

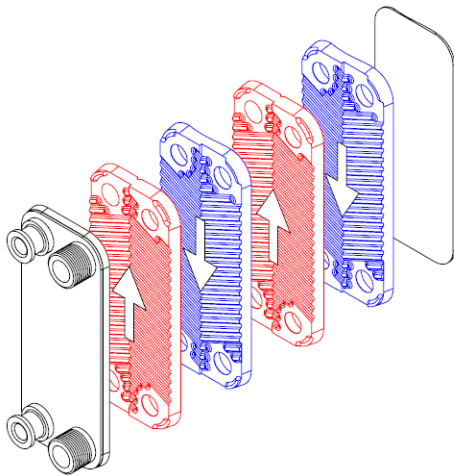
ABX BRAZED PLATE HEAT EXCHANGERS | INSTALLATION AND OPERATING INSTRUCTIONS

File No: 113.82
Date: JULY 15, 2020
Supersedes: 113.82
Date: OCTOBER 28, 2011

WARNING: BEFORE PROCEEDING WITH INSTALLATION AND OPERATION, READ ENTIRE MANUAL CAREFULLY. FAILURE TO DO SO CAN CAUSE INJURY OR PROPERTY DAMAGE

1. WORKING PRINCIPLE

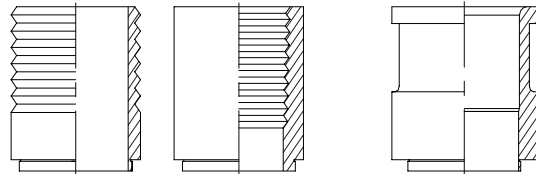
Armstrong's Brazed Plate Heat Exchanger (ABX) consists of chevron plates of acid-resistant stainless steel. Every other plate is reversed so the ridges of the herringbone pattern intersect one another on adjacent plates forming a lattice on contact points. When these points are vacuum brazed together, two separate systems of channels for two media flow in counter-current are formed. The lattice structure causes vigorous turbulence, thus ensuring maximum heat transfer.



The ABX is a highly efficient, corrosion-resistant, and pressure resistant heat exchanger. The standard ABX is designed to meet 435 psi (30 bar), 392°F (200°C), with the largest model capable of handling a maximum flow capacity of 600 gallons/min (4.2 liter/sec).

WARNING: The Heat Exchanger may have sharp edges. Exercise caution when handling

2. CONNECTION TYPES



THREADED CONNECTIONS

SOLDERED CONNECTIONS

WARNING: During operation do not exceed maximum pressure and temperature limits shown on the nameplate. Failure to do so can cause injury or property damage.

The temperature of the brazing or welding process must not exceed the melting point of the internal brazing material. Use a wet towel around the connection and the late pack to reduce the amount of heat transmitted to the pack during installation.

- 1 Clean the soldering assembly surface at the copper pipe and heat exchanger connections. Remove oil or other buildup with a degreasing agent. Polish the surfaces to remove oxide.
- 2 Apply the flux to the surface with a brush to remove and revert oxidation.
- 3 For refrigerant applications, use dry nitrogen gas on the refrigerant side.
- 4 Heat the soldering area to the soldering temperature, about 649°C (1,200°F). Temperatures above this can melt the brazing materials and result in damage.
- 5 Keep the pipe in a fixed position and apply the filler material

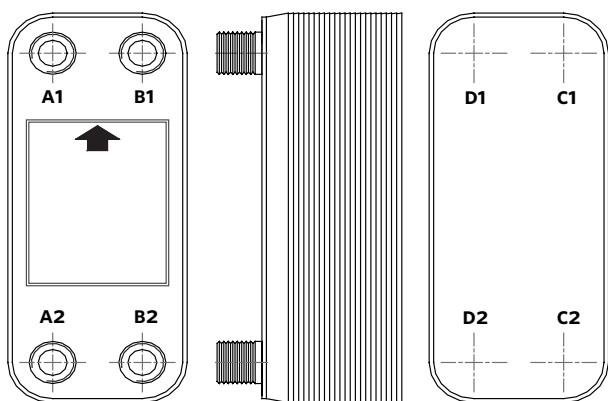
3. INSTALLATION GUIDE

In order to achieve high thermal efficiency and high heat transfer rates, ABX has to be installed in a counter flow direction.

Always install your ABX vertically especially for a refrigerant system. This is done to secure the ABX and keep minimum amount of water below the connector.

4. CONNECTION LOCATION

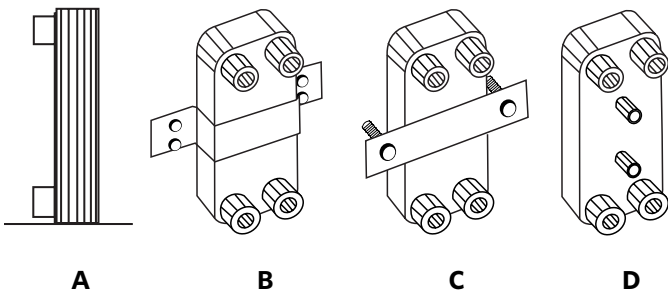
Application	FLUID 1	FLUID 2
Heating, Cooling	COLD WATER A2 → A1	HOT WATER B1 → B2
Evaporator single refrigerant	REFRIGERANT A2 → A1	CHILLER WATER B1 → B2
Condenser	REFRIGERANT A1 → A2	COOLING WATER B2 → B1



5. MOUNTING SUGGESTIONS

There are four different ways to mount the ABX:

- A Bottom support
- B Sheet metal bracket,
- C Crossbar & bolts,
- D Stud bolts



- All items should be supported independently.
- Do not apply excessive forces to the fittings.
- Except for small sized ABX030 model, our ABX cannot be fastened directly to the fittings/piping.
- Use flexible hoses or vibration dampers to reduce pulsation, shock or vibrations that are caused by the operating system.

6. OPERATING INSTRUCTIONS

Start-Up Venting: During the filling process the unit must be vented to eliminate any trapped air. This will assure proper performance and longevity of the unit.

Shut Down: The two sides should be shut down simultaneously and slowly. If this is not possible the hot side should be shut down first. If the unit is shut down for an extended period of time, it must be drained and cleaned. This is especially true if there is a risk of frost or in the presence of any aggressive medium inside the heat exchanger

7. ANTI-FREEZING PROTECTION METHODS FOR BPHE:

Any formation of freezing or icing will damage BPHE and the refrigeration system. The following methods will prevent BPHE evaporation from freezing:

- Use brine (e.g. glycol) when evaporation temperature is close to the freezing point.
- Low working pressure will cause low evaporation temperature. If the evaporation temperature is below 32°F (0°C), it will cause water to freeze. Since the bottom portion has the lowest temperature, it is the most likely spot for the ABX to crack.
- To start the refrigeration system, always start the water pump for a few minutes and then start the compressor. To stop the system, always stop the compressor first and then stop the water pump.

1 Low Pressure Cut-off Switch (LP)

A low-pressure cut-off switch should be installed with properly set values. When the actual evaporation pressure is lower than the setting value, the compressor will be cut off automatically.

2 Low temperature thermostat (LT)

The function of thermostat is to prevent evaporation temperature going under 0°C. If evaporation temperature is always above 0°C, then water has no chance to freeze and expand

3 Water temperature sensor Installation of anti-freeze temperature sensor near the water outlet is another method to prevent the water from freezing. The suggested setting temperature is at 4°C for buffering process

4 Water Flow Switch Installation of a water flow switch in the water circuit can prevent possible ABX freezing up due to low water flow rate. Usually, low water flow rate may be caused by malfunction of water pump, leaking Pipes, pipe blockage due to pipe contamination or dirty filter.

8. FOULING AND CLEANING

Different factors may effect fouling such as fluid velocity, turbulence, flow distribution, surface finish and water quality. Proper maintenance and adequate water treatment can help reduce fouling. Properly sized strainers should be installed when particles are known to exist (strainers with a mesh size of 16-20 will retain particles over 0.04"). In installations where high calcium hardness or fluid contamination is expected, the heat exchanger should be cleaned periodically by flushing, back-flushing and cleaning of the strainers. Two types of fouling are described below:

Scaling Deposits of calcium on the heat transfer surface. Deposits increase with temperatures higher than 60°C (140°F), Calcium content and pH. Maintaining a turbulent flow and lower temperatures can help reduce this type of scaling. Particles Solids in suspension in the heat transfer media.

Fouling is influenced by flow rate and velocity, as well as by the physical size of the particles

Cleaning of fouled plate heat exchanger by back flushing will remove most of the soft debris that is blocked inside. The solution used for back flushing shall be weak acids with concentration less than 5%; one example is citric acid. If the acidity is to high, the copper and stainless steel inside the PHE may be etched or corroded. Before Restarting the system, flush the plate heat exchanger With large amounts of fresh water to purge any Remaining acid solution.

9. WARNINGS

- Explosive, flammable, corrosive, toxic and/or hazardous fluids shall not be used in an ABX.
- When an unknown quality of water is applied to the ABX, filter and strainer should with a 20 mesh sized shall be placed at the water inlet to the ABX.
- Highly chlorinated water and seawater can corrode standard stainless steel plates and copper.
- Solution in the ABX shall have a pH range between 6 and 8.
- Ground water with high sulfuric compound and low pH value may cause gradual damage to the copper braze
- When handling the ABX be aware that exposed metal edges May be sharp and suitable gloves should be warn.

Storage in dry and heated conditions warehouse between 1°C to 50°C.

WARRANTY

Standard Armstrong Warranty applies

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