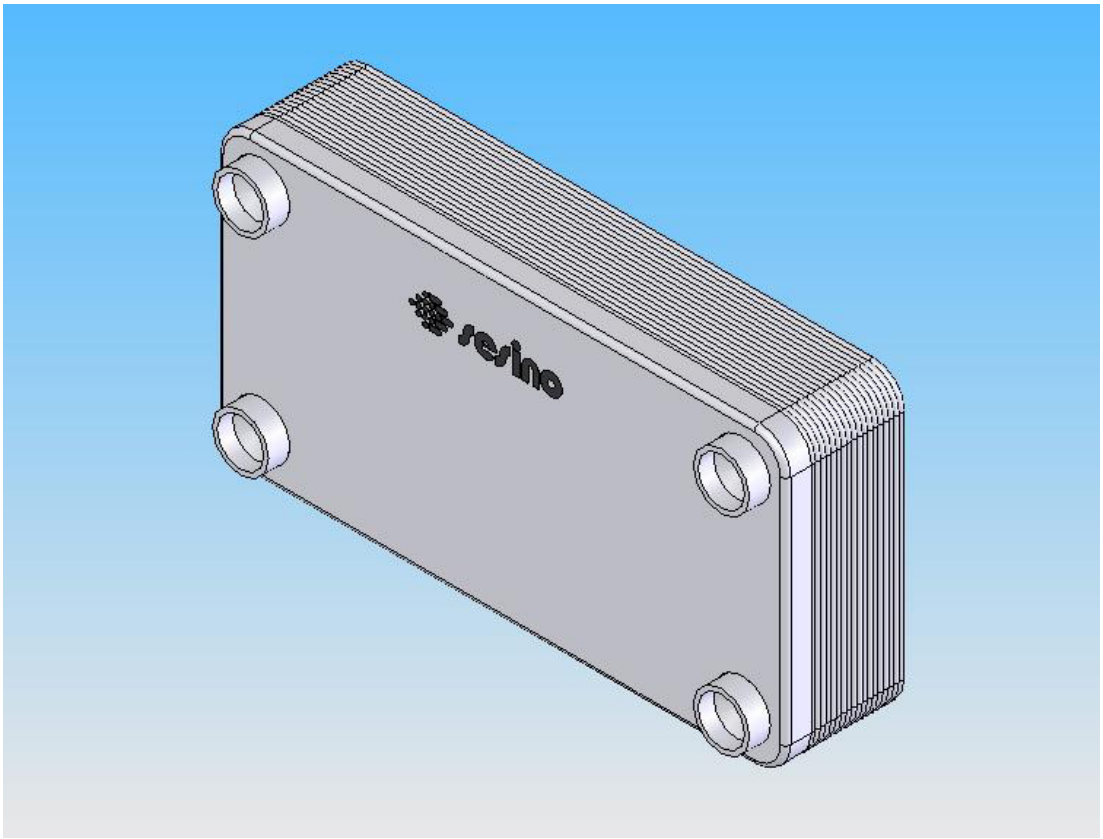
sesino

HEAT EXCHANGING EXCELLENCE SINCE 1919

USE AND MAINTENANCE MANUAL

Water-oil series M
Brazed plates
Heat exchanger

M 18 – 25 – 55



INDEX

1. INTRODUCTION

This manual should be considered an integral part of the heat exchanger and should be kept with it.
Keep this manual intact and available for the whole product life.
Carefully read the manual before installation of the heat exchanger.
The manual contains important information about safety.

2. WARNINGS

a) The heat exchanger has to be used only for that which it was designed. Any other use may cause damage to property and people, and therefore the manufacturer declines all responsibility for accidents arising from its misuse.

a) The heat exchanger must be used for the operating conditions (pressure and temperature) and for the fluid for which it was thermally and mechanically designed and for which it was evaluated the chemical compatibility. In the event of operating conditions other than those calculated the heat exchanger performance change and very serious damage to the unit might occur.

b) The pressures and flow rates of the fluids must be taken within the design limits to prevent vibration, erosion and in some cases breakage of the most stressed parts by the fluid dynamic action.

c) Before connecting the two supplies to the system verify that the hydraulic circuit meets the performance of the heat exchanger.

d) Do not touch the heat exchanger while it is running. During operation, some external surfaces may be hot.

e) Do not remove the nameplate of the heat exchanger. It reports the product specifications and contractual references that allow the traceability of the same. It is considered an integral part of the heat exchanger and should remain clearly visible on it.

3. ASSEMBLY AND INSTALLATION

Brazed plate heat exchangers consist of a pack of embossed steel plates which are brazed together by copper or nickel in a furnace. There are two separate flow channels or pressure channels (primary and secondary side) with the two fluids in counter current.

Brazed plate heat exchangers should be mounted so there is sufficient room around the them 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.
Vertical position of the exchanger is the most efficient one; all other fitting positions can lead to power loss.
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.

In most applications the highest efficiency is realized by connecting the heat exchanger for counter-current flow. The primary side of the heat exchanger is identified by an orange label. The primary channels are the inner channels. The first and last channel is always on the secondary side.

Warning: On new or renovated systems, flushing the piping to remove construction debris is recommended before connecting the piping to the heat exchanger. A mesh size of 0,8 mm (closed circuits) and 0,08 mm (open circuits) will retain any particle. The strainer must be located at the inlet to the heat exchanger.

The water-oil heat exchanger are generally fixed in the return circuit. It is also possible to carry out a separate circuit through a self-contained pump. This is recommended when the

outlet oil rates are variable. In this way, it is possible to obtain a better thermal performance.

In the hydraulic systems it is possible the occurrence of pressure peaks (fluid hammers) that could approach or exceed the maximum allowable pressure of the exchanger. In this case, it is recommended to supply it with a self-contained pump.
Warning: These pulsations move inside the oil at the sound velocity, therefore they cannot be gauged with standard manometers, but only with a proper electronic instrumentation.

Warning: 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. Service life of the heat exchangers is markedly reduced by incorrect or inadequate automatic control. There are some factors which have a detrimental effect on the service life. This facts should be avoided:

- oversized regulating valves;
- excessive variations in system differential pressures;
- regulating valves of poor quality;
- incorrect regulator settings;
- incorrect sensors placing.

Make sure to install the heat exchanger through its supports on suitable supports to hold the weight.

4. TECHNICAL SPECIFICATIONS OF USE

- Hot fluid inlet max. temperature: 225°C
- Cold fluid inlet min. temperature: -160°C
- Operating fluids: Mineral oil
Synthetic oil
Emulsified water
Water- Ethylene glycol
- Maximum allowable operating pressure: 30 bar

N.B.: please contact our Technical Department in case of special applications.

When the system on which it is installed is fully operational, you should check if the amount of the water flowing through the heat exchanger is correct. This can be done easily by controlling its thermal gradient that should not be too low (too high flow rate), neither too high (low flow rate).

It is good practice to consider a temperature difference of 10°C when the inlet water temperature is 20°C and a temperature difference of 5°C with higher water temperatures.
It is also advisable to avoid that the water remains completely still within the heat exchanger because, when its temperature exceeds 50°C, the limestone contained in it starts to sediment significantly reducing quickly the opening of the channels.

Before putting the device into operation it has to be checked to ensure that the operation data shown on the nameplate are not exceeded.
Check the tightness of the screw connections.
The pumps feeding 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.

Warning: 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 long downtime of 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.

After the device has been put into service it is to be checked to ensure that no pressure pulsations are acting on the device.

It is generally to be ensured that no operating conditions can arise which are contradictory to these assembly, operating and maintenance instructions.
Warning: Water hammers, pressure and temperature cycles can lead to leaks in the heat exchanger.

5. PERIODIC MAINTENANCE

It is needed to disassemble the exchanger from the system for cleaning purposes.
During shutdown of the unit it is be ensured that first the primary side (hot side) and then the secondary side (cold side) is closed. Vice versa 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: Do not try to dismount the exchanger without having depressurized, drained and cooled to ambient temperature the unit.

Many different factors can influence fouling. These are, for example, velocity, temperature, turbulence, fluid quality. In some applications, the fouling tendency may be high, for example, when using very hard water.
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 decreases causing the increase of the fouling tendency.

Lime deposits in the heat exchanger can be possible at temperatures above 50°C. Turbulent flow and lower temperatures reduce the risk of calcification.
It is recommended to check the exchanger every 2 or 3 months to avoid that calcareous sediments completely close the channels inside which water flows.

It is always possible to clean the heat exchanger by circulating a detergent liquid (CIP) inside it; it is recommended to use a tank containing weak acid, 5% nitric or phosphoric acid or, in case the heat exchanger is subject to frequent cleaning, 5% oxalic acid.
Warning: Care should be taken when using chemical cleaning fluids. Carefully follow the manufacturer's instructions and use systems of protection for the skin and eyes. When required use a respirator.

Let the detergent circulate inside the exchanger: for an effective cleaning the detergent flow rate must be at least equal to 1,5 times the normal working one, preferably in reverse circulation mode.
Rinse thoroughly with water in order to remove all traces of acid before putting the system into operation. The use of a solution of 1-2% sodium hydroxide or sodium bicarbonate before the last rinse ensures the complete neutralization of the acid.
Perform this cleaning at regular intervals.

During this operation, Costante Sesino S.p.A. recommend to comply with the anti-pollution standards and to use the appropriate services for the collection of waste oil.

The use of a filter is recommendable if it is assumed that particles with size of more than 1 mm may be present in the fluid; sizes smaller than 1 mm do not cause any malfunction.

6. TAMPERING

Any operation aimed to modify the heat exchanger, executed without prior authorization from the Constante Sesino S.p.A. will automatically result in the decline of the warranty provisions.

7. STORAGE

The heat exchanger has to be stored in a moisture free environment (<60%) and at a temperature (from 5 ° C to 30 ° C) such as to prevent condensation and oxidation to its internal parts.

8. DISPOSAL

The Costante Sesino S.p.A. heat exchangers are manufactured with fully recyclable materials.
Therefore they are disposable without any harm to the environment according to the rules and regulations in the area of use.

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