

# Process Cooling Equipment

## CUMULUS® FTC system



**CUMULUS® PX5 module** (above),  
**CUMULUS® PX20 and PX100**  
modules (to the right)



### Precision cooling of process fluids

The CUMULUS® Fluid Temperature Control (FTC) system from Linde has been developed for cooling of process fluids. The CUMULUS® PX modules are developed for cooling temperatures down to  $-100\text{ }^{\circ}\text{C}$ . For cooling down to  $-120\text{ }^{\circ}\text{C}$  the CUMULUS® XLT50 module is available.

### Pressure vessel approval

The CUMULUS® FTC system complies with the Pressure Equipment Directive (PED), 97/23/EC. The maximum allowable pressure is 19 bar(g) on both the process medium and the nitrogen side. The nitrogen side is protected by a safety valve.

### Materials of construction

Process medium wetted materials are stainless steel 1.4401 and 1.4404, corresponding to AISI 316 and 316L, copper and PTFE. The heat exchangers used are Alfa Laval type CB plate heat exchangers, which give quick response and unique process dynamics. These heat exchangers are made entirely from stainless steel 1.4401. The plate edges and plate contact points are brazed with 99.99% copper.

The heat exchanger package is mounted in a cold box with 100 mm thick, CFC free, polyurethane foam. The cold box is made from stainless steel 1.4301, corresponding to AISI 304, in order to minimize on site maintenance requirements.

### Electrical safety

The CUMULUS® FTC system satisfies the electrical regulations for installation in an area classified as Ex-Zone 1, IIC, T5 (maximum ambient temperature  $40\text{ }^{\circ}\text{C}$ ). This is achieved by using intrinsically safe signal loops, EEx ia. The instrument cabinet with operating panel shall be installed in a non-classified area. The CUMULUS® FTC system complies with the Low Voltage Directive (LVD), 73/23/EEC, and Electromagnetic Compatibility Directive (EMC), 89/336/EEC.

### Documentation

Each CUMULUS® FTC unit is delivered with complete documentation. It includes instructions for installation, maintenance, safety and operation, component data sheets, electrical and dimensional drawings and manufacturing control documentation such as welding documents, material certificates and test protocols.

### Technical data

	<b>CUMULUS® PX5</b>	<b>CUMULUS® PX20</b>	<b>CUMULUS® PX50</b>	<b>CUMULUS® PX100</b>	<b>CUMULUS® XLT50</b>
<b>Process data</b>					
Nominal <sup>1)</sup> cooling duty [kW]	5	20	50	100	50
Nominal <sup>1)</sup> flow rate [m <sup>3</sup> /h]	2	5	10	20	10
Pressure drop <sup>2)</sup> Process medium [bar]	1	1	1	1	1
Pressure drop Nitrogen [bar]	3	3	3	3	3
Volume <sup>3)</sup> Process medium [l]	2	6	15	39	70
Temperature range <sup>4)</sup> [°C]	-100 to +50	-100 to +50	-100 to +50	-100 to +50	-120 to +50
<b>Dimensions</b>					
Width [mm]	900	700	1 500	1 500	1 500
Depth [mm]	700	1 000	1 350	1 350	1 350
Height [mm]	660	1 150	1 500	1 500	1 750
Weight [kg]	60	220	670	800	900
<b>Control system</b>					
Siemens PLC Simatic S7 with CPU313C					
Operating panel	OP7	OP170B	OP170B	OP170B	OP170B
<b>Connections</b>					
Process medium inlet flange	DN15	DN25	DN25	DN50	DN50
Process medium outlet flange	DN15	DN25	DN25	DN50	DN50
Nitrogen inlet flange	DN15	DN25	DN25	DN25	DN25
Nitrogen outlet flange	DN15	DN25	DN25	DN25	DN25
<b>Utilities</b>					
Electricity (1P+N)	120/230 V, 10 A, 50/60 Hz				
Compressed air [bar(g)]	5-7	5-7	5-7	5-7	5-7
Dew point [°C]	< -20	< -20	< -20	< -20	< -20

- 1) These values are nominal values. In most applications, the operating load of a CUMULUS® FTC system is within the range of 5 to 100% of these values. In certain cases, the upper limit can exceed 100%.
- 2) Approximate pressure drop at nominal flow, dependant on temperature and process medium used.
- 3) Volume of process medium system inside the unit.
- 4) Valid for standard units. Option for maximum temperature of +100°C available.

Other leaflets about our complete range of applications and products are available in all sales offices.

Our experts are available for consultation.