

# Unistat 430

**Unistat 430 cycling a 10-liter vacuum insulated reactor**

**Requirement**

This case study determines the lowest achievable process temperature, stability of the control and the ability of the Unistat 430 to control the process temperature when it is connected to an Asahi 10-liter vacuum insulated reactor.

**Method**

The Asahi 10-liter vacuum insulated reactor was connected to Unistat 430 using metal insulated hoses M24. The thermofluid used in the system was "DW-Therm". "Process" control was carried out via a Pt100 sensor located in the process mass. Stirrer speed was set to 100 rpm.

**Setup details**

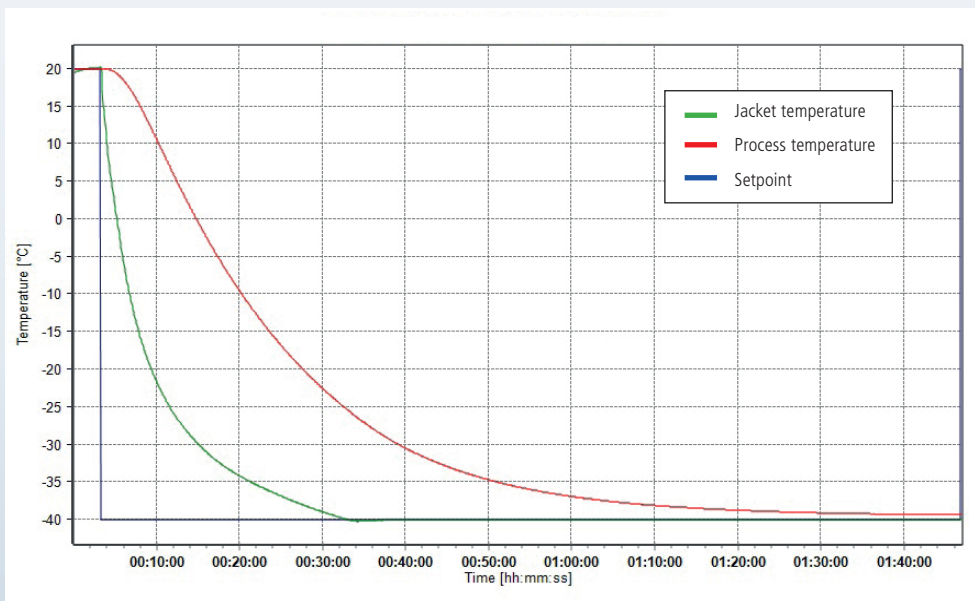
- Temperature range: -40°C...+250°C
- Cooling power: 3.5 kW @ +20°C
- 3.5 kW @ 0°C
- 2.2 kW @ -20°C
- Heating power: 4 kW
- Hoses: metal insulated M24
- HTF: DW-Therm
- Reactor: 10-liter vacuum insulated reactor
- Reactor content: 7 l DW-Therm
- Stirrer speed: 100 rpm
- Control: process
- Amb. temperature: +24°C



**Results**

**1. Lowest achievable temperature (Tmin):**

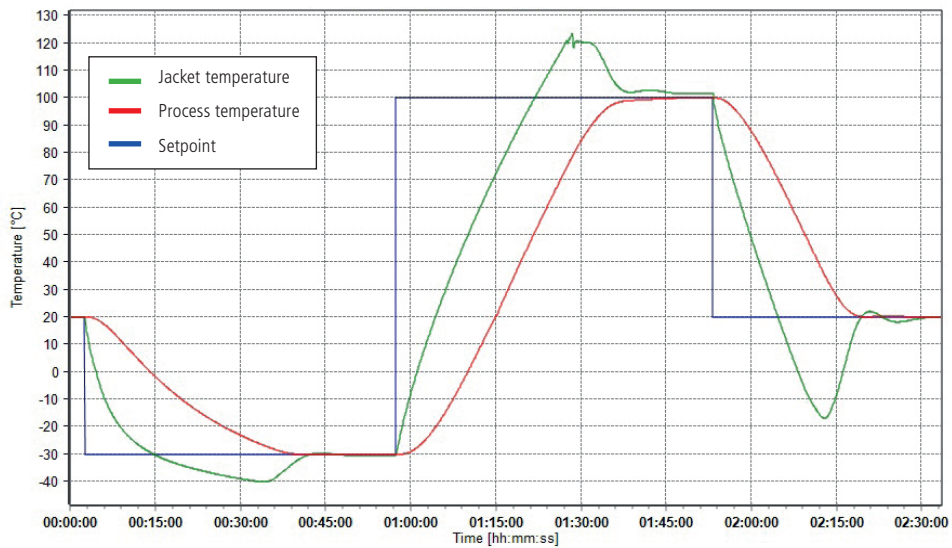
As the graphic shows, the minimum achievable temperature was -39.4°C.



## 2. Performance:

The table and the graphic shows the speed and stability of control as each new set-point is reached.

Start T	End T	Approximate time	Av. Ramp Rate
+20°C	-30°C	37 minutes	1.4 K/min
-30°C	+100°C	48 minutes	2.7 K/min
+100°C	+20°C	27 minutes	2.3 K/min



## 3. Stability:

The graphic shows the micro-adjustments to the jacket temperature to keep the process temperature precisely at 30°C.

