

Unistat P915w

Unistat P915w controls a 100 litre Chemglass glass jacketed reactor

Requirement

This case study demonstrates the performance of the Unistat P915w to control the process temperature during simulated exothermic reactions at +20°C & -40°C in “real” ambient conditions. Case study also demonstrates the lowest achievable temperature in the process.

The tables and the graphics show the responsive, tight and stable control with the jacket temperature being continually adjusted to return and hold the process temperature at the set-points as the thermal load generated by the immersion heater is suddenly changed.

Method

To simulate the exothermic reactions, a 600-watt immersion heater was placed inside the reaction mass. The heat output was controlled by a regulator with the results recorded using Huber’s “Service software”.

Setup details

Temperature range: -90°C...+250°C
 Heating power: 6.0 kW
 Hoses: 2 x M30 Metal Insulated
 HTF: DW-Therm
 Reactor: Chemglass100 liter
 Reactor content: 70 l DW-Therm
 Stirrer speed: 85 rpm
 Control: process
 Amb. temperature: +20°C

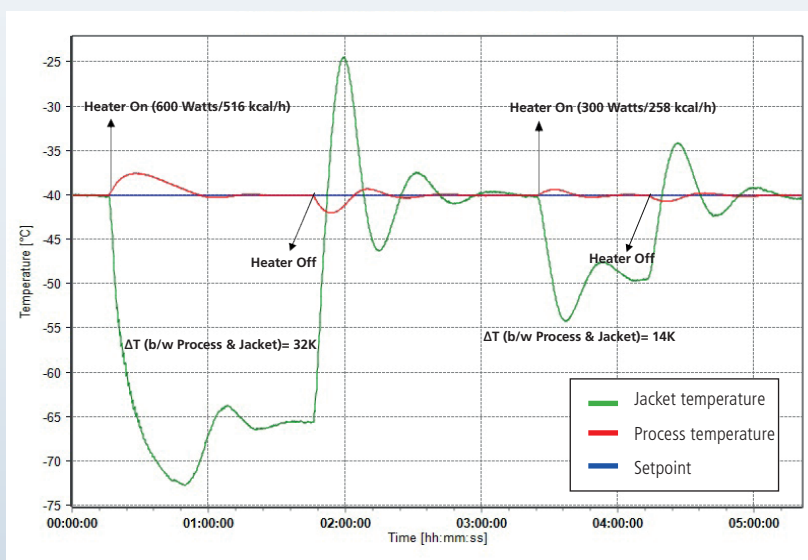


Results

1. Performance:

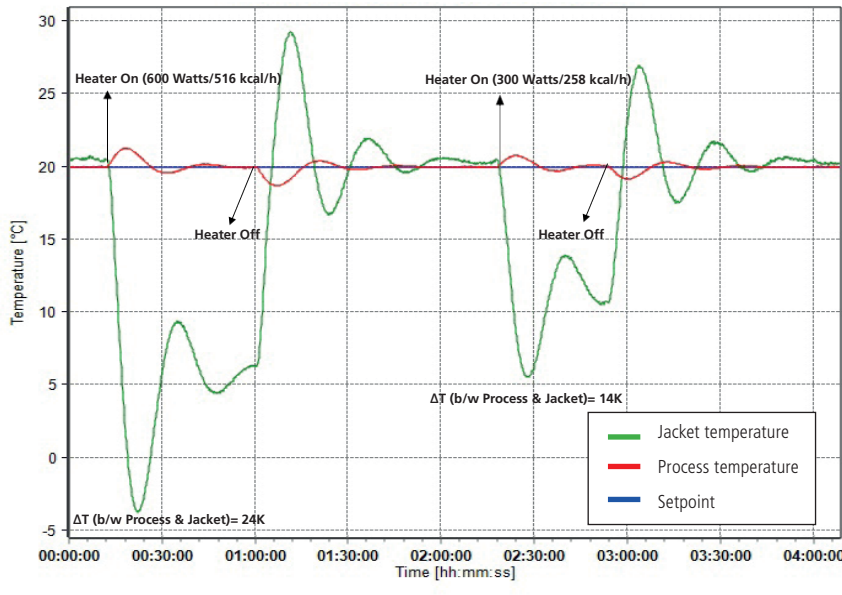
Controlling and regulating temperature at -40°C with simulated exothermic reactions of 600 Watts (516 kcal/hr) and 300 Watts (258 kcal/hr).

Set Point	Exotherm	ΔT (b/w Process & Jacket)
-40°C	600W	32K
-40°C	300W	14K



Controlling and regulating temperature at +20°C with simulated exothermic reactions of 300W (258 kcal/hr) and 600W (516 kcal/hr).

Set Point	Exotherm	ΔT (b/w Process & Jacket)
+20°C	600W	25K
+20°C	300W	15K



1. Lowest achievable temperature in the process:

Start (°C)	T-min (°C)	Time (in process)
+20°C	-81.6°C	5 hours

