Alfa Laval in brief

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

Our worldwide organization works closely with customers in almost 100 countries to help them stay ahead.

How to contact Alfa Laval

Up-to-date Alfa Laval contact details for all countries are always available on our website at www.alfalaval.com

ECR00057EN 0406

Brazed plate heat exchangers

A product catalogue for HVAC

Inside view

Five sound reasons to buy your BHEs from the market leader

Alfa Laval invented the world's first BHE in 1977 and since then has made continuous developments to optimize its performance and reliability.

1. Designed to withstand exhausting conditions
As the world leading BHE manufacturer, Alfa Laval has long experience in designing BHEs that will withstand exhausting pressure and temperature fatigue conditions. Years of R&D, unique patented solutions and innovative product design, coupled with an extensive testing program, ensure that the durability and lifetime of an Alfa Laval BHE will be hard to match.

2. A wide range of solutions
Alfa Laval BHEs come in a wide range of sizes and capacities. Different plate patterns and connections are available for various duties and performance specifications, and the BHE can be designed as a one pass, two pass or multipass unit. Let us advise you on the correct solutions for your specific needs. You can choose a standard configuration BHE, or a unit designed according to your own specific needs. The choice is entirely yours.

3. Full compliance with PED
All Alfa Laval BHEs comply with the European Pressure Vessel Safety Directive, PED, in terms of mechanical and materials specifications. They can also be delivered according to other relevant standards. Various national codes are also available.

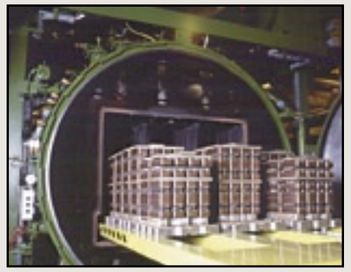
4. Fast deliveries and service worldwide
Alfa Laval is a truly global company. Our regional distribution centres serve Alfa Laval facilities and distributors worldwide, ensuring fast delivery to customers. Wherever you are, talk to us, we're only a phone call away.

5. A partner you can trust
Genuine application know-how and long experience make Alfa Laval the ideal business partner for heating and cooling. Rely on us to supply the most cost-effective solution for your specific needs – we won't let you down.

Choosing Alfa Laval makes sound financial sense

Compact, reliable and cost effective

The Alfa Laval brazed plate heat exchanger is the original BHE. Alfa Laval's first plate heat exchanger was introduced to the dairy industry in 1931. As a development from the traditional gasketed PHE, Alfa Laval introduced the world's first BHE in 1977 and since then has made continuous developments to optimize its performance and reliability. Alfa Laval's unique experience is transformed into BHEs with unsurpassed quality using well-proven materials and advanced designs.

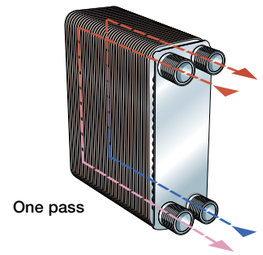


- **Fouling minimised by the turbulent flow, which results in a self-cleaning effect**
- **All BHEs are leak and pressure tested before delivery**
- **75 years of heat transfer technology experience included in each BHE**
- **Small footprint and low weight, 10-20% of a traditional Shell & Tube**
- **High temperature and pressure durability**
- **Excellent fatique resistance**

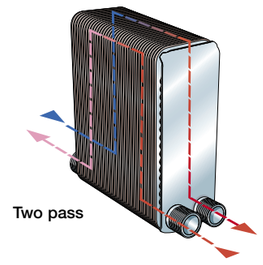
Construction
Brazing the stainless steel plates together eliminates the need for sealing gaskets and thick frame plates. The brazing material seals as well as holds the plates together at the contact points. Alfa Laval's brazed heat exchangers are always brazed at all contact points, which ensures optimal heat transfer efficiency and pressure resistance. The plates are designed to achieve longest possible lifetime.

Since virtually all the material is used for heat transfer, the BHE is very compact in size, and has low weight and a small hold-up volume.

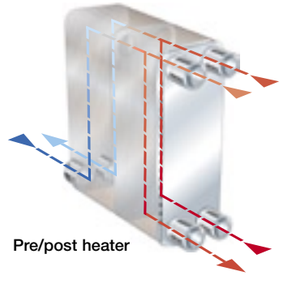
Material
The brazed plate heat exchanger (BHE) consists of thin corrugated stainless steel plates (AISI 316) which are vacuum brazed together using copper as the brazing material.



One pass



Two pass

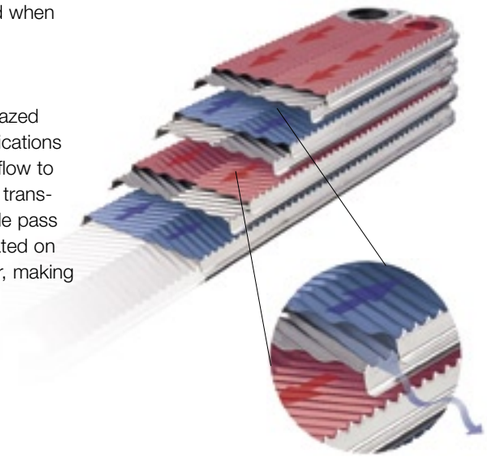


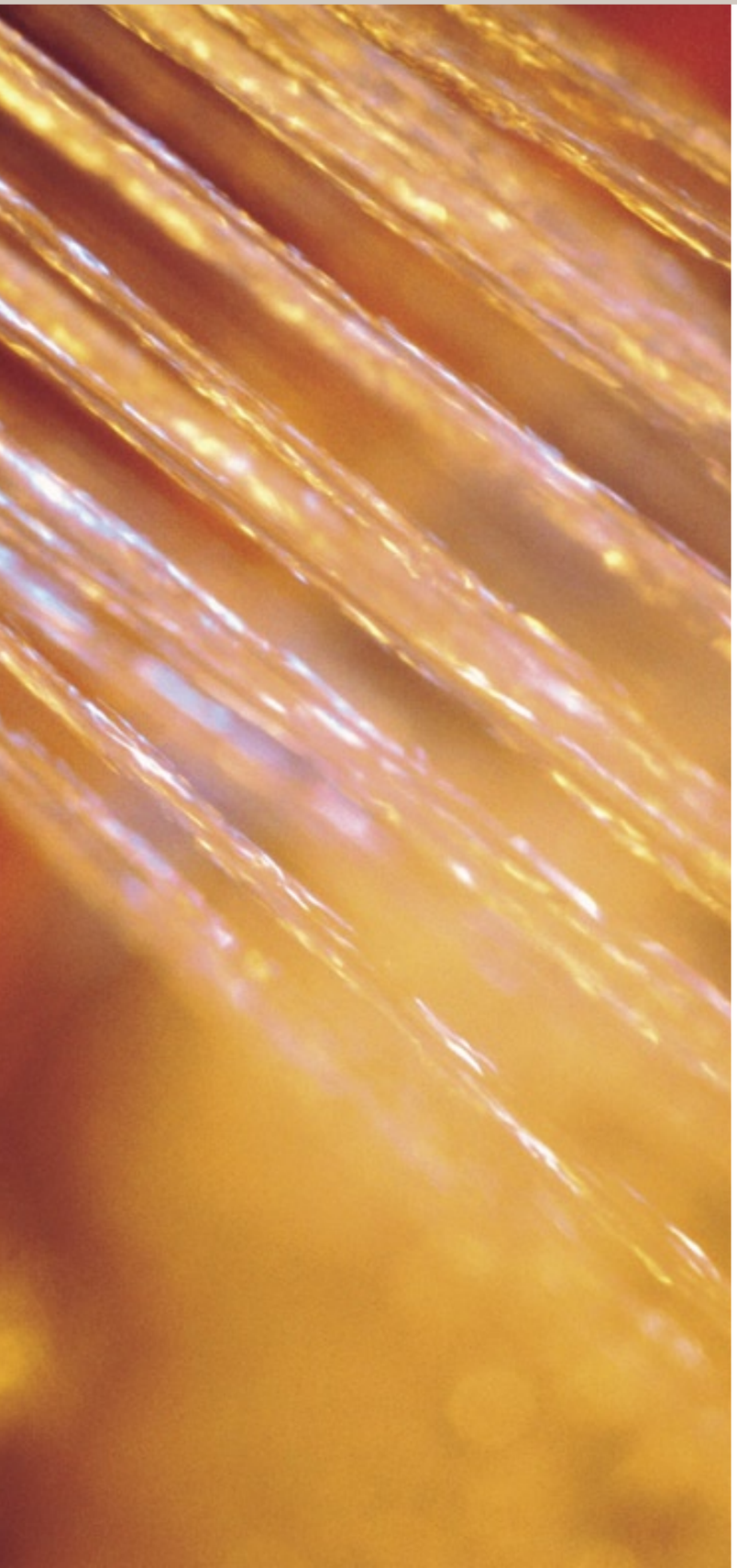
Pre/post heater

Design options
The design options of the brazed heat exchanger are extensive. Different plate patterns are available for various duties and performance specifications. The BHE can be designed as a one pass, two pass or multi pass unit. A wide range of connections are available, and there is also the option of choosing the location of the connection. Alfa Laval offers a wide range of standard heat exchanger models and sizes, tailor-made for HVAC applications, which are available from stock. Customer-specific designs can be offered when requested.

Flow principle
The basic flow principle in a brazed heat exchanger for HVAC applications is parallel and counter current flow to achieve the most efficient heat transfer process. In a standard single pass design all connections are located on one side of the heat exchanger, making installation very easy.

Mix-proof design
In applications where legal regulations or other reasons call for extra security, Alfa Laval's patented double wall design for brazed units can be used. When using double walls, the two media are separated by two stainless steel plates. In the unlikely event of an internal leakage, it will be visible on the outside of the heat exchanger and no mixing of the two fluids will occur.





Focus on fatigue
The expected lifetime of the heat exchanger is influenced by many factors, especially temperature and pressure variations in load conditions. In the case of high loads (pressure peaks, fast temperature changes), this can lead to fatigue failures, with a leaking BHE as the consequence.

Alfa Laval has extensive test facilities for pressure and temperature fatigue. The fatigue characteristics of each model are measured and analysed over and over again. With the help of the statistical data from our Fatigue Analysis Program we can estimate the lifetime of a BHE in a certain application.

The plate material in the heat exchanger is designed in order to match the demands on pressability as well as “brazeability” and fatigue durability. Metallurgical and design factors influencing fatigue are areas of constant focus for Alfa Laval’s R&D engineers when developing BHEs.

Years of continuing studies of the fatigue phenonema has put Alfa Laval in the forefront when it comes to developing and produce long lasting BHEs.

Production
Alfa Laval leads the development towards optimal quality. We do it by advanced production technology in high volumes. We do it with new technology, through constant research and development. We do it in delivery and service. As a leading global manufacturer we do it by offering a complete product range of heat exchangers.

Our knowledge gives you the best solutions, products with higher technical performance and a focus on energy savings. Quality must prevail through the whole chain from development to after sales. The brazed heat exchangers are individually leak and pressure tested to ensure first class quality, and Alfa Laval has approvals from all major approval bodies.

Applications

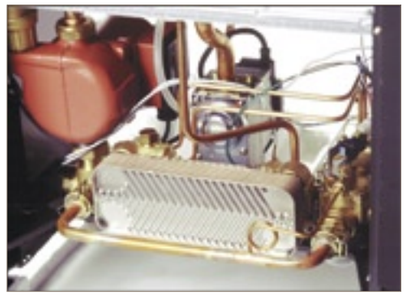
Brazed plate heat exchangers ar e commonly used in all types of heating and cooling applications with demands on comfort, reliability and safety. Heating and cooling, in most cases, is a matter of providing a comfortable indoor environment, whether at home, at work or in a public facility. Heating duties can also involve tap water, swimming pools, greenhouses etc.

Heating and district heating
General heating applications are often divided into heating and district heating, based on several major differences. Heating systems normally have the heat source inside the building and supply heat to a single building. The heat is normally provided from a boiler, but it can also come from heat pumps and solar panels. In contrast, district heating systems distribute hot water or steam to a number of buildings. The heat can be provided from a variety of sources, including geothermal sources, co-generation plants, waste heat from industry, and purpose-built heating plants. Whether for heating or district heating, the BHE has its natural place in the system.

Cooling and district cooling
Cooling applications are often divided into local and district cooling. Local cooling systems normally have the cooling source inside the building; the cooling source usually being a chiller, a dry liquid cooler or, if available, some sort of free cooling. The cold from the source water is transferred to the buildings internal system in the BHE. District cooling uses one central source to supply cooling to several buildings. This will create both financial and environmental benefits. Whether for local cooling or district cooling the BHE has its natural place in the system.

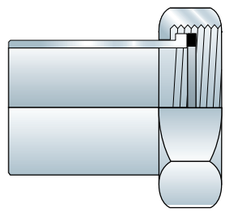
Tap water heating
The advantages of using a brazed plate heat exchanger to produce hot tap water compared to traditional coil-in-tank systems are numerous. The BHE instantly heats the tap water to the required temperature when it passes through the heat exchanger. This means that hot water is available immediately and at any time. Another benefit with using plate heat exchangers for hot tap water production is that the system requires much less space than a traditional tank and coil system. If solar energy is used to produce hot tap water a BHE makes it possible to separate the treated water in the solar panels from the tap water circuit. Also, scaling problems and corrosion risks in the solar panels are reduced when separating the circuits with a BHE.

The compactness of the BHE makes them easy to install in district heating and cooling modules, both in large and small capacity systems.



The small hold-up volume means that the tap water heater is easy to regulate, and provides instant hot water.

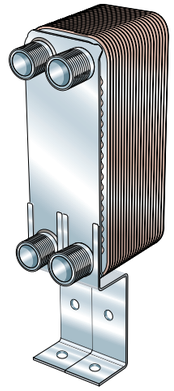
Cleaning-In-Place (CIP)
All types of heat exchangers need to be cleaned regularly to remove deposits such as scale, sludge and microorganisms. Alfa-CIP is a convenient solution that carefully removes the deposit on all heat transfer surfaces in the heat exchanger. Alfa-CIP 75, 200 and 400 are constructed in stainless steel using high quality components (pumps, valves etc.) according to ISO 9001 and with the CE-mark. The smaller units Alfa-CIP 20 and 40 are made of industrial grade plastic. Alfa-CIP is mobile due to its compact design. The units have reversible flow, and Alfa-CIP 75, 200 and 400 also have a built in heater. All cleaning detergents used by Alfa Laval are environmentally friendly and do not damage the equipment.

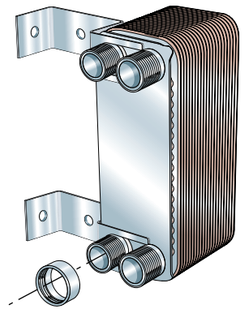


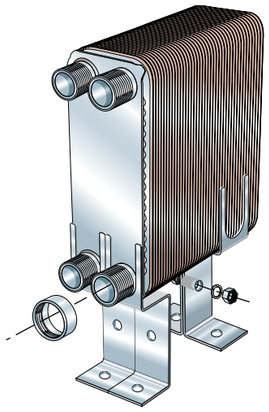
Couplings for welding or soldering
The couplings fits on the threaded connections of the units. Future service is then easy made by dismantling the heat exchanger from the pipes via the couplings. This connection is approved in most countries when weld or flange connection is required. A flat washer is used as sealing between the coupling and connections.

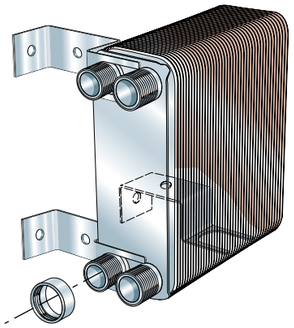
Insulation
The heat exchanger insulation is easily assembled and dismantled. The Alfa Laval insulation provides protection from the heat pack and the climate in the operating room will be dry and not too hot. The insulation material used for most models is polyurethane, which has a thermal conductivity of 0,031 W/mK. Depending on the temperature requirements two types of insulation are available for most models, max 110ºC and max 140ºC.

Feet and mounting brackets
CB27 and larger units can be delivered with feet or mounting brackets. These make the installation work easier and minimise stresses in the connected pipes. The unit can also be bolted to the floor. CB27 and CB52 can be wall mounted using the standard feet frame. CB200 and CB300 are always supplied with feet and a lifting hook to ensure safe and functional installation.









Start up procedure

1. Before starting any pump, check whether instructions exist stating which pump should be started first.
2. Check that the valve between the pump and the heat exchanger is closed.
3. Check that the valve at the exit, if there is one, is fully open.
4. Open the ventilation.
5. Start the pump.
6. Open the valve slowly.
7. When all the air is out, close the ventilation.
8. Repeat the procedure for the other side.

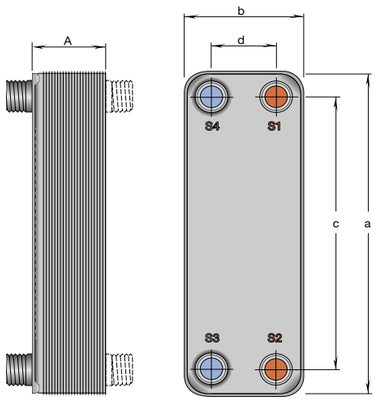
Shut down procedure

1. First establish whether instructions exist as to which side should be stopped first.
2. Slowly close the valve controlling the flow rate of the pump you are about to stop.
3. When the valve is closed, stop the pump.
4. Repeat the procedure for the other side.
5. If the heat exchanger for any reason is shut down for a longer period, more than a few days, it should be drained.

Installation
In HVAC applications it is from a performance point of view recommended to install the heat exchanger so that a counter current flow is obtained. It does not matter if the heat exchanger is mounted vertically or horizontally, as long as no change of phase takes place (evaporation/condensation). If drainage of the heat exchanger is needed for some reason, please take this into consideration when positioning the heat exchanger. The heat exchanger can be mounted with brackets or standing on feet supplied by Alfa Laval. It is important to minimise vibrations or pulsations from being transferred from the pipes to the heat exchanger. The usage of flexible hoses is one way of reducing stresses caused by vibrations, and stresses from the piping system.

Operation
Adjustments in flow rates to maintain correct temperatures or pressure drops should be made slowly in order to prevent pressure shocks to the system. Therefore fast closing valves should not be used unless the pipes in the system are very short. Any problems with keeping the performance of the heat exchanger may be caused by changing temperature conditions, changing flow rates or by fouling.

Maintenance
The heat transfer through the plates can be seriously reduced by the formation of deposits of various kinds on the plate surfaces. Even if the highly turbulent flow gives a strong resistance to the formation of deposits the turbulence can not completely eliminate fouling. Thanks to CIP (Cleaning In Place) it is possible to remove calcium deposits and other forms of scaling from the plate surfaces in an easy and effective way. Different cleaning solutions can be used depending on the type of deposits. Alfa Laval has a world-wide service organisation. Service is available in 130 countries at 15 major service centres and a network of service stations around the globe.

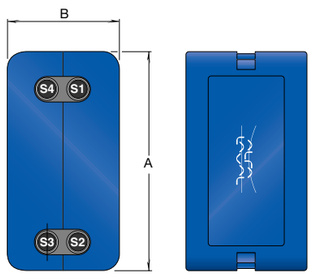


BHE data & dimensions	BP10	CB14	CB20	CB27	CB51-DW	CB52	CB76	CB77	CB100	CB200	CBH200	CB300
Max./min. design temperature (°C)	120/3	175/-160	175/-160	175/-160	175/-160	175/-160	175/-160	175/-160	175/-160	175/-160	175/-160	175/-160
Max. design pressure S3-S4/S1-S2 (bar)*	10/3	32/32	16/16	32/32	16/16	32/32	32/32[1]	27/16	16/16	16/16	25/25	27/16
Volume/channel (litres)	0,022	0,02	0,028	0,05	0,095	0,095	0,25[2] /0,25	0,25	0,2	0,51	0,51	0,7/0,58[3]
Max. flowrate (m^3/h)**	2,8/2,0	3,6	8,1	12,7/7,5	8,1	12,7/7,5	39	63/34	70	102	102	140 / 60
Height, a, (mm)	190	208	324	310	526	526	618	618	491	742	742	990
Width, b, (mm)	83	78	94	111	111	111	191	191	250	324	324	366
Vertical connection distance, c, (mm)	154	172	270	250	466	466	519	519	378	622	622	816 / 861
Horizontal connection distance, d, (mm)	40	42	46	50	50	50	92	92	138	205	205	213,5
Plate pack length, A, (mm)	(n*2,3)+7	(n*2,25)+8	(n*1,5)+8	(n*2,4)+9	(n*2,4)+10	(n*2,4)+10	(n*2,85)+10[3]	(n*2,85)+10	(n*2,2)+12	(n*2,7)+11	(n*2,7)+14	(n*2,65)+11
Weight, empty, (kg)	(n*0,04)+0,2	(n*0,05)+0,7	(n*0,08)+0,9	(n*0,13)+1,2	(n*0,23)+1,9	(n*0,23)+1,9	(n*0,44)+7	(n*0,44)+7	(n*0,38)+13	(n*0,6)+29	(n*0,6)+32	(n*1,26)+40
Standard connection, external thread (inch)	3/4" / 1/2"	3/4"	1"	1 1/4" / 1"	1"	1 1/4" / 1"	2"	3" weld/ 2"	ISOG2"/2 1/2"	3"	3"	4" / 2 1/2"
Plate material	AISI 316	AISI 316	AISI 316	AISI 316	AISI 316	AISI 316	AISI 316	AISI 316	AISI 316	AISI 316	AISI 316	AISI 316
Connection material	AISI 316/cs	AISI 316	AISI 316	AISI 316	AISI 316	AISI 316	AISI 316	AISI 316	AISI 316	AISI 316	AISI 316	AISI 316
Brazing material	Copper	Copper	Copper	Copper	Copper	Copper	Copper	Copper	Copper	Copper	Copper	Copper

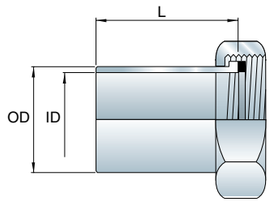
* According to PED
** Water at 5 m/s (connection velocity)
n=number of plates

[1] M and L channels 27/27 bar
[2] E channel 0,18/0,18; A channel 0,18/0,25
[3] A channels (n*2,5)+10
E channels (n*2,2)+10

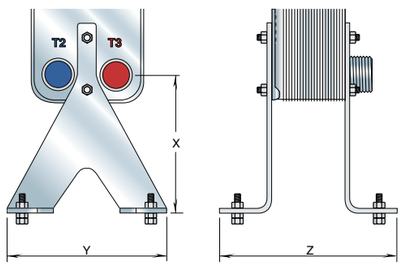
[2] S3/S4



BHE insulation	BP10	CB14	CB20	CB27	CB51-DW	CB52	CB76/77	CB100	CB200	CBH200	CB300
Type A: Polyurethane/blue ABS cover											
Height, A, (mm)	–	–	384	360	588	588	670	555	811	811	1094
Width, B, (mm)	–	–	157	182	182	182	240	315	370	370	470
Thickness (mm)	–	–	30	30	30	30	30	30	27	27	50
Max. temperature (°C)	–	–	140	140	140	140	140	140	140	140	140
Type B: Black Polypropylene/no cover									[1] Type C: Mineral wool/blue ABS cover		
Height, A, (mm)	–	260	384	350	565	565	–	–	–	–	–
Width, B, (mm)	–	135	140	153	153	153	–	–	–	–	–
Thickness (mm)	–	20	20	20	20	20	–	–	–	–	–
Max. temperature (°C)	–	110	110	110	110	110	–	–	–	–	–



Couplings for welding or soldering	BP10	CB14	CB20	CB27/CB51-DW/CB52	CB76 CB76/77 CB77	CB100	CB200	CBH200	CB300
Size (inch)	–	3/4"	3/4" and 1"	1" and 1 1/4"	2" and cs flange	2" and cs flange	–	–	–
Pipe length carbon steel, L, (m m)	–	23	50	50	50	50	–	–	–
OD/ID (mm) carbon steel pipe	–	21,3/17	26,9/22	26,9/22 and 33,7/28	48,3/44 and 60,3/54,3	48,3/44 and 60,3/54,3	–	–	–
Pipe length brass, L, (mm)	–	16	20	20 and 50	44	44	–	–	–
OD/ID (mm) brass pipe	–	18/15	25/22	25/22 and 32/28	48/42	48/42	–	–	–



Feet	BP10	CB14	CB20	CB27/CB51-DW/CB52	CB76/77	CB100	CB200	CBH200	CB300
Height, X, (mm)	–	–	–	–	199	199	178	178	217[S2]/194,5[S3]
Width, Y, (mm)	–	–	–	–	260	260	400	400	466
Length, Z, (mm)	–	–	–	–	A+180	A+180	A+160	A+160	A+260
Wall mounted	–	–	–	–	no	no	no	no	no
Material	–	–	–	–	galvanized	galvanized	galvanized	galvanized	galvanized

Mounting brackets	BP10	CB14	CB20	CB27/CB51-DW/CB52	CB76/77	CB100	CB200	CBH200	CB300
Height, X, (mm)	–	–	–	155	199	–	–	–	–
Width, Y, (mm)	–	–	–	100	182	–	–	–	–
Wall mounted	–	–	–	yes	no	–	–	–	–
Material	–	–	–	galvanized	galvanized	–	–	–	–