Heat Exchangers - the Types, Cleaning/Repair and Upgrades

The casting machines manufactured by Gruber Systems include a resin heating system design to control the temperature of the resin used in producing the cultured marble, solid surface or polymer concrete matrix. The resin heating system is composed of a thermal fluid heater, thermal fluid pump, heat exchanger, thermocouples, and hoses / fittings. The thermal fluid heater heats the thermal fluid (50% Glycol / 50% Water Mixture) while the thermal fluid pump moves the thermal fluid in a loop from the thermal fluid heater to the heat exchanger and back. Type J Thermocouples provide temperature readings to the PLC on the thermal fluid and the resin as it is discharged from the heat exchanger.

Types of Heat Exchangers

There are two types of heat exchangers used – a disposable heat exchanger or an expandable heat exchanger.

The disposable heat exchanger contains a series of plates that are placed in a sealed container. Thermal fluid is ported to one side of the plates while resin is ported to the other side of the plates. The disposable heat exchanger is a fixed size and cannot be opened. It cannot be enlarged or cleaned and must be replaced when clogged. They are used typically on Autocaster Economizers. The photo below shows the typical installation.
The expandable heat exchanger consists of the outer frame (2 thick steel plates and base), eight pieces of all-thread with washers/nuts, a set of exchange plates (stamped plates), and gaskets. The gaskets are applied to the exchange plates and then stacked to build up the exchange plate set. The exchange plate set is placed between the outer frame and the eight pieces of all-thread, washers, and nuts are tightened to compress the plate set to a specified dimension. The expandable heat exchanger can be cleaned and the number of exchange plates can be increased to add additional volume in the heat exchanger. The standard expandable heat exchanger has 14 exchange plates and the expanded heat exchanger has 26 exchange plates. The photo below shows the typical installation.

![Diagram of a thermal fluid heater system](image-url)
Repair Options

Typically, a promoted resin system is used in the casting machines. This can lead to a buildup of gelled resin in the heat exchanger over time that will restrict the flow of resin going through the heat exchanger. Eventually, the heat exchanger will need to be removed and either replaced or cleaned / repaired.

For casting machines with the Disposable Heat Exchanger, the heat exchanger must be replaced with part number 162881 Disposable Heat Exchanger or retrofitted with an expandable heat exchanger.

For machines with the expandable heat exchanger, the exchange plate set needs to be removed and refurbished. To refurbish the exchange plate set, the eight all thread bolts are loosened from the outside frame and the exchange plate set is removed. Each plate in the set needs to be separated, cleaned, inspected, new gaskets applied, and the exchange plates need to be restacked in the proper direction and order. Then the refurbished exchange plate set can be inserted back between the outer plate frame and the all-thread bolts can be retightened to a specific dimension.

Gruber Systems does not recommend that our customer clean and refurbish the exchange plate set. It is very important that each plate is not bent or scratched as that could lead to potential leaking. The gasket set used on the plates is expensive. Therefore, Gruber Systems offers an exchange plate set exchange program. Under the program, Gruber Systems will send a reconditioned set of exchange plates to the customer. When the refurbished exchange plate set is received, the customer will then loosen the eight all thread bolts from the outside frame, remove the used exchange plate set, clean the frame, insert the refurbished exchange plate set in the frame and tighten eight all thread bolts to a specified dimension. The used exchange plate set is returned to Gruber where it will be reconditioned and put in stock for the next customer’s use.

Heat Exchanger Upgrades

Casting machines with a disposable heat exchanger can be upgraded to an expandable heat exchanger with either 14 or 26 plates.

Casting machines with a 14 plate expandable heat exchanger can be retrofitted with an additional 12 exchange plates to the 26 plate configuration.