Unistat 915w

Unistat 915w controls a 80 liter De Dietrich reactor

Requirement

This case study demonstrates the performance of the Unistat 915w to control the process temperature during simulated exothermic reactions at +20°C and -40°C in "real" ambient conditions. Case study also demonstrates the lowest achievable temperature in the process along with cool down & heat up from +20°C to -60 °C to +20°C.

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

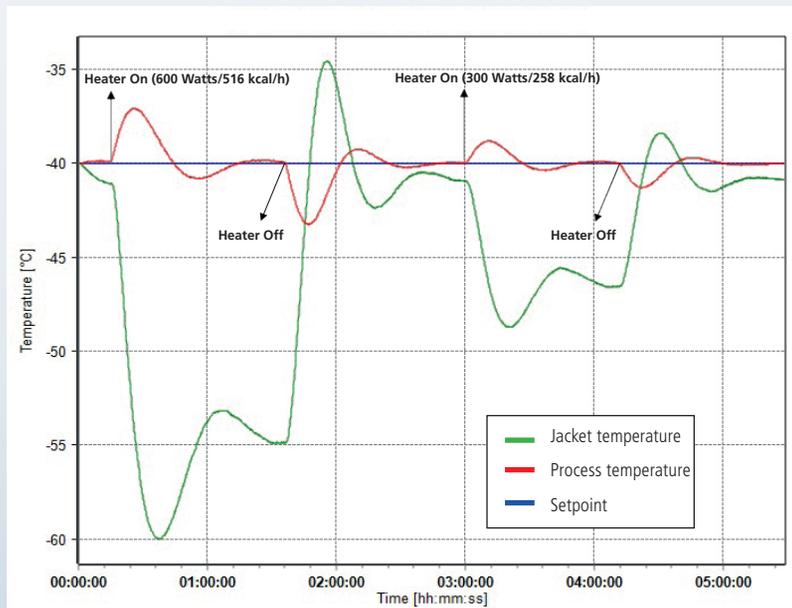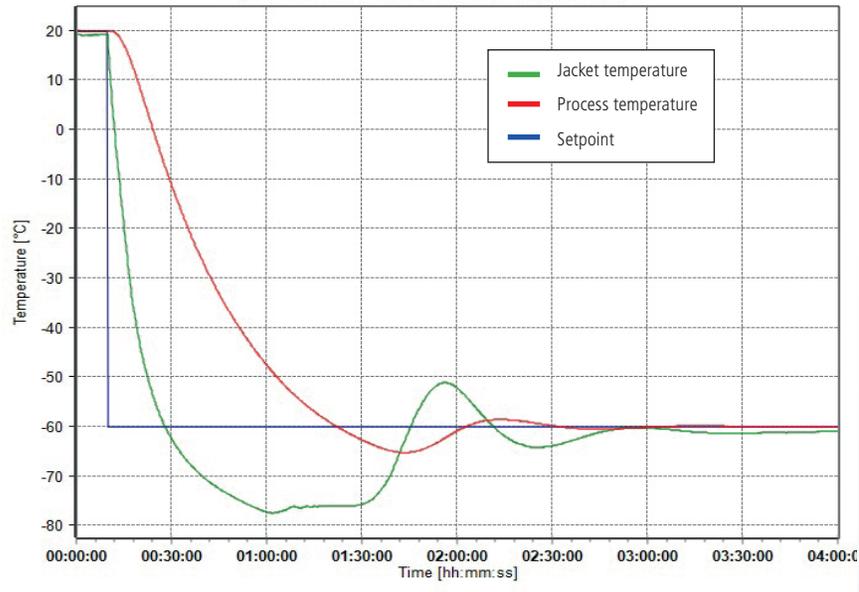|	
Temperature range:	-90°C...+250°C
Heating power:	6.0 kW
Hoses:	2 x M30 Metal Insulated
HTF:	M90.170.02
Reactor:	De Dietrich 80 liter
Reactor content:	60 l DW-Therm
Stirrer speed:	85 rpm
Control:	process
Amb. temperature:	+20°C

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	23K
-40°C	300W	9K

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

Cooling from +20°C to -60°C.

Set Point	Time (Jacket)	Time (Process)
-60°C	18 min	1 hour 15 min

Heating from -60°C to +20°C.

Set Point	Exotherm	ΔT (b/w Process & Jacket)
20°C	55 min	1 hour 20 min

Controlling and regulating temperature at +20°C with simulated exothermic reactions of 600 Watts (516 kcal/hr) and 300 Watts (258 kcal/hr).
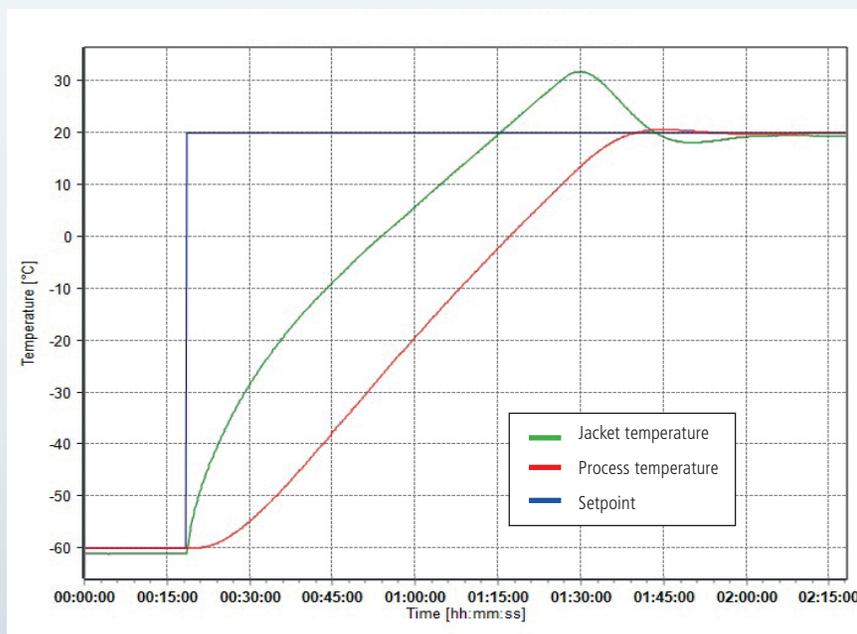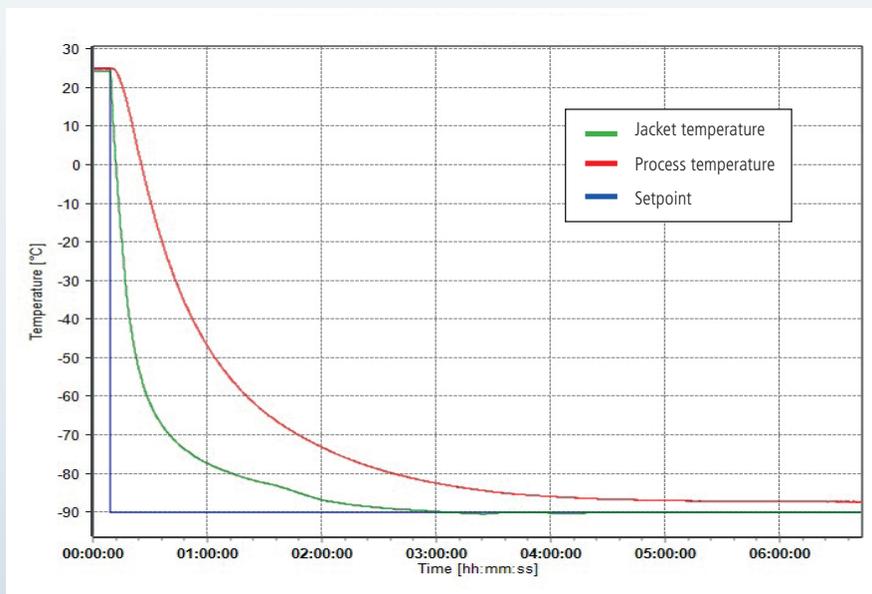
Set Point	Exotherm	ΔT (b/w Process & Jacket)
20°C	600W	10K
20°C	300W	7K
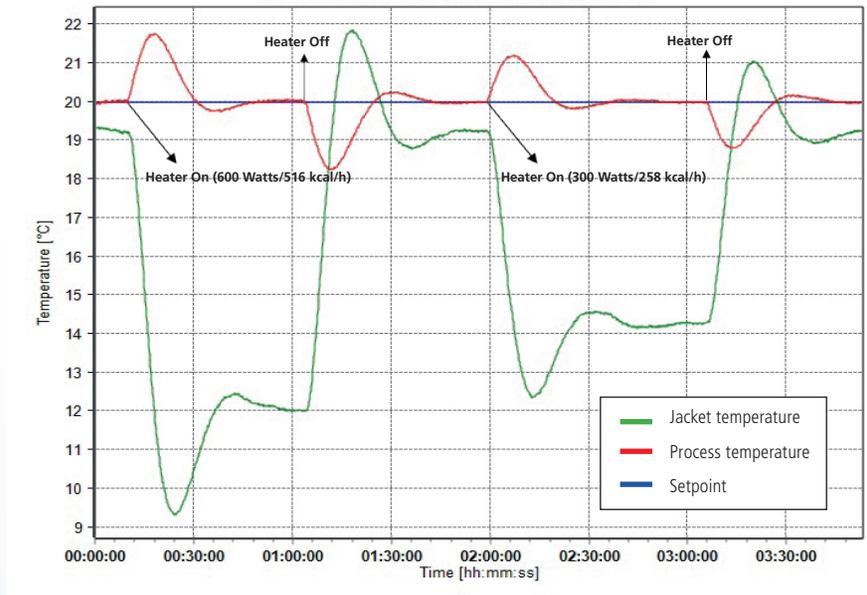
2. Lowest achievable temperature:
Lowest achievable temperature in the process (repeat).

Start T (°C)	T-min (°C)	Time (in process)	Temperature (in Jacket)	Time (in Jacket)
20°C	-87.2°C	6 Hours	-90°C	3 Hours

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

Version: 02/2023

Lowest Temperature (-87.2°C) to +20°C.

Start T (°C)	T-min (°C)	Time (in process)	Temperature (in Jacket)	Time (in Jacket)
-87.2°C	20°C	1 Hour 15 min	1 hour 40 min	3 Hours

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