

# Grande Fleur

**Grande Fleur cycling a 5-litres glass vacuum insulated reactor**

**Requirement**

This Case Study demonstrates the minimum achievable process temperature and the process temperature control abilities of the Grande Fleur when it is connected to an Asahi 5-litre vacuum insulated reactor.

**Method**

The 5-litres Asahi glass vacuum insulated reactor was connected to Grande Fleur using 1-meter M24 metal insulated hoses. 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**

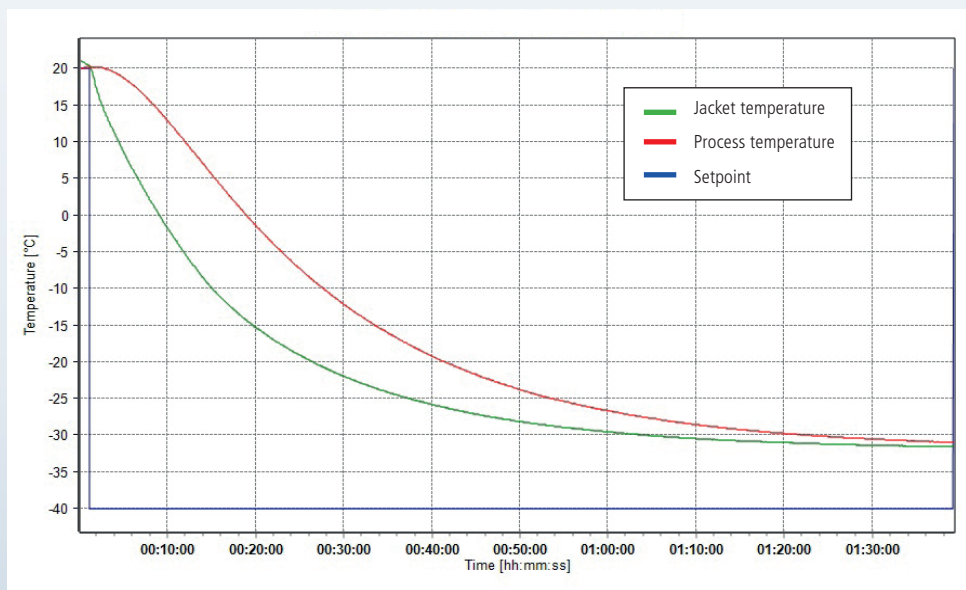
- Temperature range: -40°C...+200°C
- Cooling power: 0.6 kW @ +20°C  
0.6 kW @ 0°C  
0.35 kW @ -20°C
- Heating power: 1.5 kW
- Hoses: 2\*1 m metal insulated
- HTF: DW-Therm
- Reactor: Asahi 5-litres glass vacuum insulated
- Reactor content: 4 l M60.115/200.10
- Stirrer speed: 100 rpm
- Control: process
- Amb. temperature: +25°C



## Results

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

As the graphic shows, a minimum temperature of -31°C was reached.



## 2. Performance:

The table and graphic data show the speed, accuracy and stability of the Grande Fleur as each new set point is reached and maintained.

Start T	End T	Approximate time	Av. Ramp Rate	Fastest Ramp Rate
+20°C	-20°C	42 minutes	0.95 K/min	(+10°C to 0°C) 1.4 K/min
-20°C	+100°C	43 minutes	2.8 K/min	(+30°C to +60°C) 3.8 K/min
+100°C	+20°C	41 minutes	1.9 K/min	(+60°C to +30°C) 2 K/min

