Unistat® 510w

Cooling and heating a 40-litre steel enamel De Dietrich reactor between +120 °C and -30 °C

Requirement
This case study demonstrates the speed of response and level of control achievable when a 40-litre steel enamel De Dietrich reactor is connected to a Unistat 510w.

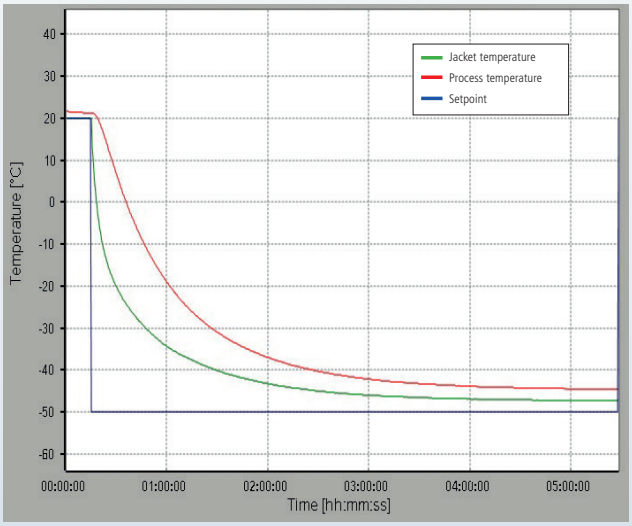
Method
The Unistat and reactor were connected using two 1,5 m insulated metal hoses. The reactor was filled with 30 litres of M40.165/200.10, a Huber supplied silicon based HTF.

Setup details

Temperature range:	-50 … +250°C
Cooling power:	5,3 kW @ 0°C
	2,8 kW @ -20°C
	0,9 kW @ -40°C
Heating power:	6,0 kW
Hoses:	M24x1,5 ; 2x1,5 m
HTF:	M60.115/200.05 (#6166)
Reactor:	40-litre steel enamel De Dietrich reactor
Reactor content:	30 litres M40.165/220.10 (#6164)
Reactor stirrer speed:	300 rpm
Control:	Process

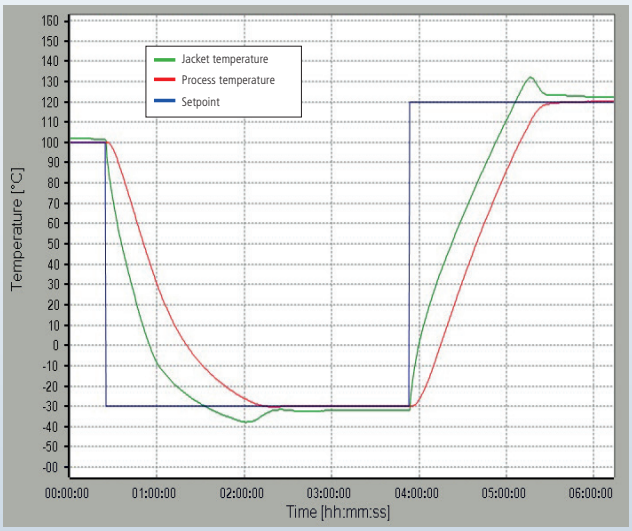
Results

Possible minimum temperature:
As the graphic shows, the minimum termperature, that the reactor jacket achieves is -48 °C and the process temperature asymptotes just above this at approximately -44 °C.



Cooling and heating a reactor between +120 °C and -30 °C:
It can be seen from the graphic how the jacket ramps creating a difference in temperature between the jacket and process in the cool down phase. It takes approximately 66 minutes to cool down the jacket from +100 °C to -30 °C. As the graphic shows, the process mass reaches the same temperature in approximately 102 minutes, demonstrating good thermal transfer between the jacket and the process mass.

In the heat up phase Unistat 510w takes 93 minutes to heat the 40-litres reactor from -30 °C to +120 °C. This is an average heating rate of 1,6 K/min as can be seen on the process temperature curve.



Technical details and dimensions are subject to change. No liability is accepted for errors or ommisions.