Unistat P510w

Unistat P510w controlling simulated reactions in a 50l DDPS glass jacketed reactor

Requirement

This case study demonstrates rapid response and the ability of the Unistat P510w to control the process temperature in an uninsulated DDPS 50l glass jacketed reactor during simulated exothermic reactions.

Method

At a process temperature set-point of +70°C, the reactions were simulated using a 1kW immersion heater placed into the "reaction mass". The heater was turned "On" controlled settings of 1kW, 750w, 500w and then 250w. At each new "reaction", that was started, the process temperature was allowed to stabilise before the heater was turned "Off" and again allowed to stabilise before the next "reaction" was started.

Setup details

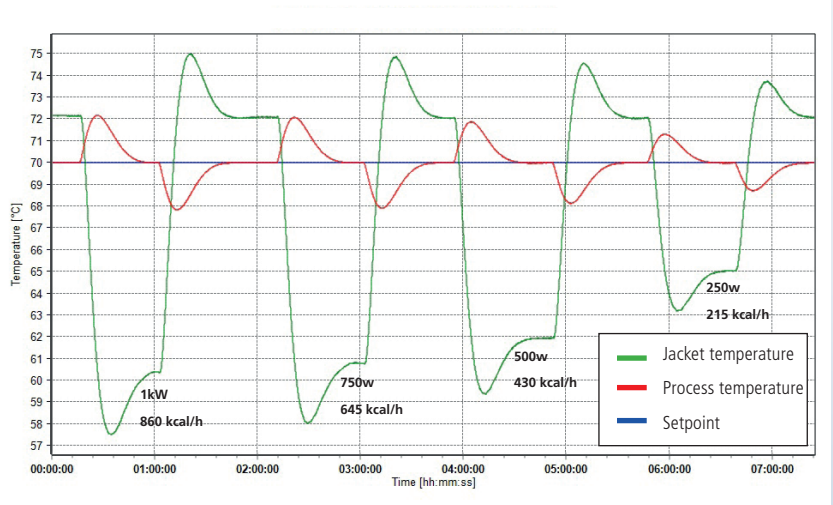
Temperature range:	-50°C...+250°C
Heating power:	6.0 kW
Hoses:	2 x M32 Metal Insulated
HTF:	M60.115/200.05
Reactor:	glass jacketed reactor 50l
Reactor content:	50l M40.165/220.10
ntrol:	process
Stirrer speed:	250 rpm

Results

1. Performance.

The rapid response of the Unistat P510w in cooling the reactor jacket from just over +72°C to +57.5°C (14.5K) within 15 minutes to generate a wide enough Delta-T to bring the reaction under control can be seen in the first reaction of 1kW.
The reaction recovery data is summarised in the table below.

kW	kcal/h	Process Rise	Recovery	Process Fall	Recovery	Max Delta-T
1.0	860	2.1K	40 min	2.2K	38 min	12.5K
0.75	645	2K	40 min	2K	38 min	12K
0.5	430	1.9K	39 min	1.9K	38 min	10.5K
0.25	215	1.3K	39 min	1.3K	37 min	6.7K



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