

Unistat® 815

Controlling a 6-litre DDPS jacketed glass reactor

Requirement

Chemistry at cryogenic temperatures raises questions on the level of control that can be expected at low temperatures. This case study looks at the ability of a Unistat 815 to cool and control a "DDPS" 6-litre glass reactor to low temperatures.

Method

The DDPS reactor was connected to the Unistat 815 using two 1-metre long M38x1.5 insulated hoses. The HTF used was Huber's "M90.055.03", a silicon based HTF.

Results

The first curve shows the Unistat 815 cooling the process to -75 °C from 20 °C in approximately 100 minutes (ramp rate of 1 K/min.). The jacket temperature reaches -82 °C before warming to guide the process temperature to -75 °C. The heat-up time through 95 K (-75 °C to 20 °C) is completed within 40-minutes (ramp rate 2.3 K/min.) with no over shoot.

Setup details

Unistat® 815 & Miniplant DDPS 6 L

- Temperature range: -85...250 °C
- Cooling power: 1.5 kW @ 250...-20 °C
1.4 kW @ 40 °C
1.2 kW @ -60 °C
0.2 kW @ -80 °C
- Heating power: 2.0 kW
- Hoses: 2x1 m; M38x1.5 (#9616)
- HTF: M90.055.03
- Reactor: 6-litre insulated jacketed glass reactor
- Reactor content: 4 litre M90.055.03
- Stirrer speed: ~ 200 rpm
- Control: process

