Baldwin™-Series Model 45 Dilution Probe conditioning systems from Perma Pure draw, filter and dilute sample gases in preparation for analysis. The out-of-stack conditioning system dilutes the sample gas 10 to 250 times with dry air, reducing the water vapor content and eliminating high-cost heated lines.

Principle of Operation
A precision, low flow, heated dilution eductor assembly driven by instrument quality air extracts sample gas from the process. The sample passes through a stinger and filter probe to remove particulate. The filter element is selected for its inertness to the sample gas; a ceramic element is standard.

A conditioned source of instrument air connects to the dilution eductor. The flow through the critical orifice in the eductor creates the vacuum that pulls the sample gas through the dilution probe system. This air mixes with the sample, diluting the gas to a lower concentration and dew point. The dilution air and sample gas flow rate may be set by selecting a different orifice size. This orifice is made from precisely machined Monel. The design of the orifice restricts the gas flow to achieve sonic levels or the speed of sound, eliminating the effects of pressure fluctuations downstream.

To maintain a constant dilution ratio, the precision dilution eductor draws the sample in at a slow rate of 25-700 cc/min. An optional fast loop eductor is available to reduce lag time between the probe tip and filter body, ensuring adequate sample supply.

### Model Number 4P-45

<table>
<thead>
<tr>
<th>Specification</th>
<th>4P-45</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enclosure</td>
<td>NEMA 4X fiberglass with 3/8” Rubatex/silicone insulation  19” x 17” x 10” HWD; 25 lbs w/o stinger &amp; flange</td>
</tr>
<tr>
<td>Electrical requirements</td>
<td>Probe: 90-260 VAC, 50/60 Hz, 600 Watts  Blowback solenoid: 120 VAC standard, 230 VAC (optional 24 VDC)</td>
</tr>
<tr>
<td>Dilution ratios</td>
<td>250:1, 100:1, 40:1, 10:1</td>
</tr>
<tr>
<td>Max. sample gas inlet temperature</td>
<td>45°F / 230°C with silicone rubber O-rings  600°F / 318°C with Kalrez® o-rings</td>
</tr>
<tr>
<td>Filter element</td>
<td>2 micron, 3” ceramic, 90 cc internal volume, standard (optional Teflon®, SS, SS mesh 0.1-20µm)</td>
</tr>
<tr>
<td>Filter housing</td>
<td>316L stainless steel, 160 cc internal volume (optional Durinert® or Teflon coating)</td>
</tr>
</tbody>
</table>
**TECHNICAL SPECIFICATIONS**

- **Dilution air flow**: 1-10 lpm; 50 psig minimum
- **Dilution air purity**: -20°C dewpoint, less than 1 ppm CO, CO₂, NOₓ, SOₓ
- **Critical flow dilution orifice**: Monel
- **Orifice vacuum**: -15 "Hg
- **Stack gas absolute pressure range**: -10 "H₂O to +20 psig
- **Temperature control, filter holder**: 400°F / 204°C aluminum heat jacket
- **Temperature control, diluter**: 400°F / 204°C aluminum heat jacket
- **Control thermocouple**: Type K
- **Monitoring thermocouple, optional**: Type K, terminated on terminal strip
- **Heater jacket**: Machined aluminum with (2) 300 W cartridge heaters
- **Temperature control**: External by user, optional heater/blowback controller
- **Over temperature switch**: External by dilution sample probe controller option Integral, surface mount, set at 350°C
- **Warm up time**: 2 hours
- **Blowback tank volume**: 1.5 liters, 10 liters at 90 psig
- **Blowback frequency**: By experience, minimum once every 24 hours
- **Blowback duration**: 2 seconds
- **Blowback solenoid**: 2 way, 3/8" orifice, pilot operated
- **Fast loop eductor**: Option as specified
- **Fast loop air pressure**: 50 psig
- **Fast loop supply air flowrate**: 10 lpm
- **Fast loop sample bypass flow**: 5-7 lpm