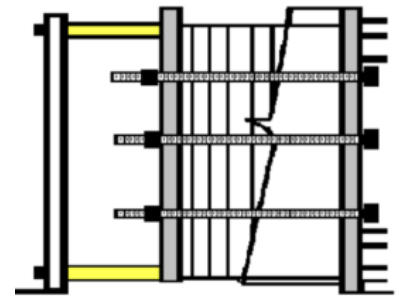


Monday, June 27, 2022

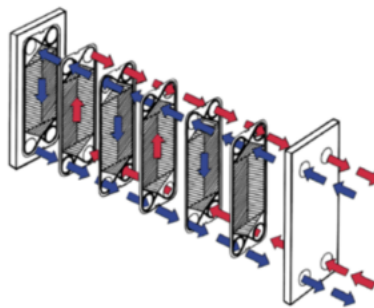
# Heat Exchanger Types and Where to Use Them: Part 2 – Plate Style

Monday Morning Minutes | by Norm Hall, June 27, 2022

Plate heat exchangers have been around for over one hundred years but only made their debut in HVAC systems in the last 50 years. They are used in liquid to liquid and refrigeration applications. There are a variety of assorted styles used in building heating and cooling systems. Today, the R. L. Deppmann Monday Morning Minutes looks at gasketed and brazed plate heat exchangers.

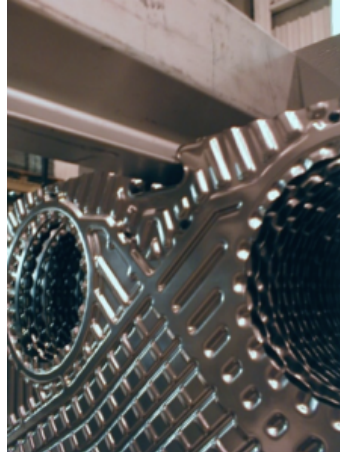


## Gasketed Plate Heat Exchangers



The basic plate heat exchanger consists of a series of thin, corrugated plates with gaskets that are compressed together and bolted together within a frame to create an arrangement of flow channels. The fluids travel through small channels stamped onto thin plates. For

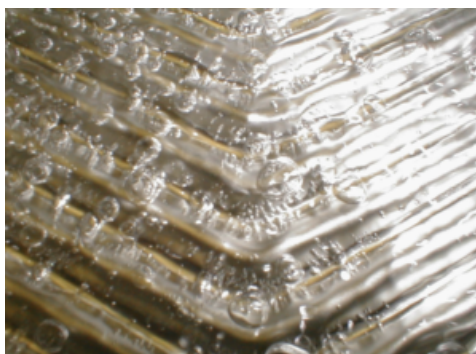
best heat transfer, the fluids normally travel in opposite directions through “V” shaped channels.



Four holes punched in the plate corners form a continuous tunnel which acts as a distribution manifold for the inlet and outlet of each fluid. Each plate is fitted with a gasket. The gasket either confines the fluid to the port or directs the fluid to the heat transfer area of the plate. In a single wall design, the two fluids are separated by these gaskets.

The gaskets allow the plates to be replaceable. The gaskets allow the plates to be cleaned.

## Great Heat Transfer at a Price



Why are plate style heat exchangers used in HVAC and plumbing liquid to liquid applications? Let me digress into a short heat transfer class. There are three outstanding

advantages of this style of exchanger over the shell and tube design introduced last week in [part 1](#).

**Increased Velocity:** The first advantage is superb heat transfer due to high fluid velocity. The “U” values of a heat exchanger for any fluid are, primarily, based on velocity. The more velocity, the more turbulence, and the higher the heat transfer rates. The extremely small passageways in a plate create a heat transfer rate of two to four times that of a shell and tube.

**Increased surface area:** The flow passageways through a plate are smaller. There is less water in the middle of the passage or tube and more volume touching the heat transfer surfaces. In a shell and tube exchanger the length would get exceptionally large to increase the surface area. In a plate, the water moves up and down each plate, one after another. There is more “length” by moving up and down from one plate to another.

**Great cross temperature capability:** The plate exchanger is normally a single pass counterflow device. This means one fluid is always flowing in the opposite direction of the other. This allows the outlet temperature on one side to approach the inlet side on the other. Think of free cooling applications where tower water

**The price you pay:** The price for this additional heat transfer is much higher pressure drops and high concern for the quality of the water.

## Brazed Plate Heat Exchangers

Brazed plate heat exchangers are a series of plates that are brazed together and cannot be separated. The gaskets in the plate exchangers mentioned above provide many advantages.



The gaskets do, at times, provide a disadvantage. Brazed plate exchangers help solve two key issues.

The gasketing process adds cost. Brazed plate exchangers are less expensive. They can also be built faster. These advantages allow the brazed plate technology to be used in smaller loads and residential loads.

Another advantage of brazed plates is the danger caused by a gasket leak. The fluids may mix at that point. The brazed plate avoids this issue since there is no gasket. This opens the opportunity to use the plates in other markets. An example is refrigerant evaporators.

## Plate Exchanger Application

The R. L. Deppmann Monday Morning Minutes have much more information about plate heat exchangers. Here are a few links you may wish to review:

- [Not All Plate Heat Exchangers Are Alike! \(deppmann.com\)](#)
- [Double Wall Plate Heat Exchangers \(deppmann.com\)](#)
- [Gasketed Plate and Frame Accessories \(deppmann.com\)](#)
- [Accessorize Your Plate Exchangers \(Part 2\) | R.L. Deppmann MMM](#)
- [Velocity Limits in Gasketed Plate Heat Exchangers - Part 4 \(deppmann.com\)](#)
- [Two Secrets for Bell and Gossett GPX Plate Heat Exchangers \(deppmann.com\)](#)
- [Michigan Energy Code - Plate Heat Exchanger Testing | RLD \(deppmann.com\)](#)
- [Heat Exchanger Fouling Factors \(deppmann.com\)](#)