FAQ : Frequently asked questions

Here are the most frequently asked questions answered by our technicians :

- What are the operating temperature and pressure limits?
- What fluids are compatible with brazed plate heat exchangers ?
- When must filters be used and what is the recommended filter mesh size?
- What are your recommendations regarding the startup and shutdown of equipment and on changing its operating mode?
- What materials are used and what criteria are used in choosing them?
- What are the prices of our heat exchangers?
- What data do we need to design our equipment?
- What is the delivery time?
- What information is required in order to prepare an estimate?

What are the operating temperature and pressure limits?

Most members of the ALPEMA international heat exchanger manufacturers' association manufacture brazed plate-fin heat exchangers designed for operating pressures between a vacuum and 100 bars. For Fives Cryo, the upper pressure limit is higher than 130 bars.
The temperature limits for commonly used materials are specified by construction codes. ASME permits the use of aluminium alloy 3003 at temperatures between -269°C and +204°C, and alloy 5083 at up to +65°C. European standards, however, permit the use of alloy 3003 at up to +250°C.
It is common practice to limit the design temperature of brazed plate-fin heat exchangers to +65°C. In some conditions, however, this temperature limit can be exceeded.

What fluids are compatible with brazed plate heat exchangers ?

As a general rule, the fluids must be clean, free of humidity and non-corrosive for aluminium. There is no need to allow for a fouling factor, unless it is specified by the user. Suitable filtering devices should be installed upstream of the heat exchangers to avoid plugging risks. If there are special conditions entailing a risk of fouling, it is advisable to inform the heat exchanger manufacturer. Fives Cryo's experience in unplugging and cleaning techniques is recognized all over the world. Standard ISO 15547-2 advises users to specify the quantity of mercury and its compounds, as well as heavy metals, present in the fluids. If water is present, the user should also specify the quantities of H_2S, NH_3, CO_2, SO_2, NOx, CO and Cl, and the pH value. For further details, see the ALPEMA standards.

When must filters be used and what is the recommended filter mesh size ?

The plugging of brazed plate-fin heat exchangers can lead not only to a considerable loss of performance and an increase in pressure drops, but also to faulty distribution and thermal stresses that can jeopardize mechanical integrity. It is therefore recommended to install filters on the heat exchanger feed streams when there is a risk of contamination in the fluids. Furthermore, on the basis of its experience, Fives Cryo recommends installing temporary filters and pressure drop measuring devices on feed pipes during startup phases, to prevent the ingress of particles into them during fitting. Fives Cryo is also able to give users advice on startup procedures.
A mesh size of 177 µm (80 Tyler) covers most applications, but larger mesh sizes may be sufficient during startup, provided that they at least remove particles bigger than 40% of the width of the fin channels.

What are your recommendations regarding the startup and shutdown of equipment and on changing its operating mode ?

The ALPEMA gives guidelines on permissible thermal stresses during startup and shutdown. On the strength of its experience, Fives Cryo has developed its own computer software, such as ProSec Dynamic which we use to analyse the impacts of various scenarios so that we can make more specific recommendations.

What materials are used and what criteria are used in choosing them ?

In general, alloy 3003 is used for the heat exchanger matrix (fins, parting sheets, bars) and alloy 5083 is used for headers and nozzles. Other aluminium alloys can also be used in order to meet specific process requirements (such as the maximum design temperature) in accordance with the applicable construction code.
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What are the prices of our heat exchangers ?

As our customers' needs are always different, we calculate our prices for each new heat exchanger

What data do we need to design our equipment ?

To design a heat exchanger to order, we need the process data for each fluid (flow rate, temperature, pressure, composition) on inlet to and outlet from the heat exchanger in order to provide the required thermal, hydraulic and mechanical performances.

What is the delivery time ?

The delivery time depends on the dimensions and complexity of the heat exchanger, on the equipment’s capacity (number of basic units) and on the required supply boundaries (including or excluding assembly with pipes, vessels, ancillary equipment, etc.). It also depends on the customer’s needs as regards the project, while ensuring integration of our product in the manufacturing process. In practice, the delivery time varies from a few months to a year.

What information is required in order to prepare an estimate ?

In addition to process data, complete specifications detailing your project’s special characteristics and constraints are required so that we can submit an offer suited to your needs.