Unistat® 405w

Cooling a Glas-Keller 1-litre reactor from 20 °C to -20 °C

Requirement
This case study examines the fast response of a Unistat 405w controlling the process temperature inside a 1-litre un-insulated glass reactor from the company Glas-Keller.

Method
The Unistat 405w is connected to the Glas-Keller 1-litre reactor with two 1-metre insulated metal hoses. The reactor is filled with 0.75 litre of "M90.055.03", a silicon based HTF and controlled from a process sensor located inside the reactor.

Results
It can be seen that the Unistat 405w quickly cools the jacket temperature to rapidly cool the process to -20 °C from 20 °C. The process reaches the new set-point rapidly with negligible overshoot before being controlled precisely at -20 °C The ramp rate over the temperature change is almost linear at an average speed > 2.8 K/min. taking 14 minutes to reach -20 °C.

Setup details
Unistat® 405w & Glas-Keller reactor

Temperature range:	-45...250 °C
Cooling Power:	1.3 kW @ 250…0 °C 0.7 kW @ -20 °C
Heating Power:	1.5 kW / 3 kW
Pump speed:	3300 rpm
Hoses:	2x1 m; M24x1.5 (#9325)
HTF:	DW-Therm (#6479)
Reactor:	1-litre jacketed glass reactor
Reactor contents:	0.75 litre M90.055.03 (#6259)
Reactor stirrer speed:	200 rpm
Control:	process