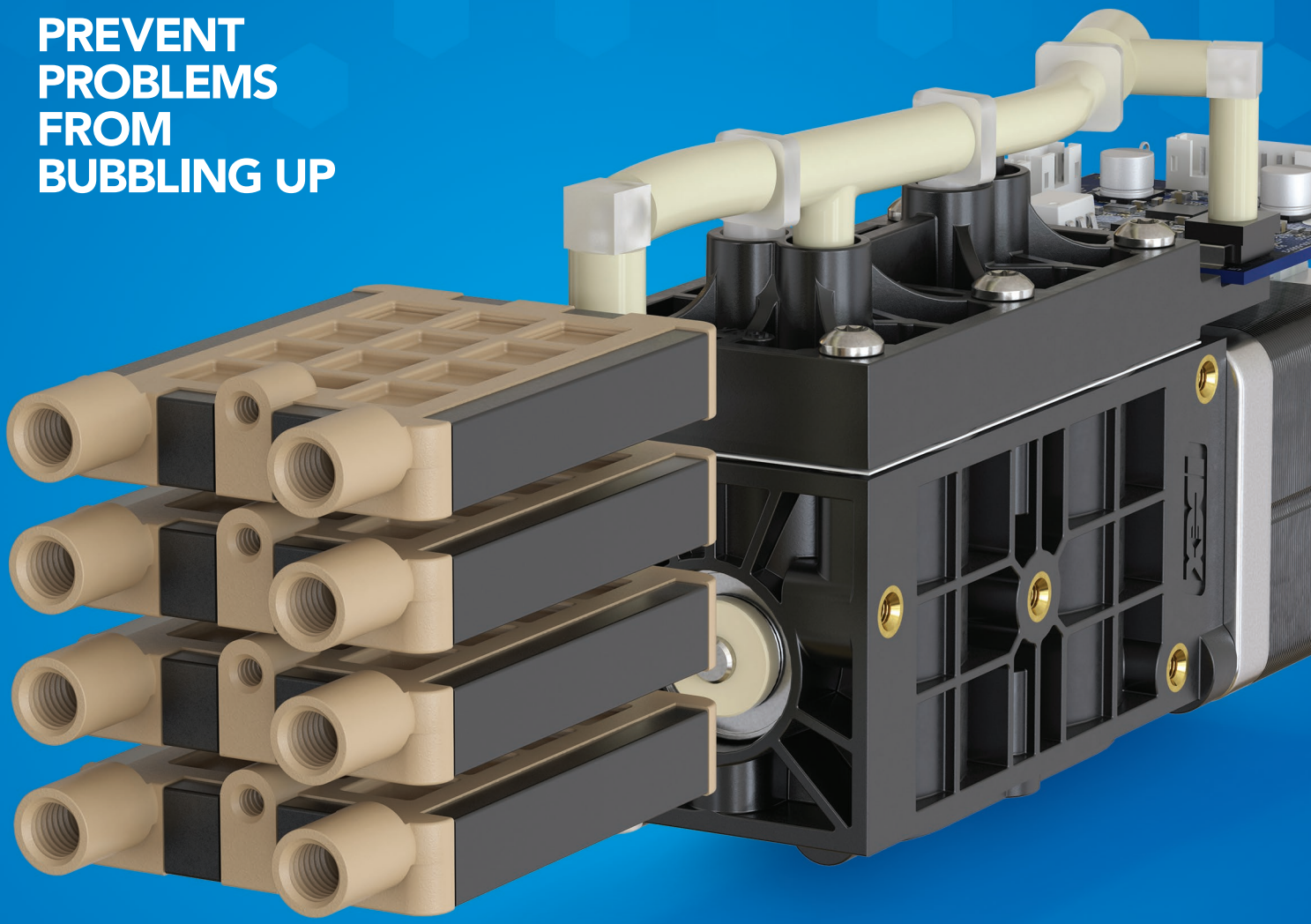
Degassing Solutions

PREVENT PROBLEMS FROM BUBBLING UP



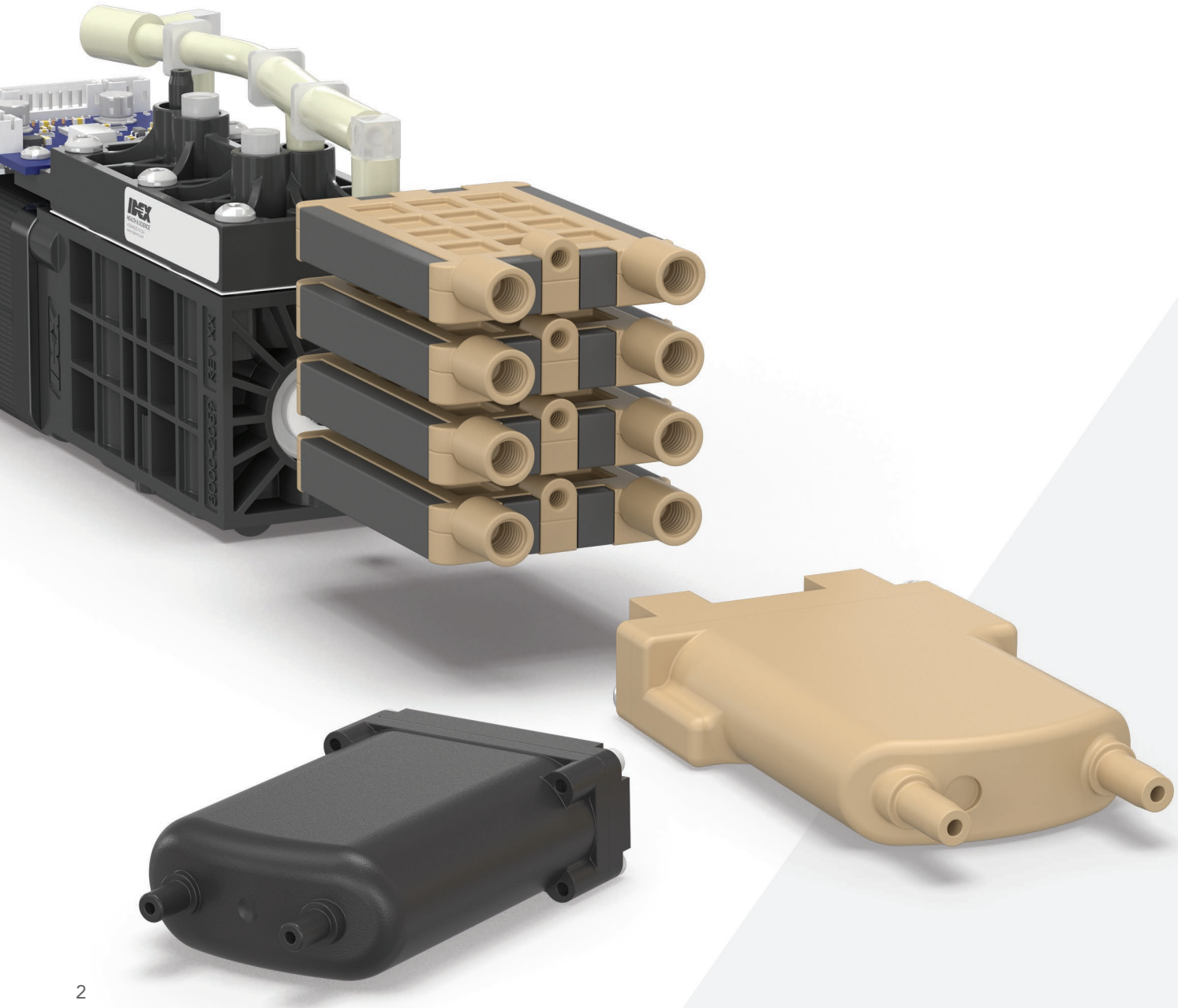
IDEX HEALTH & SCIENCE

Intelligent Solutions for Life®

Fluidics | Optics | Consumables | Assemblies

Maximize Accuracy. Minimize Errors.

Bubbles in system fluid lines lead to inconsistent flow, sampling errors, poor detector sensitivity, and unplanned service calls. Incorporating a degasser into your instrument design is a simple step to increase system accuracy and sensitivity, removing dissolved gases before they can interrupt critical analyses. We custom-design our degassers to meet the needs of your system and application, optimizing flow rates, reagents, and solvent compatibility.

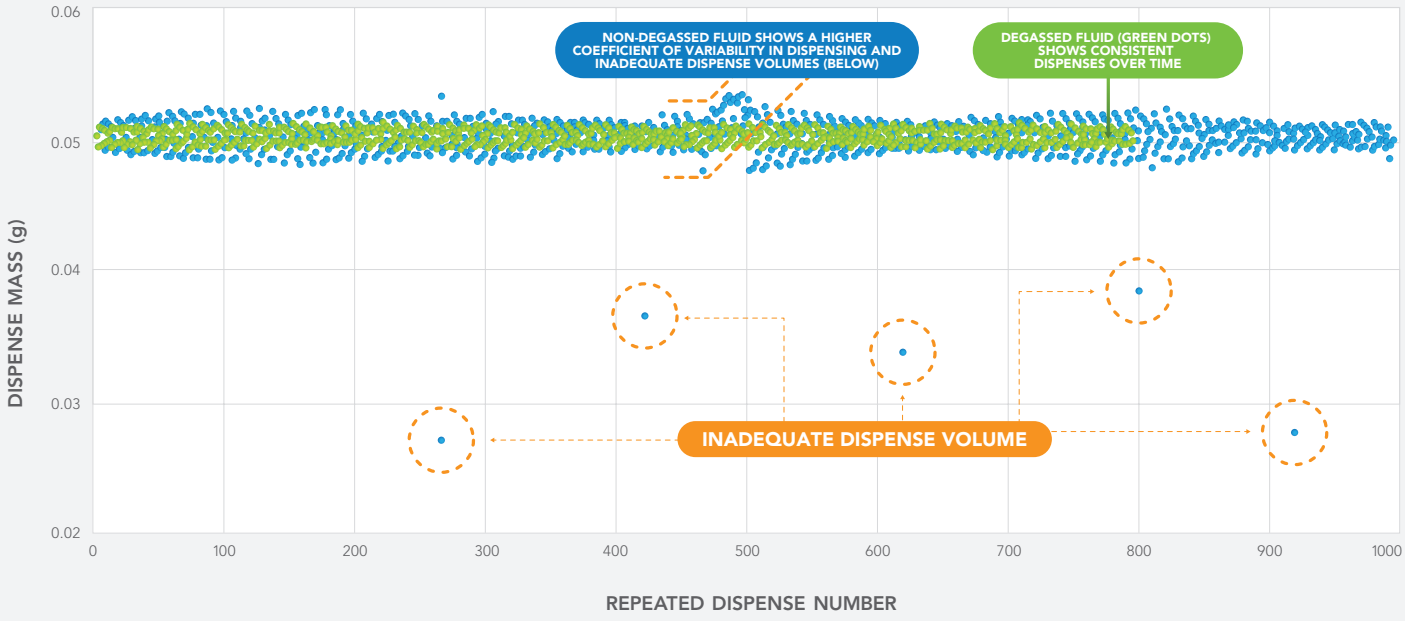


Engineered for Demanding Applications

Across a wide variety of applications, IDEX Health & Science degassing solutions eliminate bubbles to ensure your system has optimal flow stability, dispense volumes, and reliable optical detection.

- FLOW CYTOMETRY
- CLINICAL CHEMISTRY
- ION CHROMATOGRAPHY
- LIQUID CHROMATOGRAPHY
- NEXT GENERATION SEQUENCING
- SPATIAL BIOLOGY
- SAMPLE PREPARATION

Dispense Volume Over 1000 Dispenses



To demonstrate the benefit of incorporating a degasser into instrumentation, we had a benchtop system dispense 1000 aliquots of volume: first without degassed fluid, then with degassed fluid. Without degassing, inconsistent dispense volumes occur due to bubbles outgassing into the system lines. With degassing, the system demonstrates high reproducibility throughout the series of dispenses.

- Dispensing with a Degasser
- Dispensing without a Degasser

Importance of Degassing

Henry's Law establishes the relationship between gas solubility, pressure, and temperature. If the temperature increases or the pressure decreases, dissolved gases become less soluble in the solution and escape as bubbles.

Changes in system pressure, temperature, or reagent mixing can cause bubbles to outgas in system lines. Troubleshooting bubble outgassing in system lines can be challenging during instrument installation, especially in geographically diverse environments. What may not show up during development can be a headache to manage once your customer installs the instrument in their lab. Integrating a degasser into the flow path mitigates these concerns by bringing the concentration of dissolved gases in solution below the saturation point, thereby eliminating the risk of outgassing that can cause pumping errors or a noisy baseline in the detector.

THE IMPACT OF CHANGES IN TEMPERATURE AND PRESSURE ON SYSTEM FLUIDS

The chart below shows how temperature and pressure can impact the solubility of dissolved air in water. Dissolved gases are problematic to all liquid chemistries. As samples or reagents move through your analytical system, outgassing can occur at multiple points, affecting its reliability and performance.

SOLUBILITY OF GAS IN WATER (mg/L)

TEMPERATURE	760	700	600	500	400	300	200	100
40°C	6.4	5.9	4.9	4.0	3.1	2.2	1.3	0.4
35°C	6.9	6.3	5.4	4.4	3.5	2.5	1.5	0.6
30°C	7.5	6.9	5.9	4.8	3.8	2.8	1.7	0.7
25°C	8.2	7.6	6.4	5.3	4.2	3.1	2.0	0.9
20°C	9.1	8.3	7.1	5.9	4.7	3.4	2.2	1.0
15°C	10.1	9.3	7.9	6.6	5.2	3.9	2.5	1.2
10°C	11.3	10.4	8.9	7.4	5.9	4.4	2.9	1.4

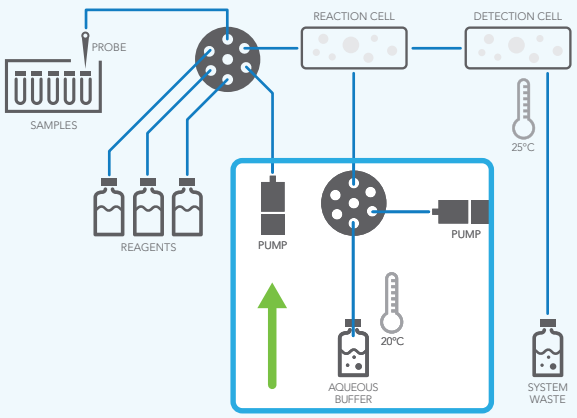
PRESSURE mm Hg

SYSTEM DESIGN WITH MANIFOLD-INTEGRATED DEGASSING

In addition to offering standalone degassing solutions, IDEX Health & Science can seamlessly integrate degassers onto manifolds for an elegant system design.

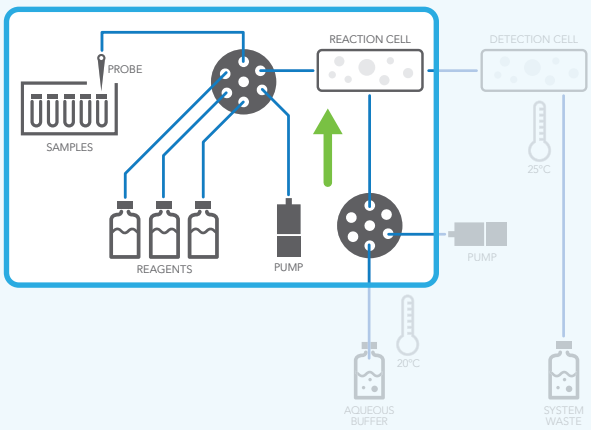
How Bubbles Form in Instrument Fluid Lines

The below series of graphics details how fluid moves through a typical system. Each phase demonstrates where bubbles can outgas in instrument fluid lines during operation. By installing a degasser before liquid enters the flow path, the fluid is conditioned before it enters the system, eliminating the risk of bubbles outgassing in fluid lines and disrupting your workflow.



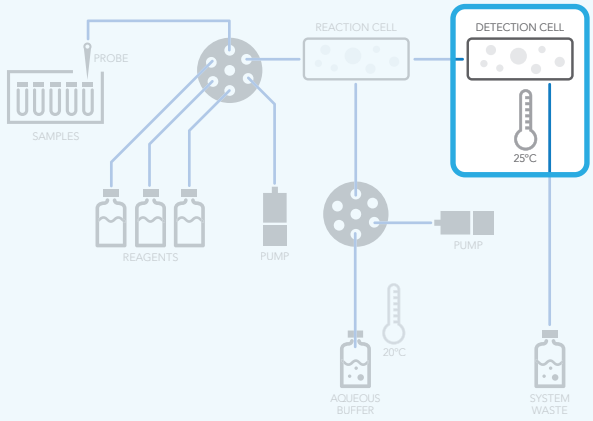
Phase 1: Pump Pulls Fluid into the System

The solubility of air in water at atmospheric pressure is 9.1 mg/L at 20°C. As the pump pulls fluid from the reagent bottle into the instrument (represented by the green arrow), it moves from atmospheric pressure to system pressure. This change in pressure allows dissolved gas to escape as bubbles in system tubing lines; these bubbles impact pumping accuracy.



Phase 2: Mixing of Reagents Can Lower Gas Solubility

Introducing samples, reagents, or solvents into the flow path changes system pressure and may form bubbles. Systems that undergo rapid temperature changes (heating) can also result in bubble formation that could impact pumping stability, sample reproducibility, or travel to the detector, causing detection errors. Extra gas that the fluid cannot retain escapes in the form of bubbles.

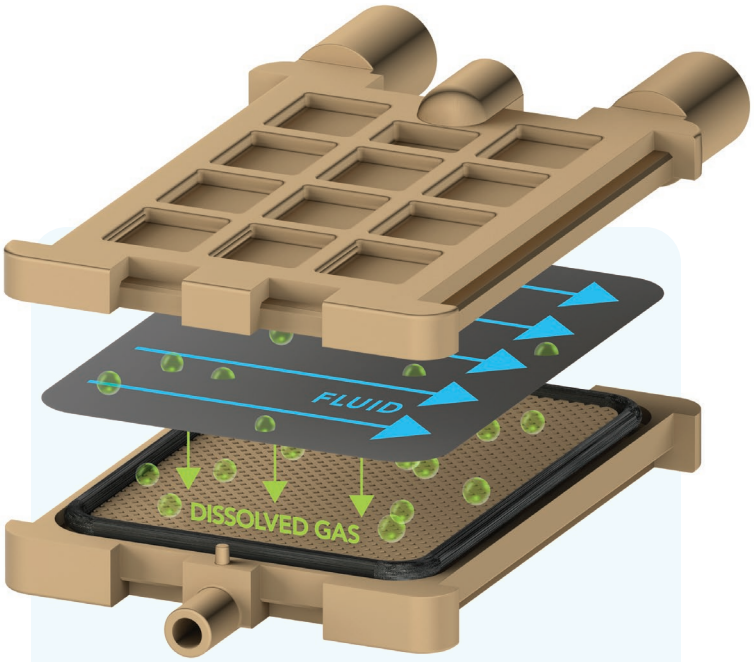


Phase 3: Detection and Other Heat Sources Can Increase Temperature

The detector cell is another opportunity for a change in pressure and/or temperature. When bubbles outgas in the detector, this can lead to sharp spikes, ghost peaks, increased background, or a complete loss of signal.

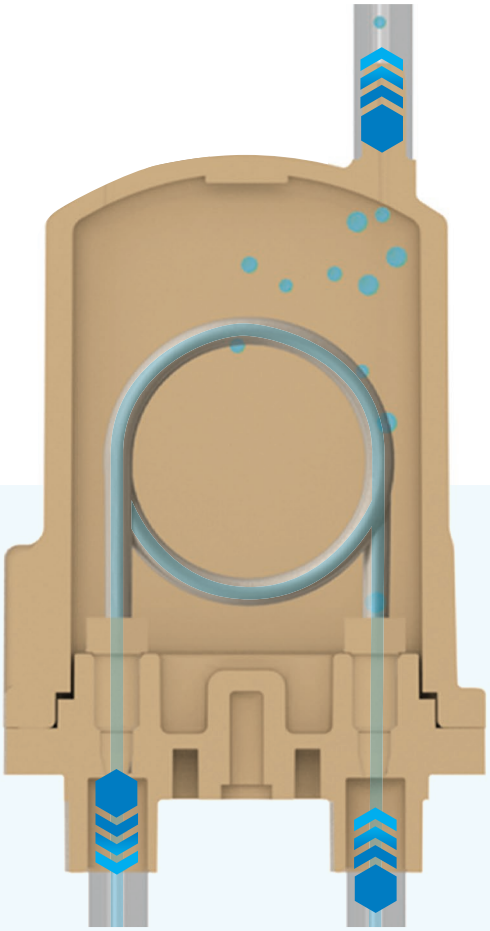
Degassing Solutions

Degassers eliminate bubbles before they form, enhancing instrument accuracy and throughput. IDEX Health & Science offers a suite of solutions depending on your application need.



Film Degassers

In film degassing, as the liquid flows across the Teflon™ film surface, dissolved gas migrates through the film and out to the vacuum. Our patented design offers very low flow resistance and broad solvent compatibility.



Lumen Degassers

In lumen (hollow tube) degassers, as liquid passes through the silicone or Teflon™ tubing, the pressure difference between the inside and the outside of the tube drives the migration of dissolved gas from the liquid to the vacuum side. The size and number of lumens correspond to the flow rate of liquid that needs to be degassed.

Our Degassing Solutions Minimize the Risk of System Errors Due to Outgassing

FLUID ENTRY

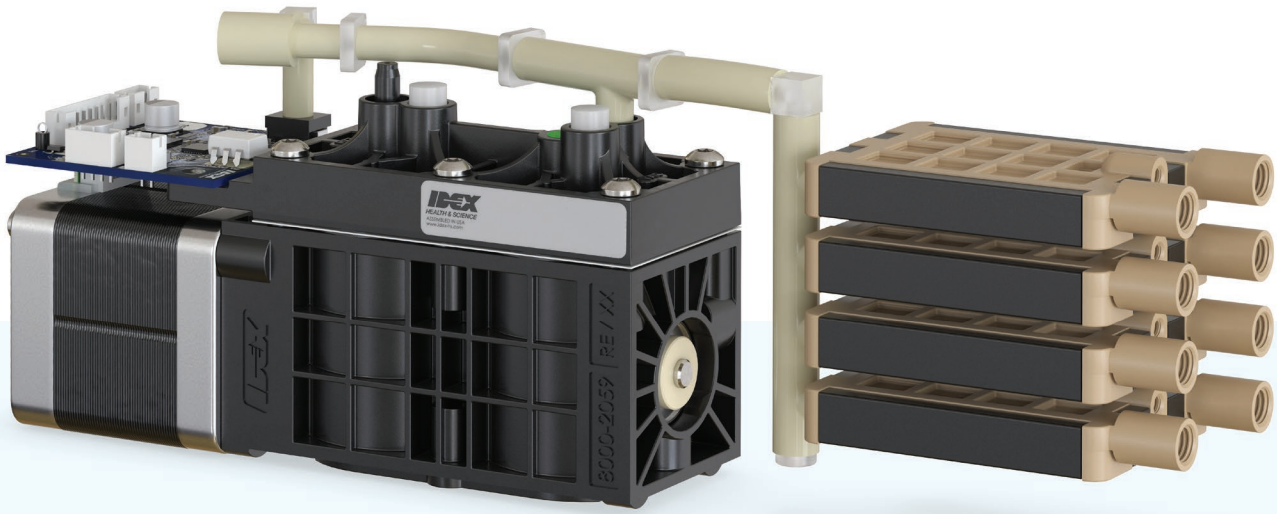
The fluid stream enters the degassing chamber.

VACUUM EXTRACTION

A vacuum is used to pull dissolved gas from the fluid stream.

BUBBLE PREVENTION OUTPUT

As gases are pulled out in the degassing chamber, fluid exits with lower gas levels.



Next Generation Degassing Vacuum Control System

Our next-generation degassing vacuum control pumping system offers precise performance with low noise and vibration. An optimized drive-train design enhances operational accuracy and extends lifetime. The integrated PCB allows you to control the specific vacuum requirements of your application. This dual-stage vacuum pump works seamlessly with lumen and flat film degassing chambers.

Teflon™ Degassers

Teflon™ based degassers offer the widest range of chemical compatibility for systems running organic solvents and aqueous solutions.

Silicone Degassers

Silicone based degassers offer high flow rate capabilities for water-based systems to improve dispense accuracy and reliability.

Build Your Degassing Solution Around Your Application Needs

Partner with IDEX Health & Science to minimize variability and boost instrument performance with custom degassing solutions tailored to your fluid design and application.

With more than 50 years of experience, IDEX Health & Science delivers precision-engineered degassing solutions that support the performance and reliability your instrument demands.

Our broad portfolio of vacuum-degassing assemblies is designed to control bubbles across a wide range of system fluids and flow rates. Whether you need a custom solution or off-the-shelf integration, our experts work with you to match the right design for your fluid path and instrument requirements. Solutions are available for use with your integrated vacuum pump – or paired with our proven vacuum systems – to ensure stable, consistent results in even the most demanding conditions.

INNOVATIVE TECHNOLOGY

Built on the latest advancements in vacuum degassing technology, we deliver consistent, high-quality performance and set the standard for degassing innovation.

EXPERT TEAM

Our engineers and technicians bring experience and deep technical insight to every project, ensuring quality, precision, and reliability at every stage.

PROVEN TRACK RECORD

Trusted by leading companies across various sectors, our degassers have a proven, long-standing record of consistent, reliable results in critical applications.

CUSTOM DEGASSING SOLUTIONS

We understand that every application is different. That's why we partner with you to design a degassing assembly tailored to your exact instrument requirements. From chamber count and vacuum pump size to PCB, brackets, and labeling, our solutions are built custom for your system to deliver the right performance and ensure material compatibility.

Questions to Consider when Selecting a Degasser

Choosing the right degasser starts with understanding your system's unique parameters. The questions below help clarify key performance and compatibility factors so you can identify what's needed for optimal degassing in your application.

Why is there a minimum recommended flow rate for degassing chambers?

A While it is true that the longer a liquid stays in the vacuum chamber, the more time there is for gas to permeate through the membrane and be removed by the vacuum pump, running at too low a flow rate, especially at high vacuum pressure, can lead to "over-degassing." This may cause solvent pervaporation (evaporation) through the membrane and affect analytical accuracy.

What is degassing, and why is it important in fluidic systems?

A Degassing is the process of removing dissolved gases from liquids. In fluidic systems, especially in life sciences, dissolved gases can form bubbles that disrupt flow, cause baseline noise in detectors, and lead to inaccurate results. Degassing ensures consistent, bubble-free flow for reliable performance.

What are common sources of dissolved gases in fluidic systems?

A Dissolved gases can enter fluids through exposure to air, temperature changes, pressure drops, or mixing. Even freshly prepared solutions can contain gases like oxygen or nitrogen that need to be removed.

My system is very sensitive to metals. Is your flow path metal-free?

A Our chambers offer a complete metal-free flow path for compatibility across a wide range of applications.

Which degassing chamber is best for my application?

A Material selection will be the first critical step. If the fluids you are using are mainly aqueous, silicone, or Teflon™, chambers can be selected. However, if your fluids contain organic solvents, only Teflon™ chambers should be chosen. The next consideration is the application flow rate. Ensure the chamber you select is the best size to maintain efficient gas removal (residence time). We are happy to help you select the best option for your application needs.

Once my degasser is designed, what other considerations should I have for my system?

A To prevent re-gassing of fluids, ensure the rest of the system is plumbed with non-permeable tubing. We offer a wide variety of PEEK, SST, and fluoropolymer tubing to help meet your system plumbing needs.

Where would I install the degasser in my flow path? Can I install it after the pumps?

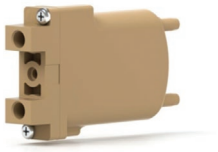
A For the longest lifetime operation, position degassing chambers before the pump pulls the fluid into your system. They should not be placed inline after push set up; otherwise, there is a risk of pressure rupturing the membrane.

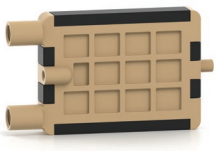
How complicated is it to integrate a degasser into my instrument design?

A Our degassing systems come with PCBs for quick connectivity and access to our Python Library for fast start-up and programming.

Once you've considered these factors, use the following pages to compare available degassing solutions based on chamber material, flow rate, pressure tolerability, and compatibility.

Degassing Chambers





PRODUCT NAME	Mini Chamber	Film Degasser	DGC-020w
Membrane Technology	Teflon™ AF	Teflon™ AF	Silicone
Flow Range (Recommended)	25 µL/min – 10mL/min	200 µL/min – 10mL/min	5 – 20 mL/min
Maximum Pressure	480 kPa	186 kPa	100 kPa
Organic Solvent Compatible	Yes	Yes	No
Wetted Materials	Teflon™ AF, PEEK, Glass-filled PTFE	Teflon™ AF, PEEK, Carbon	EPDM, PPS, VMQ

Vacuum Pumps

APPLICATION TYPE	Analytical	Prep
Solvent Load*	Standard	High
Performance**	50 mmHg @ 60±20 RPM	80 mmHg @ 80±20 RPM
Pump Head Continuous Purge Air Flow Rate	~12 SCCM	~30 SCCM
Mounting Options	Bottom & Side	Bottom & Side
PCB Included	Yes	Yes

** Influenced by solvent volatility and the resulting pervaporation.*

*** 3 SCCM air bleed, closed loop, room temp. Air bleed provides a steady flow of ambient air to clear condensation and maintain consistent pump operation. Higher air flow rates help with higher vapor loads and deeper vacuum levels.*

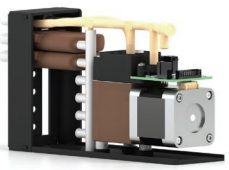
SCCM = Standard Cubic Centimeter per Minute.

RPM= Revolutions Per Minute.

For a full list of degassing products and part numbers, please visit www.idex-hs.com/degassers

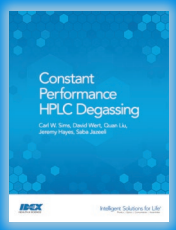
DGC-080W	ERC-250W	DGC-300W	DGC-500NE	DGC-600W
Silicone	Silicone	Silicone	Polymethylpentene	Silicone
10 – 40 mL/min	200 – 350 mL/min	200 – 400 mL/min	200 – 500 mL/min	200 – 800 mL/min
100 kPa	100 kPa	100 kPa	100 kPa	100 kPa
No	No	No	No	No
Silicone, PVC, EPDM	Silicone, PVC, NBR	Silicone, PVC, NBR, PP	EPDM	Silicone, PVC, NBR

Complete Degassers



TYPE OF DEGASSING SYSTEM	Standalone Degassers	OEM Mini	OEM Mini Lite
Number of Fluid Channels	1 – 5	1 – 5	1 – 6
Dimensions (L x W x H)	10.4 x 2.9 x 5.2" (26.4 x 3.4 x 13.2 cm)	7.9 x 6.0 x 2.4" (20.0 x 15.2 x 6.1 cm)	6.8 x 2.1 x 4.0" (17.3 x 5.3 x 10.2 cm)
Max Flow Rate (mL/min)	40	10	10
Recommended Flow Rate (mL/min)	Up to 10	Up to 10	2

Degassing Resources



White Paper

Constant Performance HPLC Degassing

DOWNLOAD:
idex-hs.com/hplc-degassing

Product Guide

Improve Instrument Performance with In-Line Degassers

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Film Degasser Brochure

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