

# Debubblers & Degassers



Testing System® degassing chambers in Rohnert Park, CA.



**NEW!**

*Debubbler/Degassers combine active bubble removal with vacuum degassing to improve dispense precision and accuracy*

## Dear Customer

We are pleased to present our 2011/2012 catalog, which includes Innovadyne™, Ismatec®, Isolation Technologies™, Rheodyne®, Systec®, and Upchurch Scientific® products. In this catalog, you will find all the critical fluidic products and high-quality components you've come to expect from IDEX Health & Science.

This catalog has a new 'look and feel', with a new organization to all of our products. Now, you will be able to find all of our fittings in one chapter, with separate chapters for products like tubing, valves, pumps, etc. And, as always, we have many new products – including some very innovative UHPLC fittings and accessories – scattered throughout the catalog that we hope will prove useful to you.

We appreciate your business and continued loyalty to our family of products and services and thank you for trusting IDEX Health & Science with your liquid handling needs. Your feedback is valuable, so please let us know if there are ways we can be of greater service.



**Joe Stupfel**

VP Marketing & Research, Development & Engineering  
IDEX Health & Science LLC

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## How to Order

### Direct from IDEX Health & Science

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#### For Europe orders:

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#### For Online orders:

**Web:** www.idex-hs.com

Please include the following information with your order: Purchase Order Number, Contact Name, Shipping and Billing Address, Telephone Number, Product Number(s) and Quantity(ies). If you are a Purchasing Agent, please include the name of the person for whom the products are ordered.

For your information, our Federal Taxpayer Identification number is 01-0736657.

### Order Processing/Shipping

Orders process within one business day and ship within two business days. Requests for earlier shipments can be made — please contact IDEX Health & Science for more details.

All shipments are FCA unless otherwise noted. Shipping charges will be prepaid and added to the invoice. Or, if requested, we will charge your carrier account number.

### Terms



Terms of payment are net 30 days. Mastercard®, Visa® and American Express® are accepted.

There is no minimum order. Customers are responsible for C.O.D. charges if they elect this payment method. Terms and prices are subject to change without notice. Visit [www.idex-hs.com](http://www.idex-hs.com) for complete Terms & Conditions.

### Return of Materials

Returns must be authorized in advance. Please contact us within 30 days of purchase for your Returns Material Authorization (RMA) Number. A restocking fee may apply.

### Direct from our Global Distribution Network

The IDEX Health & Science brands represented in this catalog (Innovadyne™, Ismatec®, Isolation Technologies™, Rheodyne®, Systec®, and Upchurch Scientific®) have established relationships with a large, global network of Distributors, many of whom can offer the product support and assistance that we cannot, including:

- ▶ Carrying local inventory of commonly-ordered items
- ▶ Understanding YOUR working environment and requirements
- ▶ Providing technical application assistance
- ▶ Answering questions regarding new and existing products
- ▶ Complete availability during your time zone business hours
- ▶ Personal visits as required
- ▶ Access to complementary product lines to provide a “one-stop shopping” experience

We have come to rely on our authorized Distributors to provide value-added service to end-users of our products. So, while we are happy to take your order directly, we encourage you to contact your local Distributor — we feel confident it will be a positive experience!

### How to Find A Local Distributor

For a complete distributor listing please visit [www.idex-hs.com/distributors](http://www.idex-hs.com/distributors) or email:

**US:** CustomerService.hs@idexcorp.com

**Europe:** CustomerService.hseurope@idexcorp.com

**Asia:** CustomerService.hsasia@idexcorp.com

Our customer service team will help you contact a distributor in your area.

### Return of Materials

Product purchased through a Distributor must be returned directly to that Distributor. Please contact them for Return Material Authorization procedures.

Visit Us At  [WWW.IDEX-HS.COM](http://WWW.IDEX-HS.COM)

*The products in this catalog are intended for use with analytical, biotechnology and diagnostic equipment and accessories. THE MANUFACTURERS OF THE PRODUCTS IN THIS CATALOG SHALL HAVE NO LIABILITY WHATSOEVER DUE TO ANY MISUSE OF THEIR PRODUCTS. Of course, the safe use of our products depends on our customers, since it is you who select and control the protective gear and safety procedures used, as well as the pressures, temperatures, solvents, samples, ventilation, and other variables. Product and material performance ratings are provided as guides only. Individual field tests should be performed by customers to determine safe operating parameters given your particular procedures and use.*

IDEX Health & Science facilities are certified ISO 9001. Some facilities are also certified ISO 13485:2003.

## Systemec® Debubbler Series

### Remove Bubbles, Dissolved Gas, or Both!

Dissolved gases and bubbles in system liquids cause dispense volume anomalies in many instruments, negatively affecting both dispense precision and analytical accuracy. Now you have a choice of components for actively removing bubbles with or without also removing dissolved system gases. Online Vacuum Degassing offers operating convenience, high efficiency and low operating costs compared to other common degassing technologies.

## Debubbler/Degasser

### Combines Vacuum Degassing with Active Bubble Removal

- ▶ Improves instrument performance — reduces downtime due to bubble formation
- ▶ Fewer false positives due to reduction of partial reagent dispenses
- ▶ Easily integrates into any pump, degassing tray, or stand-alone degassing application

For dispensing applications, removing both bubbles and dissolved gases from the flow path improves dispense precision and accuracy and enhances overall system performance. By combining vacuum degassing with active bubble removal, the Systemec Degasser/Debubblers both eliminate existing bubbles and actually prevent the formation of new bubbles by removing the dissolved gases before they can nucleate and cause problems.

## Active Debubbler

### Remove Bubbles in Fluid Stream Before or After the Pump

- ▶ Improves instrument performance — reduces downtime due to bubble formation
- ▶ Fewer false positives due to reduction of partial reagent dispenses
- ▶ Easily integrates into any pump, degassing tray, or stand-alone degassing application

In many low-pressure systems, such as diagnostic instruments, bubbles in the fluid stream can cause false detection readings and dispense anomalies. For these systems, the Systemec Active Debubbler captures and removes bubbles before they can affect the instrument or the results.

## Transfer-Line Degasser

### Removes Dissolved Gases During Fluid Transfer

- ▶ Eliminates baseline fluctuations for improved detector sensitivity
- ▶ Coaxial design reduces number of connections, improves reliability
- ▶ Single lumen design increases degassing reliability

Inside instruments, where space is at a premium, the Systemec Transfer-Line Degasser can be routed to deliver fluids into and through small places. This unique degasser employs a co-axial design to remove dissolved gases and bubbles, while the liquid is being transferred.



## Application Note

- ▶ Liquid handling
- ▶ IVD
- ▶ HPLC/UHPLC
- ▶ O<sub>2</sub> and CO<sub>2</sub> removal

In medical analyzers, bubbles interfere with critical volumetric reagent dispenses and cause sample failures, wasting time and money. Because bubbles adhere to nearly every part of a dispensing system, high velocity or induced turbulent flow is often used to displace and discharge bubbles from the flow stream and into a waste area. These alternative processes waste reagents and are time consuming, unpredictable, and may additionally require designing the system to recognize bubbles are present. Regardless of how the systems are designed, aqueous systems will always be subject to the laws of physics that cause out-gassing during changes in fluid temperature, pressure, or chemicals mixture. In fluid applications like these, debubblers are the optimal solution to capture and remove formed bubbles to prevent sample dispense inaccuracies, and degassing is ideal to prevent downstream bubble formation from recurring.

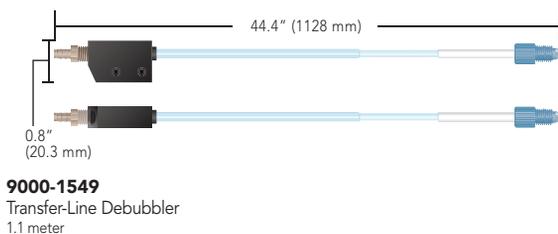
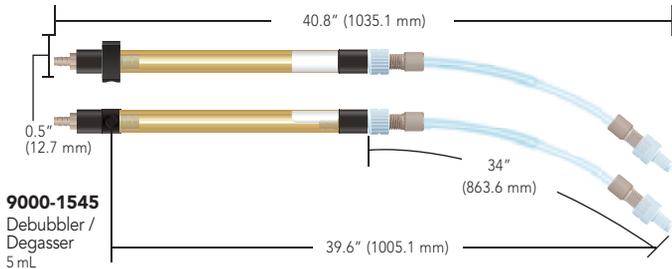
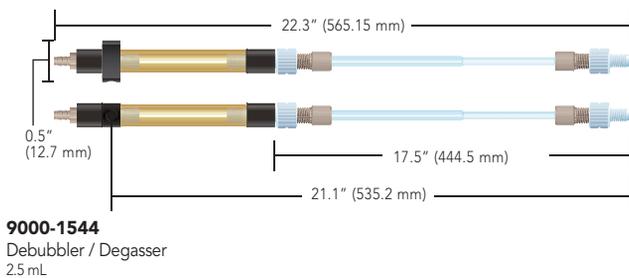
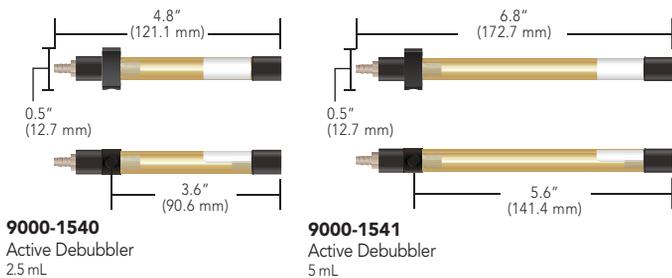


**Top Seller** SEE STARRED PRODUCTS

Part No.	Description	Standard Bubble Trap Size	Transfer Line Length	Internal Volume	Max Bubble Capacity
<b>DEBUBBLER SERIES – AVAILABLE STANDARD CONFIGURATION</b>					
9000-1540	2.5 mL Active Debubbler	2.5 mL	-	2.5 mL	2.5 mL
9000-1541	5 mL Active Debubbler	5 mL	-	5 mL	5 mL
9000-1544	2.5 mL Debubbler/Degasser	2.5 mL	430 mm (17")	2.5 mL in transfer line + 2.5 mL in bubble trap	2.5 mL
9000-1545	5 mL Debubbler/Degasser	5 mL	850 mm (33.5")	5 mL in transfer line + 5 mL in bubble trap	5 mL
★ 9000-1549	1.1 m Transfer-Line Degasser	-	1.1 m (43")	4 mL	N/A

## Overall Dimensions

Please note: These drawings are not actual size.



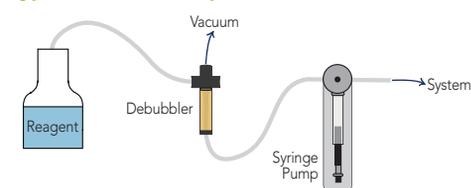
## Specifications

	Active Debubblers	Degasser/ Debubblers	Transfer Line Degasser
<b>Bubble Removal (volume of air removed/min @ 10 mL/min H<sub>2</sub>O)</b>	Up to 30 cc	Up to 30 cc	N/A
<b>Degassing Efficiency<sup>†</sup> @ 1 mL/min H<sub>2</sub>O</b>	N/A	55% O <sub>2</sub> removal	70% O <sub>2</sub> removal
<b>Membrane Material</b>	PORIDEX™	PORIDEX	PORIDEX
<b>Other Wetted Materials</b>	Ultem®, Polyethylene	Ultem, Polyethylene, ETFE	Polyethylene, ETFE
<b>Solvent Compatibility</b>	Solutions >50% aqueous. Not compatible with detergent concentrations > 0.05%.		
<b>Standard Bubble Trap Volume</b>	2.5 / 5.0 mL	2.5 / 5.0 mL	N/A
<b>Transfer-line Volume</b>	N/A	2.5 / 5.0 mL	4 mL
<b>Maximum Pressure (@ 25 °C)</b>	0.7 MPa (100 psi)		
<b>Maximum Operating Temperature</b>	40 °C		
<b>Recommended Vacuum Level</b>	0.16 bar (abs)		
<b>Transfer Line Length:</b>	2.5 mL size: 488.95 mm (19.25"), 5.0 mL size: 977.9 mm (38.5")		
<b>Liquid Connection:</b>	3.18 mm (0.125") OD ETFE Tubing		
<b>Vacuum Connection:</b>	Barb-type Fitting for 1.57 mm (0.062") ID tubing		
<b>Pressure Drop:</b>	0.8 mm Hg / mL / min (assumes laminar flow and viscosity of 1 cP)		

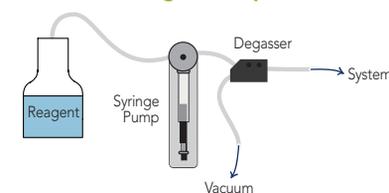
<sup>†</sup> Debubbling / degassing efficiency can be optimized based on flow rate, fluid to be degassed, and gas to be removed.

## Implementations

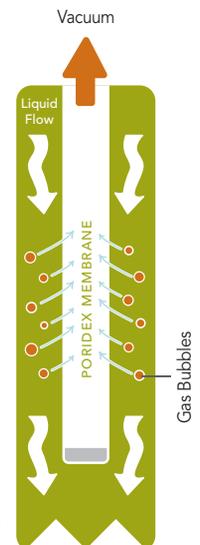
### Typical Debubbler Implementation



### Transfer-Line Degasser Implementation



Gas bubbles are actively removed from a flowing liquid stream by vacuum via the PORIDEX membrane.



## Note

Degassing tubing is flexible and therefore can be coiled to shorten the overall length or used to transfer the fluid within an instrument to the next desired location.

## 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.

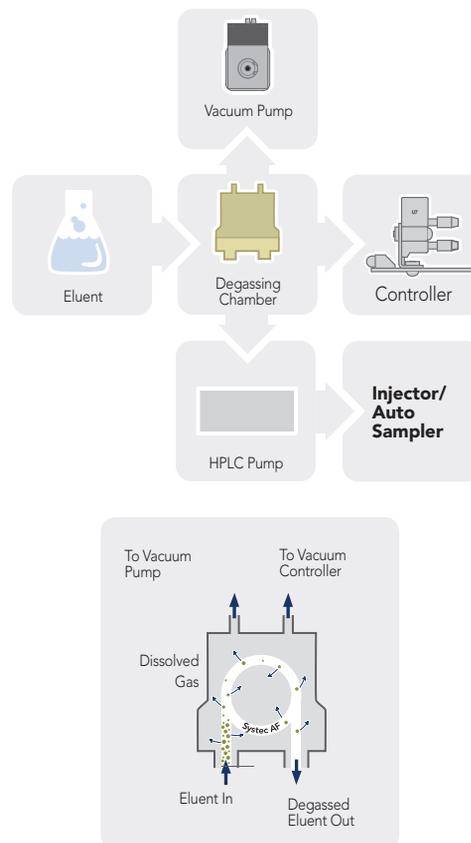
### Tubing Connections

We recommend ETFE tubing (page 73) 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). Applicable flangeless fittings for 1/8" OD tubing are found on page 26.

### GPC and HFIP Applications

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

## Typical Degasser Implementation



Dissolved gases are actively removed from a flowing liquid stream by vacuum via the Systec AF® membrane.

## Specifications

	Stand-Alone Degassing Modules
Maximum number of degassing channels	5
Degassing Efficiency <sup>†</sup> @ 1 mL / min MeOH	>70% O <sub>2</sub> Removal
Membrane Material	SYSTEC AF
Other Wetted Materials	PEEK, PPS(GF), PTFE(GF), FEP
Solvent Compatibility	Not compatible with fluorinated solvents. Special version available for GPC solvents.
Flow Path ID	1.14 mm (0.045")
Internal Volume	480 µL (standard)
Maximum Pressure (@ 25 °C)	0.5 MPa (70 psi)
Pressure Drop	0.18 bar/mL/min

<sup>†</sup> Degassing efficiency can be optimized based on flow rate, fluid to be degassed, and gas to be removed.  
1. Standard ID; other sizes available

## System® Stand Alone MINI Vacuum Degassing System

- ▶ Ultra-high degassing efficiency
- ▶ Low volume, easy to prime
- ▶ Patented control eliminates baseline fluctuations
- ▶ Single lumen design for consistent degassing
- ▶ Inert flow path
- ▶ 5+ year lifetime

The System Stand Alone MINI HPLC vacuum degassing system for HPLC is a high efficiency in line module that removes dissolved gases from HPLC mobile phases. Its unique design assures reliable continuous operation and the highest level of continuous performance available without the need for helium degassing. Up to five solvent lines may be degassed simultaneously by one unit.

### ZHCR® Control with Built-in Test Diagnostics

- ▶ Microcontroller self-test vacuum sensor validation on power-up
- ▶ Continuous vacuum system monitoring to ensure optimum operational conditions are maintained
- ▶ Vacuum system fault detection and shutdown function indicators

### AF / ZHCR Degassing Technology

Flow-through vacuum degassing chamber with a single amorphous perfluorinated copolymer (System AF®) degassing membrane, enabling degassing efficiency 50 times that of PTFE.

The ZHCR (Zero Hysteresis / Constant Run) vacuum pump employs a patented closed-loop, micro-stepping RPM control strategy permitting the pump to run with continuously variable speed, providing quick pull-down at high RPM, and then sustaining a consistent vacuum level at low RPM.

Fluctuations in detector baseline due to changes in vacuum level are eliminated by not having to repeatedly stop and start a single-speed pump. This also greatly reduces wear and noise.

The brushless motor enables quiet operation and is appropriate for environments where solvent vapors may be present.



### Note

#### Validation Output

A 2-pin rear panel receptacle labeled "Validation" with mating screw-lock plug is provided to allow a validation signal from the control circuit to be sent to a computer or data system. This validation output indicates vacuum level.

#### Signal:

5mV DC 0.13 bar (1 mmHg) / absolute from 2.7 to 106.7 bar (20 to 800 mmHg) (0.100 V DC at 2.7 bar (20 mmHg); 4.000V DC at 1.067 bar (800 mmHg))

#### Accuracy:

±1.0% of reading ±0.010V DC from 2.7 to 106.7 bar (20 to 80 mmHg)

#### Power Requirement

##### Input Power required with AC Adapter (included):

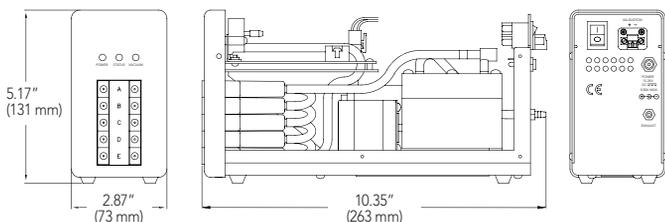
100 to 240V AC (±10%), 1A, 50 to 60 Hz (±3 Hz)

Four interchangeable wall sockets are supplied with the AC Adapter: North America/Japan, U.K., Continental Europe, Australia.

#### CE Certification

This product has been certified under the following CE testing standards: EN61326-1; EN55011; EN61300-3-2; EN61300-3-3 & EN61010-1.

### Overall Dimensions



**Top Seller** SEE STARRED PRODUCTS

Part No.	Number of Channels	Channel Volume	Max HPLC Gradient Flow Capability <sup>b</sup>	Pressure Drop <sup>c</sup>	Degassing Flow Path ID
<b>SYSTEC STAND ALONE MINI VACUUM DEGASSING SYSTEMS – AVAILABLE CONFIGURATIONS<sup>A</sup></b>					
★ 0001-6500	2	480 µL	2.0 mL/min	0.18 bar/mL/min	0.045" (1.14 mm)
★ 0001-6501	4	480 µL	2.0 mL/min	0.18 bar/mL/min	0.045" (1.14 mm)

A. Custom configurations are available. Consult us for your own OEM solution to your specific application.

B. The flow rates given are for a gradient mixture of 50/50 MeOH/H<sub>2</sub>O, with a typical low pressure gradient mixing valve. Higher flow rates are possible with high pressure mixing.

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

## Systec® Stand Alone Prep Scale Vacuum Degassing System

- ▶ Ultra-high degassing efficiency
- ▶ Low volume, easy to prime
- ▶ Patented control eliminates baseline fluctuations
- ▶ Dual lumen design for low-flow resistance
- ▶ Inert flow path
- ▶ 5+ year lifetime

The Systec Stand Alone Prep Scale vacuum degassing system for HPLC is a high efficiency in line module that removes dissolved gases from HPLC mobile phases. Built for the rigors of modern preparative and semi-prep scale HPLC, its unique design assures reliable continuous operation and the highest level of continuous performance available. Two solvent lines may be degassed simultaneously by one unit.

### ZHCR® Control with Built-in Test Diagnostics

- ▶ Microcontroller self-test vacuum sensor validation on power-up
- ▶ Continuous vacuum system monitoring to ensure optimum operational conditions are maintained
- ▶ Vacuum system fault detection and shutdown function indicators

### AF / ZHCR Degassing Technology

The prep / semi-prep scale degassing chambers are designed to be easy to prime, and are configured with a Systec AF® degassing membrane to provide maximum degassing capacity with the absolute minimum internal volume (<3% of PTFE designs with comparable degassing capacity).

The ZHCR (Zero Hysteresis / Constant Run) vacuum pump employs a patented closed-loop, micro-stepping RPM control strategy permitting the pump to run with continuously variable speed, providing quick pull-down at high RPM, and then sustaining a consistent vacuum level at low RPM.

Fluctuations in detector baseline due to changes in vacuum level are eliminated by not having to repeatedly stop and start a single-speed pump. This also greatly reduces wear and noise.

The brushless motor enables quiet operation and is appropriate for environments where solvent vapors may be present.



### Note

#### Validation Output

A 2-pin rear panel receptacle labeled "Validation" with mating screw-lock plug is provided to allow a validation signal from the control circuit to be sent to a computer or data system. This validation output indicates vacuum level.

#### Signal:

5mV DC / 0.13 bar (1 mmHg) absolute from 2.7 to 106.7 bar (20 to 800 mmHg) (0.100V DC at 2.7 bar (20 mmHg); 4.000V DC at 106.7 bar (800 mmHg))

#### Accuracy:

±1.0% of reading ±0.010V DC from 2.7 to 106.7 bar (20 to 800 mmHg)

#### Power Requirement

##### Input Power required with AC Adapter (included):

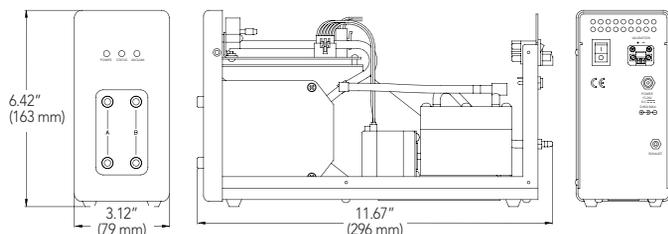
100 to 240V AC (±10%), 1A, 50 to 60 Hz (±3 Hz)

Four interchangeable wall sockets are supplied with the AC Adapter: North America/Japan, U.K., Continental Europe, Australia.

#### CE Certification

This product has been certified under the following CE testing standards: EN61326-1; EN55011; EN61300-3-2; EN61300-3-3 & EN61010-1.

### Overall Dimensions



**Top Seller** SEE STARRED PRODUCTS

Part No.	Number of Channels	Volume Per Channel	Max HPLC Gradient Flow Capability <sup>C</sup>	Pressure Drop <sup>D</sup>	Degassing Flow Path ID
<b>SYSTEC STAND ALONE PREP SCALE VACUUM DEGASSING SYSTEMS – AVAILABLE CONFIGURATIONS<sup>A, B</sup></b>					
0001-6482	2	8.4 mL	20 mL/min	0.04 bar/mL/min	0.065" (1.65 mm)
★ 0001-6484	2	13.8 mL	40 mL/min	0.06 bar/mL/min	0.065" (1.65 mm)

A. Custom configurations are available. Consult us for your own OEM solution to your specific application.

B. The standard prep scale chambers are not recommended for GPC applications or for use with HFIP (hexafluoroisopropanol).

C. The flow rates given are for a gradient mixture of 60/40 MeOH/H<sub>2</sub>O, with a typical low pressure gradient mixing valve. Higher flow rates are possible with high pressure mixing.

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