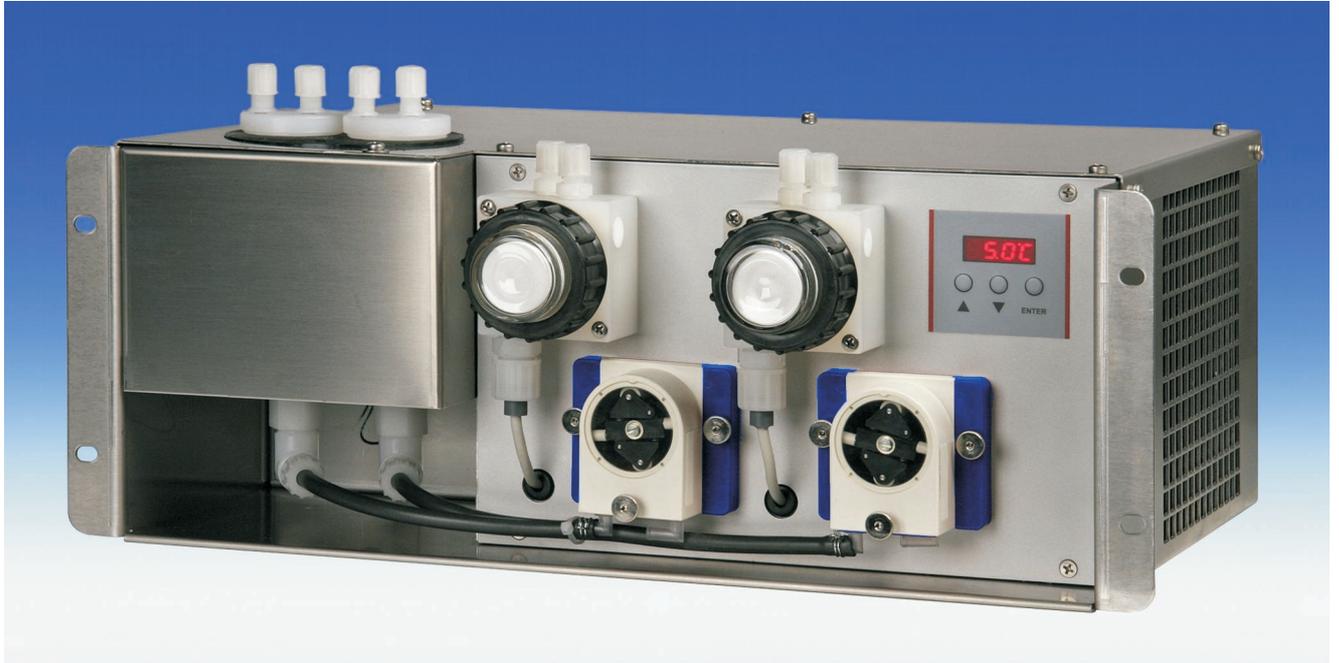


# Sample Gas Cooler EGK 2-19



AP000086

Accurate measurements of gases require gas samples with stable dew points even under harsh ambient conditions.

The EGK models provide a compressor-type cooling system connected to a cooling block. The cooling block evenly dissipates the heat thus supporting the highly efficient heat exchangers. The temperature of the cooling block is regulated by the **Bühler Constant Regulating System**. This system allows smooth regulation and eliminates the disadvantages of the traditional on-off operating mode.

The EGK 2-19 can be supplied with one or two heat exchangers made of stainless steel, glass or PVDF. Condensate is drained by peristaltic pumps.

Filters can be installed and the filter housings may include moisture detectors.

Measurement and display of signals are by the internal micro controller and the LED display.

Due to the wide variety of combinations and pre assembled parts, a cooling system can be designed for any specific application. Contact one of Bühler's application specialists for further information.

- **Compact design: completely pre assembled and ready for connecting**
- **Low maintenance cost due to easy accessibility**
- **One or two gas paths**
- **Heat exchanger made of stainless steel, DURAN glass or PVDF**
- **Adjustable outlet dew point and alarm limits**
- **Self-monitoring**
- **Status outputs**
- **Ambient temperatures up to 50°C**
- **Nominal cooling capacity 320 kJ/h**
- **Dew point stability 0.1 K**
- **4-20 mA analogue temperature output**
- **Available for wall mounting or 19" cabinet**

## Concept

The EGK 2-19 may include one or two heat exchangers. Optional components commonly found in conditioning system can be integrated:

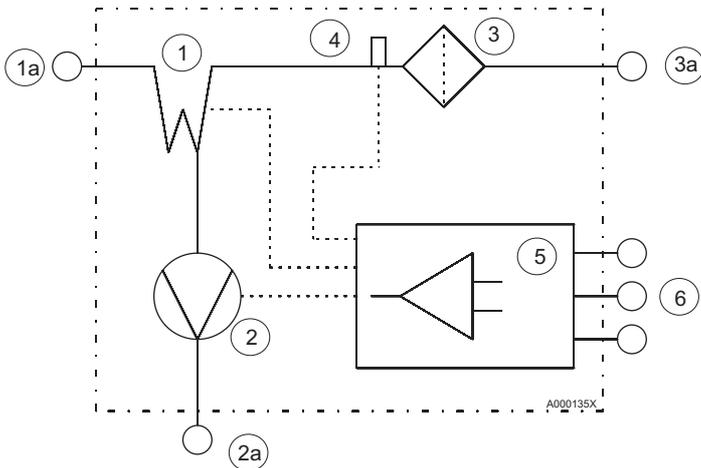
- peristaltic pumps for condensate drainage
- filters
- moisture detectors

The cooler is completely configurable to meet the needs of any specific application. This modular approach combines many of the discrete functions of previous designs therefore minimizing cost and assembly time.

The condition of the filter element can be seen easily through a viewing glass. The moisture detector is easy to disassemble for maintenance.



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## Description of a fully assembled gas path

The sample gas is routed to the input of the heat exchanger (1, 1a) made of stainless steel, glass or PVDF. The output of the heat exchanger is pre-tubed to the filter (3). The dried and filtered sample gas leaves the filter at the outlet (3a). The condensate is withdrawn by the peristaltic pump (2) which is tubed to the heat exchanger. The optional moisture detector (4) is monitored by the internal controller (5). This eliminates the need for additional controllers.

## Controller (5)

The core element of the electronic circuit is the microprocessor-controlled Buhler Constant Regulating System. The front panel display (with 3 control keys) shows the cooler temperature as well as the system status. Several system parameters can be set such as outlet dewpoint, alarm limits or sensitivity of the moisture detector.

## Electrical connections (6)

All signals are accessible on the top of the cooler via a Phoenix plug. The power supply is connected via a plug as well. No fixed wiring is required.



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## Technical data

### Cooler

Warming up time	after max. 15 min.
Nominal cooling capacity (at 25°C)	320 kJ/h
Ambient temperature	+5...50 °C
Factory set dew point	ca. 5 °C
Dew point stability static	0.1 K
Drift over full range	± 1.5 K
Temperature differential between heat exchangers	< 0.5 K
Max. input gas parameters	see table heat exchanger
Max. Pressure	see table heat exchanger possible limitations by filter or peristaltic pump (see there)

### Heat exchanger

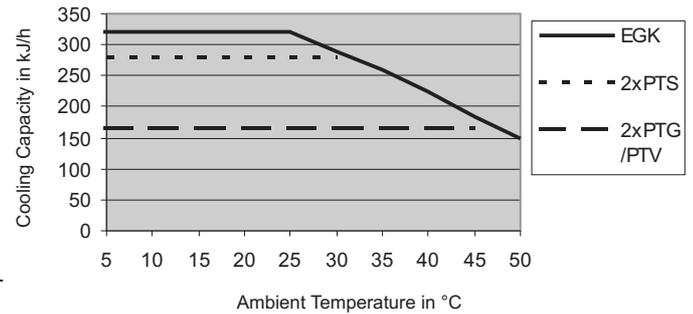
The energy content of the sample gas and, as a result, the cooling capacity is determined by 3 parameters: gas temp.  $\vartheta_G$ , dewpoint  $\tau_e$  and flow  $v$ . The outlet dewpoint rises with increasing energy content (heat) of the gas. The required cooling capacity is determined by the max. acceptable level of the outlet dew point.

The following table shows cooler performance assuming the following conditions:  $\tau_e=40^\circ\text{C}$  and  $\vartheta_G=70^\circ\text{C}$ . Indicated is the  $v_{\text{max}}$  in NI/h cooled air (i.e. after the moisture has condensed).

If the real values stay below the parameters  $\tau_e$  and  $\vartheta_G$ ,  $Q_{\text{max}}$  can be increased. For example, instead of  $\tau_e = 40^\circ\text{C}$ ,  $\vartheta_G = 70^\circ\text{C}$  and  $v = 280$  l/h the values  $\tau_e=50^\circ\text{C}$ ,  $\vartheta_G=80^\circ\text{C}$  and  $v=220$  l/h could be achieved.

**Please let us know if you want assistance or use our cooler adaption programme.**

## Performance data



**Remark:** Limits shown for the heat exchangers are for an inlet dew point of 40°C.

Heat exchanger	PTS PTS-I <sup>2)</sup>	PTG PTG	PTV PTV-I <sup>2)</sup>
Flow rate $Q_{\text{max}}$ <sup>1)</sup>	500 l/h	280 l/h	280 l/h
Inlet dewpoint $\tau_{e,\text{max}}$ <sup>1)</sup>	65 °C	65 °C	65 °C
Gas inlet temperature. $\vartheta_{G,\text{max}}$ <sup>1)</sup>	180 °C	140 °C	140 °C
Max. cooling capacity $Q_{\text{max}}$	140 kJ/h	63 kJ/h	63 kJ/h
Gas pressure $p_{\text{max}}$	160 bar	3 bar	3 bar
Pressure drop $\Delta p$ (Q=150 l/h)	10 mbar	10 mbar	10 mbar
Dead volume $V_{\text{tot}}$	29 ml	29 ml	57 ml
Sample gas connections (metric)	Swagelok 6 mm GL 14 (6 mm) <sup>3)</sup>	DN 4/6	DN 4/6
(US)	1/4"	GL 14 (1/4") <sup>3)</sup>	1/4"-1/8"
Condensate out connections (metric)	G 3/8" i	GL 25 (12 mm) <sup>3)</sup>	G 3/8" i
(US)	NPT 3/8"	GL 25 (1/2") <sup>3)</sup>	NPT 3/8"

<sup>1)</sup> with maximum heat transfer of the heatexchanger and max. cooling capacity of the cooler

<sup>2)</sup> Types marked "I" have NPT-threads or US tubes, respectively

<sup>3)</sup> Inner diameter gasket

## General data

Housing	Stainless steel
Packing dimensions	appr. 555 x 430 x 340 mm
Weight incl. heat exchangers	appr. 15 kg
Weight fully equipped	19 kg
Gas terminals: Exchangers	see table
	Filter DN 4/6 / 1/4"-1/6"
	Peristaltic pump: 5 mm
Media wetted materials	
Filter:	see table
Exchanger	see table
Moisture detector	see below
Tubing	PTFE / Viton

## Electrical specification

Power supply	115 or 230 V, 50/60 Hz, plug according to DIN 43650
Power consumption	290/260 VA
Status contacts specs.	max. 250 V, 2 A
Plug type	Phoenix-plug
Protection class	IP 20

## Options

### Analogue output

(included in option FF-3-N)	
Signal	4-20 mA (corresponds to -20 °C to +50 °C cooler temperature)

### Peristaltic pump

Operating pressure with pump	≤ 0.5 bar
Hose	Norprene
Pump flow	0.3 l/h
Vacuum	> 320 mbar
Pressure	> 0.5 bar

### Filter

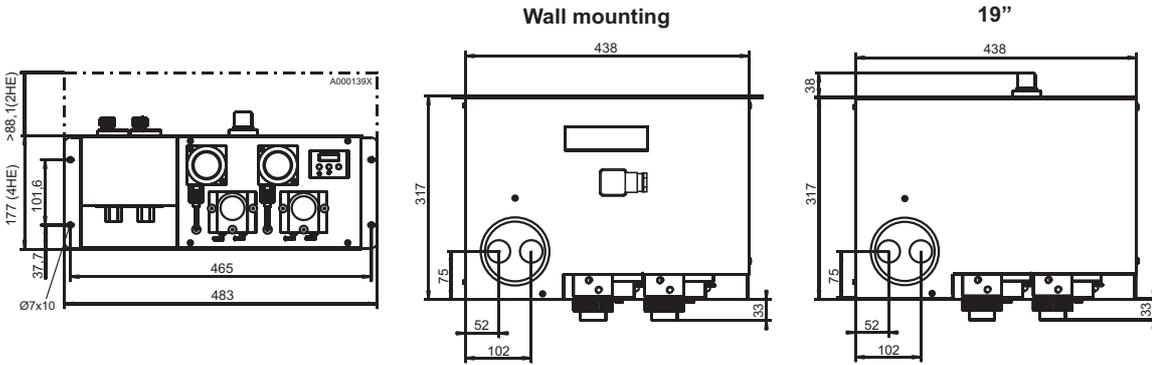
Operating pressure with filter	max. 2 bar
Filter surface	42 cm <sup>2</sup>
Retention rate	2µm
Dead volume	28.5 ml
Material	Filter housing: PTFE, PVDF, Duran glass (wetted parts)
	Sealing: Viton
	Filter element: Sintered PTFE

### Moisture Detector FF-3-N

(includes analogue output)	
Operating pressure with FF-3-N	max. 2 bar
Material	PVDF, 1.4571, Epoxy 1.4576, PTFE

# Dimensions

**Please note:** Space above the cooler for the tubing must be provided.



**Please note:** Leave enough space above the cooler for installation of hoses.

## Ordering Hints

Please extract the part number for the cooler fulfilling your requirements from the type code below.

**Please note:** Each gas path should be equipped with a peristaltic pump or an automatic condensate drain.

Part.No.	4	5	2	X						0	<b>EGK 2-19</b>
	<b>Housing</b>										
	0	Housing for wall mounting									
	1	Housing for 19" cabinet									
	<b>Power Supply</b>										
	1	115V metric fittings									
	2	230V metric fittings									
	3	115V US fittings									
	4	230V US fittings									
	<b>1 Gas Path / Material / Version (1 heat exchanger)</b>										
	0	0	Without heat exchanger								
	1	1	Single path heat exchanger / stainless steel / (PTS and PTS-I)								
	1	2	Single path heat exchanger / glass / (PTG)								
	1	3	Single path heat exchanger / PVDF / (PTV and PTV-I)								
	<b>Condensate Discharge</b>										
	0	Without condensate discharge									
	1	1 peristaltic pump, mounted <sup>1)</sup>									
	<b>Filter</b>										
	0	Without filter									
	1	1 filter mounted									
	<b>Moisture Detector <sup>2)</sup></b>										
	0	Without moisture detector									
	1	1 moisture detector, mounted									
	<b>Options <sup>2)</sup></b>										
	0	No options									
	1	With 4 - 20 mA analogue temperature output									
	<b>2 Gas Paths / Material / Version (2 heat exchangers)</b>										
	0	0	Without heat exchanger								
	2	1	2 Single path heat exchangers / stainless steel / (PTS and PTS-I)								
	2	2	2 Single path heat exchangers / glass / (PTG)								
	2	3	2 Single path heat exchangers / PVDF / (PTV and PTV-I)								
	<b>Condensate Discharge</b>										
	0	Without condensate discharge									
	2	2 peristaltic pumps, mounted <sup>1)</sup>									
	<b>Filter</b>										
	0	Without filter									
	1	1 filter mounted									
	2	2 filters mounted									
	<b>Moisture Detector <sup>2)</sup></b>										
	0	Without moisture detector									
	1	1 moisture detector, mounted (only possible with 1 filter)									
	2	2 moisture detectors, mounted (only possible with 2 filters)									
	<b>Options <sup>2)</sup></b>										
	0	No options									
	1	With 4 - 20 mA analogue temperature output									

<sup>1)</sup> Each heat exchanger is equipped with a peristaltic pump. The power supply of the pump has the same as for the cooler itself

<sup>2)</sup> Option "moisture detector" includes option "4 - 20 mA analogue output".

## Ordering Hints Spare Parts

Part No.	Description
91 24 03 00 27	Spare tube for peristaltic pump, right angle terminals
41 15 10 50	Filter element FE-4, Package 8 pcs.