MESSER
Gases for Life

Cryocontrol

Efficient temperature control using cryogenic cooling

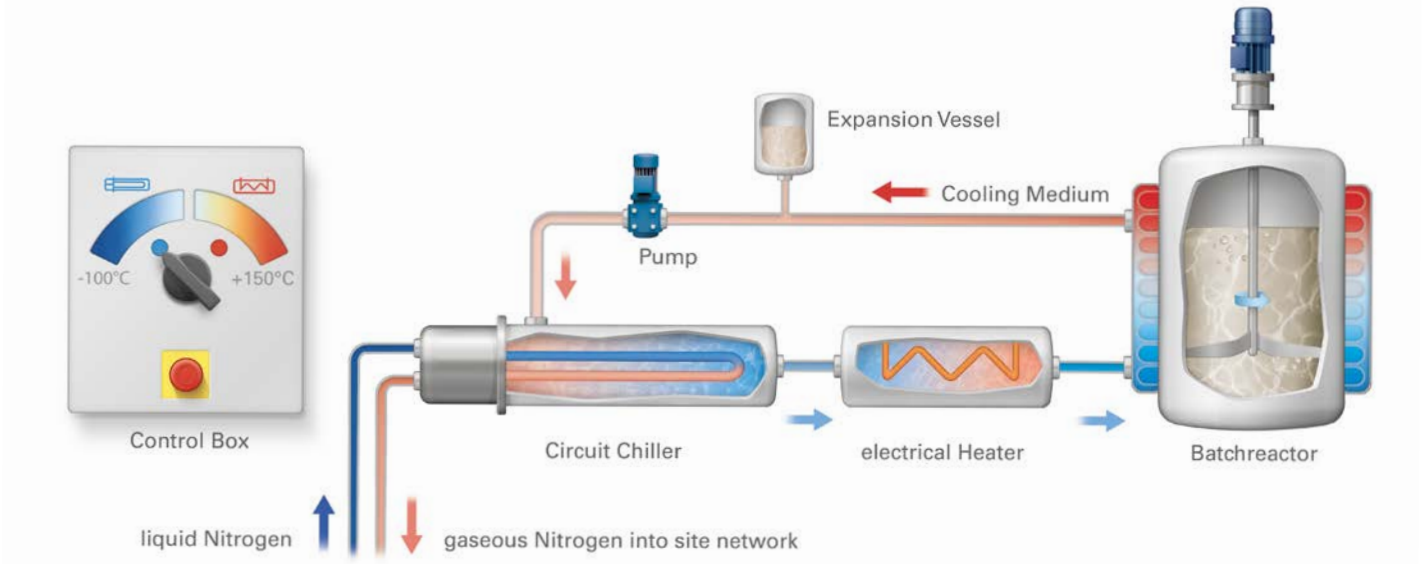
Optimisation options that leave no one out in the cold

Very low process temperatures are frequently required in reactors in the field of state-of-the-art pharmaceuticals and fine chemistry (e.g. in producing active ingredients). They help to steer synthesis steps in the right direction or to increase product output. Temperature requirements as low as -100 °C are not uncommon, with the same process step also usually requiring high process temperatures. The Cryocontrol process from Messer supplies precisely this controlled cooling energy or heat.

It meets the need for high efficiency and short cycle times with rapid temperature change and low control deviation. The Cryocontrol system's high reliability and low maintenance requirements, of course, provide it an almost ideal source of cooling energy.

Nitrogen – many advantages at temperatures below zero

The Cryocontrol process is superior to conventional refrigerating machines in several respects – particularly for applications at low temperature ranges. For example, the compressors of refrigerating machines have to be very powerful to achieve extremely low temperatures at all. As performance requirements increase, so too do investment costs - significantly. Furthermore, investing in cooling compressors only rarely pays for itself because refrigeration is not usually required permanently, but only for the limited period of a production campaign. At the same time the compressors are subject to increased wear because they are constantly being switched on and off in order to handle the rapid change between cooling and heating phases. Even though this is precisely what is required to implement the batch reactions which are generally required.

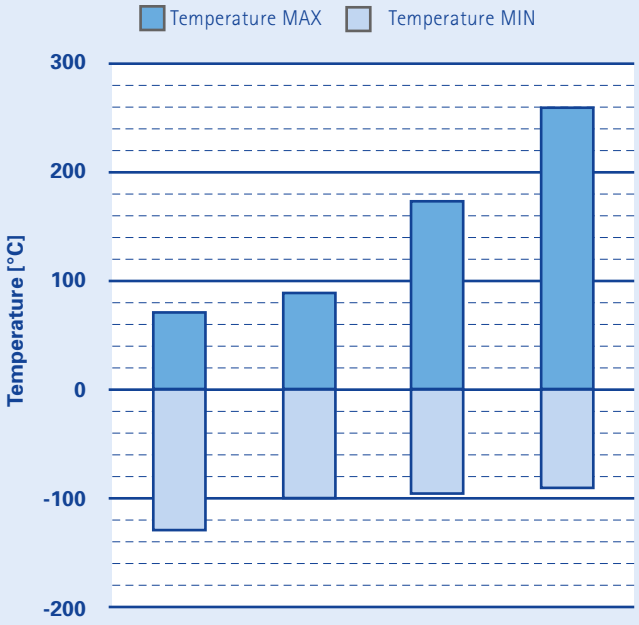


The suitable heat transfer medium

The range of possible applications for the Cryocontrol process is determined decisively by the physical characteristics of the heat transfer medium.
The central selection criteria are:

- good heat transfer characteristics
- low viscosity, especially at the low temperature range
- low melting point
- high boiling point
- good environmental compatibility

As a result different media have established themselves in practice:



Isohexane	Ethanol	Therminol VLT	Syltherm XLT
70	90	175	260
-130	-100	-95	-90

Cryocontrol – maintaining temperatures efficiently and economically

The Cryocontrol process uses the cooling energy of liquid nitrogen. The principle of the process is simple but efficient: an intermediate heat transfer medium circuit is interposed between the source of cooling energy, nitrogen, and the reactor. This circuit enables the reactor to be both cooled and heated.
In cooling mode the heat transfer circuit is cooled using liquid nitrogen. The nitrogen can subsequently be used in gaseous form for other applications, e.g. for inerting.
In heating mode the nitrogen supply is interrupted; the heat transfer medium is usually heated using a flow heater. The low temperature difference between the cooling medium and the product means that the reactor contents are heated and cooled very gently and evenly. This allows the synthesis of temperature-sensitive products.

In a nutshell

The Cryocontrol process is always an ideal solution when

- low and medium average cooling effects or
- high peak cooling effects

are required in the cryogenic temperature range.
Above all in batch and/or campaign production does Cryocontrol demonstrate the advantages it offers compared to mechanical refrigeration units

We will be pleased to show you how you can utilise the strengths of Cryocontrol systems to reach your goals – and not just on paper: our pilot unit is available to you for tests and an initial sample batch.

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