

Clean In Place (CIP)

Cleaning in place is accomplished by circulating a suitable cleaning solution through the heat exchanger instead of opening it. This removes deposits or trapped product on the plates. CIP works best in the reverse direction of normal flow. Good results are also possible with same direction flow and higher velocities.

Great care must be taken to select proper cleaning solutions and cycles to avoid damaging the plates and gaskets. Due to the large variety of cleaning needs, each user is responsible for determining the best method for his situation. It is recommended that a reputable supplier of cleaning materials be consulted for assistance.

Caution:

The heat exchanger must be thoroughly drained and rinsed immediately following CIP. Residue from CIP may cause corrosion if left in the heat exchanger.

7.4 Replacement of plates

Before replacing a plate in a heat exchanger, the new plate must be checked against the plate it is replacing. The new plate must be identical in every way.

The general arrangement drawing provided with the heat exchanger provides information on the material, port punching, gaskets and location of each plate in the heat exchanger.

Note: During the installation, **always alternate left and right hand plates**. For simplification only, whole blocks of identical left or right hand plates are shown on the plate arrangement drawing. The total number of each is given. Vertical flow plates may be changed from left hand to right or vice versa by turning the plate over.

7.5 Regasketing

Plate heat exchanger gaskets are attached to individual plates by one of two methods, glued or clip-in. Glued-in gaskets are attached by a thermoplastic adhesive which is heat-cured for maximum strength.

The clip-in gaskets (Paraclip) are attached to the plates by small nubs around the perimeter of the gasket which snap into matching holes.

Removal of old gaskets

To remove Paraclip clip in gaskets, the gasket may be carefully pulled from the plate. If the gasket is to be reused, pull slowly to avoid tearing off the clips or stretching the gasket.

To remove glued in gaskets, the bond between the plate and gasket is softened by using a propane torch to heat the plate from the nongasketed side directly behind the gasket. As the adhesive softens, use pliers to pull the gasket from the groove. Continue this process until the entire gasket has been removed.

Caution:

Avoid overheating the metal. This will discolor and damage the plate.

To remove remaining traces of old adhesive, grease or dirt from gasket grooves, use a solvent such as Acetone or a commercial gasket removal product. Do not use abrasives to clean the gasket grooves.

Attachment of Glued-in Gaskets

To attach new replacement gaskets, apply a thin even film of 3M formula EC-1099 adhesive to the plate gasket groove. The adhesive may be spread evenly with a small acid brush dipped in acetone. Allow the adhesive to dry until tacky, about 30 seconds. Press the gasket firmly in place, starting at one corner of the plate and continuing across and along the length of the plate. The entire gasket must be firmly in place with no twists or bumps.

As each plate is gasketed, it should be stacked neatly on a clean, flat surface in the order it will be installed. Take special care not to move the gaskets out of position. After all the plates are regasketed, they may be placed in the frame. The frame is tightened per Paragraph 5.6 to a platage dimension about 10% above the maximum compressed platage specified on the general arrangement drawing.

Heat Transfer

5.3 Gasketing *(continued)*

Many plate heat exchangers utilize a **glued gasket type**. Sometimes these gaskets may be difficult to change, and returning them to a qualified service center for replacement may be a wiser choice. Field replacement can be accomplished as follows:

- Old gaskets must be completely removed. A hot air gun or a low torch flame applied to the back of the gasket groove will soften the gasket adhesive allowing the gasket to be pulled off with pliers.
- As an alternative, plates can be dipped in -196°C liquid Nitrogen which will cause gaskets to crumble off.
- The remaining gasket and adhesive in the gasket groove should be removed using a stainless steel scraper or with emery / abrasive paper.

WARNING!

Use abrasive paper carefully to avoid creating deep scratches in the gasket groove that could lead to leaks underneath the gasket.

- Afterwards the gasket grooves must be degreased by wiping them with a clean cloth impregnated with a solvent (trilene, tetrachloroethylene, acetone).
- For normal gluing, 3M's type 3MEC1099 adhesive or equal is recommended. Use manufacturer's instructions for best results.

WARNING!

The adhesive must be compatible with the plate and gasket material and the heat exchanger service. Consult supplier if necessary to confirm.

Approximate adhesive quantity requirements:

<u>Ounces / plate</u>	<u>Models</u>
0.50	S7 - S37
1.00	SX49 - S66
1.50	S108 - 8149

- Before applying the adhesive visually inspect the gasket groove making certain it is clean and dry.
- Use sand paper or emery cloth to roughen the flat side of the elastomer gasket that will be attached to the plate.
- Apply a thin even layer of adhesive to the gasket groove using a short hard brush.
- When the glue is tacky, which could take 5-10 minutes, carefully line the gasket up with the groove and press it in.
- An elastomer gasket's tolerance may change during and after forming. Short gaskets must be stretched by pulling before installation and long gaskets should have the short ends installed first and then press the gaskets in moving toward the middle of the plate.
- Stack the plates in a pile with a weight on top and allow to dry per the adhesive manufacturer's guideline.