HPLC Vacuum Degassing Systems

- High Efficiency Degassing
- Continuous Monitoring for Leaks
- Smallest Footprint Available
- Quiet, Long-Life Operation
- Two and Four Channel Models

Designed for HPLC

Systec® HPLC Vacuum Degassing Systems are high-efficiency inline modules that quickly and conveniently remove dissolved gases from HPLC mobile phases. The unique design of the modules assures reliable continuous operation and the highest level of continuous performance available, thus eliminating the need for helium degassing. Depending on the model, two to four solvent lines may be degassed simultaneously by one unit. Compared to PTFE degassing, the extremely low internal volume of the module’s analytical-scale Systec AF™ channels provides quicker equilibration and shorter startup times.

Degassing Chamber and Membrane

The heart of the Systec Vacuum Degassing System is the Systec AF degassing membrane. Within each vacuum chamber, there is a single, highly efficient and chemically inert tube, which actively removes dissolved gas from the flowing mobile phase stream. As the mobile phase passes through the Systec AF tubing, dissolved gas migrates under a concentration gradient through the fluid and tubing into the vacuum where it is exhausted to the atmosphere. Low flow restriction Systec AF degassers provide 50 times the degassing efficiency compared to PTFE-based designs.

Unique Vacuum Pump

Systec HPLC Degassing Systems utilize a two-stage, series, stepper motor-driven vacuum pump with a unitary PTFE diaphragm designed specifically for the rigors of HPLC degassing. On power up, each model self-tests and validates its vacuum sensor. The pump runs continuously and is whisper quiet. The vacuum system is continuously vented.

Ten Year Life

The life expectancy of the vacuum pump is greater than 220 million cycles, or typically 10 years of average use.

Constant Vacuum Level

System Condition Responsive—Closed loop electronic control continuously monitors the system for faults and varies the vacuum pump speed (RPM) to quickly evacuate the vacuum chambers and sustain a constant vacuum level for optimal degassing conditions.

Rapid Equilibration Time

The “Ready-to-Run” degassing system equilibration time is three minutes or less.

Easy to Prime

These units are easy to prime due to their low flow resistance and ultra-low internal volumes.

Clean Detector Baselines

Fluctuations in baseline due to changes in vacuum level are eliminated by not having to repeatedly stop and start a single-speed pump.

Validation Output

A validation signal from the control circuit is available to be sent to a computer or data system. This validation output indicates vacuum level.
HPLC Vacuum Degassing Systems (cont.)

### Specifications:

**Operating Specifications**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume/Channel</td>
<td>480 µL</td>
</tr>
<tr>
<td>Flow Rate/Channel</td>
<td>1.0 mL/min</td>
</tr>
<tr>
<td>Pressure Drop</td>
<td>1.37 mm Hg/mL/min</td>
</tr>
<tr>
<td>Flow Path ID</td>
<td>0.045” (1.14 mm)</td>
</tr>
<tr>
<td>Wetted Pathways</td>
<td>Metal-free, PEEK™ and Systec AF™</td>
</tr>
<tr>
<td>Flow Path Connections</td>
<td>1/4-28 flat-bottom ports</td>
</tr>
</tbody>
</table>

**Electrical Specifications**

- **Signal**: 5 mVDC/1 mm Hg absolute from 20 to 800 mm Hg (0.1% of reading ±0.010 VDC from 20 to 800 mm Hg)
- **Accuracy**: ±1.0% of reading ±0.010 VDC
- **Display**: LED indicator lights
- **Power Requirement**: 100 to 240 VAC (±10%), 1A, 50 to 60 Hz (±3 Hz); AC adapter included; Four interchangeable plugs are supplied with the AC Adapter: North America/Japan, U.K., Continental Europe and Australia.
- **CE Certification**: These products have been certified under the following CE testing standards: EN61326-1, EN65011; EN61300-3-2; EN61300-3-3 and EN61010-1.

**Size Specifications**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width (W) x Height (H) x Depth (D)</td>
<td>7.3 cm W x 12.7 cm H x 25.0 cm D</td>
</tr>
</tbody>
</table>

**Patents and Licensing**

- **Patents**: Degasser technology protected by U.S. Patents 5,340,384; 6,248,157 and 6,494,938.

1 Flow rate that will remove 70% of dissolved gas from a single channel of pure methanol.

2 Estimated tubing pressure per unit change in flow assuming laminar flow with a viscosity of 1.0 cP.

For custom instrument manufacturer degassing solutions, please contact Rheodyne® LLC (see contact information listed on page 172).

### Application Note

**Why Degas Your Mobile Phase?**

Dissolved air in HPLC mobile phases can result in flow rate instability and baseline disturbance.

**Flow rate instability**: Non-degassed mobile phase can outgas in the pumphead, causing bubbles to be formed and trapped inside the head or check valves. These bubbles can cause flow disturbances and pressure fluctuations, resulting in flow rate instability.

**Baseline disturbance**: As the mobile phase passes through the column, it experiences a large pressure drop. Non-degassed mobile phase can outgas due to this pressure differential, causing air bubbles to form. Air bubbles passing through or lodging in the flow cell cause detection disturbances, exhibited as baseline noise.

**Why Use a Degassing System?**

Helium sparging is a common means of degassing HPLC solvents. This method has its drawbacks, however. Sparging is a relatively inefficient method. Helium tanks are expensive and bulky, and solvent backup and contamination are concerns. In addition, helium sparging can change the composition of a premixed mobile phase over time, due to the difference in the evaporation rates of mobile phase components.

In contrast, the Systec® Degassing System has none of these drawbacks, and it is extremely fast and efficient at removing dissolved gases—more efficient than helium sparging or PTFE-based degassing systems.

**Tubing Connections**

We recommend Tefzel® ETFE tubing (page 72) be used to limit regassing of mobile phase between the degasser and your pump. ETFE is recommended because of its superior impermeability to gases (compared to PTFE, FEP and PFA tubing). Please refer to the “Polymer Tubing Gas Permeability” chart on page 75 for more information. For chemical compatibility information, please see page 156. Applicable fittings for 1/8” OD tubing are found on page 59.

**GPC and HFIP Applications**

Standard degassing chambers, with PEEK bulkhead unions, are not recommended for GPC applications or for use with HFIP (hexafluoropropionanol). Special GPC “hardened” versions are available. Please contact us for more information.