

## 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

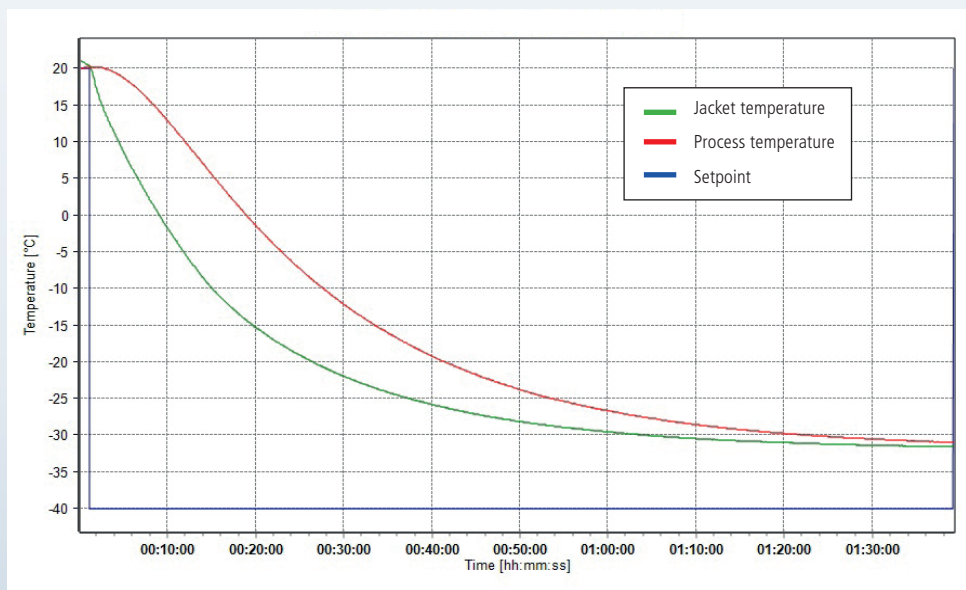
Temperature range:	-40°C...+200°C
Cooling power:	0.6 kW @ +20°C 0.6 kW @ 0°C 0.35 kW @ -20°C
Heating power:	1.5 kW
Hoses:	2*1 m metal insulated
HTF:	M60.115/200.05
Reactor:	Asahi 5-litres glass vacuum insulated
Reactor content:	4 l M60.115/200.10
Stirrer speed:	100 rpm
Control:	process
Amb. temperature:	+25°C



## Results

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

As the graphic shows, a minimum temperature of -31°C was reached after 18 minutes.



## 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

