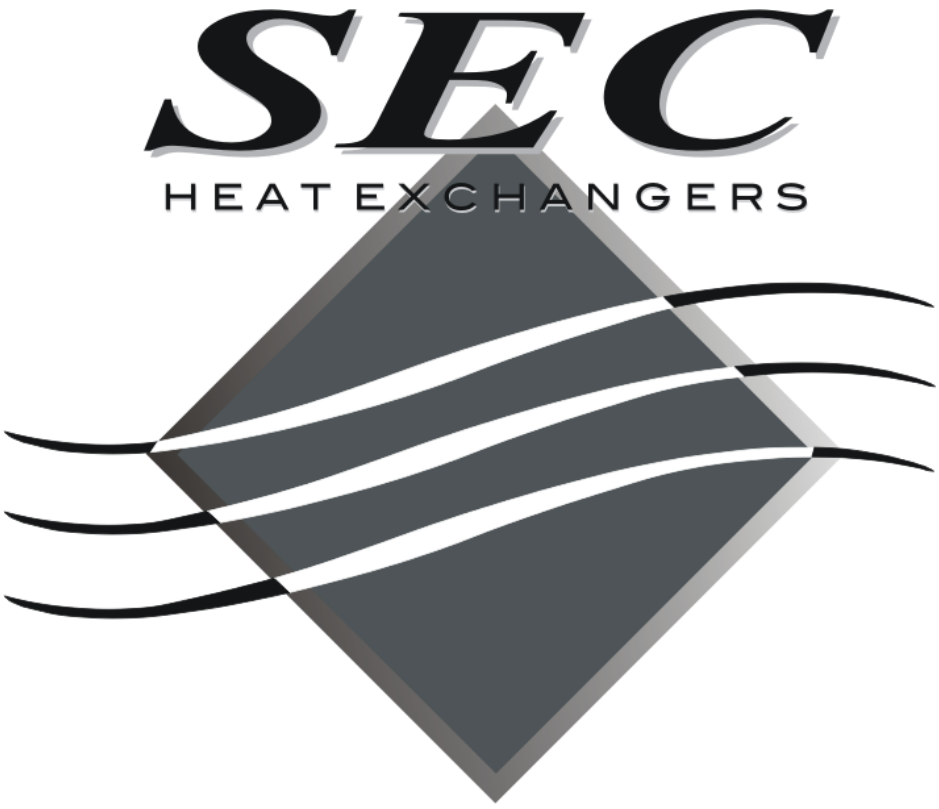
www.brazedplate.com



BRAZED PLATE INSTALLATION MANUAL

S.E.C. Heat Exchangers

P.E.I. CANADA C0A 1A0

tel; 902-659-2424 fax; 902-659-2800

Table of Contents

Please read this manual

Before proceeding with installation and operation please read the entire manual carefully.
Failure to follow the instructions can cause injury or property damage.
When receiving heat exchangers, any claims for damage or shortage in shipment must be filed immediately against the transportation company.
SEC heat exchangers may have some sharp edges so exercise caution when handling.

Description

SEC brazed plate heat exchangers consist of a plate pack of formed stainless steel plates which are brazed together with a copper or nickel brazing material. When we assemble the pack every second plate is turned 180°C to the proceeding and the next plate.
There are two separate flow channels; 1 for the hot fluid and 1 for the cold fluid.

Materials of construction

Plates:	316 Stainless steel [1.4401]
Solder:	Copper 99,9% or Nickel.

Maximum operating conditions:
max. operating pressures: up to 635 psi
max. operating temperature.: up to 195°C

Mounting Position and precautions:
SEC heat exchangers should be mounted so there is sufficient room around the heat exchanger to perform maintenance work.
The mounting position must be selected to allow venting and draining of the heat exchanger.
For thermal applications a vertical position is prefered. Connections facing you with the longer dimension of the heat exchanger vertical.
Never mount the heat exchanger with the connections facing downward.
For all gas condensing applications the heat exchanger must be mounted vertically.
The heat exchanger should be supported by a bracket or support. The unit should not be supported by the piping.
Do not over tighten the piping to the heat exchanger. Damage due to high forces and torques will result.

Piping Connections
In most applications the highest efficiency is realized by connecting the heat exchanger in the counter-current method.
This is where the fluids flow in opposite direction to each other through the heat exchanger.

Attention:
Please insure that severe vibrations or pulstations cannot be transmitted to the heat exchanger by installing vibration absorbers in the piping and using vibration absorbing material between the heat exchanger and other equipment.
Studies by the Finnish Institute of District Heating on district-heating systems have shown that the service life of the heat exchangers is markedly reduced by incorrect or inadequate automatic control. Here are some factors which have a detrimental effect on the service life.

- *Oversized regulating valves*
- *Excessive variations in system differential pressures*
- *Regulating valves of poor quality*
- *incorrect regulator settings*
- *Incorrect sensor placing*

Attention*:*
On new or renovation systems, flushing the piping system to remove construction debris is recommended before connecting the piping to the heat exchanger.
A fine mesh filter or 'Y' strainer capable of removing any particle above 1 mm in size, installed on the inlet piping is recommended. Blockage in the heat exchanger can lead to fouling or freezing of the heat exchanger!

Warning:
When soldering or welding piping or fittings to the heat exchanger you must never develop any darker annealing colours than 'straw yellow'. Also do not exert any high forces and torques on the connection.

Soldering Connections
Clean the assembly surface of the connection piping and heat exchanger connections. Polish the surfaces to remove oxides. Apply a high quatily flux to both surfaces. Solder using good workmanship practises. To prevent oxidation, the heat exchanger can be purged with nitrogen or another inert gas. Do not aim the flame in the direction of the heat exchanger and do not exceed 650° C (1200°F).
Soldering material: use a high content silver filler for brazing
Use a wet rag to prevent overheating of the heat exchanger.

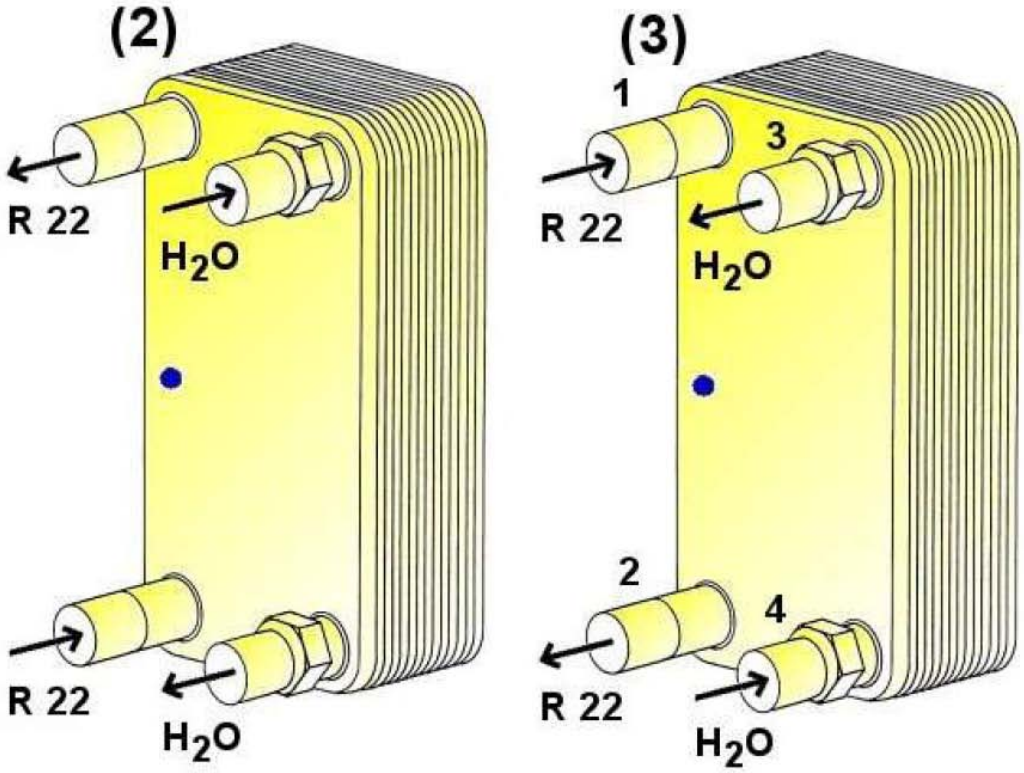
Welding Connections
Use TIG or MIG welding.
Use a wet rag to prevent overheating of the heat exchanger.
In order to avoid oxidation the heat exchanger is to be protected from the inside with nitrogen.

Threaded Connection
Mount the heat exchanger first, then connect the pipes to the heat exchanger.

START UP:
#1
Before putting the heat exchanger into operation please check that it will not be subjected to pressures and temperatures that will damage it.
#2
Check the tightness and integrity of the pipingconnections.
#3
Pumps feeding the heat exchanger must be equipped with shut-off valves. The pumps and piping system should be purged of air. In order to avoid pressure surges, the pumps should be started up against closed valves. After starting trhe pumps the valves can be opened slowly. Pressure surges are to be avoided. During filling vent the heat exchanger of air. Inadequately vented heat exchangers do not yield their full performance as the complete heating surface is not available for heat transfer and can also increases the danger of corrosion.
#4
Startup the cold fluid first.

SHUT DOWN:
#1 Shutdown must be effected slowly and simultaneously for both hot and cold sides.
If this is not possible, the hot side must be shutdown first.
#2 For long term downtime the heat exchanger is to be completely drained and cleaned.
This applies in particular when there is a danger of freezing, and in the case of aggressive fluids and or fluids which have a biological fouling tendency.

(2) = Evaporator (3) = Condenser



This installation shows R-22 only but the principal applies to all other commonly available refrigerants.

Operation
After putting the heat exchanger into service perform visual inspections to ensure there are no leaks or pressure pulsations. If the heat exchanger is fitted between a control valve and a differential pressure regulator, please ensured that with simultaneous closing of both regulating devices no negative pressure can form and cause pressure hammers.
In district heating systems particular attention is to be paid to the fact that the secondary pressure maintaining system is designed for the maximum district heating supply temperature. Otherwise pressure hammers can occur in the part-load range.
Check the functional efficiency of the control devices (connection to the piping network')
It is generally to be ensured that no operating conditions can arise which are contradictory to these assembly, operating and maintenance instructions.

Warning:
Steam hammers and pressure surges can lead to leaks in the heat exchanger.
Adequate equipotential bonding is to be ensured in order not to endanger the corrosion-proofing.

Anti-freeze:
Expansion due to freezing damages heat exchangers. At temperatures close to or below the freezing point anti-freeze agents (e.g. glycol) should be used in the fluids.

Fouling [plugging]
Many different factors can influence fouling. These are, for example, fluid velocity, temperature, turbulence, distribution, water quality. Filtration is advised to remove any partical above 1.0 mm.
The fluids should pumped through the heat exchanger at the highest possible velocities. This will reduce the possibility of fouling. If partial flow conditions exist often turbulence in the heat exchanger will decrease and the fouling tendency increase.
Calcium deposits on the heating exchanger surface can occur at water temperatures above 60° C. Turbulent flow and lower temperatures reduce the risk of calcification.

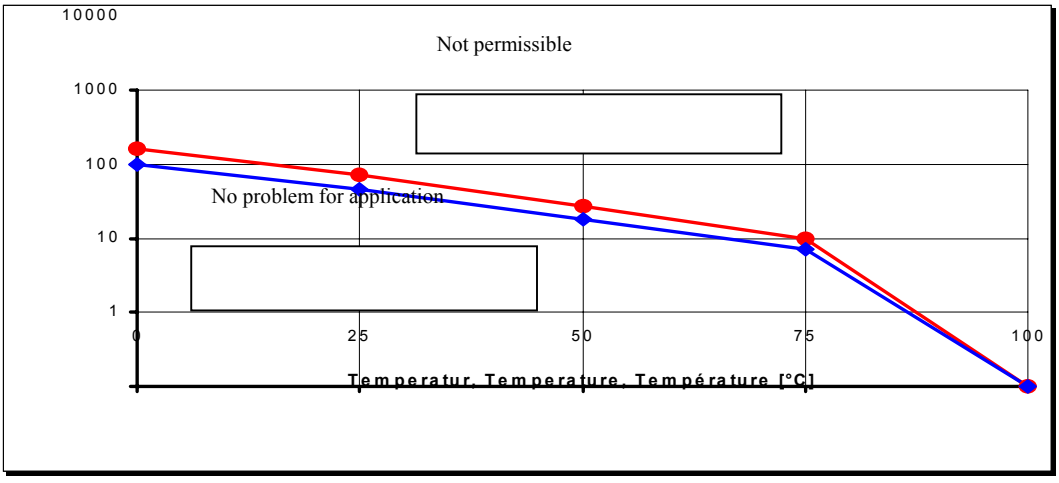
Warning:
Poor water quality leads to a higher susceptibility to corrosion.
Fine silt or sand can cause errosion of the heat exchanger plates.

Cleaning
Should formation of mineral deposits occur (e.g. high degrees of hardness or severe fouling) cleaning must be carried out at regular intervals.
Rinse the heat exchanger out in the opposite direction to normal fluid flow direction with a suitable cleaning solution, or water. Use cleaning chemicals that are sold by reputable companies and that are suitable for cleaning stainless steel, copper or nickel.

Resistance of soldered plate heat exchangers to corrosion caused by water constituents
The soldered plate heat exchangers consist of embossed plates of stainless steel AISI 316. Therefore the corrosion resistance of the stainless steel and of the brazing material, copper or nickel, must be taken into account.

The following values for water constituents are to be observed.

Water constituent	Heat Exchanger, copper soldered	Heat Exchanger, nickel soldered
Chlorides	Above 100°C no chlorides permitted (See diagram below)	
Iron/Manganese	< 2 mg/kg	
Ammonia	< 2 mg/kg	no restriction
pH-value	6 – 9	
Electric conductivity	> 50 µS/cm	
Free carbonic acid	< 20 mg/kg	
Nitrates	< 100 mg/kg	
Sulphates	< 50 mg/kg	
The values stated are guide values which show variations under certain operating conditions.		
Should you have any questions please call us [011] 902-659-2424		



Permissible chloride content dependent upon temperature

2546 Iona Road. Station Building. Belfast,
Prince Edward Island - Canada C0A 1A0
North America: 1.800.335.6650 - International: 1.902.659.2424
Fax: 1.902.659.2800 - info@secheatexchangers.com
www.heatexchangers.ca
www.secplateandframe.com

To Obtain Other SEC Publications Please Visit our Web Site At:

http://www.brazedplate.com