PRISM® PE dryers
membrane air dehydration . . .
tell me more
Air Products’ PRISM PE dryers are compact and efficient dehydrators for industrial air supplies. These robust dryers remove water vapor from compressed air streams by the selective permeation of water molecules through polymers. They are “molecular filters” in which water travels across the membrane faster than other gas molecules. Advantages include lower maintenance time and expense compared to desiccant or refrigerant dryers. Membrane dryers are superior for operation at remote sites and for point-of-use applications.
PRISM PE dryer advantages

**Durable**
Each module is manufactured from high-performance ABS with aluminum caps which will withstand some of the most grueling environments. Some models are available in 316L stainless steel for corrosive environments.

**Cost-effective**
The simple design makes PRISM PE dryers less expensive to purchase and maintain than desiccant or refrigerant dryers. No moving parts or expensive media required.

**Proven technology**
The selective permeation technology has been in use by Air Products for decades. This simple system is passive, with no moving parts, resulting in more reliable products that can be deployed in a wide range of environments, including mobile systems. PRISM PE dryer modules are found in critical applications, like the oil and gas industry and onboard aircraft carriers in the U.S. naval fleet.

**Flexible application**
PRISM PE dryers can be mounted vertically or horizontally to meet your design requirements. The purge inlet port is designed with a swivel fitting to allow for various installation positioning. A user-installed orifice or adjustable valve optimizes the purge rates and dew points for each application.

**Simple start-up**
PRISM PE dryers are easily commissioned. Simply apply clean compressed air, and production begins. No break-in period, expensive media, or complex equipment to manage and maintain.

**Industrial grade**
PRISM PE dryers are designed to handle industrial production loads. The solid construction is perfect for remote and severe duty installations like oil and gas and mining operations.

**Quality assured**
Every PRISM PE dryer has to pass our rigorous testing requirements before it will be released into service. You can be confident that every dryer will be a solid performer. The PRISM Membranes business unit is proud of its AS9100 certification for quality management systems, which meets the exacting requirements of the global aerospace industry.

**Efficient**
PRISM PE membrane dryers are the most efficient units available. Compared to other brands, the PRISM PE dryers operate with lower purge rates.
Alternative technology comparison

100 cfm dryers

<table>
<thead>
<tr>
<th></th>
<th>Dessicant¹</th>
<th>Deliquescent²</th>
<th>PE4030 Membrane</th>
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<tr>
<td>Size inches (mm)</td>
<td>49 x 17 x 13 (1245 x 432 x 330)</td>
<td>13 x 51 (330 x 1295)</td>
<td>5.6 x 41 (141 x 1045)</td>
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<tr>
<td>Weight</td>
<td>172 lbs. (78 kg)</td>
<td>260 lbs. (118 kg)</td>
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<tr>
<td>Maintenance</td>
<td>Intensive PM schedule</td>
<td>Recharging and monitoring</td>
<td>None</td>
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<td>Consumable items</td>
<td>Desiccant and filters ($1020 US), valves + solenoids ($1039 US)</td>
<td>Deliquescent tablets ($1.25/lb) 130 lbs (59kg)</td>
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</tr>
<tr>
<td>Expandable</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Power required</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Management system</td>
<td>PLC controlled + sensors</td>
<td>Manual drain valve + visual ports</td>
<td>None</td>
</tr>
<tr>
<td>Dew point attainable</td>
<td>Variable –4°F to –100°F</td>
<td>20° below inlet dew point</td>
<td>Variable +40°F to –70°F</td>
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</tbody>
</table>

¹ Nano NDL-110-F Heatless Desiccant Air Dryer.
² Van Air D-12 Freedom Single Tower Deliquescent Air Dryer.

Membrane dryers are passive devices that have lower capital and operational costs. The small size and simple operation make them ideal for applications where bulky units will not fit. Membrane dryers are quiet, require no external power, and do not have expendable media that requires maintenance.

A typical membrane separator contains thousands of fibers that are bundled and encased at both ends in epoxy resin. The ends of the bundle are cut, which leaves the fiber bores open on both ends, allowing the gas to travel from one end to the other. The fiber bundle is enclosed in a suitable casing. The casing protects the fibers and routes the gas properly.

Air Products’ PRISM membranes: experience, performance, and value.
Membrane dryers passively produce dry air with no moving parts or electrical components, consumable items, or desiccant dust carry-over. They provide silent and uninterrupted operation for a wide range of dew point specifications.

Membrane dryers remove water vapor from gas streams by the selective permeation of water molecules through polymers. Membrane dryers can be described as “molecular filters” where water travels across the membrane faster than other gas molecules.

The permeation of gases is driven by the difference in partial pressure across a thin polymeric separating layer supported on a spongy porous substrate which makes up the core of the membrane. Gases permeate across the separating layer in either direction at a rate that is proportional to the driving force and the permeation coefficient. As wet feed gas flows along the high-pressure side (or “feed” side) of a membrane dryer, water permeates across the membrane to the low-pressure side (or “permeate” side). The water vapor content of the feed gas becomes progressively lower as it flows along the length of the membrane dryer, which causes less driving force for permeation.

A dry stream of air is injected at low pressure on the permeate side to increase the driving force for water permeation at the dry end of the membrane dryer. This dry stream (fed to the permeate side through the inlet purge port) is called the external purge, dry sweep, or inlet purge. The gas that permeates across the membrane can be considered internal purge. The external and internal purge gas streams together make up the total purge that exits from the purge outlet port. Some of the dry air exiting the membrane dryer can be used as the external purge or a secondary source can be used.

The purge gas carrying the removed water vapor on the permeate side flows in the direction opposite to the feed stream. This “counter-current” flow enables the highest possible driving force to be created over the length of the membrane dryer. Performance is improved (increased dryer capacity or decreased purge) by operating the permeate side at the lowest feasible pressure.

The shell houses the membrane element and provides connection ports for the inlet feed air, outlet dry product air, inlet external purge, and outlet total purge. The membrane element consists of a bundle of hollow fibers with the ends potted in epoxy or other resin. The wet feed gas enters and flows through the bores of the hollow fibers, and dry gas exits the bores of the hollow fibers at the opposite end.
### Ordering information

<table>
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<tr>
<th>Catalog Number</th>
<th>Product Number</th>
<th>Shell Materials</th>
<th>Connection Thread Type</th>
<th>Connection Size</th>
<th>Cap Materials</th>
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### ABS product dimensions and weights

For dimensions of stainless steel and other specialty products, please contact Air Products PRISM Membranes.

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<tr>
<th>Model</th>
<th>Length</th>
<th>Diameter</th>
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<td>6.3 161</td>
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## Dryer performance – quick reference

### Flow capacity in scfm – inlet air @ 100 psig, 100°F, 100% RH

<table>
<thead>
<tr>
<th>Model</th>
<th>Flow @ +40°F PDP</th>
<th>Flow @ +20°F PDP</th>
<th>Flow @ 0°F PDP</th>
<th>Flow @ –20°F PDP</th>
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**Purge rate (% of inlet flow)**

- PE1015-E1: 14.0%
- PE1020-E1: 16.9%
- PE1030-E1: 18.7%
- PE2020-E1: 20.7%
- PE2030-E1: 20.0%
- PE3020-E1: 19.8%
- PE3030-E1: 20.0%
- PE4020-E1: 20.0%
- PE4030-E1: 20.0%

### Flow capacity in standard liters per second – inlet air @ 7 barg, 35°C, 100% RH

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<th>Flow @ +3°C PDP</th>
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<td>Inlet</td>
<td>Outlet</td>
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**Purge rate (% of inlet flow)**

- PE1015-E1: 13.3%
- PE1020-E1: 16.6%
- PE1030-E1: 18.2%
- PE2020-E1: 19.8%
- PE2030-E1: 19.8%
- PE3020-E1: 19.8%
- PE3030-E1: 19.8%
- PE4020-E1: 19.8%
- PE4030-E1: 19.8%

**PDP = Pressure Dew Point**

**Performance ratings are for single dryers at typical operating conditions for comparison only. Contact our Technical Services department to receive detailed performance charts or to generate computer simulations for your applications.**

**Operating dryers in parallel will increase the flow volumes**
For more information regarding Air Products’ PRISM membrane products, please contact our Customer Service department.

Air Products PRISM Membranes
11444 Lackland Road
Saint Louis, Missouri 63146 USA
T 314-995-3300
F 314-995-3500
Membrane@airproducts.com
or visit airproducts.com/membranes

Permea China LTD
60 Jinshajiang Road
Shandong, 264006 China
T +86-535-2165333
F +86-535-2165336
fungp@airproducts.com
or visit permea.com.cn

Air Products Japan, Inc.
21F, Muza Kawasaki Central Tower
1310 Omiya-cho, Saiwai-Ku, Kawasaki
Kanagawa, Japan 212-8554
T +81-44-542-1531
F +81-44-542-1521
higucht@airproducts.com
or visit airproducts.co.jp

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The Air Products PRISM Membranes Business Unit’s quality management system is certified to ISO9001 and AS9100C.