SEC

HEAT EXCHANGERS

BRAZED PLATE HEAT EXCHANGERS

Installation Manual

www.brazedplate.com

Table of Contents

Before proceeding with installation and operation read entire manual carefully.
Failure to do so 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 by the consignee.
The SEC Heat Exchanger may have some sharp edges so exercise caution when handling.

Description
SEC Brazed Plate heat exchangers consist of a pack of refined steel plates which are brazed together by copper or nickel in a furnace. When assembling the pack every second plate is turned 180°C in the plane. There are two separate flow channels with two mediums in counter current.

Materials
Plates: Stainless steel 1.4401
Solder: Copper 99,9% for WP Types or Nickel for NP Types

Performance
max. operating pressure: 30 bar or 40bar(WP,WP-AE)
16 bar (NP,NP-AE and special versions like U,DS,TIO)
max. operating temperature.: 195°C

Please note the data on the nameplate of the heat exchanger!
SEC Brazed Plate Heat Exchangers are designed according to International Standards
Production is performed in accordance with ISO 9001.

Mounting Position
SEC Brazed Plate Heat Exchangers should be mounted so there is sufficient room around the heat exchanger to perform maintenance work..The fitting position is to be chosen in such a way that venting and draining of the heat exchanger are possible. For thermal applications a vertical fitting position is the most effective one. All other fitting positions can lead to power loss.
For all two phase applications the heat exchanger should always be mounted vertically, (i.e. evaporator, condenser, etc..).

Never mount the heat exchanger with the connections pointing down. Preferably the heat exchanger should be supported by a bracket or support. The unit should not be supported solely by the piping. The maximum connecting forces and torques are not to be exceeded.

Piping Connections
In most applications the highest efficiency will be realized by connecting the heat exchanger for counter-current flow.
The primary side of the heat exchanger is identified by a colored label.
Heating applications**:** **red label**
Refrigerant applications: **blue label** (Refrigerant side)

NOTE:
Always insure that severe vibrations or pulsations cannot be transmitted to the heat exchanger by installing vibration absorbers in the piping and using vibration absorbing material between the heat exchanger and the equipment.
Studies 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**

NOTE:
On new or renovation systems, flushing the liquid piping to remove construction debris is recommended before connecting the piping to the heat exchanger. A mesh size of 16-20 mesh will retain any particle above 1 mm. The strainer must be located at the inlet to the heat exchanger. Blockage in the heat exchanger will lead to fouling or freezing of the heat exchanger!

WARNING:
The heat exchangers must not develop any darker annealing colours than 'straw yellow' as otherwise there is a danger of corrosion.
Do not exert any high forces and torques on the connection.

Soldering Connections
Clean the soldering assembly surface at the copper tube and heat exchanger connections. Polish the surfaces to remove oxides. Apply the flux to the surface. In order to prevent oxidation, the heat exchanger is to be protected from the inside with nitrogen.
Do not aim the flame in the direction of the heat exchanger, solder at a maximum temperature of 650° C (1200°F).
Soldering material: 45 – 55 % silver filler for brazing
Use a wet rag to prevent overheating of the heat exchanger.
Hold the tube in a fixed position during soldering.

WARNING:
Excessive heating can lead to fusion of the copper and thus to the destruction of the heat exchanger!

Welding Connections
Use WIG 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 and then connect the pipes to the heat exchanger by means of the threaded connections.

Putting HEX into Operation:
Before putting the device into operation it is to be checked to ensure that the operation data shown on the nameplate are not exceeded.

Check the tightness of the screw connections.
The pump(s) that feed the heat exchanger must be equipped with shut-off valves. Pumps which generate higher pressures than stated for the device must be fitted with safety valves. The pumps must not aspirate any air so that no disruptions of operation due to water hammer occur. In order to avoid pressure surges, the pumps are to be started up against closed valves. The valves in the supply and return lines are to be opened slowly and, as far as possible, simultaneously, until the service temperature is reached. Pressure surges are to be avoided. During filling the device is to be vented via the vent valves located in the piping. Inadequately vented heat exchangers do not yield their full performance as the complete heating surface is not available. Remaining air increases the danger of corrosion. Shutdown must be effected slowly and simultaneously for both sides (primary and secondary sides). If this is not possible, the hot side is to be shutdown first. For a relatively long downtime of the plant the heat exchanger is to be completely drained and cleaned. This applies in particular when there is a danger of frost, in the case of aggressive fluids and fluids which have a biological fouling tendency.

Operation
After the device has been put into service it is to be checked to ensure that no pressure pulsations are acting on the device. If the heat exchanger is fitted between a control valve and a differential pressure regulator, it is to be ensured that with simultaneous closing of both regulating devices no negative pressure can form and thus steam hammers are avoided.
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 steam 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
Icing results in the destruction of the heat exchanger. At temperatures close to the freezing point ant-freeze agents (e.g. glycol) are to be used. For the fitting of temperature sensor the fitting of the heat exchanger with a ½" internal thread socket is possible. These can be arranged opposite the primary or secondary connection.

Fouling
It is to be ensured that the Standard Guidelines for Drinking and Heating Water, and the SEC Guidelines for Water Constituents are observed (see next page).
Many different factors can influence fouling. These are; velocity, temperature, turbulence, distribution, water quality.
At the fluid inlets of the heat exchanger, filters (mesh 0.8 mm) are to be provided for prevention of fouling. The fluids are to be moved at the highest possible mass flows. In the event of excessively low mass flows (part load) the turbulence in the heat exchanger can decrease and the fouling tendency increase.
Calcium deposits on the heating exchanger surface can occur at temperatures above 60° C. Turbulent flow and lower temperatures reduce the risk of calcification.
During shutdown of the unit it is be ensured that first the primary side and then the secondary side is closed. During start-up, first the secondary side and then the primary side is opened. In that way overheating of the heat exchanger is avoided.

Warning:
Poor water quality leads to a higher susceptibility to corrosion.

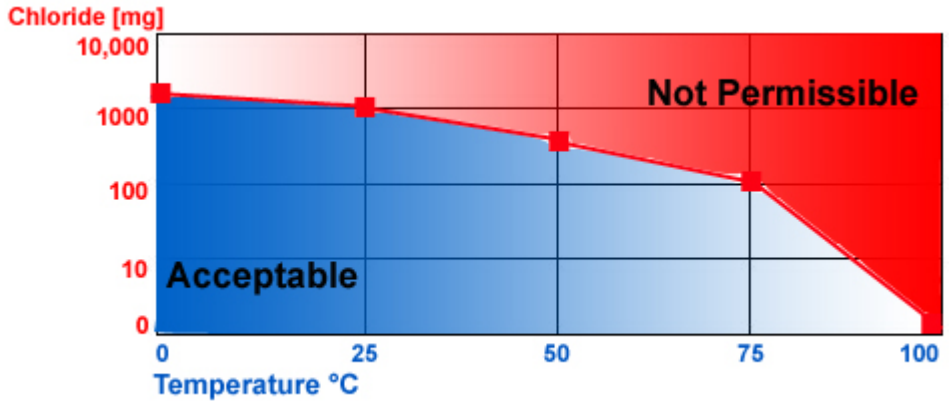
Cleaning
Should formation of deposits occur due to the water quality, high degrees of hardness or severe fouling, cleaning is to be carried out at regular intervals, by means of rinsing.
Rinse the heat exchanger against the normal flow direction with a suitable cleaning solution. Only the cleansing agents designed for cleaning stainless steel and copper or nickel are to be used.

Resistance of soldered plate heat exchangers to corrosion caused by water constituents
The soldered brazed plate heat exchangers consist of embossed plates of stainless steel 1.4401 or 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 above are guides which show variations under certain operating conditions.
If you have any questions please call us at Tel: 902.659.2424 or Fax: 902.659.2800

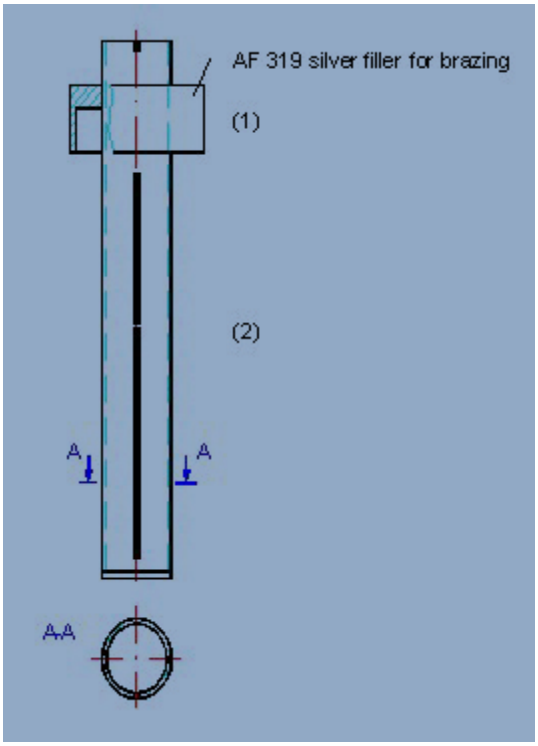


The Permissible Chloride Content is Dependent upon Temperature

Hard polyurethane foam insulation
Insulation consist of two half shells which are bound together by two retaining clips. The fitting of the insulation is carried out, only after, the connection of the heat exchanger to the piping network. has been completed
The durability of the heat resistance properties is ensured up to 135°C.

Diffusion resistant sealed insulation
Diffusion resistant sealed insulation consist of 10/20mm gauge closed-pore synthetic rubber of a NBR base with smooth surface skin. The durability of the heat resistance properties is ensured up to 105°C. All insulation elements can be trimmed to the size of any heat exchanger equipment and then treaded with an adhesive coating.
Install the insulation kit, only after, all soldering or welding is complete and the unit is cool.
“Dry fit” the insulation pieces to assure proper size before installation, and follow exactly the manufactures instructions.

Distribution piping



Note: Vaporizers applications only!

The distributor pipe consists of a lance-piece (2), whose length is dependent on the number of plates of the heat exchanger and a ring (1), whose circumference is determined by the type of heat exchanger employed. Both parts are supplied as a screw-jointed fixture.
The lance is equipped with a slot.
The distribution slot has to be mounted in the refrigerant inlet of the vaporizer, the distribution slot must be mounted downside (6‘o clock position).
The fluid refrigerant is fed into the heat exchanger through the slot and this ensures an uniform distribution of the refrigerant in the primary channels.
The ring of the distributor pipe is brazed as a fixture in the primary side connection (refrigerant inlet) of the heat exchanger.
Please note, that the installation of the distributor pipe will require the selection of certain specific connection-pieces to the heat exchanger.