

# Brazed Plate Heat Exchangers

## Installation, Operation, Maintenance



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### General description

The VAU Blockbuster VM Series of Brazed Plate Heat Exchangers is designed to achieve the maximum transfer of heat between two media of different temperatures, without allowing the media to mix. The VAU Blockbuster is constructed of several layers of baffled stainless steel plates. The unique stamping pattern of the baffled plates maximizes the effectiveness of the heat transfer. The series, size and number of plates is dependent upon the specific heat transfer requirements of a particular application.

The plates within a VAU Blockbuster Brazed Plate Heat Exchanger are made of AISI 316L (1.4404) stainless steel, pressed and jointed to a plate pack and brazed with a 99.99% pure copper brazing agent using a vacuum oven process.

Each baffled stainless steel plate has an opening in each of the four corners. During the manufacturing process of VAU Blockbuster units, every other baffled stainless steel plate is rotated 180° in order to create two distinct media chambers, or channels.

These two distinct media channels allow for the asymmetric flow of media across a multitude of intersections, created by the unique pattern of the baffled stainless steel plates, and causes high turbulence of the media flowing through the two distinct channels.

The result is a high heat transfer value, as well as a significant reduction of deposits on the plates from the media flowing through the unit, as compared to a shell and tube heat exchanger.

### Application and Installation Considerations

The following points should be observed to ensure the correct installation and operation of the VAU Blockbuster VM Series of Brazed Plate Heat Exchangers.

Because of the potential degradation of the copper brazed joints of the VAU Blockbuster VM Series of brazed plate heat exchangers, distilled water and media containing or forming NH<sub>3</sub> (ammonia), sulphur or of sulphuric acid composition and media containing high levels of halogens (iodine, chlorine, bromine, fluorine, astatine) should not be used.

Media with particulates and/or heavy solids are not appropriate for use with the VAU Blockbuster, as they will cause clogging and early failure of the unit.

To avoid fatigue of the brazed joints and the potential of a failure, installations must be made in a manner to avoid pulsations and vibrations to the unit.

The unit must be installed and operated in a manner which limits bending and twisting torque on the connection ports to the maximums specified within this document.

Do not weld on the VAU Blockbuster. Welding current running through the unit will damage it. **Failure of a unit due to welding on it is NOT covered by our warranty.**

Extreme care must be taken by the installer if pipe connections are soldered directly to the unit. The temperature reached during the soldering process must not approach the melting point of the VAU Blockbuster's internal brazing material.

VAU advises that, where possible, soldered pipe connections should be made to a swivel female by sweat (solder) adapter coupling, which can then be attached to the unit's male threaded port fittings. These adapter couplings are available from VAU. **Failure of a unit due to soldering or welding damage is NOT covered by our warranty.**

In the event of operational shut down periods in excess of approximately 100 hours, draining of both flow channels in the unit is strongly recommended in order to avoid standstill corrosion and clogging.

In installations with media of high calcium hardness, during a shutdown process we recommend shutting down the warm flow channel first, in order to help prevent the build-up of calcium deposits on the surface of the plates within the unit. Calcium deposit fouling accelerates at temperatures above 140° F (60°C). Maintaining higher pressure, resulting in a more turbulent media flow, along with temperatures less than 140° F (60°C) will reduce calcium deposits. Periodic flushing and back-flushing of the unit is recommended when the unit is used with media of high calcium hardness.

With refrigerant applications, to avoid damaging the unit due to freezing, the refrigerant supply should be shut down before the secondary fluid is shut down.

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### Installation and Pipe Connections

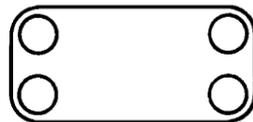
The plate heat exchangers should be installed in a vertical position to provide draining of flow channels (fig. 1).

**correct position  
for mounting**

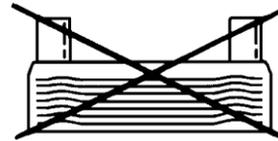


Fig. 1

**only partial draining  
possible**



**no draining  
possible**



Do not exceed the maximum bending moment and torque specifications referened in the table, below. Use of gasket or washer seating swivel female adapters is recommended.

### Torque Specifications

Heat Exchanger type	Port Size/Fitting	Bending moment [ft/lbs]	Torque [ft/lbs]
VM 15	G 3/4 or 3/4" NPT	26	110
VM 30	G 1 or 1" NPT	26	110
VM 55	G 1 or 1" NPT	26	110
VM 60	G 1 1/4 or 1 1/4" NPT	45	265
VM 85	G 1 3/4 or 2" NPT	515	700

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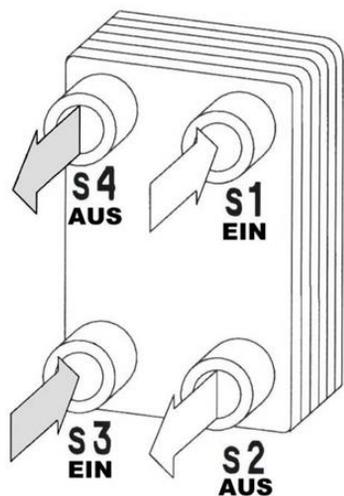


The media must flow through the device in counter flow paths.

Every VAU Blockbuster unit contains a product label, identifying the connection ports and the required counter flow patterns of the media. Figure 2 details these counter flow patterns.

Installations employing smaller VAU Blockbuster Brazed Plate Heat Exchangers (VM 15 and VM 30 Series) may be fastened directly to and supported by supply piping. Installations employing larger VAU Blockbuster Brazed Plate Heat Exchangers (VM 55, VM 60, and VM 85 Series) must be floor-mounted, wall-mounted, shelf-mounted, or equipment-mounted in a manner that adequately supports the weight of the unit and flowing media without putting inordinate stress on the connection ports of the unit. Wall and floor mounting brackets and associated hardware are available for the VAU Blockbuster VM 55, VM 60 Series. Floor mounting brackets and transport handles are available for the VAU Blockbuster VM 85 Series.

VAU Blockbuster Brazed Plate Heat Exchangers must be installed in a manner to avoid exposure to vibrations, pulsations, and thermal and hydraulic stresses. Proper system design may call for the use of flexible connectors, expansion loops and tanks, water hammer arrestors, slow-closing solenoid valves, and other equipment necessary to establish an application environment conducive to effective operation of the VAU Blockbuster, as well as other application components.



### Pipe Connections

With the VAU Blockbuster unit standing upright, as shown in Fig. 1, piping must be installed in a manner to achieve the counter flow of media. One media will enter the bottom left side of the unit and exit the top left side of the unit. The other media will enter the top right side of the unit and exit the bottom right side of the unit. As shown in Fig.2 on page 5, either counter flow path configurations of media are acceptable. Please be certain to plan and implement your installation according to either of the flow paths shown in Fig. 2.

Installation design should incorporate the use of shut-off valves in the supply piping. Additionally, vent valves should be provided to supply piping feeding the top of the unit and drain valves should be provided for supply piping feeding the bottom of the unit.

Before connecting the female pipe connections to the male threaded port connections on the VAU Blockbuster, ensure that the threads and gaskets or washers are free of dirt and other particles which may affect successfully achieving leak-free connections.

Extreme care must be taken by the installer if pipe connections are soldered directly to the unit. The temperature reached during the soldering process must not approach the melting point of the VAU Blockbuster's internal brazing material. The soldering flame must be held away from the VAU Blockbuster. Use silver solder with a silver content of at least 45%. VAU advises that, where possible, soldered pipe connections be made to a swivel female by sweat (solder) adapter coupling, which can then be attached to the unit's male threaded port fittings.

As a rule, all plumbing pipes must be installed in a manner that keeps movement of the pipes and other plumbing components in the system from transferring bending or twisting torque or stress to the VAU Blockbuster.

Do not use the VAU Blockbuster as a ground, when welding on a component in the system or in the vicinity of the unit.

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### Operation

Before start-up, ensure that all threaded connection joints are tight. Also review the operating design specifications of all system components, such as pumps and boilers, to ensure that minimum and maximum temperatures and maximum pressures of other components of the system do not exceed those specified on the VAU Blockbuster name plate.

### Pumps

Supply pumps in the system should be equipped with control valves. Pumps producing pressures in excess of the specification parameters for the VAU Blockbuster must be installed with safety or pressure reducing valves.

To avoid damaging the VAU Blockbuster due to water hammer stress, supply pumps must not introduce air into the media flowing through the unit.

### Start-up

To avoid hydraulic stress to the VAU Blockbuster, pumps should be started with closed valves. Where possible, the valves in the supply and return lines should be opened simultaneously and equally.

To avoid thermal stress to the VAU Blockbuster, the media closest to ambient temperature of the VAU Blockbuster should be introduced first to the unit, followed by the second media.

The flow rate should be increased slowly and not reach full flow until normal operating temperature are achieved.

### Venting

During initial media flow through a drained or new unit, vent valves should be open to allow all trapped air to escape from the system.

Insufficiently vented VAU Blockbuster units will not perform as designed due to trapped air remaining in the system. Additionally, this trapped air will increase risk of unit damage due to water hammer and corrosion.

### Shut-down

With heating applications, the warm side media flow should always be shut down prior to the cold side media flow. With refrigerant applications, the cold side media (refrigerant) should always be shut down prior to the warm side media flow. It is imperative to gradually shut down media flow.

In the event of operational shut down periods in excess of approximately 100 hours, draining and cleaning of both flow channels in the unit is strongly recommended in order to avoid standstill corrosion and clogging. This is particularly critical in applications

with aggressive and biological fouling media, as well as when the unit could be exposed to freezing temperatures.

### Cleaning

VAU Blockbuster units can be cleaned by flushing and back-flushing, in place, with chemical cleaners. Appropriate chemical cleaners should be selected, based upon the type of fouling to be removed, as well as the compatibility of the chemical cleaner to stainless steel and copper.

Increased pressure loss in the system may indicate the formation of deposits within the unit. This is especially true in applications using media which have a tendency to form deposits, such as calcium.

Units unable to be successfully flushed and/or back-flushed may be the result of a complete fouling of the channels. If this occurs, the unit will require replacement.

The installation of circulating pumps in the system will result in shorter cleaning times and improved cleaning performance. Flow of the circulating pumps need to be in the reverse direction of normal operating flows.



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