

## Unistat® 510w H12 NR



### Temperature control of the 100l Chemglass reactor

#### Requirement

This Case Study demonstrates the ability of the latest version of the Unistat 510w that uses R1270 as a refrigerant and also serves as a useful tool to compare the performance of a Unistat 510w that used R452a as a refrigerant

#### Method

The Unistat and reactor were connected using two metal hoses M30. The reactor was filled with 75 liters of M20.195/235.20. "Process" control was carried out via a Pt100 sensor located in the process mass. Stirrer speed was set to 100 rpm.

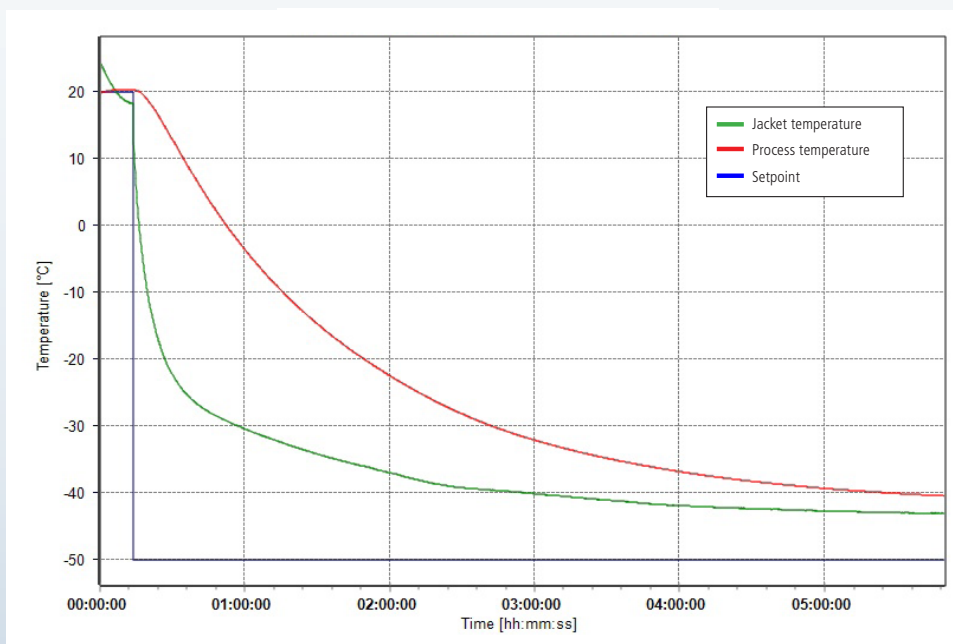
#### Setup details

Temperature range:	-50 ... +250°C
Cooling power:	5,3 kW @ 0°C
	2,8 kW @ -20°C
	0,9 kW @ -40°C
Heating power:	12,0 kW
Hoses:	2 x M30 metal Insulated
HTF:	M60.115/200.05
Reactor:	100 litres glass jacketed
Reactor content:	75l M20.195/235.20
Reactor stirrer speed:	100 rpm
Control:	Process
Amb. temperature:	+22°C

## Results

### 1. Lowest achievable temperature in the reaction mass:

The graphic below shows the minimum achievable temperature in the reaction mass to be -40.8°C

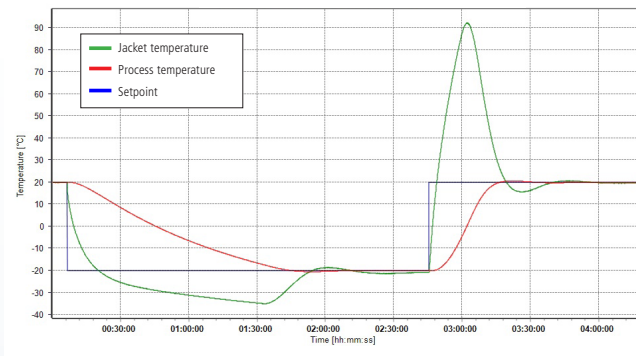


## 2. Performance:

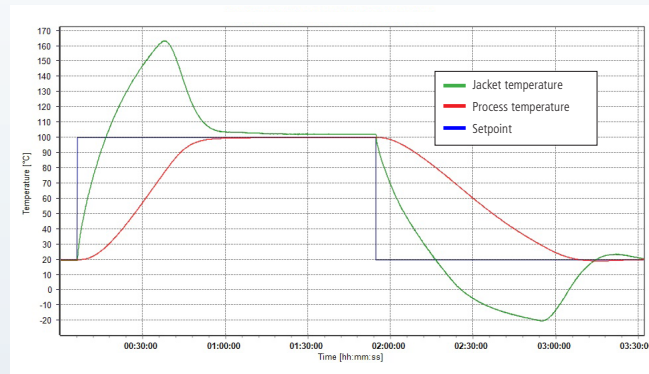
The graphic shows the speed, accuracy and stability of the Unistat 510w as each new set-point is reached

Start T	End T	Time taken	Av. Ramp Rate
20°C	-20°C	98 minutes	0.4 K/min
-20°C	20°C	30 minutes	1.3 K/min
20°C	100°C	55 minutes	1.5 K/min
100°C	20°C	72 minutes	1.1 K/min
20°C	150°C	76 minutes	1.7 K/min
150°C	20°C	99 minutes	1.3 K/min

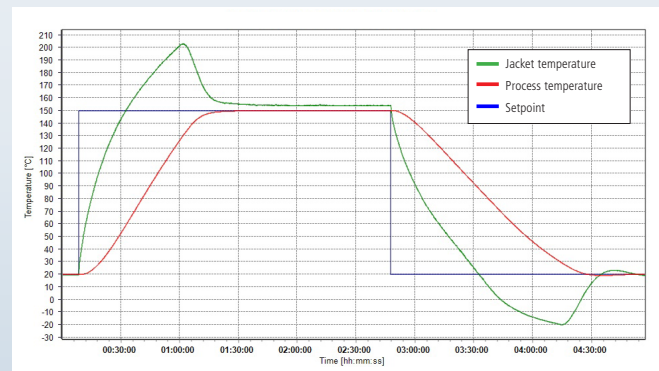
Temperature Control: from +20°C to -20°C to +20°C



Temperature Control: from +20°C to +100°C to +20°C

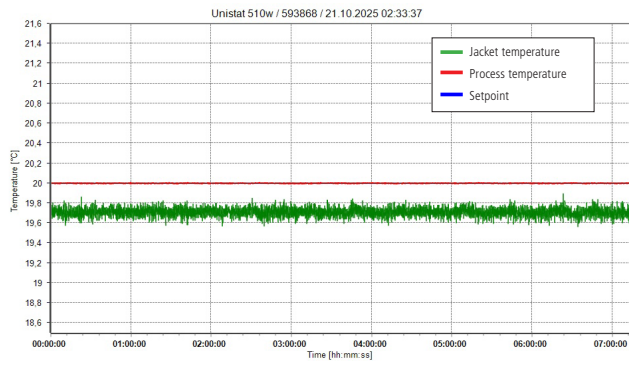


Temperature Control: from +20°C to +150°C to +20°C

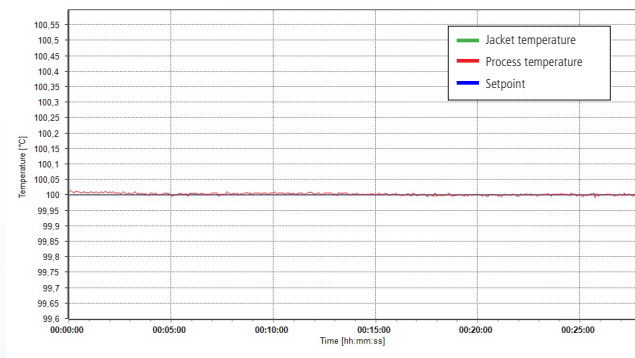


### 3. Stability

The graphic below shows the tight control at +20°C with a stability in the process mass being better than +/-0.01K



The graphic below shows the stability at +100°C in the process mass being better than +/-0.015K



The graphic below shows the stability at +150°C in the process mass being better than 0.015K

