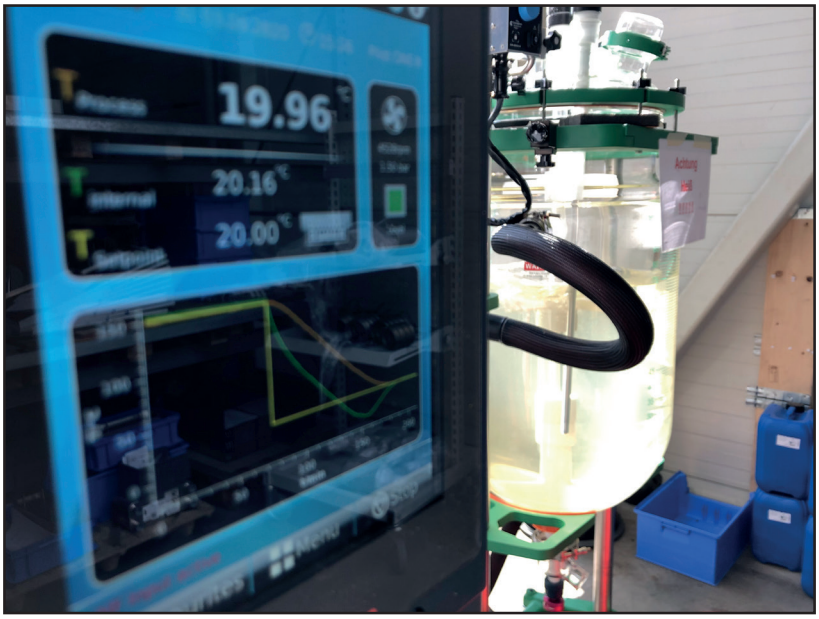
Unistat® 510



Temperature control of the 100 liters Chemglass reactor

Requirement
This Case Study demonstrates the process temperature control and the minimum achievable process temperature when Unistat 510 controls the temperature of the reaction mass in a 100 liters Chemglass reactor.

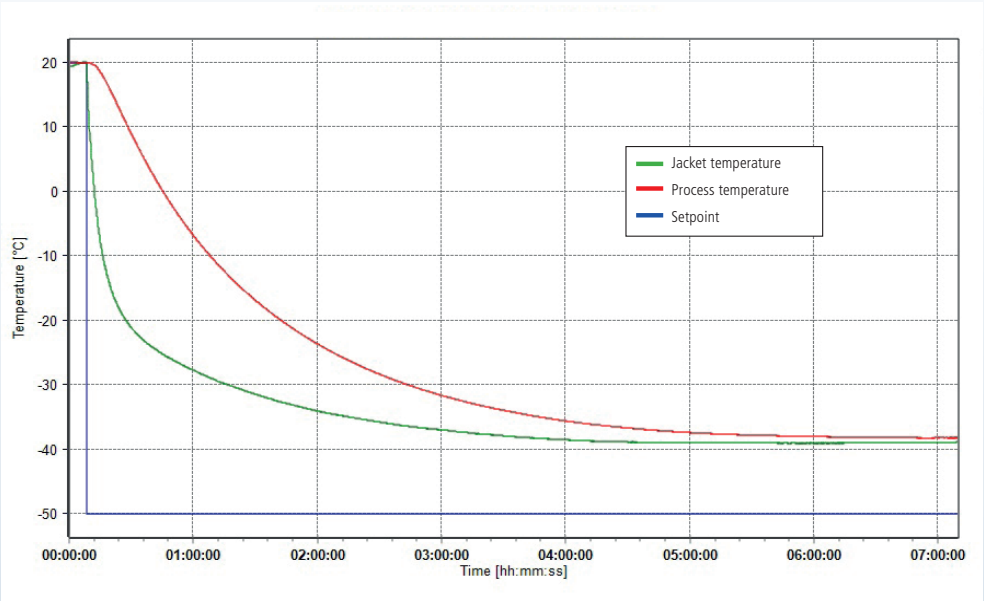
Method
The Unistat and reactor were connected using two metal hoses M30. The reactor was filled with 80 liters of DW-Therm. "Process" control was carried out via a Pt100 sensor located in the process mass. Stirrer speed was set to 80 rpm.

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:	2 x M30 metal Insulated
HTF:	DW-Therm
Reactor:	100 litres glass jacketed
Reactor content:	80 litres DW-Therm
Reactor stirrer speed:	80 rpm
Control:	Process
Amb. temperature:	+29°C

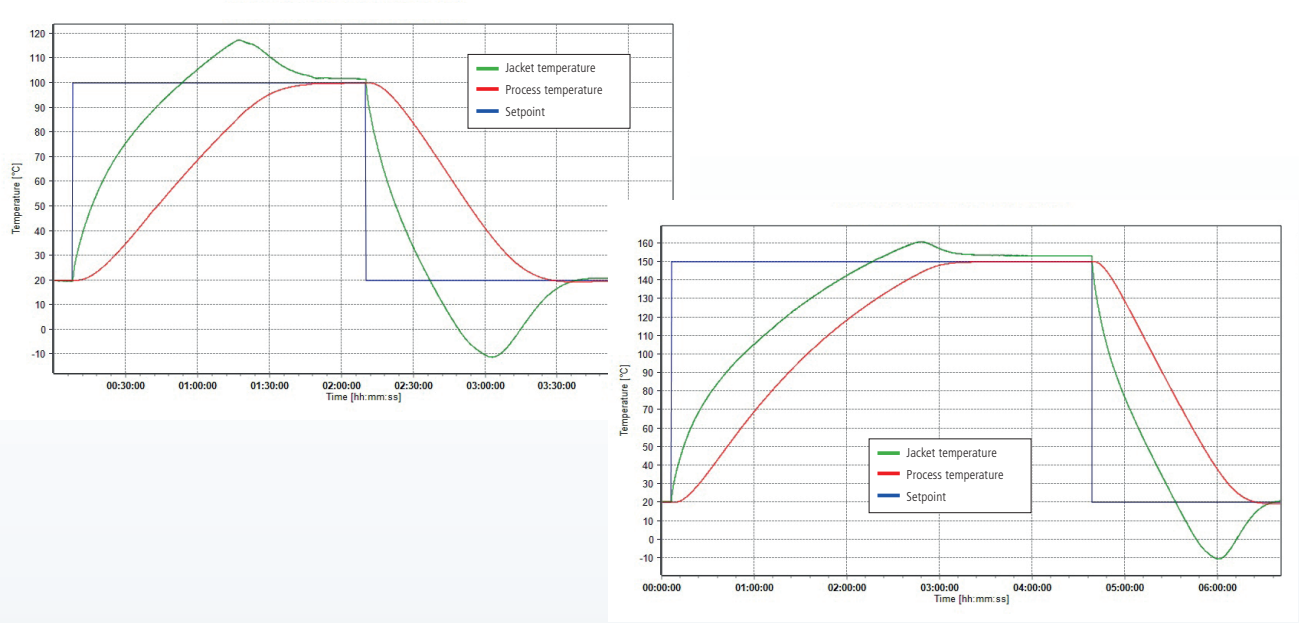
Results

1. Lowest achievable temperature (Tmin):
In this Case Study, the ambient temperature was a very high 29°C.
The graphic shows that a minimum process temperature of -38.6°C was achieved.

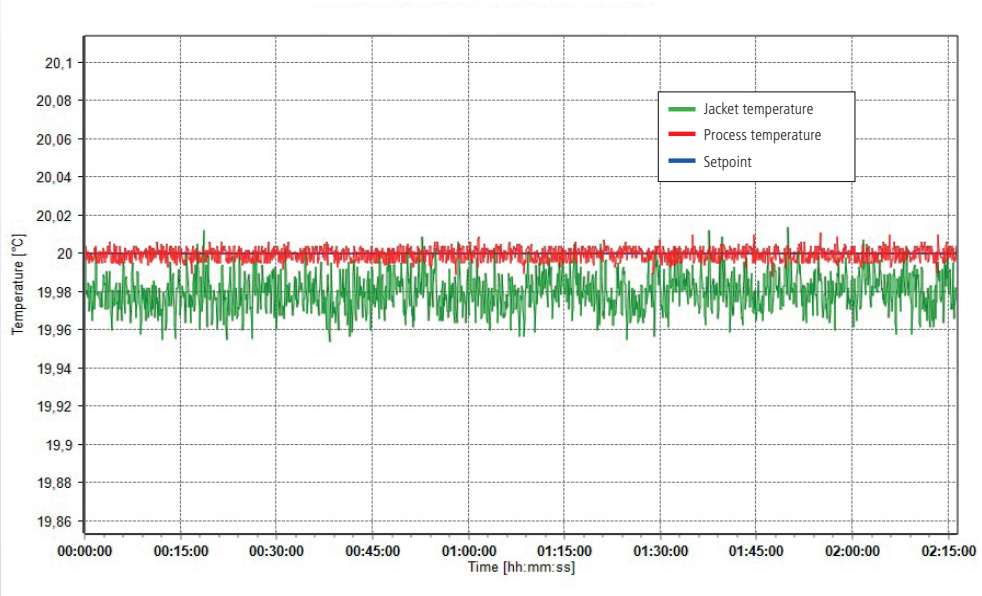


2. Performance:
In this Case Study, the ambient temperature was a very high 29°C.
The graphic shows the speed, accuracy and stability of the Unistat 510 as each new set-point is reached.

Start T	End T	Approximate time	Av. Ramp Rate	Fastest Ramp Rate
+20°C	+100°C	114 minutes	0.7 K/min	(30°C to 60°C) 1.4 K/Min
+100°C	+20°C	75 minutes	1.1 K/min	(60°C to 30°C) 1.3 K/Min
+20°C	+150°C	200 minutes	0.7 K/min	(30°C to 60°C) 1.2 K/Min
+150°C	+20°C	107 minutes	1.2 K/min	(+60°C to +30°C) 1.3 K/Min



3. Stability:
This Case Study was carried out to simulate more realistic conditions with the Unistat 510 and reactor in full sunlight with an ambient temperature of +29°C.
The graphics show the stability of control at 20°C.



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