, reproduced or copied in any manner whatsoever, in whole or in part, except for your internal use as necessary, and upon the further condition that, as our sole property, they shall not be used for furnishing information and/or disclosed, in whole or in part, to others or otherwise for any purpose not specifically authorized in a writing signed by one of our corporate officers.

12. PATENT INFRINGEMENT

(a) We make no express or implied warranties of non-infringement with respect to the Equipment. We will, however, defend, indemnify and hold you harmless from any third party apparatus claims based upon an issued U.S. patent to the extent such claim relates to the Equipment supplied and sold to you; provided, however, that we undertake no indemnification in respect of third-party rights (i) where the alleged patent infringement is based upon or related to any method, process or design claims in third-party U.S. patents, any combination of the Equipment with other equipment not supplied by us, or any modifications of the Equipment made by you and not approved by us, or (ii) to the extent the alleged infringement is directly attributable to the negligence or intentional misconduct of you or otherwise for which you are obligated to indemnify us for under paragraph 12(c).

Terms and conditions of sale

(b) We shall assume defense of a claim at our expense in accordance with these Terms and Conditions, provided you shall notify us within 30 days of your receipt of notice of an alleged third-party claim that you believe would entitle you to patent infringement indemnification pursuant to paragraph 12(a). You acknowledge and agree that we shall have the sole right to settle or otherwise compromise such a third-party claim, including but not limited to the right to either (i) modify the Equipment to avoid infringement if you are agreeable to the modification, (ii) repurchase the Equipment from you at a price equal to the then-current fair market value of the Equipment, or (iii) secure rights by assignment or license to permit continued use of the Equipment.

(c) If a third party charges us with patent infringement relating to Equipment sold by us to you, we shall have the right to either (i) modify the Equipment to avoid infringement if you are agreeable to the modification, (ii) repurchase the Equipment from you at a price equal to the then-current fair market value of the Equipment, or (iii) secure rights by assignment or license to permit continued use of the Equipment. If a third party charges us with patent infringement on the bases set forth in paragraph 12(a)(i) or (ii), you shall indemnify and hold us harmless for all expenses as well as any awards of damage assessed against us, and, without limiting any of our other rights and remedies available at law or in equity, we shall also have the right to modify or repurchase the Equipment or to secure rights for continued use by way of assignment or license as set forth in this paragraph.

13. **INSPECTION:** Upon prior written notice, you may make reasonable inspections of Equipment at our facility. We reserve the right to determine the reasonableness of the request and to select an appropriate time and location for such inspection. You agree to execute appropriate confidentiality provisions upon our request prior to visiting our facility. All costs of inspection shall be solely determined by us and shall be payable by you. No inspection or expediting by you at the facilities of our suppliers is authorized.

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16. **INAPPLICABILITY OF CISG:** The parties specifically agree that the United Nations Convention on Contracts for the International Sale of Goods shall not apply to any sale or order or the contract between us.

17. **GOVERNING LAW & VENUE:** These Terms and Conditions and any dispute or claim arising out of or related to an order or the contract between us shall be finally decided in accordance with the laws of the Commonwealth of Virginia, without giving effect to the provisions thereof relating to conflict of laws. You agree that the venue for any such dispute shall lie in the United States District Court for the Eastern District of Virginia, Richmond Division. In the event that federal jurisdiction cannot be established pursuant to 28 U.S.C. §§ 1331 or 1332, the venue for any such dispute shall lie in the Circuit Court of Henrico County, Virginia. You expressly submit and waive any objection to the sole and exclusive jurisdiction of such courts.

18. **GENERAL:** All previous agreements or understandings between us, either oral or written, with regard to the subject order, with the exception of a pre-existing non-disclosure agreement between us, are void and these Terms and Conditions constitute the entire agreement between us with respect to the matters addressed herein. Neither of us shall assign an order or contract to which these Terms and Conditions apply without the prior written consent of the other party, which consent shall not be unreasonably withheld. If any provision of these Terms and Conditions is held to be invalid or unenforceable, such holding shall not affect the validity or enforceability of any other provision herein. No waiver by either of us of any default or breach by the other party will operate as or be deemed a waiver of any subsequent default or breach.

Alfa Laval Terms and Conditions of Sale (July 2018) v.1



Alfa Laval AC16 / ACH16

Brazed plate heat exchanger for air conditioning and refrigeration

Alfa Laval AC brazed plate heat exchangers provide efficient heat transfer with a small footprint. They are specifically designed to work in air conditioning and refrigeration applications as evaporators and condensers in chillers and heat pumps.

Applications

- Evaporator
- Condenser
- Cascade systems

Benefits

- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free

Design

The brazing material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and longest possible service life.

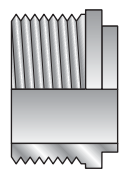
Different pressure ratings are available for different needs.

Asymmetric channels provide optimal efficiency in the most compact design. This results in low refrigerant charge or lower pressure drop on the water or brine side, reducing the CO₂ footprint.

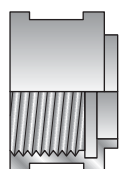
Based on standard components and a modular concept, each unit is custom-built to meet the specific requirements of each individual installation.

Suitable with most HFC, HFO and natural refrigerants.

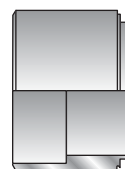
Examples of connections



External thread



Internal thread



Soldering



Technical Data

Standard materials

Cover plates	Stainless steel
Connections	Stainless steel
Plates	Stainless steel
Brazing filler	Copper

Dimensions and weight¹

A measure (mm)	8.8 + (2.16 * n)
A measure (inches)	0.35 + (0.09 * n)
Weight (kg) ²	0.27 + (0.04 * n)
Weight (lb) ²	0.59 + (0.09 * n)

1. n = number of plates
2. Excluding connections

Standard data

Volume per channel, litres (gal)	A (S1-S2): 0.030 (0.008)
	A (S3-S4): 0.024 (0.0063)
	H: 0.027 (0.060)

Max. particle size, mm (inch)	1.1 (0.043)
-------------------------------	-------------

Max. flowrate ¹ m ³ /h (gpm)	4.1 (18)
--	----------

Flow direction	Parallel
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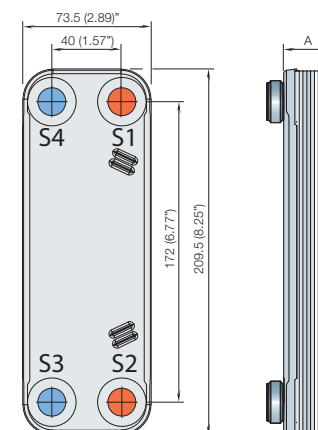
Min. number of plates	4
-----------------------	---

Max. number of plates	60
-----------------------	----

1. Water at 5 m/s (16.4 ft/s) (connection velocity)

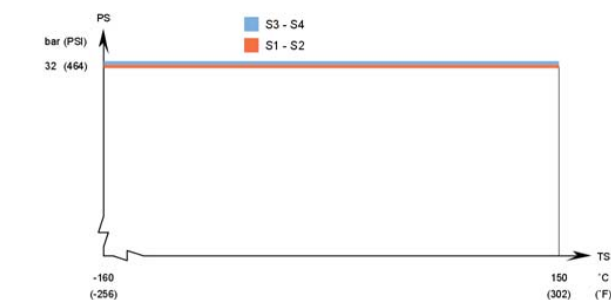
Dimensional drawing

Measurements in mm (inches)

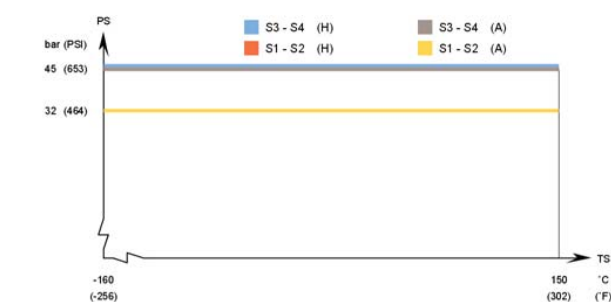


Design pressure and temperature

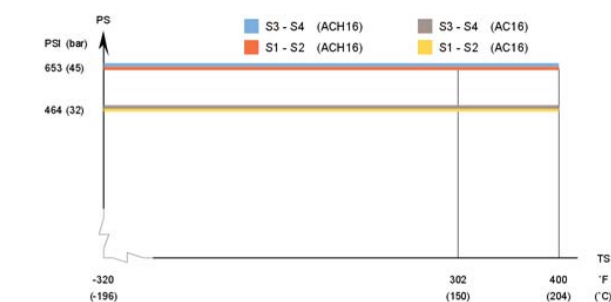
AC16 – PED approval pressure/temperature graph



ACH16 – PED approval pressure/temperature graph



AC16/ACH16 – UL approval pressure/temperature graph



Designed for full vacuum.

Alfa Laval plate heat exchangers are available with a wide range of pressure vessel approvals. Please contact your Alfa Laval representative for more information.

NOTE: Values above are to be used as an indication. For exact values, please use the drawing generated by the Alfa Laval configurator or contact your local Alfa Laval representative.

CHE00001EN 2016-04

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Alfa Laval AC18 / ACH18

Brazed plate heat exchanger for air conditioning and refrigeration

Introduction

Alfa Laval AC brazed plate heat exchangers provide efficient heat transfer with a small footprint. They are specifically designed to work in air conditioning and refrigeration applications as evaporators and condensers in chillers and heat pumps.

Applications

- Evaporator
- Condenser
- Cascade systems

Benefits

- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free

Design

The brazing material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and longest possible service life.

Different pressure ratings are available for different needs.

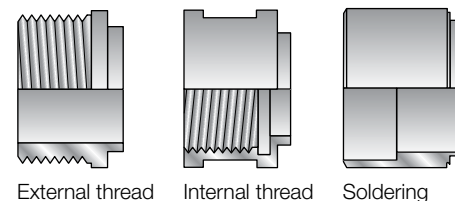
Asymmetric channels provide optimal efficiency in the most compact design. This results in low refrigerant charge or lower pressure drop on the water or brine side, reducing the CO₂ footprint.

Based on standard components and a modular concept, each unit is custom-built to meet the specific requirements of each individual installation.

Suitable with most HFC, HFO and natural refrigerants.



Examples of connections



Technical Data

Standard materials	
Cover plates	Stainless steel
Connections	Stainless steel
Plates	Stainless steel
Brazing filler	Copper

Dimensions and weight ¹	
A measure (mm)	8.8 + (2.16 * n)
A measure (inches)	0.35 + (0.09 * n)
Weight (kg) ²	0.4 + (0.07 * n)
Weight (lb) ²	0.88 + (0.15 * n)

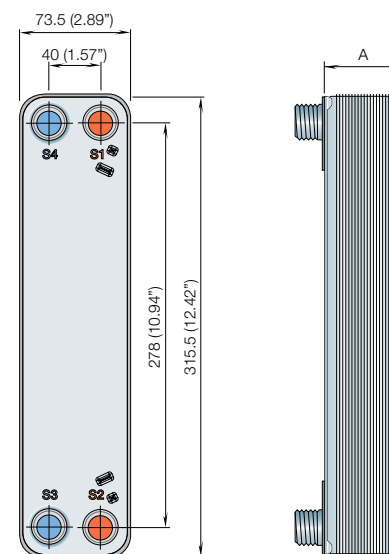
¹ n = number of plates
² Excluding connections

Standard data	
Volume per channel, litres (gal)	A (S1-S2): 0.042 (0.0111) A (S3-S4): 0.0345 (0.0091) H: 0.0379 (0.0100)
Max. particle size, mm (inch)	1.1 (0.043)
Max. flowrate ¹ m ³ /h (gpm)	4.1 (18.1)
Flow direction	Parallel
Min. number of plates	4
Max. number of plates	52

¹ Water at 5 m/s (16.4 ft/s) (connection velocity)

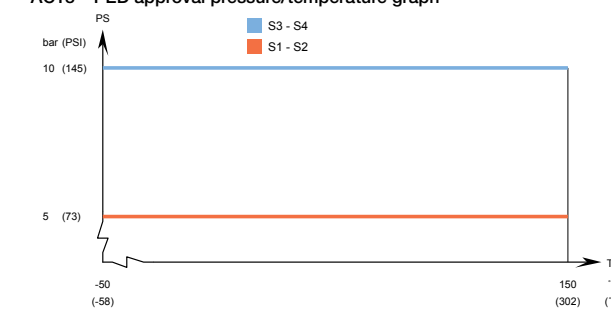
Dimensional drawing

Measurements in mm (inches)

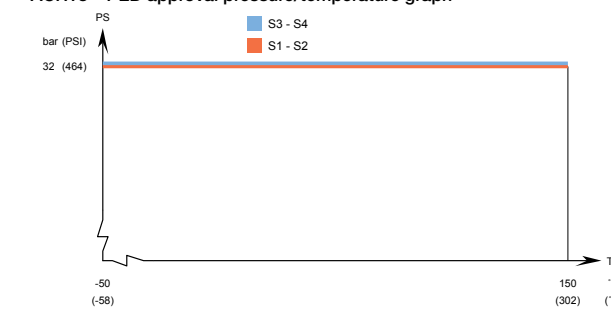


Design pressure and temperature

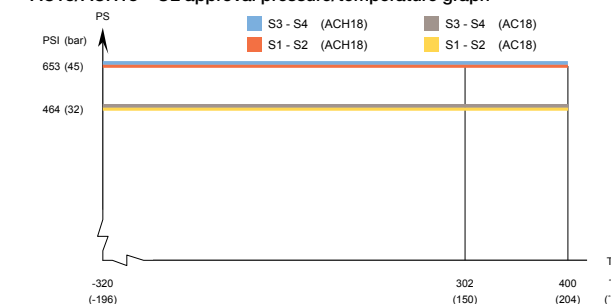
AC18 – PED approval pressure/temperature graph



ACH18 – PED approval pressure/temperature graph



AC18/ACH18 – UL approval pressure/temperature graph



Designed for full vacuum.

Alfa Laval plate heat exchangers are available with a wide range of pressure vessel approvals. Please contact your Alfa Laval representative for more information.

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Alfa Laval AC30EQ / ACH30EQ

Brazed plate heat exchanger for air conditioning and refrigeration

Introduction

Alfa Laval AC brazed plate heat exchangers provide efficient heat transfer with a small footprint. They are specifically designed to work in air conditioning and refrigeration applications as evaporators and condensers in chillers and heat pumps.

Applications

- Evaporator
- Condenser
- Cascade systems

Benefits

- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free

Design

The brazing material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and longest possible service life.

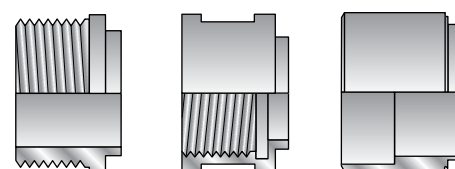
Different pressure ratings are available for different needs.

The integrated distribution system ensures an even distribution of the refrigerant throughout the plate package.

Based on standard components and a modular concept, each unit is custom-built to meet the specific requirements of each individual installation.

Suitable with most HFC, HFO and natural refrigerants.

Examples of connections



External thread Internal thread Soldering



Technical Data

Standard materials	
Cover plates	Stainless steel
Connections	Stainless steel
Plates	Stainless steel
Brazing filler	Copper

Dimensions and weight ¹	
A measure (mm)	9 + (1.52 * n)
A measure (inches)	0.35 + (0.06 * n)
Weight (kg) ²	1 + (0.09 * n)
Weight (lb) ²	2.20 + (0.20 * n)

¹ n = number of plates

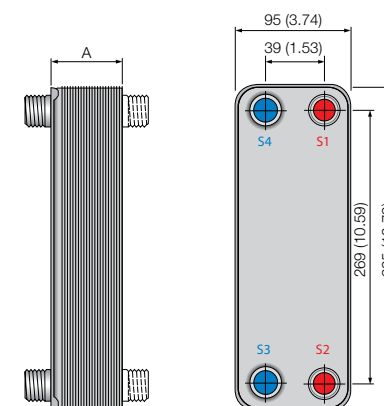
² Excluding connections

Standard data	
Volume per channel, litres (gal)	0.028 (0.0074)
Max. particle size, mm (inch)	0.6 (0.024)
Max. flowrate ¹ m ³ /h (gpm)	8.8 (38.7)
Flow direction	Parallel
Min. number of plates	4
Max. number of plates	120

¹ Water at 5 m/s (16.4 ft/s) (connection velocity)

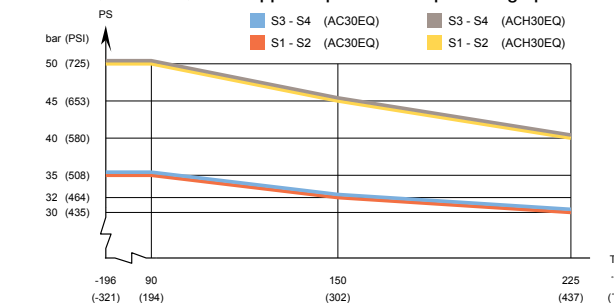
Dimensional drawing

Measurements in mm (inches)

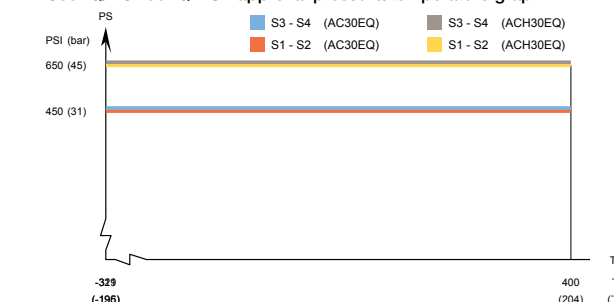


Design pressure and temperature

AC30EQ/ACH30EQ – PED approval pressure/temperature graph



AC30EQ/ACH30EQ – UL approval pressure/temperature graph



Designed for full vacuum.

Alfa Laval plate heat exchangers are available with a wide range of pressure vessel approvals. Please contact your Alfa Laval representative for more information.

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Alfa Laval AC70X / ACH70X / ACP70X

Brazed plate heat exchanger for air conditioning and refrigeration

Introduction

Alfa Laval AC brazed plate heat exchangers provide efficient heat transfer with a small footprint. They are specifically designed to work in air conditioning and refrigeration applications as evaporators and condensers in chillers and heat pumps.

Applications

- Evaporator
- Condenser
- Cascade systems

Benefits

- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free

Design

The brazing material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and longest possible service life.

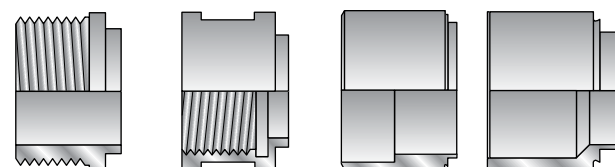
Different pressure ratings are available for different needs.

The integrated distribution system ensures an even distribution of the refrigerant throughout the plate package.

Based on standard components and a modular concept, each unit is custom-built to meet the specific requirements of each individual installation.

Suitable with most HFC, HFO and natural refrigerants.

Examples of connections



External thread Internal thread Soldering Welding



Technical Data

Standard materials	
Cover plates	Stainless steel
Connections	Stainless steel
Plates	Stainless steel
Brazing filler	Copper

Dimensions and weight ¹	
A measure (mm)	11 + (2.3 * n)
A measure (inches)	0.43 + (0.09 * n)
Weight (kg) ²	1.9 + (0.18 * n)
Weight (lb) ²	4.19 + (0.40 * n)

¹ n = number of plates

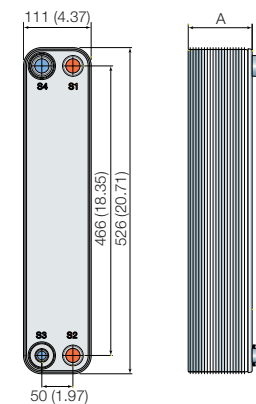
² Excluding connections

Standard data	
Volume per channel, litres (gal)	0.095 (0.0251)
Max. particle size, mm (inch)	1.0 (0.039)
Max. flowrate ¹ m ³ /h (gpm)	14 (61.6)
Flow direction	Parallel
Min. number of plates	4
Max. number of plates	124

¹ Water at 5 m/s (16.4 ft/s) (connection velocity)

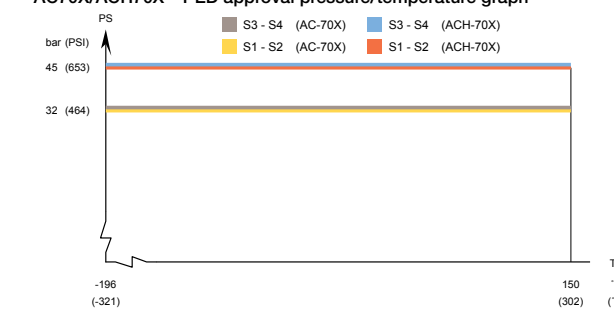
Dimensional drawing

Measurements in mm (inches)

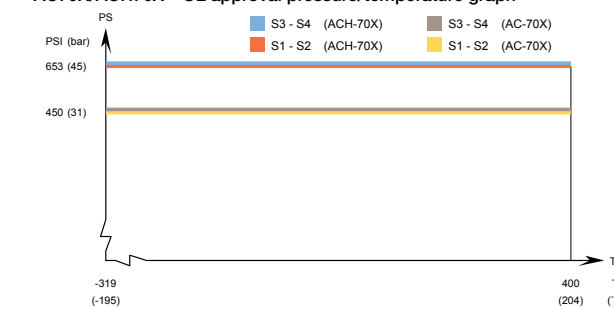


Design pressure and temperature

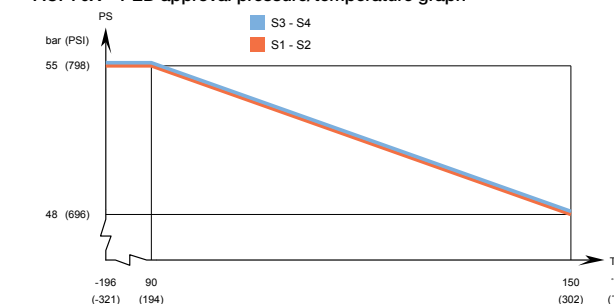
AC70X/ACH70X – PED approval pressure/temperature graph



AC70X/ACH70X – UL approval pressure/temperature graph



ACP70X – PED approval pressure/temperature graph



Designed for full vacuum.

Alfa Laval plate heat exchangers are available with a wide range of pressure vessel approvals. Please contact your Alfa Laval representative for more information.

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Alfa Laval AC232DQ / ACH232DQ

Brazed plate heat exchanger for air conditioning and refrigeration

Introduction

Alfa Laval AC brazed plate heat exchangers provide efficient heat transfer with a small footprint. They are specifically designed to work in air conditioning and refrigeration applications as evaporators and condensers in chillers and heat pumps.

Applications

- Evaporator
- Condenser

Benefits

- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free

Design

The brazing material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and longest possible service life.

Different pressure ratings are available for different needs.

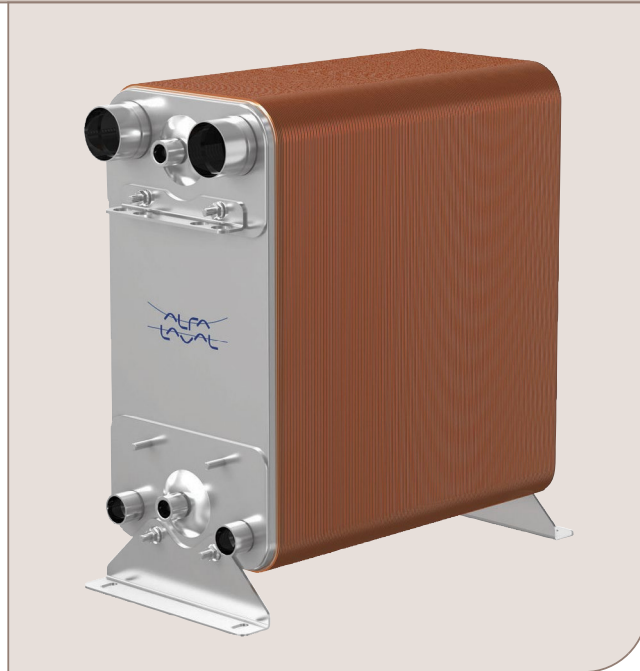
The True dual-circuit design provides a higher freezing resistance compared to back-to-back solutions.

Designed for high-efficiency applications, such as those applications with high evaporation temperature and low water/brine pressure drop. This results in reduced environmental impact and lower costs.

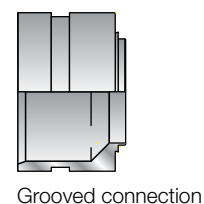
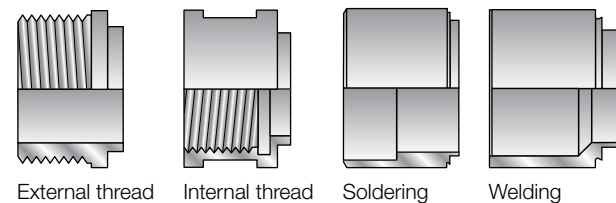
The integrated distribution system ensures an even distribution of the refrigerant throughout the plate package.

Based on standard components and a modular concept, each unit is custom-built to meet the specific requirements of each individual installation.

Suitable with most HFC, HFO and natural refrigerants.



Examples of connections



Technical Data

Standard materials	
Cover plates	Stainless steel
Connections	Stainless steel
Plates	Stainless steel
Brazing filler	Copper

Dimensions and weight ¹	
A measure (mm)	13 + (2.14 * n)
A measure (inches)	0.51 + (0.08 * n)
Weight (kg) ²	6 + (0.40 * n)
Weight (lb) ²	13.23 + (0.88 * n)

¹ n = number of plates

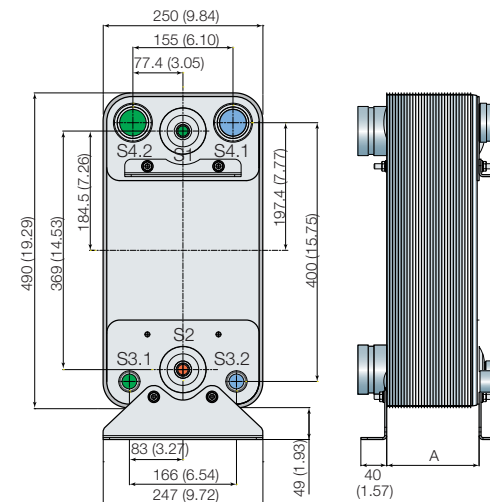
² Excluding connections

Standard data	
Volume per channel, litres (gal)	(S1-S2): 0.156 (0.0412) (S3-S4): 0.2 (0.0528)
Max. particle size, mm (inch)	0.9 (0.035)
Max. flowrate ¹ m ³ /h (gpm)	60 (264.2)
Flow direction	Parallel
Min. number of plates	10
Max. number of plates	260

¹ Water at 5 m/s (16.4 ft/s) (connection velocity)

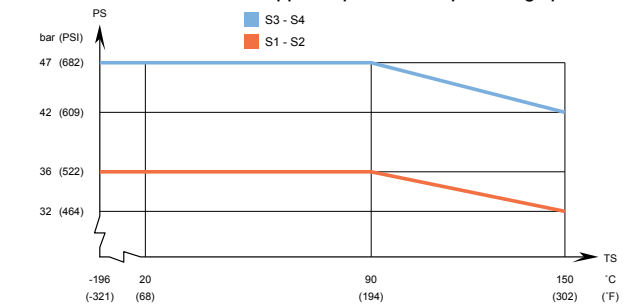
Dimensional drawing

Measurements in mm (inches)

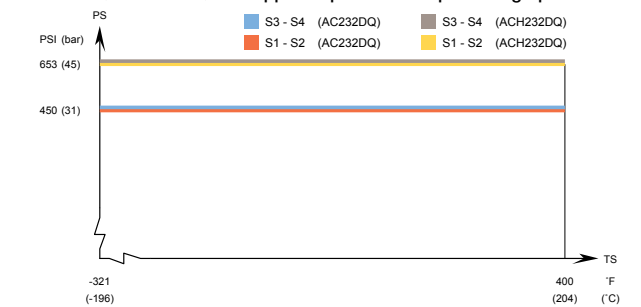


Design pressure and temperature

AC232DQ/ACH232DQ – PED approval pressure/temperature graph



AC232DQ/ACH232DQ – UL approval pressure/temperature graph



Designed for full vacuum.

Alfa Laval plate heat exchangers are available with a wide range of pressure vessel approvals. Please contact your Alfa Laval representative for more information.

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Alfa Laval ACH240DQ

Brazed plate heat exchanger for air conditioning and refrigeration

Introduction

Alfa Laval AC brazed plate heat exchangers provide efficient heat transfer with a small footprint. They are specifically designed to work in air conditioning and refrigeration applications as evaporators and condensers in chillers and heat pumps.

Applications

- Evaporator
- Condenser

Benefits

- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free

Design

The brazing material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and longest possible service life.

The True dual-circuit design provides a higher freezing resistance compared to back-to-back solutions.

Asymmetric channels provide optimal efficiency in the most compact design. This results in low refrigerant charge or lower pressure drop on the water or brine side, reducing the CO₂ footprint.

The asymmetry guarantees the best performance in both full- and partial-load conditions.

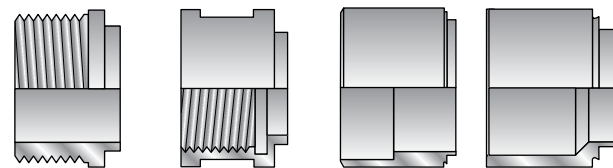
Designed for high-efficiency applications, such as those applications with high evaporation temperature and low water/ brine pressure drop. This results in reduced environmental impact and lower costs.

The integrated distribution system ensures an even distribution of the refrigerant throughout the plate package.



Suitable with most HFC, HFO and natural refrigerants.

Examples of connections



External thread Internal thread Soldering Welding



Grooved connection

Technical Data

Standard materials	
Cover plates	Stainless steel
Connections	Stainless steel
Plates	Stainless steel
Brazing filler	Copper

Dimensions and weight ¹	
A measure (mm)	12.6 + (2.13 * n)
A measure (inches)	0.50 + (0.08 * n)
Weight (kg) ²	6 + (0.43 * n)
Weight (lb) ²	13.23 + (0.95 * n)

¹ n = number of plates

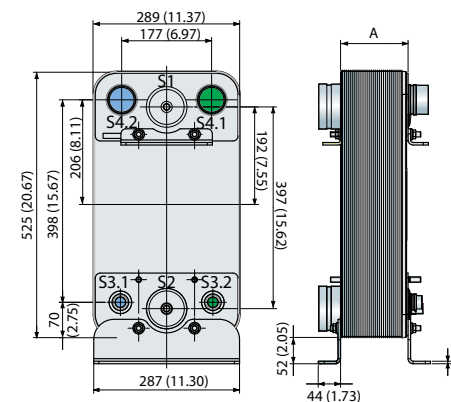
² Excluding connections

Standard data	
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 ¹ m ³ /h (gpm)	71 (312.6)
Flow direction	Parallel
Min. number of plates	10
Max. number of plates	262

¹ Water at 5 m/s (16.4 ft/s) (connection velocity)

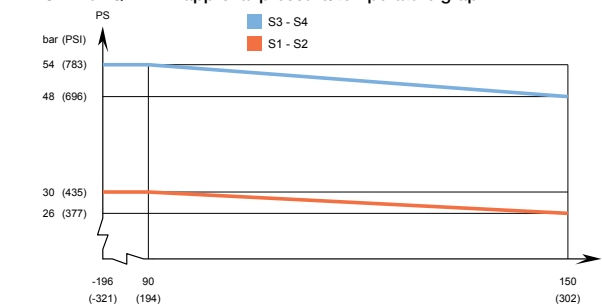
Dimensional drawing

Measurements in mm (inches)

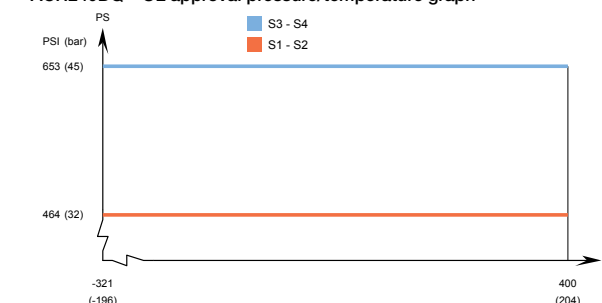


Design pressure and temperature

ACH240DQ – PED approval pressure/temperature graph



ACH240DQ – UL approval pressure/temperature graph



Designed for full vacuum.

Alfa Laval plate heat exchangers are available with a wide range of pressure vessel approvals. Please contact your Alfa Laval representative for more information.

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Alfa Laval AC500EQ / ACH500EQ / ACP500EQ

Brazed plate heat exchanger for air conditioning and refrigeration

Introduction

Alfa Laval AC brazed plate heat exchangers provide efficient heat transfer with a small footprint. They are specifically designed to work in air conditioning and refrigeration applications as evaporators and condensers in chillers and heat pumps.

Applications

- Evaporator
- Condenser
- Cascade systems

Benefits

- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free

Design

The brazing material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and longest possible service life.

Different pressure ratings are available for different needs.

Single-circuit design.

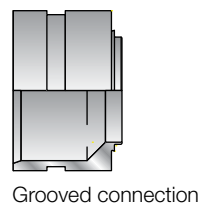
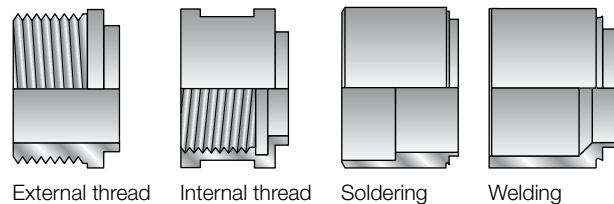
The integrated distribution system ensures an even distribution of the refrigerant throughout the plate package.

Based on standard components and a modular concept, each unit is custom-built to meet the specific requirements of each individual installation.

Suitable with most HFC, HFO and natural refrigerants.



Examples of connections



Technical Data

Standard materials	
Cover plates	Stainless steel
Connections	Stainless steel
Plates	Stainless steel
Brazing filler	Copper

Dimensions and weight ¹	
A measure (mm)	12 + (2.61 * n)
A measure (inches)	0.47 + (0.10 * n)
Weight (kg) ²	12.5 + (0.84 * n)
Weight (lb) ²	27.56 + (1.85 * n)

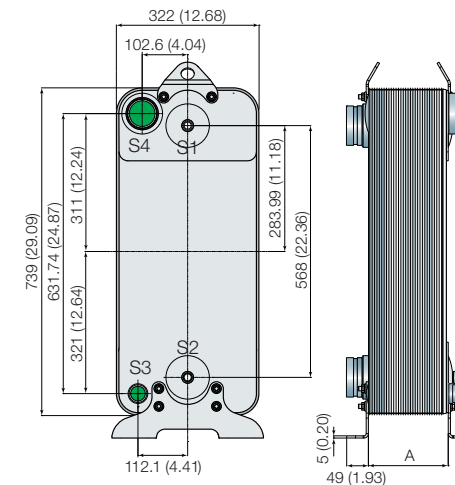
¹ n = number of plates
² Excluding connections

Standard data	
Volume per channel, litres (gal)	(S1-S2): 0.47 (0.1242) (S3-S4): 0.5 (0.1321)
Max. particle size, mm (inch)	1.1 (0.043)
Max. flowrate ¹ m ³ /h (gpm)	120 (528.3)
Flow direction	Parallel
Min. number of plates	10
Max. number of plates	270

¹ Water at 5 m/s (16.4 ft/s) (connection velocity)

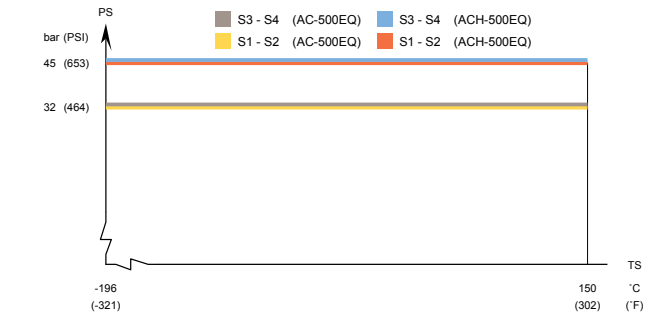
Dimensional drawing

Measurements in mm (inches)

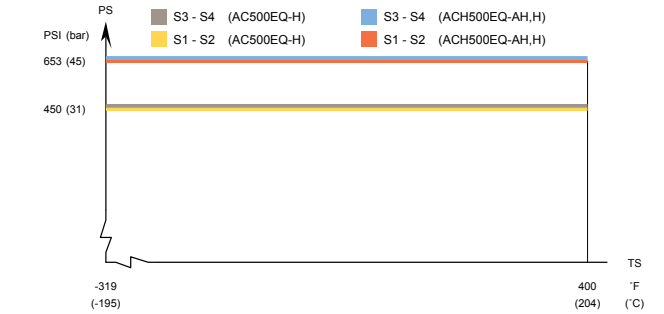


Design pressure and temperature

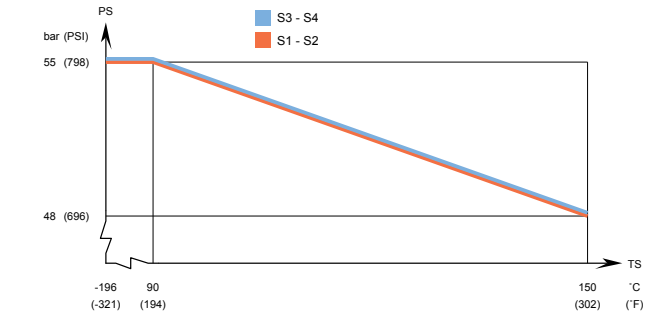
AC500EQ/ACH500EQ – PED approval pressure/temperature graph



AC500DEQ/ACH500EQ – UL approval pressure/temperature graph



ACP500EQ – PED approval pressure/temperature graph



Designed for full vacuum.

Alfa Laval plate heat exchangers are available with a wide range of pressure vessel approvals. Please contact your Alfa Laval representative for more information.

NOTE: Values above are to be used as an indication. For exact values, please use the drawing generated by the Alfa Laval configurator or contact your local Alfa Laval representative.

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Alfa Laval AC220EQ / ACH220EQ / ACP220EQ

Brazed plate heat exchanger for air conditioning and refrigeration

Introduction

Alfa Laval AC brazed plate heat exchangers provide efficient heat transfer with a small footprint. They are specifically designed to work in air conditioning and refrigeration applications as evaporators and condensers in chillers and heat pumps.

Applications

- Evaporator
- Condenser
- Cascade systems

Benefits

- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free

Design

The brazing material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and longest possible service life.

Different pressure ratings are available for different needs.

Asymmetric channels provide optimal efficiency in the most compact design. This results in low refrigerant charge or lower pressure drop on the water or brine side, reducing the CO₂ footprint.

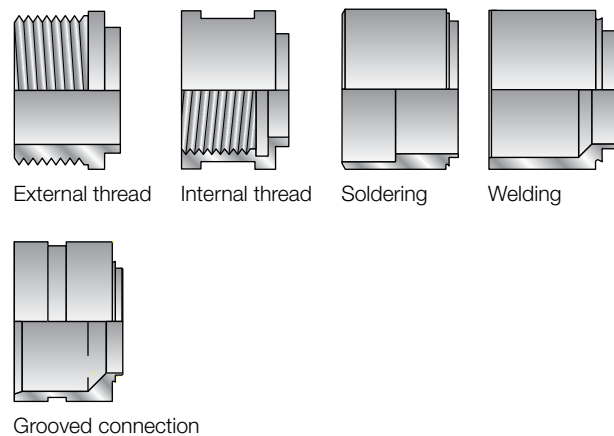
The integrated distribution system ensures an even distribution of the refrigerant throughout the plate package.

Based on standard components and a modular concept, each unit is custom-built to meet the specific requirements of each individual installation.

Suitable with most HFC, HFO and natural refrigerants.



Examples of connections



Technical Data

Standard materials	
Cover plates	Stainless steel
Connections	Stainless steel
Plates	Stainless steel
Brazing filler	Copper

Dimensions and weight ¹	
A measure (mm)	16 + (2.06 * n)
A measure (inches)	0.63 + (0.08 * n)
Weight (kg) ²	4.82 + (0.35 * n)
Weight (lb) ²	10.63 + (0.77 * n)

¹ n = number of plates

² Excluding connections

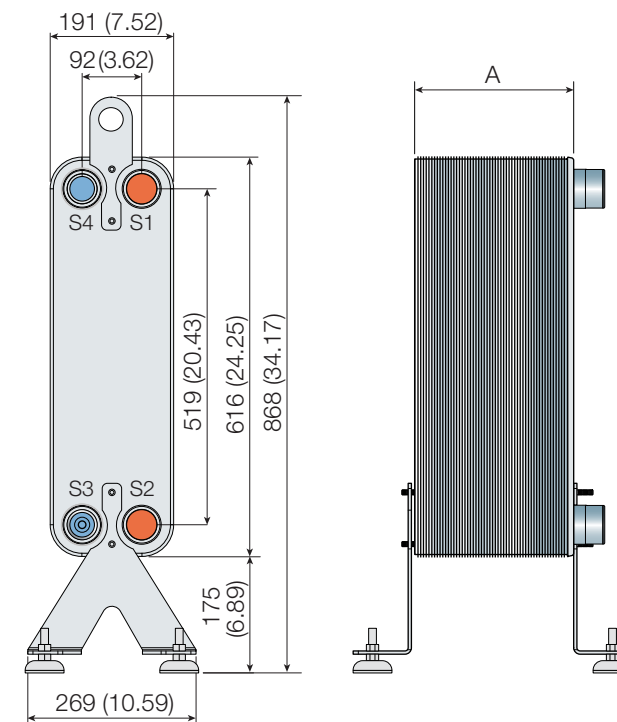
Standard data

Volume per channel, litres (gal)	M, L: 0.2 (0.0528)
	AH, AM (S1-S2): 0.2 (0.0528)
	AH, AM (S3-S4): 0.16(0.0423)
Max. particle size, mm (inch)	1 (0.039)
Max. flowrate ¹ m ³ /h (gpm)	51 (224.5)
Flow direction	Parallel
Min. number of plates	10
Max. number of plates	300

¹ Water at 5 m/s (16.4 ft/s) (connection velocity)

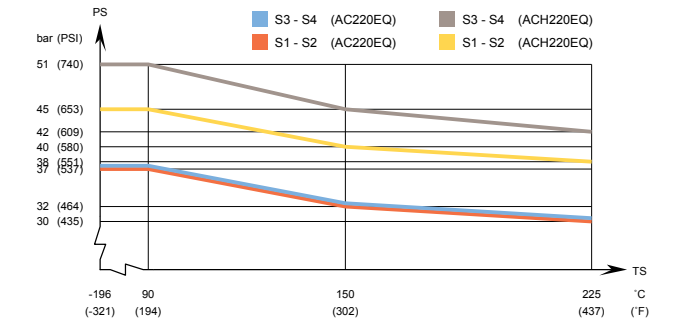
Dimensional drawing

Measurements in mm (inches)

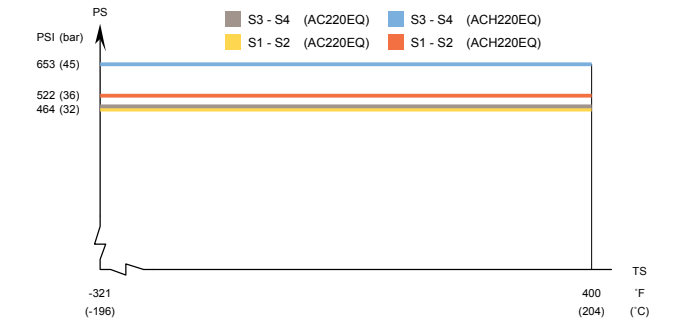


Design pressure and temperature

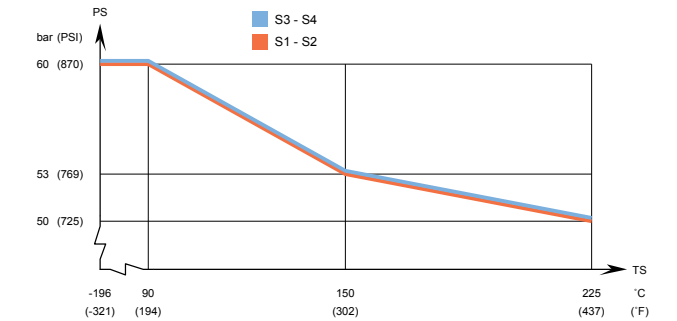
AC220EQ/ACH220EQ – PED approval pressure/temperature graph



AC220EQ/ACH220EQ – UL approval pressure/temperature graph



ACP220EQ – PED approval pressure/temperature graph



Designed for full vacuum.

Alfa Laval plate heat exchangers are available with a wide range of pressure vessel approvals. Please contact your Alfa Laval representative for more information.

NOTE: Values above are to be used as an indication. For exact values, please use the drawing generated by the Alfa Laval configurator or contact your local Alfa Laval representative.

Marine approvals

ACMH220EQ can be delivered with marine classification certificate (ABS, BV, CCS, ClassNK, DNV, GL, LR, RINA, RMRS)



Alfa Laval AC502DQ / ACH502DQ

Brazed plate heat exchanger for air conditioning and refrigeration

Alfa Laval AC brazed plate heat exchangers provide efficient heat transfer with a small footprint. They are specifically designed to work in air conditioning and refrigeration applications as evaporators and condensers in chillers and heat pumps.

Applications

- Evaporator
- Condenser

Benefits

- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free

Design

The brazing material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and longest possible service life.

Different pressure ratings are available for different needs.

The True dual-circuit design provides a higher freezing resistance compared to back-to-back solutions.

Asymmetric channels provide optimal efficiency in the most compact design. This results in low refrigerant charge or lower pressure drop on the water or brine side, reducing the CO₂ footprint.

The asymmetry guarantees the best performance in both full- and partial-load conditions.

Designed for high-efficiency applications, such as those applications with high evaporation temperature and low water/brine pressure drop. This results in reduced environmental impact and lower costs.

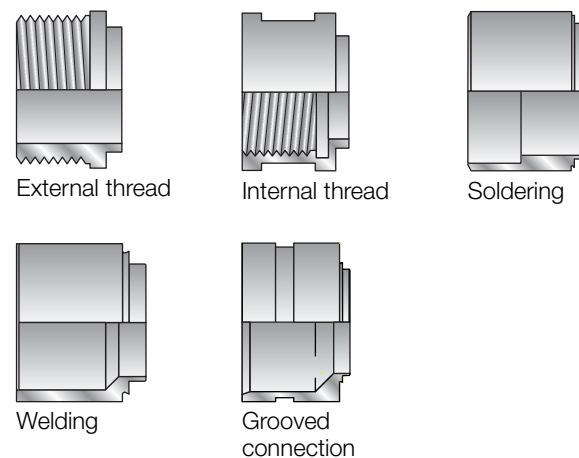
The integrated distribution system ensures an even distribution of the refrigerant throughout the plate package.

Based on standard components and a modular concept, each unit is custom-built to meet the specific requirements of each individual installation.

Suitable with most HFC, HFO and natural refrigerants.



Examples of connections



Technical Data

Standard materials

Cover plates	Stainless steel
Connections	Stainless steel
Plates	Stainless steel
Brazing filler	Copper

Dimensions and weight¹

A measure (mm)	12 + (2.52 * n)
A measure (inches)	0.47 + (0.1 * n)
Weight (kg) ²	13 + (0.84 * n)
Weight (lb) ²	28.66 + (1.85 * n)

1. n = number of plates
2. Excluding connections

Standard data

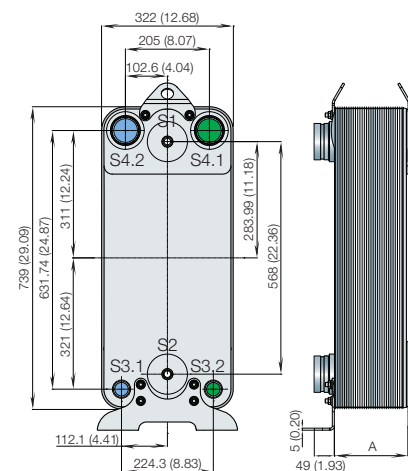
Volume per channel, litres (gal)	H (S1-S2): 0.47 (0.121)
	H (S3-S4): 0.50 (0.129)
	AH (S1-S2): 0.52 (0.134)
	AH (S3-S4): 0.45 (0.116)

Max. particle size, mm (inch)	1.1 (0.043)
Max. flowrate ¹ m ³ /h (gpm)	120 (528)
Flow direction	Parallel
Min. number of plates	10
Max. number of plates	270

1. Water at 5 m/s (16.4 ft/s) (connection velocity)

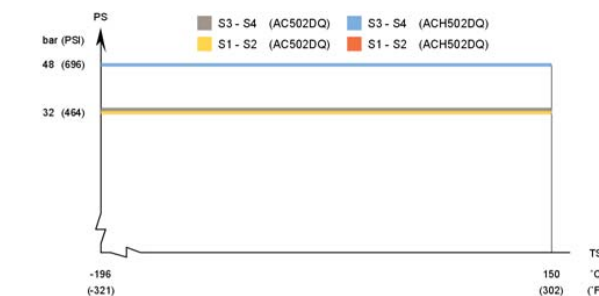
Dimensional drawing

Measurements in mm (inches)

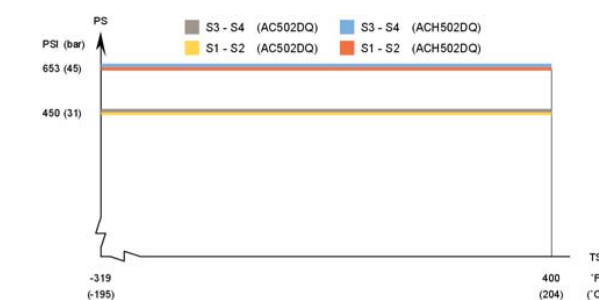


Design pressure and temperature

AC502DQ/ACH502DQ – PED approval pressure/temperature graph



AC502DQ/ACH502DQ – UL approval pressure/temperature graph



Designed for full vacuum.

Alfa Laval plate heat exchangers are available with a wide range of pressure vessel approvals. Please contact your Alfa Laval representative for more information.

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Alfa Laval AlfaNova 27 / HP 27 / XP27

Fusion-bonded plate heat exchanger in 100% stainless steel

Introduction

Alfa Laval AlfaNova fusion-bonded plate heat exchangers are made of 100% stainless steel. They are suitable for applications which place high demand on cleanliness, applications where aggressive media like ammonia are used or where copper and nickel contamination is unacceptable.

AlfaNova provides efficient heat transfer with a small footprint, has an extreme pressure fatigue resistance and covers high temperatures, up to 550°C/1022°F.

Applications

Suitable for a wide range of applications, such as:

- HVAC heating and cooling
- Refrigeration
- Oil cooling
- Industrial heating and cooling
- Process heating and cooling

Benefits

- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free
- Copper free

Design

The AlfaFusion filler material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and longest possible service life.

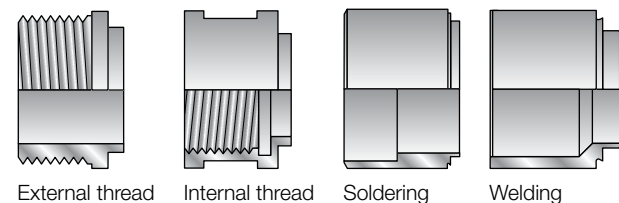
Different pressure ratings are available for different needs.

The XP design is particularly suited to CO₂ applications.

Based on standard components and a modular concept, each unit is custom-built to meet the specific requirements of each individual installation.



Examples of connections



Technical Data

Standard materials	
Cover plates	Stainless steel
Connections	Stainless steel
Plates	Stainless steel
AlfaFusion filler	Stainless steel

Dimensions and weight ¹

A measure (mm)	11 + (2.42 * n)
	HP: 13 + (2.42 * n)
	XP: 15 + (2.42 * n)
A measure (inches)	0.43 + (0.10 * n)
	HP: 0.51 + (0.10 * n)
	XP: 0.59 + (0.10 * n)
Weight (kg) ²	1 + (0.13 * n)
	HP: 1.5 + (0.13 * n)
	XP: 2 + (0.13 * n)
Weight (lb) ²	2.20 + (0.29 * n)
	HP: 3.31 + (0.29 * n)
	XP: 4.41 + (0.29 * n)

¹ n = number of plates

² Excluding connections

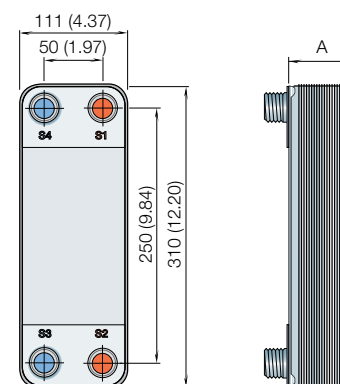
Standard data

Volume per channel, litres (gal)	0.05 (0.0132)
Max. particle size, mm (inch)	1.2 (0.047)
Max. flowrate ¹ m ³ /h (gpm)	14 (61.6)
Flow directions	Parallel
Min. number of plates	6
Max. number of plates	100

¹ Water at 5 m/s (16.4 ft/s) (connection velocity)

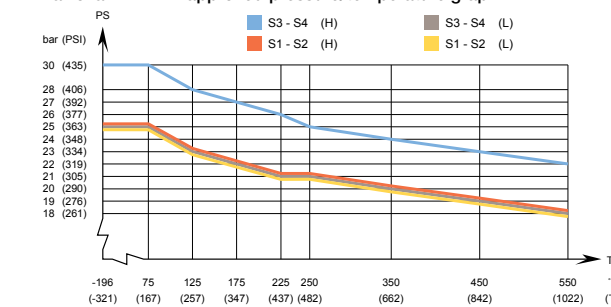
Dimensional Drawing

Measurements in mm (inches)

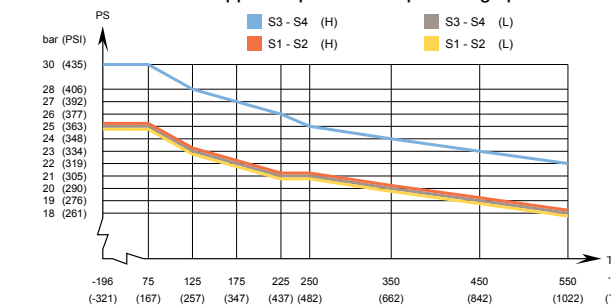


Design pressure and temperature

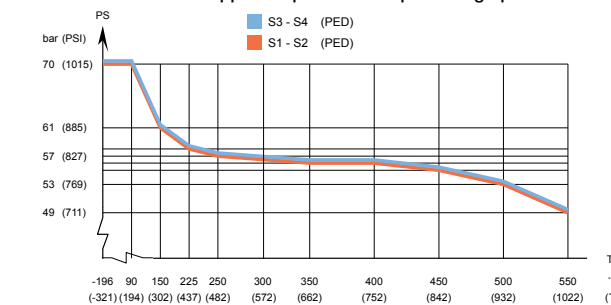
AlfaNova 27 - PED approved pressure/temperature graph



AlfaNova HP 27 - PED approved pressure/temperature graph



AlfaNova XP27 - PED approved pressure/temperature graph



Designed for full vacuum.

Alfa Laval plate heat exchangers are available with a wide range of pressure vessel approvals. Please contact your Alfa Laval representative for more information.

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Alfa Laval AlfaNova 14

Fusion-bonded plate heat exchanger in 100% stainless steel

Introduction

Alfa Laval AlfaNova fusion-bonded plate heat exchangers are made of 100% stainless steel. They are suitable for applications which place high demand on cleanliness, applications where aggressive media like ammonia are used or where copper and nickel contamination is unacceptable.

AlfaNova provides efficient heat transfer with a small footprint, has an extreme pressure fatigue resistance and covers high temperatures, up to 550°C/1022°F.

Applications

Suitable for a wide range of applications, such as:

- HVAC heating and cooling
- Refrigeration
- Oil cooling
- Industrial heating and cooling
- Process heating and cooling

Benefits

- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free
- Copper free

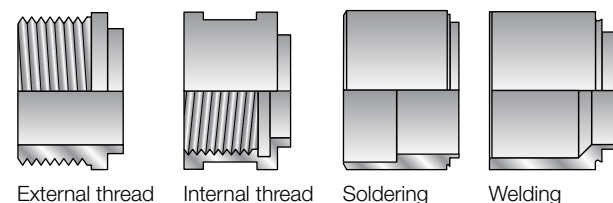
Design

The AlfaFusion filler material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and longest possible service life.

Based on standard components and a modular concept, each unit is custom-built to meet the specific requirements of each individual installation.



Examples of connections



Technical Data

Standard materials	
Cover plates	Stainless steel
Connections	Stainless steel
Plates	Stainless steel
AlfaFusion filler	Stainless steel

Dimensions and weight ¹	
A measure (mm)	8 + (2.48 * n)
A measure (inches)	0.31 + (0.10 * n)
Weight (kg) ²	0.4 + (0.07 * n)
Weight (lb) ²	0.88 + (0.15 * n)

¹ n = number of plates

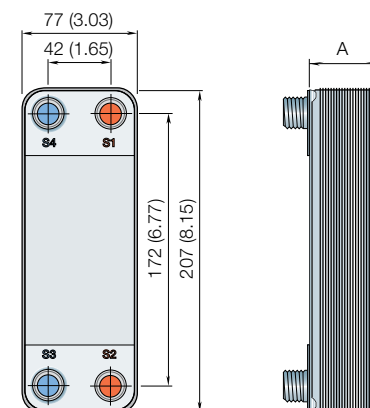
² Excluding connections

Standard data	
Volume per channel, litres (gal)	0.02 (0.0053)
Max. particle size, mm (inch)	1.2 (0.047)
Max. flowrate ¹ m ³ /h (gpm)	4.6 (20.3)
Flow directions	Parallel
Min. number of plates	4
Max. number of plates	50

¹ Water at 5 m/s (16.4 ft/s) (connection velocity)

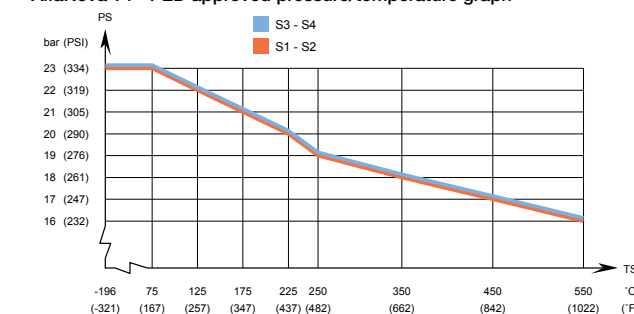
Dimensional Drawing

Measurements in mm (inches)

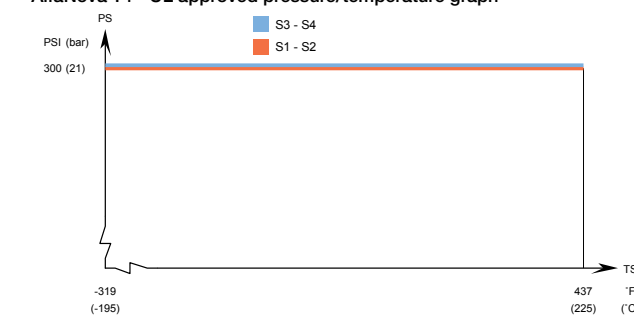


Design pressure and temperature

AlfaNova 14 - PED approved pressure/temperature graph



AlfaNova 14 - UL approved pressure/temperature graph



Designed for full vacuum.

Alfa Laval plate heat exchangers are available with a wide range of pressure vessel approvals. Please contact your Alfa Laval representative for more information.

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Alfa Laval AlfaNova 52 / HP 52 / XP52

Fusion-bonded plate heat exchanger in 100% stainless steel

Introduction

Alfa Laval AlfaNova fusion-bonded plate heat exchangers are made of 100% stainless steel. They are suitable for applications which place high demand on cleanliness, applications where aggressive media like ammonia are used or where copper and nickel contamination is unacceptable.

AlfaNova provides efficient heat transfer with a small footprint, has an extreme pressure fatigue resistance and covers high temperatures, up to 550°C/1022°F.

Applications

Suitable for a wide range of applications, such as:

- HVAC heating and cooling
- Refrigeration
- Oil cooling
- Industrial heating and cooling
- Process heating and cooling

Benefits

- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free
- Copper free

Design

The AlfaFusion filler material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and longest possible service life.

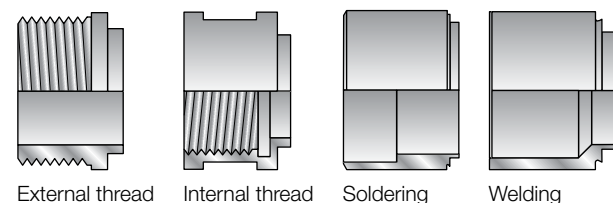
Different pressure ratings are available for different needs.

The XP design is particularly suited to CO₂ applications.

Based on standard components and a modular concept, each unit is custom-built to meet the specific requirements of each individual installation.



Examples of connections



Technical Data

Standard materials

Cover plates	Stainless steel
Connections	Stainless steel
Plates	Stainless steel
AlfaFusion filler	Stainless steel

Dimensions and weight ¹

A measure (mm)	11 + (2.48 * n)
A measure (inches)	0.43 + (0.10 * n)
Weight (kg) ²	1.9 + (0.22 * n)
Weight (lb) ²	4.19 + (0.49 * n)

¹ n = number of plates

² Excluding connections

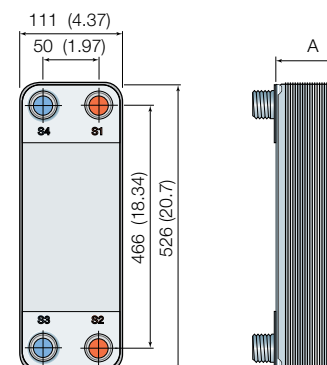
Standard data

Volume per channel, litres (gal)	0.095 (0.0251)
Max. particle size, mm (inch)	1.2 (0.047)
Max. flowrate ¹ m ³ /h (gpm)	14 (61.6)
Flow directions	Parallel
Min. number of plates	6
Max. number of plates	150

¹ Water at 5 m/s (16.4 ft/s) (connection velocity)

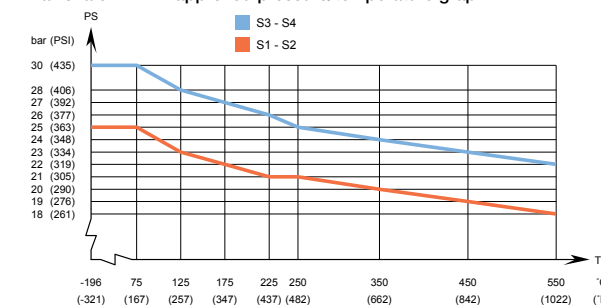
Dimensional Drawing

Measurements in mm (inches)



Design pressure and temperature

AlfaNova 52 - PED approved pressure/temperature graph



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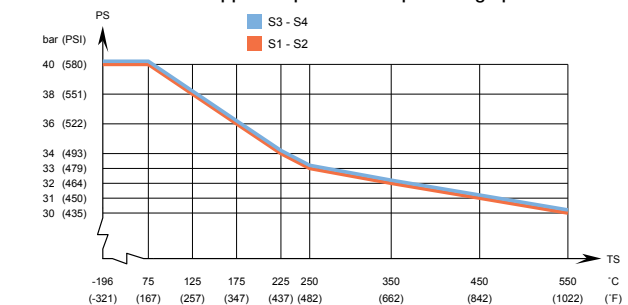
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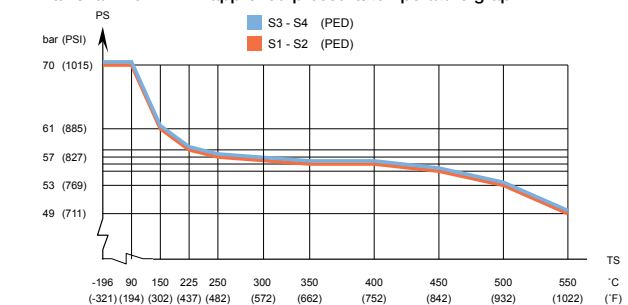
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AlfaNova HP 52- PED approved pressure/temperature graph ¹



¹ Min. temperature -10°C (14°F) with connection tube made of carbon steel.

AlfaNova XP52 - PED approved pressure/temperature graph



Designed for full vacuum.

Alfa Laval plate heat exchangers are available with a wide range of pressure vessel approvals. Please contact your Alfa Laval representative for more information.

NOTE: Values above are to be used as an indication. For exact values, please use the drawing generated by the Alfa Laval configurator or contact your local Alfa Laval representative.



Alfa Laval AlfaNova 76 / HP 76

Fusion-bonded plate heat exchanger in 100% stainless steel

Introduction

Alfa Laval AlfaNova fusion-bonded plate heat exchangers are made of 100% stainless steel. They are suitable for applications which place high demand on cleanliness, applications where aggressive media like ammonia are used or where copper and nickel contamination is unacceptable.

AlfaNova provides efficient heat transfer with a small footprint, has an extreme pressure fatigue resistance and covers high temperatures, up to 550°C/1022°F.

Applications

Suitable for a wide range of applications, such as:

- HVAC heating and cooling
- Refrigeration
- Oil cooling
- Industrial heating and cooling
- Process heating and cooling

Benefits

- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free
- Copper free

Design

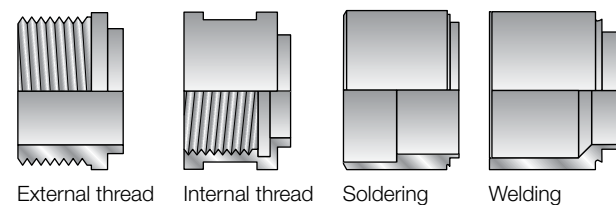
The AlfaFusion filler material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and longest possible service life.

Different pressure ratings are available for different needs.

Based on standard components and a modular concept, each unit is custom-built to meet the specific requirements of each individual installation.



Examples of connections



Technical Data

Standard materials	
Cover plates	Stainless steel
Connections	Stainless steel
Plates	Stainless steel
AlfaFusion filler	Stainless steel

Dimensions and weight ¹

A measure (mm)	11 + (2.85 * n)
A measure (inches)	0.43 + (0.11 * n)
Weight (kg) ²	8 + (0.49 * n)
Weight (lb) ²	17.64 + (1.08 * n)

¹ n = number of plates

² Excluding connections

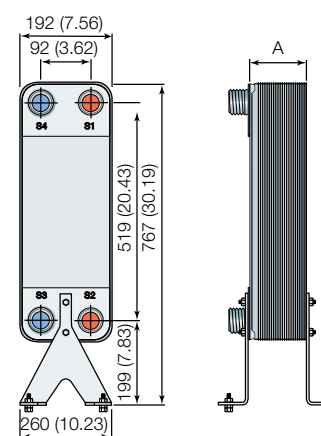
Standard data

Volume per channel, litres (gal)	(A) S1-S2: 0.25 (0.0660)
	(A) S3-S4: 0.18 (0.0476)
	(H, L): 0.25 (0.0660)
	(E): 0.18 (0.0476)
Max. particle size, mm (inch)	1.2 (0.047)
Max. flowrate ¹ m ³ /h (gpm)	37 (162.9)
Flow directions	Parallel
Min. number of plates	10
Max. number of plates	150

¹ Water at 5 m/s (16.4 ft/s) (connection velocity)

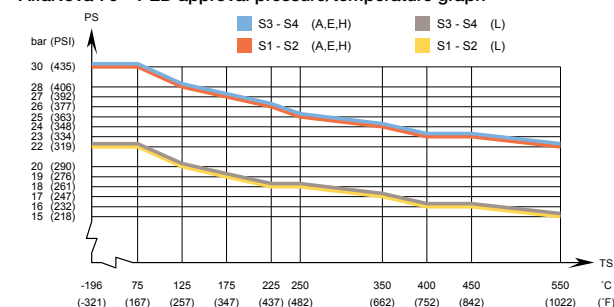
Dimensional Drawing

Measurements in mm (inches)



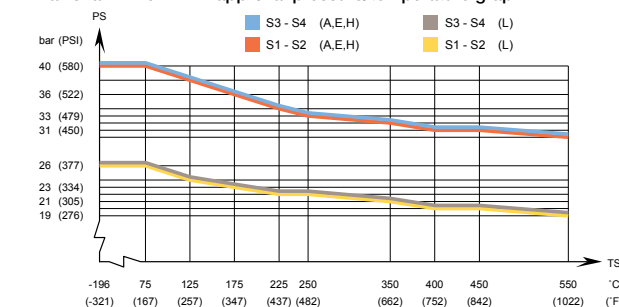
Design pressure and temperature

AlfaNova 76 – PED approval pressure/temperature graph ¹



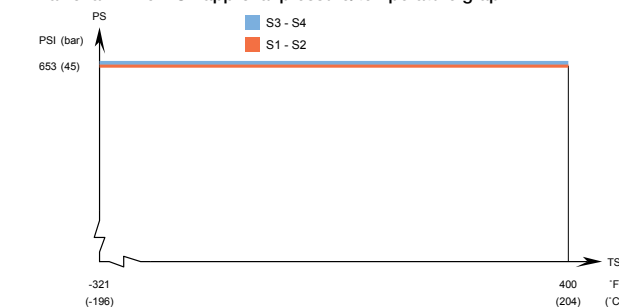
¹ Min. temperature -10°C (14°F) with connection tube made of carbon steel.

AlfaNova HP 76 – PED approval pressure/temperature graph ¹



¹ Min. temperature -10°C (14°F) with connection tube made of carbon steel.

AlfaNova HP 76 – UL approval pressure/temperature graph



Designed for full vacuum.

Alfa Laval plate heat exchangers are available with a wide range of pressure vessel approvals. Please contact your Alfa Laval representative for more information.

NOTE: Values above are to be used as an indication. For exact values, please use the drawing generated by the Alfa Laval configurator or contact your local Alfa Laval representative.

Marine approvals

AlfaNovaM HP 76 can be delivered with marine classification certificate (ABS, BV, CCS, ClassNK, DNV, GL, LR, RINA, RMRS)



Alfa Laval AXP52

Brazed plate heat exchanger for extreme high-pressure requirements

Introduction

Alfa Laval AXP is specifically designed to work in air conditioning and other refrigeration applications, where the pressure requirements are extremely high.

Applications

Because of their high-pressure performance, they are particularly well-suited to CO₂ applications, such as transcritical gas cooling.

Benefits

- Tolerates extremely high operating pressures
- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free

Design

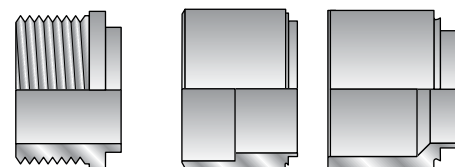
The brazing material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and longest possible service life.

AXP are brazed plate heat exchangers with thin external frames in carbon steel that are able to withstand extremely high operating pressures.

The unit can be supplied with a refrigerant distribution system for optimal evaporator performance.

Always delivered with lifting lugs for easy handling.

Examples of connections



External thread Soldering Welding



Technical Data

Standard materials	
Cover plates	Stainless steel
Connections	Stainless steel
Plates	Stainless steel
Brazing filler	Copper
External frame	Carbon steel, Zinc electroplated

Dimensions and weight ¹	
A measure (mm)	14 + (2.37 * n)
A measure (inches)	0.55 + (0.09 * n)
Weight (kg) ²	38 + (0.22 * n)
Weight (lb) ²	83.77 + (0.49 * n)

¹ n = number of plates

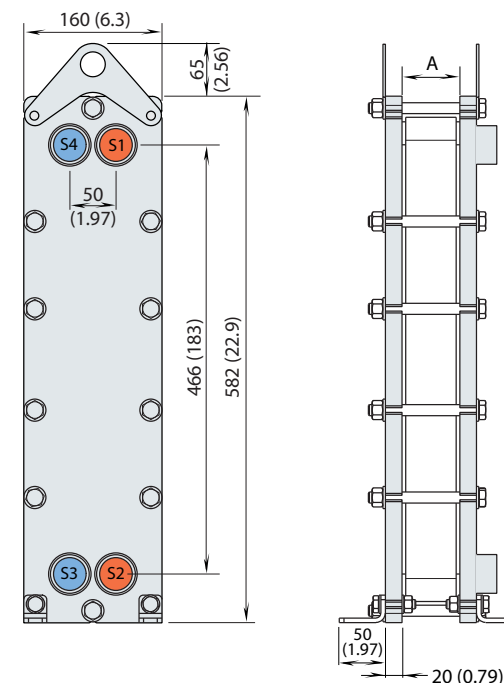
² Excluding connections

Standard data	
Volume per channel, litres (gal)	0.095 (0.0251)
Max. particle size, mm (inch)	1.2 (0.047)
Max. flowrate ¹ m ³ /h (gpm)	14 (61.6)
Flow direction	Parallel
Min. number of plates	6
Max. number of plates	150

¹ Water at 5 m/s (16.4 ft/s) (connection velocity)

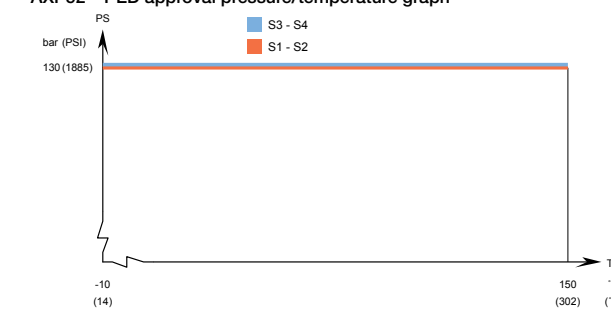
Dimensional drawing

Measurements in mm (inches)

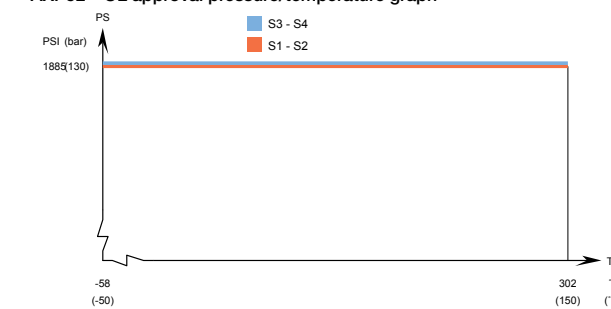


Design pressure and temperature

AXP52 – PED approval pressure/temperature graph



AXP52 – UL approval pressure/temperature graph



Designed for full vacuum.

Alfa Laval plate heat exchangers are available with a wide range of pressure vessel approvals. Please contact your Alfa Laval representative for more information.

NOTE: Values above are to be used as an indication. For exact values, please use the drawing generated by the Alfa Laval configurator or contact your local Alfa Laval representative.

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Alfa Laval CB30 /CBH30 / CBP30

Brazed plate heat exchanger



Introduction

Alfa Laval CB brazed plate heat exchangers provide efficient heat transfer with a small footprint.

Applications

- HVAC heating and cooling
- Refrigeration
- Oil cooling
- Industrial heating and cooling

Benefits

- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free

Design

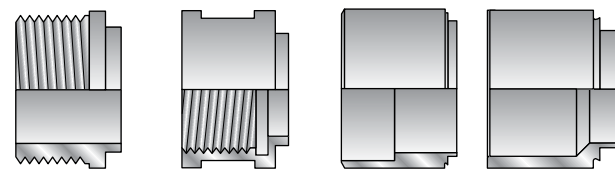
The brazing material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and longest possible service life.

Different pressure ratings are available for different needs.

The unit can be supplied with a refrigerant distribution system for optimal evaporator performance.

Based on standard components and a modular concept, each unit is custom-built to meet the specific requirements of each individual installation.

Examples of connections



External thread Internal thread Soldering Welding

Technical data

Standard materials

Cover plates	Stainless steel
Connections	Stainless steel
Plates	Stainless steel
Brazing filler	Copper

Dimensions and weight

Dimensions and weight ¹

A measure (mm)	13 + (2.31 * n)
A measure (inches)	0.51 + (0.09 * n)
Weight (kg) ²	1.2 + (0.11 * n)
Weight (lb) ²	2.65 + (0.24 * n)

¹ n = number of plates

² Excluding connections

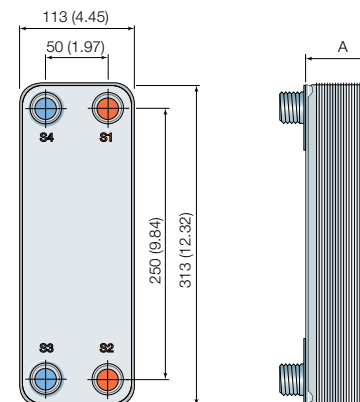
Standard data

Volume per channel, litres (gal)	0.054 (0.0143)
Max. particle size, mm (inch)	1 (0.039)
Max. flowrate ¹ m ³ /h (gpm)	14 (61.6)
Flow direction	Parallel
Min. number of plates	4
Max. number of plates	150

¹ Water at 5 m/s (16.4 ft/s) (connection velocity)

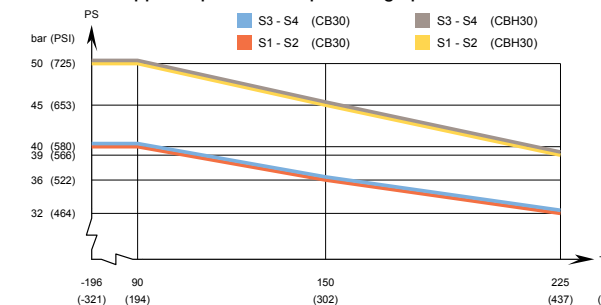
Dimensional drawing

Measurements in mm (inches)

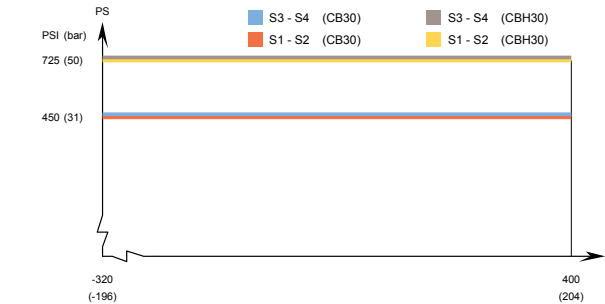


Design pressure and temperature

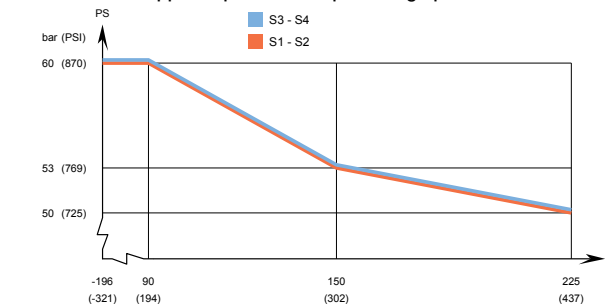
CB30 – PED approval pressure/temperature graph



CB30 – UL approval pressure/temperature graph



CBP30 – PED approval pressure/temperature graph



Designed for full vacuum.

Alfa Laval plate heat exchangers are available with a wide range of pressure vessel approvals. Please contact your Alfa Laval representative for more information.

NOTE: Values above are to be used as an indication. For exact values, please use the drawing generated by the Alfa Laval configurator or contact your local Alfa Laval representative.

Marine approvals

CBM30 can be delivered with marine classification certificate (ABS, BV, CCS, ClassNK, DNV, GL, LR, RINA, RMRS)



Alfa Laval CB60 / CBH60 / CBP60

Brazed plate heat exchanger



Introduction

Alfa Laval CB brazed plate heat exchangers provide efficient heat transfer with a small footprint.

Applications

- HVAC heating and cooling
- Refrigeration
- Oil cooling
- Industrial heating and cooling

Benefits

- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free

Design

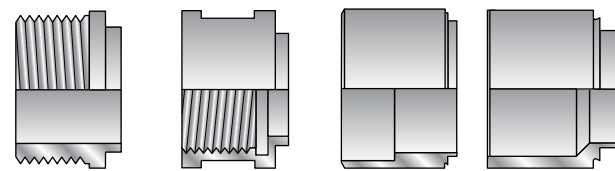
The brazing material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and longest possible service life.

Different pressure ratings are available for different needs.

The unit can be supplied with a refrigerant distribution system for optimal evaporator performance.

Based on standard components and a modular concept, each unit is custom-built to meet the specific requirements of each individual installation.

Examples of connections



External thread Internal thread Soldering Welding

Technical data

Standard materials	
Cover plates	Stainless steel
Connections	Stainless steel
Plates	Stainless steel
Brazing filler	Copper

Dimensions and weight

Dimensions and weight ¹	
A measure (mm)	CB, CBH: $13 + (2.32 * n)$ CBP: $15 + (2.32 * n)$
A measure (inches)	CB, CBH: $0.51 + (0.09 * n)^2$ CBP: $0.59 + (0.09 * n)$
Weight (kg) ³	CB, CBH: $2.1 + (0.18 * n)^2$ CBP: $2.26 + (0.18 * n)$
Weight (lb) ³	CB, CBH: $4.63 + (0.40 * n)$ CBP: $4.98 + (0.40 * n)$

¹ n = number of plates

² Excluding reinforcement

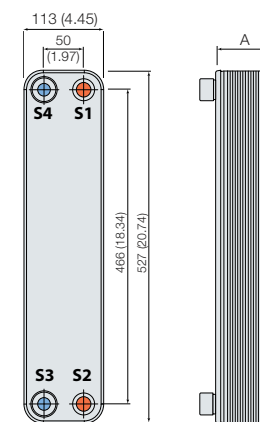
³ Excluding connections

Standard data	
Volume per channel, litres (gal)	0.103 (0.0272)
Max. particle size, mm (inch)	1 (0.039)
Max. flowrate ¹ m ³ /h (gpm)	14 (61.6)
Flow direction	Parallel
Min. number of plates	4
Max. number of plates	150

¹ Water at 5 m/s (16.4 ft/s) (connection velocity)

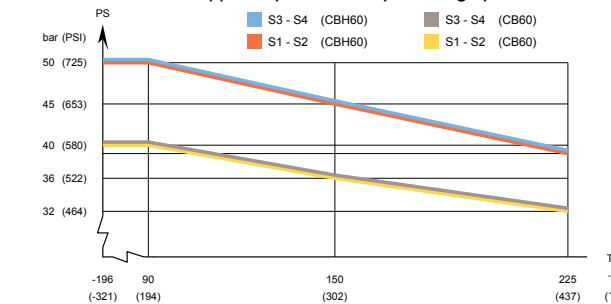
Dimensional drawing

Measurements in mm (inches)

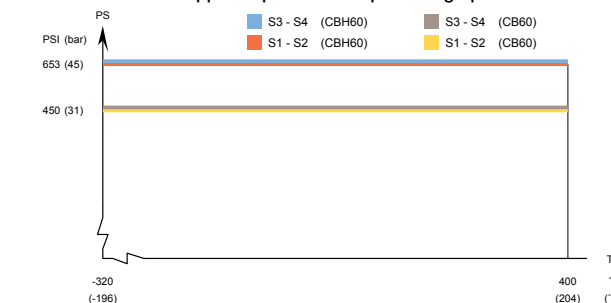


Design pressure and temperature

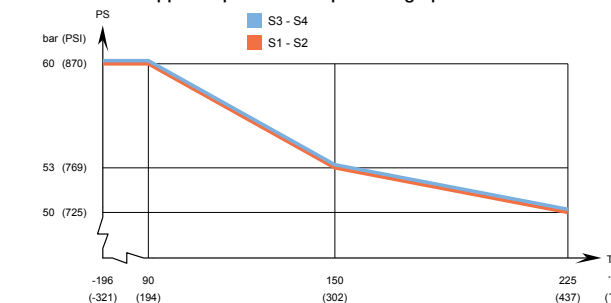
CB60/CBH60 – PED approval pressure/temperature graph



CB60/CBH60 – UL approval pressure/temperature graph



CBP60 – PED approval pressure/temperature graph



Designed for full vacuum.

Alfa Laval plate heat exchangers are available with a wide range of pressure vessel approvals. Please contact your Alfa Laval representative for more information.

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Alfa Laval CB110 / CBH110 / CBP110

Brazed plate heat exchanger

Introduction

Alfa Laval CB brazed plate heat exchangers provide efficient heat transfer with a small footprint.

Applications

- HVAC heating and cooling
- Refrigeration
- Oil cooling
- Industrial heating and cooling

Benefits

- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free

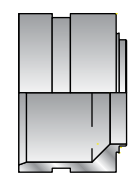
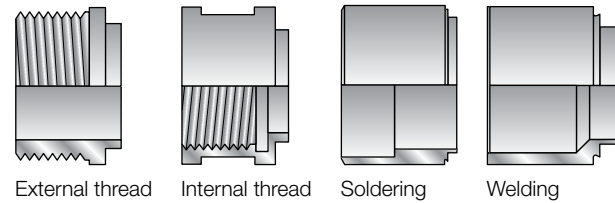
Design

The brazing material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and longest possible service life.

Different pressure ratings are available for different needs.

Based on standard components and a modular concept, each unit is custom-built to meet the specific requirements of each individual installation.

Examples of connections



Grooved connection



Technical data

Standard materials

Cover plates	Stainless steel
Connections	Stainless steel
Plates	Stainless steel
Brazing filler	Copper

Dimensions and weight

Dimensions and weight ¹

A measure (mm)	15 + (2.56 * n)
A measure (inches)	0.59 + (0.10 * n)
Weight (kg) ²	4.82 + (0.35 * n)
Weight (lb) ²	10.63 + (0.77 * n)

¹ n = number of plates

² Excluding connections

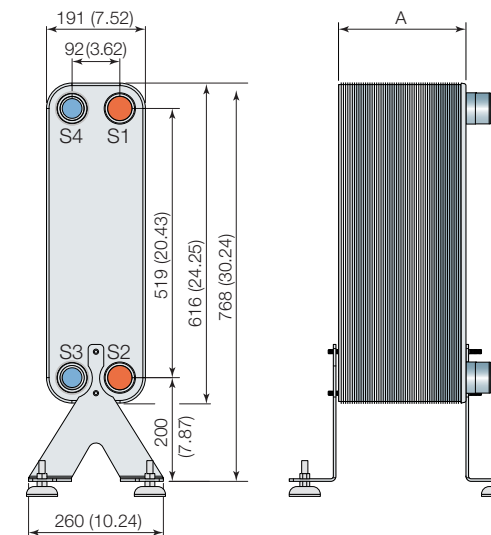
Standard data

Volume per channel, litres (gal)	0.21 (0.0555)
Max. particle size, mm (inch)	1.2 (0.047)
Max. flowrate ¹ m ³ /h (gpm)	51 (224.5)
Flow direction	Parallel
Min. number of plates	10
Max. number of plates	240

¹ Water at 5 m/s (16.4 ft/s) (connection velocity)

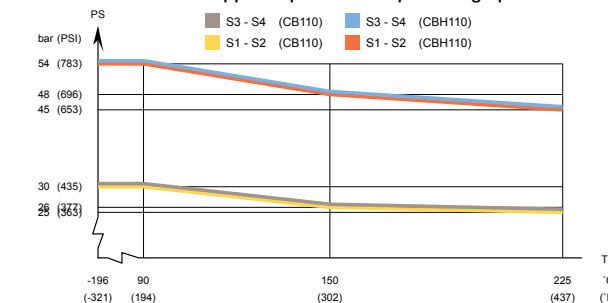
Dimensional drawing

Measurements in mm (inches)

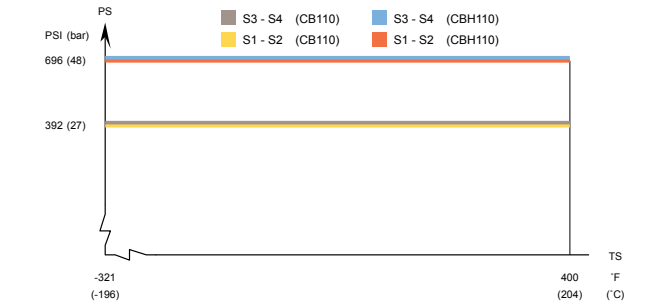


Design pressure and temperature

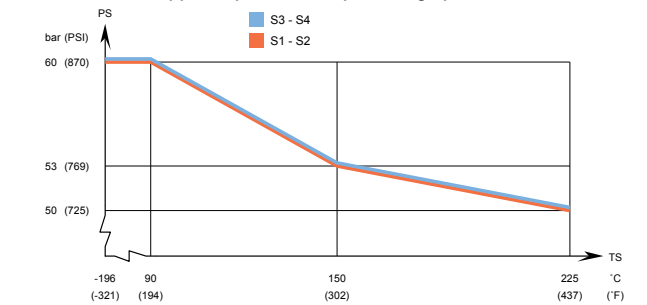
CB110/CBH110 – PED approval pressure/temperature graph



CB110/CBH110– UL approval pressure/temperature graph



CBP110 – PED approval pressure/temperature graph



Designed for full vacuum.

Alfa Laval plate heat exchangers are available with a wide range of pressure vessel approvals. Please contact your Alfa Laval representative for more information.

NOTE: Values above are to be used as an indication. For exact values, please use the drawing generated by the Alfa Laval configurator or contact your local Alfa Laval representative.

Marine approvals

CBM110 can be delivered with marine classification certificate (ABS, BV, CCS, ClassNK, DNV, GL, LR, RINA, RMRS)



Alfa Laval CB16 / CBH16

Brazed plate heat exchanger

Introduction

Alfa Laval CB brazed plate heat exchangers provide efficient heat transfer with a small footprint.

Applications

- HVAC heating and cooling
- Oil cooling
- Industrial heating and cooling

Benefits

- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free

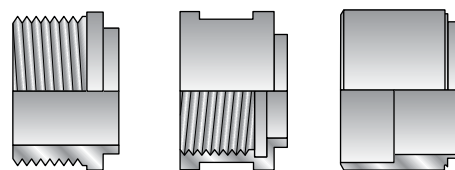
Design

The brazing material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and longest possible service life.

Different pressure ratings are available for different needs.

Based on standard components and a modular concept, including symmetric and asymmetric channels, each unit is custom-built to meet the specific requirements of each individual installation.

Examples of connections



External thread Internal thread Soldering



Technical data

Standard materials	
Cover plates	Stainless steel
Connections	Stainless steel
Plates	Stainless steel
Brazing filler	Copper

Dimensions and weight

Dimensions and weight ¹	
A measure (mm)	7 + (2.16 * n)
A measure (inches)	0.28 + (0.09 * n)
Weight (kg) ²	0.138 + (0.04 * n)
Weight (lb) ²	0.30 + (0.09 * n)

¹ n = number of plates

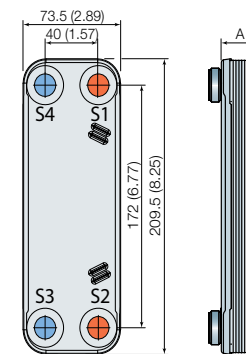
² Excluding connections

Standard data	
Volume per channel, litres (gal)	A (S1-S2): 0.03004 (0.0079) A (S3-S4): 0.02425 (0.0064) H: 0.02716 (0.0072)
Max. particle size, mm (inch)	1.1 (0.043)
Max. flowrate ¹ m ³ /h (gpm)	4.1 (18.1)
Flow direction	Parallel
Min. number of plates	4
Max. number of plates	60

¹ Water at 5 m/s (16.4 ft/s) (connection velocity)

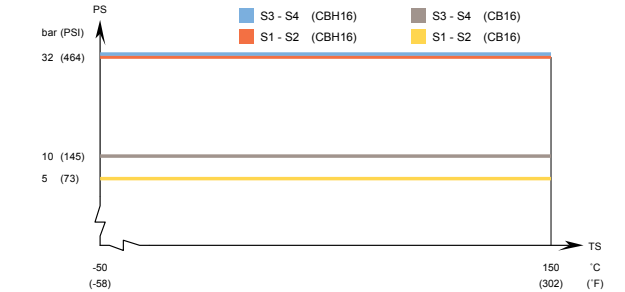
Dimensional drawing

Measurements in mm (inches)

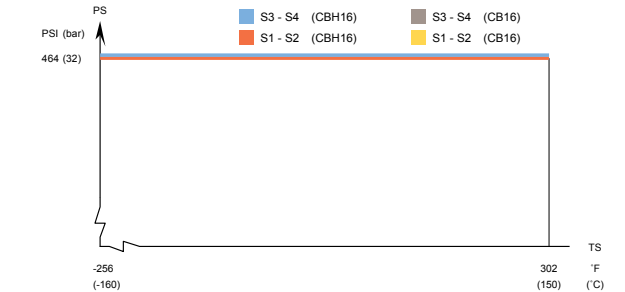


Design pressure and temperature

CB16/CBH16 – PED approval pressure/temperature graph



CBH16AQ – UL/CRN approval pressure/temperature graph



Designed for full vacuum.

Alfa Laval plate heat exchangers are available with a wide range of pressure vessel approvals. Please contact your Alfa Laval representative for more information.

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Alfa Laval CBH18DWAQ

AHRI Certified® brazed plate heat exchanger

Introduction

Alfa Laval CBAQ is AHRI Certified® through the Liquid to Liquid Brazed & Fusion-bonded Plate Heat Exchangers (LLBF) Certification Program which ensures thermal performance in accordance with the product specifications.

Alfa Laval CB brazed plate heat exchangers provide efficient heat transfer with a small footprint.

Double wall plates are used as an extra precaution to avoid intermixing of fluids.

Applications

- HVAC heating and cooling

Benefits

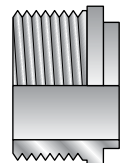
- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free
- Leak detection
- No fluid contamination

Design

The brazing material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and longest possible service life.

The double wall construction provides external leak detection and minimizes the risk of mixing the fluids. The thermal performance is similar to single wall heat exchanger.

Examples of connections



External thread



Technical data

Standard materials

Cover plates	Stainless steel
Connections	Stainless steel
Plates	Stainless steel
Brazing filler	Copper

Dimensions and weight

Dimensions and weight ¹

A measure (mm)	12.2 + (2.27 * n)
A measure (inches)	0.48 + (0.09 * n)
Weight (kg) ²	0.6 + (0.13 * n)
Weight (lb) ²	1.32 + (0.29 * n)

¹ n = number of plates

² Excluding connections

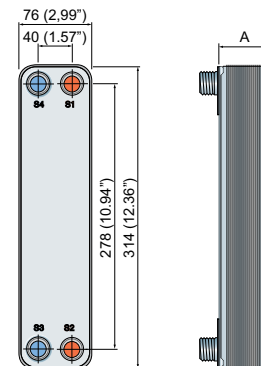
Standard data

Volume per channel, litres (gal)	0.0335 (0.0088)
Max. particle size, mm (inch)	0.6 (0.024)
Max. flowrate ¹ m ³ /h (gpm)	4.1 (18.1)
Flow direction	Parallel
Min. number of plates	10 (DW)
Max. number of plates	52 (DW)

¹ Water at 5 m/s (16.4 ft/s) (connection velocity)

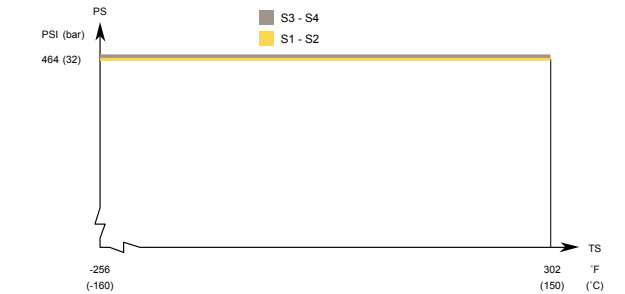
Dimensional drawing

Measurements in mm (inches)

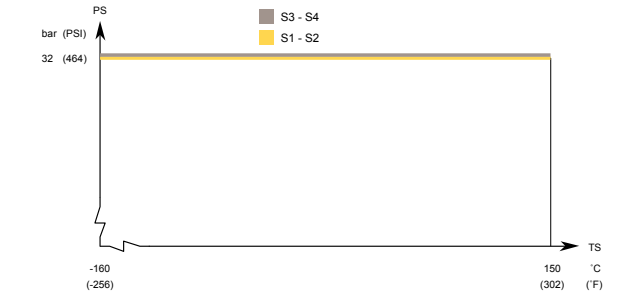


Design pressure and temperature

CBH18DWAQ – UL approval pressure/temperature graph



CBH18DWAQ – PED approval pressure/temperature graph



Designed for full vacuum.

Alfa Laval plate heat exchangers are available with a wide range of pressure vessel approvals. Please contact your Alfa Laval representative for more information.

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Alfa Laval CB90DWAQ

Brazed plate heat exchanger

Introduction

Alfa Laval CBAQ is AHRI Certified® through the Liquid to Liquid Brazed & Fusion-bonded Plate Heat Exchangers (LLBF) Certification Program which ensures thermal performance in accordance with the product specifications.

Alfa Laval CB brazed plate heat exchangers provide efficient heat transfer with a small footprint.

Double wall plates are used as an extra precaution to avoid intermixing of fluids.

Applications

- HVAC heating and cooling

Benefits

- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free
- Leak detection
- No fluid contamination

Design

The brazing material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and longest possible service life.

The double wall construction provides external leak detection and minimizes the risk of mixing the fluids. The thermal performance is similar to single wall heat exchanger.



Technical data

Standard materials	
Cover plates	Stainless steel
Connections	Stainless steel
Plates	Stainless steel
Brazing filler	Copper

Dimensions and weight

Dimensions and weight ¹	
A measure (mm)	13 + (2.61 * n)
A measure (inches)	0.51 + (0.10 * n)
Weight (kg) ²	3.34 + (0.50 * n)
Weight (lb) ²	7.36 + (1.10 * n)

¹ n = number of plates

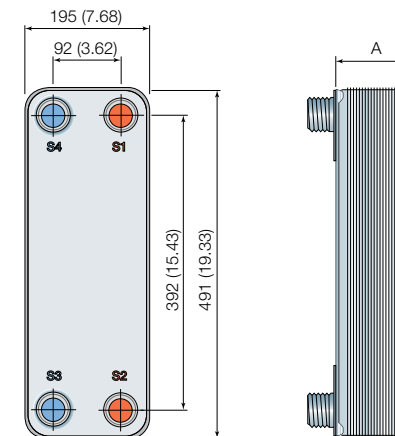
² Excluding connections

Standard data	
Volume per channel, litres (gal)	0.173 (0.0457)
Max. particle size, mm (inch)	1.0 (0.039)
Max. flowrate ¹ m ³ /h (gpm)	37 (162.9)
Flow direction	Parallel
Min. number of plates	10
Max. number of plates	150

¹ Water at 5 m/s (16.4 ft/s) (connection velocity)

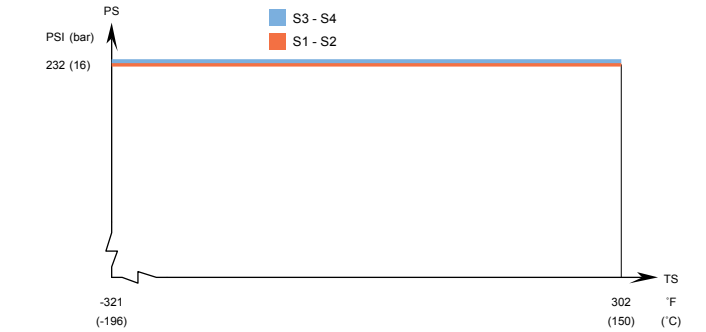
Dimensional drawing

Measurements in mm (inches)



Design pressure and temperature

CB90DWAQ – UL approval pressure/temperature graph



Designed for full vacuum.

Alfa Laval plate heat exchangers are available with a wide range of pressure vessel approvals. Please contact your Alfa Laval representative for more information.

NOTE: Values above are to be used as an indication. For exact values, please use the drawing generated by the Alfa Laval configurator or contact your local Alfa Laval representative.



Alfa Laval CBH18DW

Brazed plate heat exchanger

Introduction

Alfa Laval CB brazed plate heat exchangers provide efficient heat transfer with a small footprint.

Double wall plates are used as an extra precaution to avoid intermixing of fluids.

Applications

- HVAC heating and cooling
- Condenser

Benefits

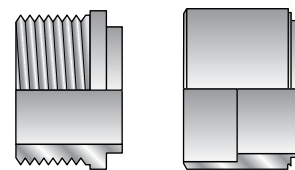
- Compact
- Easy to install
- Self-cleaning
- Low level of service and maintenance is required
- All units are pressure and leak tested
- Gasket free
- Leak detection
- No fluid contamination

Design

The brazing material seals and holds the plates together at the contact points ensuring optimal heat transfer efficiency and pressure resistance. Using advanced design technologies and extensive verification guarantees the highest performance and longest possible service life.

The double wall construction provides external leak detection and minimizes the risk of mixing the fluids. The thermal performance is similar to single wall heat exchanger.

Examples of connections



External thread Soldering



Technical data

Standard materials	
Cover plates	Stainless steel
Connections	Stainless steel
Plates	Stainless steel
Brazing filler	Copper

Dimensions and weight

Dimensions and weight ¹	
A measure (mm)	12.2 + (2.27 * n)
A measure (inches)	0.48 + (0.09 * n)
Weight (kg) ²	0.6 + (0.13 * n)
Weight (lb) ²	1.32 + (0.29 * n)

¹ n = number of plates

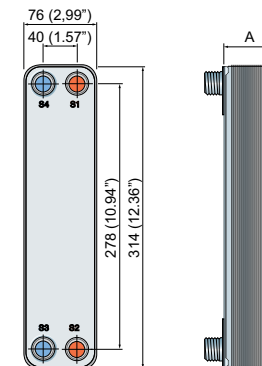
² Excluding connections

Standard data	
Volume per channel, litres (gal)	0.0335 (0.0088)
Max. particle size, mm (inch)	0.6 (0.024)
Max. flowrate ¹ m ³ /h (gpm)	4.1 (18.1)
Flow direction	Parallel
Min. number of plates	10 (DW)
Max. number of plates	52 (DW)

¹ Water at 5 m/s (16.4 ft/s) (connection velocity)

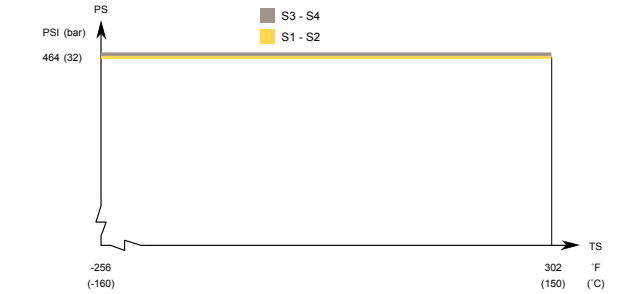
Dimensional drawing

Measurements in mm (inches)

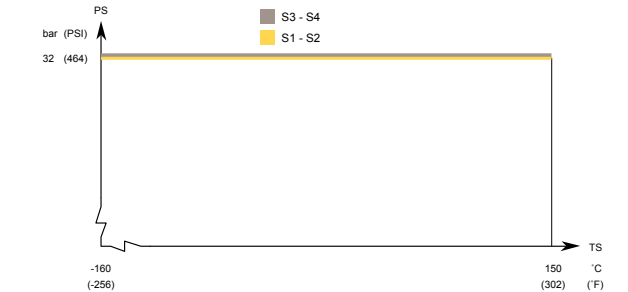


Design pressure and temperature

CBH18DW – UL approval pressure/temperature graph



CBH18DW – PED approval pressure/temperature graph



Designed for full vacuum.

Alfa Laval plate heat exchangers are available with a wide range of pressure vessel approvals. Please contact your Alfa Laval representative for more information.

NOTE: Values above are to be used as an indication. For exact values, please use the drawing generated by the Alfa Laval configurator or contact your local Alfa Laval representative.

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Alfa Laval in brief

Alfa Laval is a leading global provider of specialized products and engineering solutions.

Our equipment, systems and services are dedicated to helping customers to optimize the performance of their processes. Time and time again.

We help our customers to heat, cool, separate and transport products such as oil, water, chemicals, beverages, foodstuffs, starch and pharmaceuticals.

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