

# PD™ - Series Gas Dryers

## Continuously Dry Gases For High-Performance, High-Flow Applications

- Achieves low dew points
- Removes only water vapor
- Dries continuously
- Requires no electricity
- Maintenance-free operation
- No moving parts
- Excellent corrosion resistance
- Low pressure drop

Perma Pure PD™-Series gas dryers use exclusive Nafion® tubing technology to continuously dry gases to very low dew points. The PD-Series dryers operate over a wide range of temperatures, pressures and flow rates for high-performance, high-flow gas drying applications.

### Principle of Operation

PD-Series gas dryers transfer moisture from one gas stream to a counter-flowing purge gas, much like a shell-and-tube heat exchanger transfers heat. Water molecules permeate through the Nafion tube wall, evaporating into the purge gas stream. The water concentration differential between the two gas streams drives the reaction, quickly drying the air or gas.



Purge gas should be instrument air or other dry gas. If no dry gas is available, a portion of the gas dried by the PD-Series dryer can act as the purge gas in a split-stream or reflux method. For more information about the drying process, including the use of the sample gas as the purge gas, please visit our website at [www.permapure.com](http://www.permapure.com).

### Perma Pure offers three PD-Series dryer product lines:

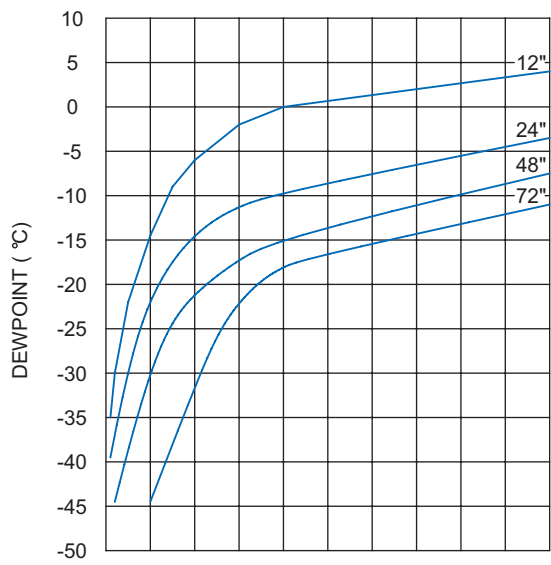
Model Number	PD-50T	PD-100T	PD-200T
Number of Nafion Tubes	50	100	200
Available Lengths	12, 24, 48 or 72 inches		
Housing Materials	Polypropylene or Fluorocarbon or Stainless Steel		
Recommended Flow Rates <sup>1</sup>	4 slpm	8 slpm	15 slpm

<sup>1</sup>Flow rates based upon unheated, 24" dryer achieving a -10°C dew point. Consult curves on back page for other flow rates.



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### PD-Series Performance

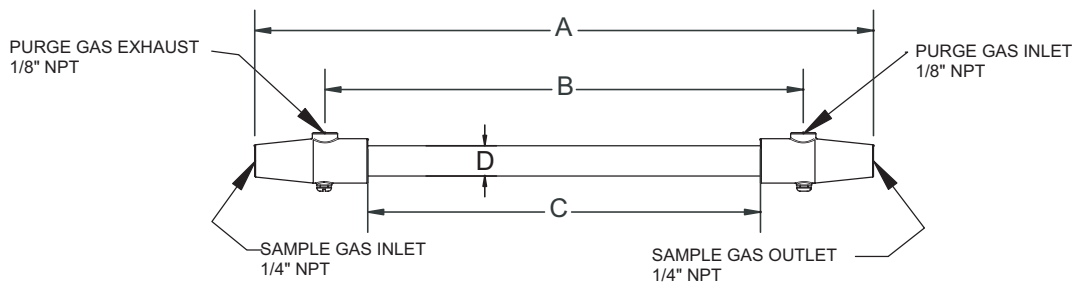


PD-50T...	0	1	2	3	4	5	6	7	8	9	10
PD-100T...	0	2	4	6	8	10	12	14	16	18	20
PD-200T...	0	4	8	12	16	20	24	28	32	36	40

MODEL FLOW (liters/min.)

Conditions: Inlet dew point of 20°C, purge flow rate 2 times sample flow

For inlet dew point greater than 20°C, assume that the first half of the dryer will be used to bring the dew point down to ambient, then read the value of the next shorter dryer. For example, in a stream with an initial dew point of 50°C, flowing at 2 slpm, a PD-50T-24 should yield an outlet dew point of -6°C, the performance of the 12" unit.



Model Number	A	B	C	D
PD-50T-12(MPP,MPS,MKS,MKA,SS,SA)	15.3"	11.8"	9.7"	0.75"
PD-50T-24(MPP,MPS,MKS,MKA,SS,SA)	23.3"	19.8"	17.7"	0.75"
PD-50T-48(MPP,MPS,MKS,MKA,SS,SA)	47.3"	43.8"	41.7"	0.75"
PD-50T-72(MPP,MPS,MKS,MKA,SS,SA)	71.3"	67.8"	65.7"	0.75"
PD-100T-12(MPS,MKS,MKA,SS,SA)	15.3"	11.8"	9.7"	0.875"
PD-100T-24(MPS,MKS,MKA,SS,SA)	23.3"	19.8"	17.7"	0.875"
PD-100T-48(MPS,MKS,MKA,SS,SA)	47.3"	43.8"	41.7"	0.875"
PD-100T-72(MPS,MKS,MKA,SS,SA)	71.3"	67.8"	65.7"	0.875"
PD-200T-12(MPS,MKS,MKA,SS,SA)	15.3"	11.8"	9.7"	1.000"
PD-200T-24(MPS,MKS,MKA,SS,SA)	23.3"	19.8"	17.7"	1.000"
PD-200T-48(MPS,MKS,MKA,SS,SA)	47.3"	43.8"	41.7"	1.000"
PD-200T-72(MPS,MKS,MKA,SS,SA)	71.3"	67.8"	65.7"	1.000"

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### Pressure Drop Calculations

$$\Delta P \text{ for PD-50T (psid)} = \text{Sample flow rate (lpm)} \times \text{length of dryer (inches)} \times (0.0056)$$

$$\Delta P \text{ for PD-100T (psid)} = \text{Sample flow rate (lpm)} \times \text{length of dryer (inches)} \times (0.0028)$$

$$\Delta P \text{ for PD-200T (psid)} = \text{Sample flow rate (lpm)} \times \text{length of dryer (inches)} \times (0.0014)$$



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