



Hybrid Sample Gas Cooler

Patent #: US 11,067,483

The Baldwin Hybrid Sample Gas Cooler combines the superior performance of Perma Pure's Nafion™ based drying technology with the functionality of a traditional thermoelectric cooler. Powered by compressed air, this non-electric cooler achieves dew points lower than 0°C helping to prevent problems associated with condensation. The patented mechanical design is ideal for locations that have limited or no access to power or other areas where a non-electric product may be desirable.

- **Non-electric mechanical design:**
 - Reduces the costs associated with electrical installation and permits*
 - Simplifies Maintenance
 - Reduces maintenance costs
 - Increases reliability resulting in decreased downtime
- **Achieves dew points lower than 0°C**
 - Reduces the risk of damage to the analyzer
 - Decreases spectral interference
- **Operates with greater efficiency than comparable non-electric coolers****



Models Available:

Model	Sample Gas Pressure	Filter Drain Mechanism ¹	Bypass Port ²	Float Operated Drain Valve ³
PCD-3000-W	Negative	A	No	No
PCD-3000-W-DP	Negative	B	No	No
PCD-3000-PR	Positive	C	Yes	No
PCD-3000-PR-CD	Positive	D	Yes	Yes

1. Filter Drain Mechanism:

- A. Filter Drain Eductor compresses incoming air creating a vacuum needed to drain condensate from the filter
- B. Includes a bulkhead fitting to accommodate an external drain pump (not included)
- C. Liquids collected at the bottom of the filter bowl are pushed out of the filter by the sample gas pressure via the metering tube and out of the filter drain port
- D. Liquids collected at the bottom of the filter bowl are pushed out of the filter by the sample gas pressure and into the float operated drain valve. The drain valve prevents sample gas from escaping into the drain line.

2. Bypass port can be used to lower lag times for applications where a faster response time may be desirable

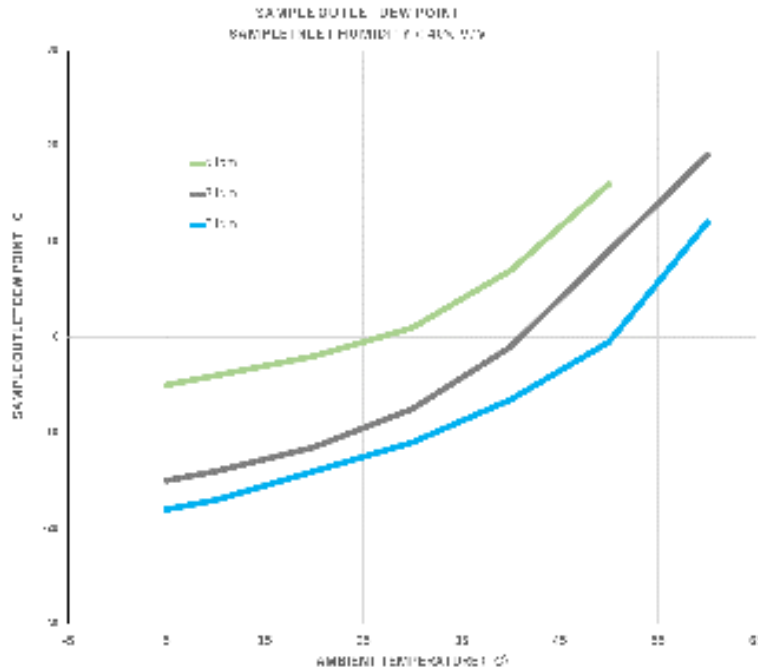
3. Float operated drain valve prevents sample gas from escaping into the drain line

Other Features:

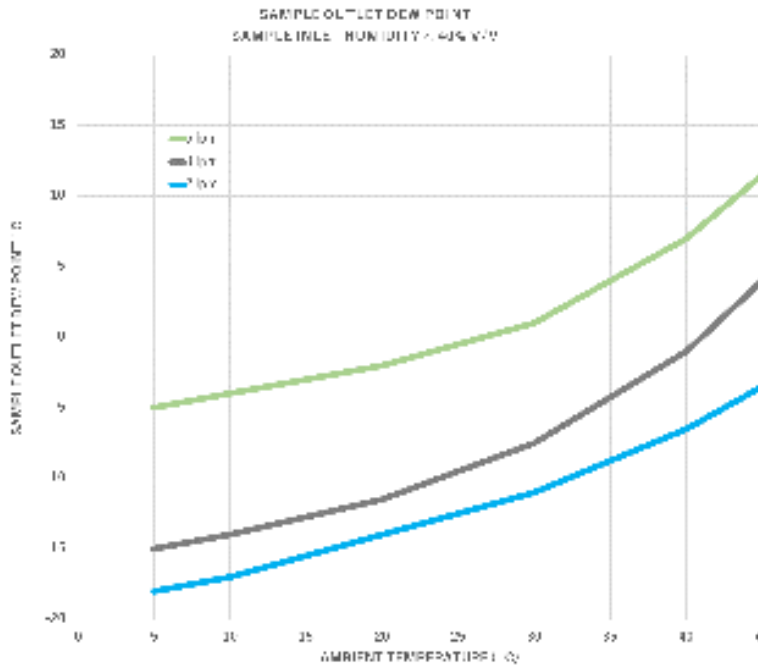
- Perma Pure™ PD Sample Dryer effectively removes water in the vapor phase with no further loss of analytes, increasing analytical accuracy***
- High ambient temperature operating range 4° - 55°C (39° - 131°F)
- Chemically resistant wetted parts
- Includes coalescing filter to remove particulates and acid mists
- Can be stack mounted, eliminating the need for heated lines****
- Can be mounted outside, freeing up space in over-crowded analyzer sheds****
- Four different models available for various applications and sample pump configurations.

Performance Charts

Full Operating Environment:



Typical Operating Environment:



*Grounding Lug is necessary for installation

**Compared to a vortex cooler removing 40% water by volume at sample flow rate between 3 and 4 LPM

*** There may be some initial loss of water-soluble analytes through the coalescing filter

**** Ambient temperature must be above 4°C (39° F)

Specifications:

Physical	
System Mount	Wall Mount - Vertically
Enclosure Nominal Dimensions (H x W x D)	24" x 10" x 5" 600 mm x 250 mm x 120 mm
Enclosure Rating	NEMA 4, 4X/ CUL & UL Listed/ File #E65324 IP65 Rated
Sample Gas Tubing Connection	1/4" Tube Compression Fitting
Umbilical Seal Line	Heat shrink style, 5" length, 2" minimum expanded I.D. Nose
Weight	20.1 Lbs (9.1 Kg)
Utility Requirement	
Instrument Air	3.5 SCFM (100 SLPM) @ 4 Bar (60 PSIG)
Drain/Exhaust Requirement	.25SCFM/7SLPM Air with entrained sample condensate
Environmental	
Operational Temperature Range	4 - 55 °C
Materials	
System Enclosure	Fiberglass Reinforced Polyester
Insulation	Rubber Foam (Buna-N)
O-Ring Seals	Viton®
Filter Housing	Kynar® (PVDF)/Glass
Sample Filter	Glass Fiber, .1um, 95% efficiency, coalescing
Sample Gas Path, Fittings and Tubes	PVDF®/FEP Teflon®
Sample Gas	
Max Pressure	2 Bar (30PSI)
Max Humidity	75 °C Dew Point
Maximum Inlet Water Concentration	40%
Max Flow	3.5 LPM @ 50 °C 5 LPM @ 20 °C
Maximum Inlet Temperature	138 °C (280 °F)