Fluidics

Low Pressure Systems Designed to Balance Performance and Cost

IDEX HEALTH & SCIENCE

Intelligent Solutions for Life™

Fluidics | Optics | Consumables | Assemblies

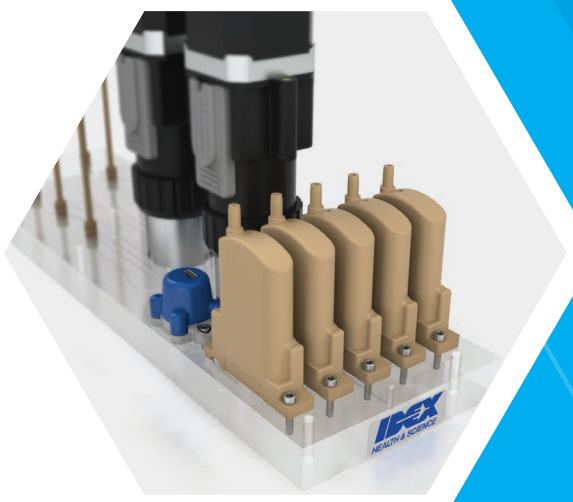
Direct Fluid Across Many Applications

WE LET YOU FOCUS ON YOUR CHEMISTRY

As the world of life sciences becomes increasingly complex, developers are challenged to do more with less, while also maximizing the performance of reagent chemistries. IDEX Health & Science specializes in directing fluid to where it needs to be, so you can automate your fluidic process in a simple package and form factor. Our team of experts has decades of experience in life science applications to help you avoid pitfalls across a broad range of operations and accelerate your time to market.

WE ENABLE A WIDE RANGE OF FLUIDICS, FROM COMPONENTS THROUGH SUBASSEMBLIES

Whether you're looking for a single fluidic component or the development of a comprehensive fluidic engine, we can help you manage risk and overall costs across your complete development process. As a component and assembly manufacturer, we utilize innovative collaboration agreements to keep development costs competitive and make experience-based trade-offs to help support our manufacturing partners early in the development process.

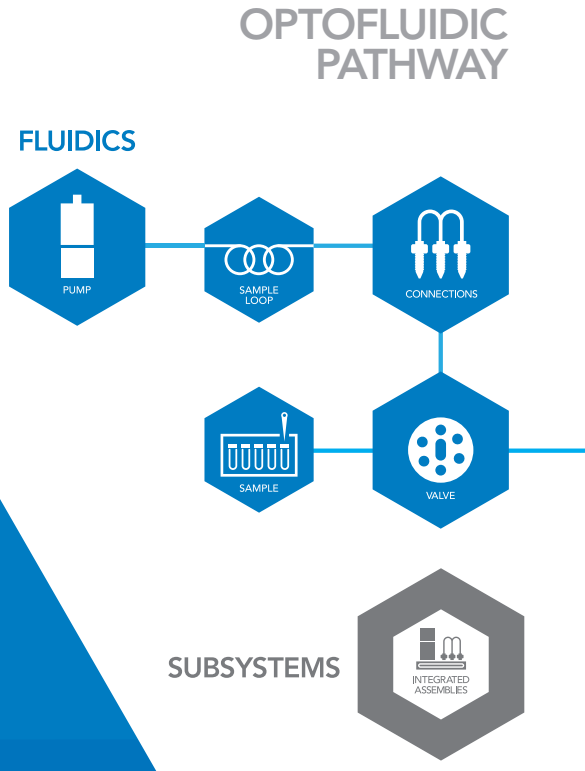


APPLICATIONS

Product Development Process

LAUNCH PRODUCTS MORE EFFECTIVELY

Using our proven process, we solve your unique problems by innovating projects through efficient product development. We deliver quality technology on time, to secure your success in highly competitive markets. The more complex a system becomes, the more complicated the process required to build it becomes. We simplify product development with our disciplined process that aligns our expertise with your business objectives to take you from conception to market easier. Below is a glimpse of what our development process looks like:

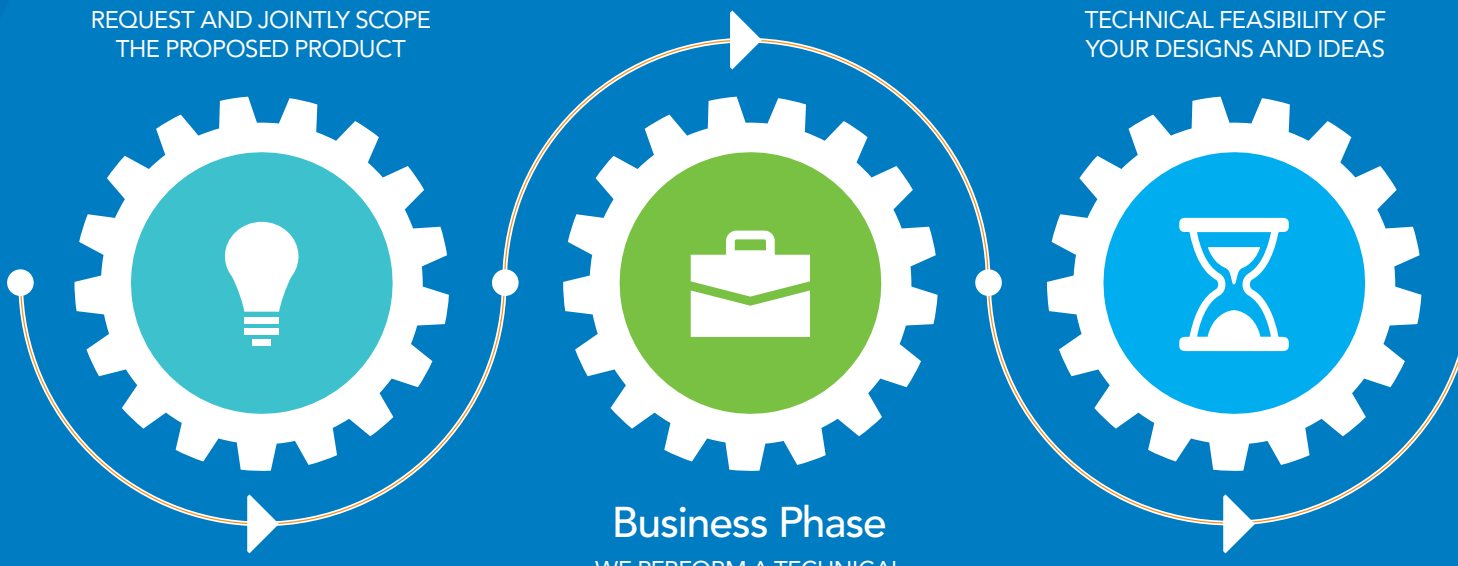


New Project Proposals

WE WILL REVIEW YOUR REQUEST AND JOINTLY SCOPE THE PROPOSED PRODUCT

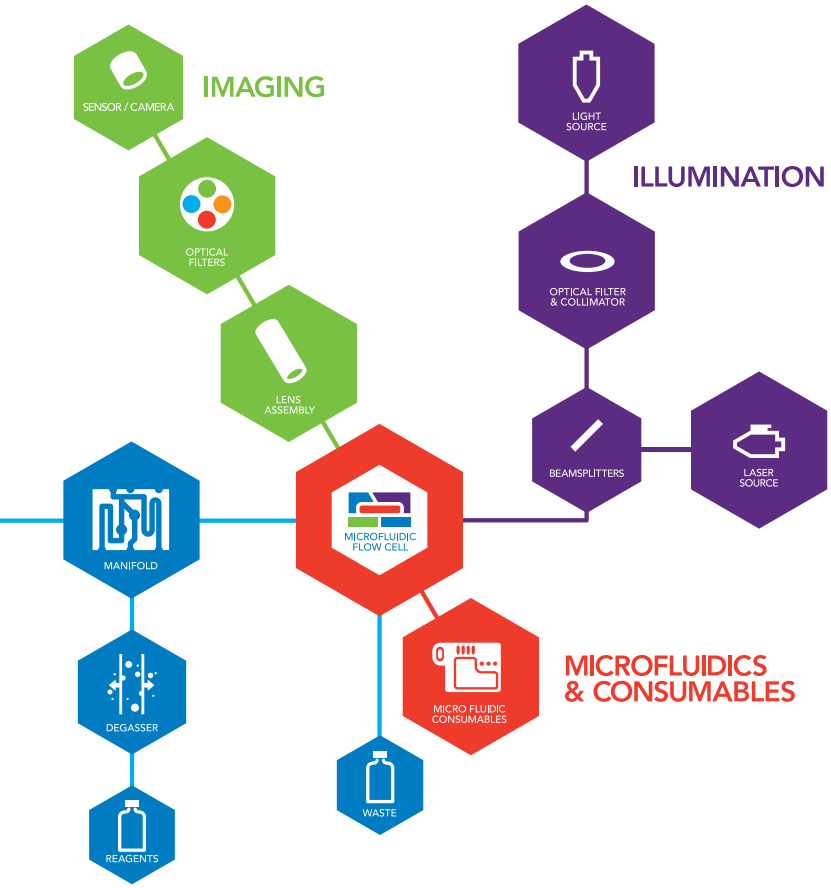
Feasibility Phase

WE EVALUATE THE TECHNICAL FEASIBILITY OF YOUR DESIGNS AND IDEAS



Business Phase

WE PERFORM A TECHNICAL ASSESSMENT AND DEVELOP A BUSINESS CASE



WE'VE PIONEERED THE COMPLETE OPTOFLUIDIC PATHWAY

IDEX Health & Science engineers parts, components, and subsystems that result in innovative and optimized optofluidic systems. We've combined the full pathway to better understand the bigger picture, driving innovation and performance into one efficient system.

We can solve your most demanding fluidic and optical challenges, and protect you from risk in all the areas in between your expertise. As the optofluidic leader, we deliver the most complete portfolio of technologies, components, and capabilities.

Pre-Production Phase

WE COMPLETE TESTING AND VERIFICATION AND PREPARE TO RELEASE THE PRODUCT

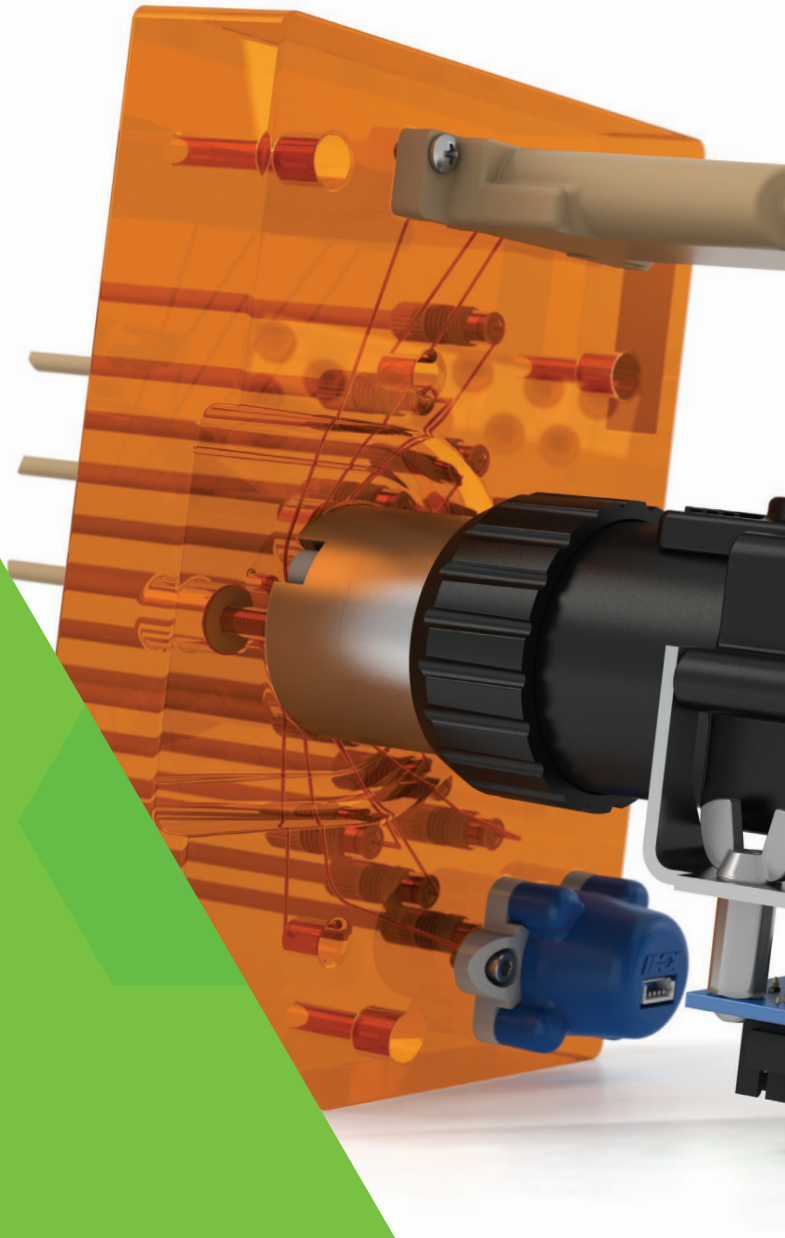
Design Phase

TOGETHER WE ITERATE THROUGH DESIGN AND DEVELOPMENT ROUNDS TO TEST AND VALIDATE

Market Launch

WE ASSIST YOU BEYOND DEVELOPMENT AND PROVIDE LIFE-OF-INSTRUMENT SUPPORT

Fluidic System Solutions



OUTPERFORM YOUR COMPETITION WITH SOLUTIONS THAT DIFFERENTIATE

Design simplification is paramount to successful fluidic instrumentation. We specialize in optimizing fluidic subassemblies with designs that reduce complexity and simplify manufacturing and service, all while enhancing your performance.

See a few examples of our advanced subassemblies, such as valves on manifolds, custom pumps, and manifold-mounted components, to the right.

Learn more at idex-hs.com/system-solutions

Valves on Manifolds

Whether you're working with solenoid or rotary shear valves, integration onto a manifold can reduce the number of leak points and simplify your fluidic design, installation, and instrument manufacturability.

Custom Pumps

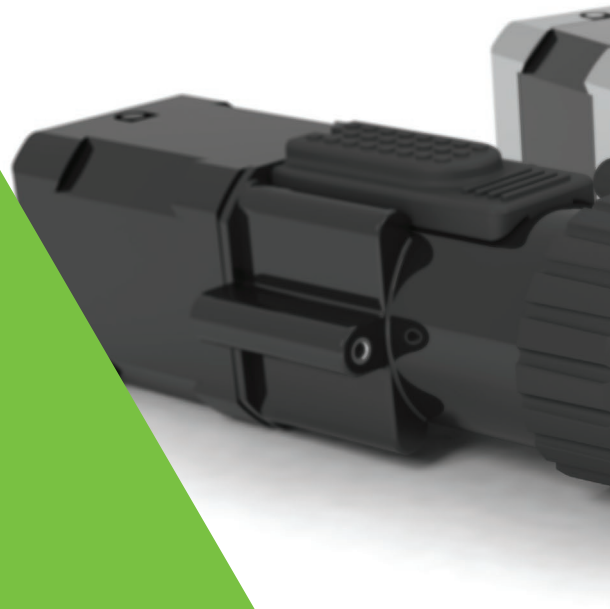
Often a pump needs to be more than a fluidic displacement device. Integrating valving and other fluidics into a pump head often improves precision and throughput.

Manifold-Mounted Components

Depending on end-use, our products are available with standard connections or manifold-mountable configurations to maximize functionality.

GET STARTED ON YOUR DESIGN

Our fluidic system design solutions are not limited to those pictured above, and when it comes to creating subassemblies that differentiate we truly understand that one size does not fit all. Depending on the requirements of your system, our experts will review your intended diagram and propose opportunities to simplify the design and/or make critical improvements to increase performance. **Start the conversation at idex-hs.com/custom**



Custom Rotary Shear Valves

HOW DO YOU SIMPLIFY INSTRUMENT DESIGN WHILE IMPROVING PERFORMANCE?

Most instrument designers are familiar with rotary shear valves used for sample injection and reagent selection. Today, many are discovering that customizing the rotor and stator face seal can effectively create a rotating manifold-on-manifold to achieve much more than reagent selection or injection alone. By customizing the valve per your specific desired valve-states, our experts can greatly simplify the flow path while also reducing dead volume, potential carry over, and pumping actions associated with other valve types. Not to mention custom designs can handle up to 24 reagent ports.

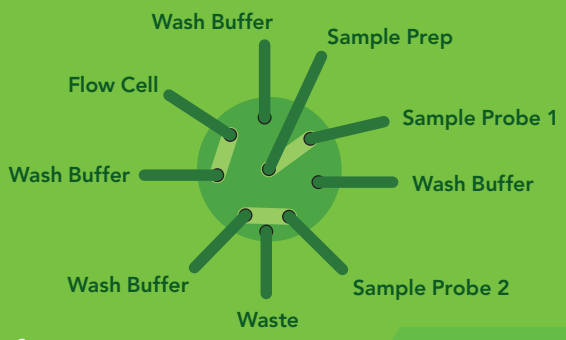
For further guidance about the key factors to consider when designing a custom valve, reach out to our team of experts and we will help evaluate and determine the best options for your desired valve states.

Learn more at idex-hs.com/rotary-shear-valves

EXAMPLES OF CUSTOM VALVE STATES:

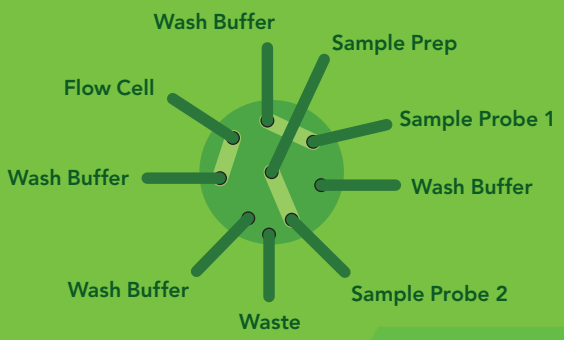
Valve Position 1: Aspirate Probe 1

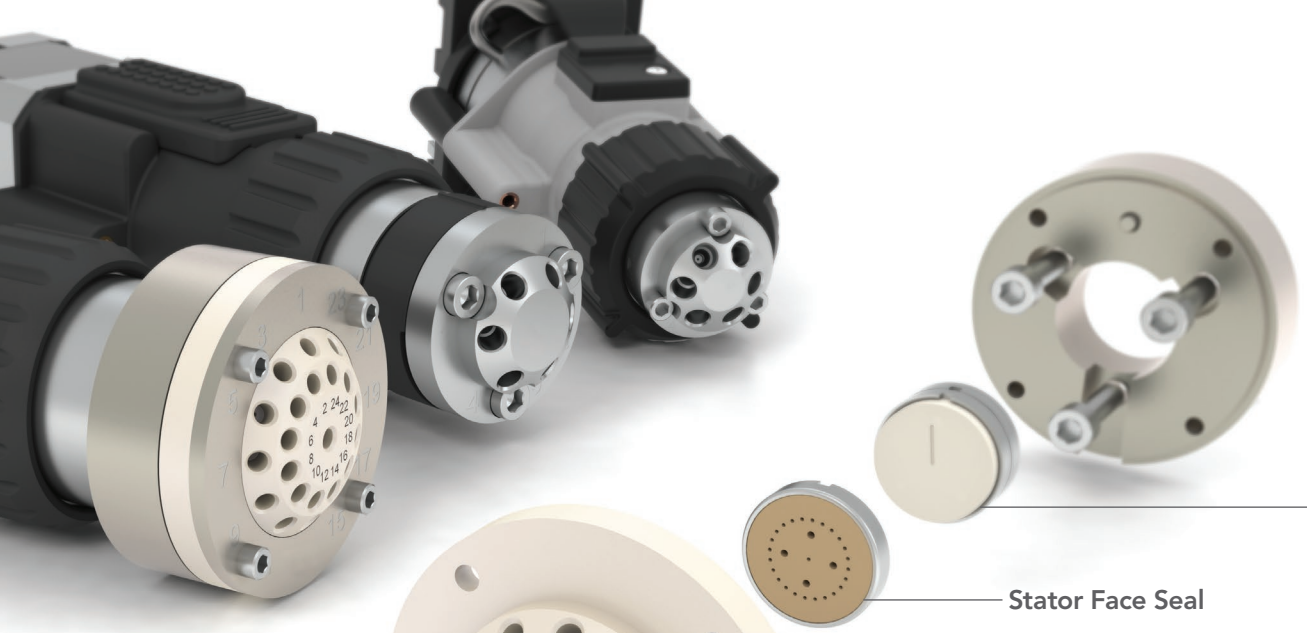
Aspirate Sample Probe 1 to Sample Prep
Rinse Sample Probe 2
Rinse Flow Cell



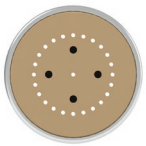
Valve Position 2: Aspirate Probe 2

Aspirate Sample Probe 2 to Sample Prep
Rinse Sample Probe 1
Rinse Flow Cell



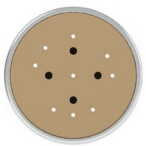


Standard Stator Face Assembly Example



Standard Rotor Seal Example

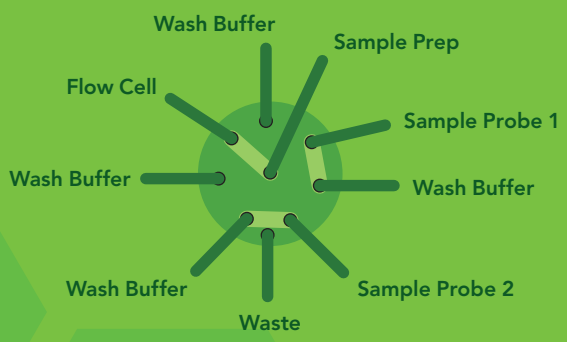
Custom Stator Face Assembly Example



Custom Rotor Seal Example

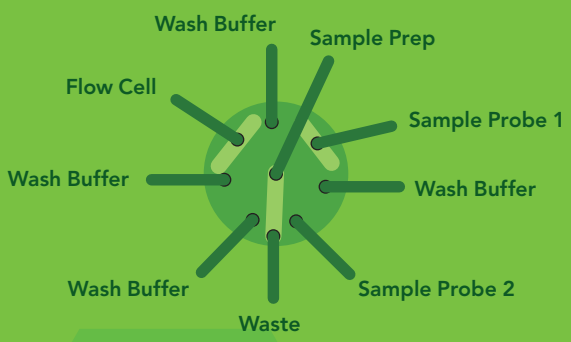
Valve Position 3: Analysis

Sample Prep to Flow Cell
Rinse Sample Probe 1 and 2



Valve Position 4: Sample to Waste

Sample Prep to Waste
All Other Channels Closed



Pumps

HOW DO YOU AVOID LEAKS WHILE HANDLING AGGRESSIVE BUFFERS AND REAGENTS IN YOUR INSTRUMENT?

Salty buffers and detergents are incredibly common reagents used in both *in vitro* diagnostics and biotechnological instrumentation. While most pumps can guarantee millions of cycles when driving reagents, the potential for leaks caused by degradation of the sealing surfaces by salty solutions must also be considered. IDEX Health & Science uses durable seal technology that boasts an unmatched lifetime – even with salty solutions – and is backed by rigorous life test data.

Learn more at idex-hs.com/pumps

Materials

- Pump Heads
  - Acrylic
  - Ultem
  - PEEK (Natural & Black)
  - Others available
- Piston
  - TZP Ceramic
  - Sapphire
- Seal
  - UHMWPE
  - Viton/FFKM

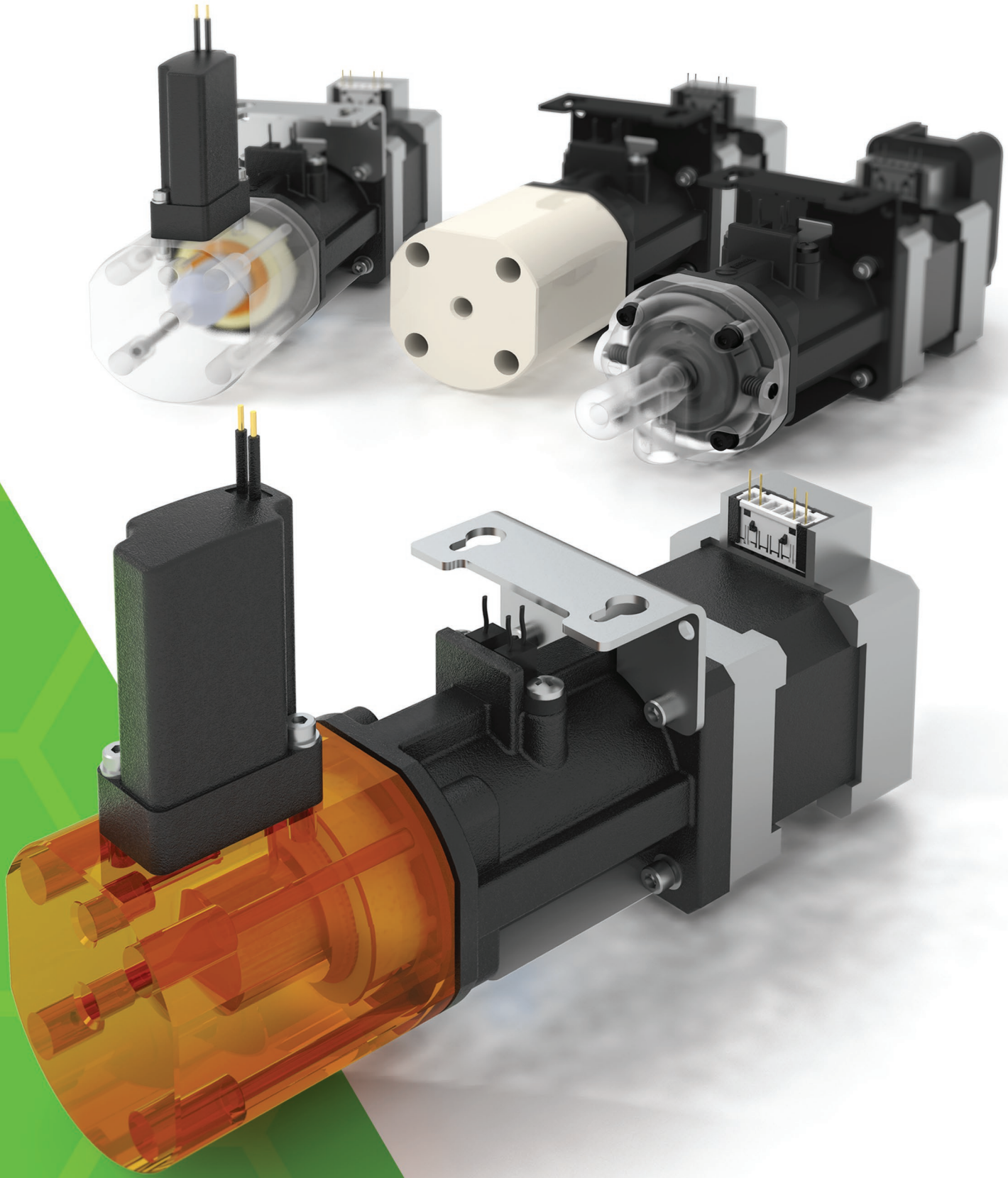
Capabilities

- < 1.0% CV at 2% Volume Dispense
- B10 Lifetime: 5M Cycles
- Differentiated Technical Support

Rapid Delivery Standard Pumps

- Standard Pump Components in Stock for Rapid Delivery
- Contact Our Team for Available Sizes
- Chemically Inert Wetted Materials

LEAK RESISTANT | PRECISION VOLUME | LOWEST CV | PRECISION ENGINEERED | RELIABILITY



Fluidic Connections

WHAT COULD COMPROMISED CONNECTIONS REALLY COST YOU?

Fluidic connections are one of the most important components of an instrument, but they are often overlooked. With dozens or even hundreds of connections in an instrument, failure at even one single point can result in a costly service call. That's why we have always maintained the most stringent testing protocols. Our experts ensure all our fluidic connections meet the highest level of quality and margin of safety so you can have peace of mind when connecting to our tubing, fittings, or components. With one look at the quality of our molded components, you will see what sets us apart.

Learn more at idex-hs.com/connections

Low Pressure Fittings

We offer a broad collection of low pressure fittings for systems that operate under one thousand psi. We are dedicated to providing the most reliable, proven fittings on the market, applying more stringent testing protocols and safety margins to ensure your safety.

SUPER FLANGELESS

For tubing assemblies or connections that need to be broken frequently, our flagship fittings are ideal. A polymer ferrule secured to the end of the tube with a metal lock ring forms a permanent connection, making flanged tubing unnecessary. With inert materials like PEEK or ETFE, they minimize dead volume and are easily serviceable. Available as separate components or within tubing assemblies.

FLANGELESS FITTINGS

Most frequently used during development for flexibility, our flangeless fittings series use a nut and removable ferrule design that can be assembled in the receiving port. This type of fitting is not recommended for tubing assemblies.

FLANGED FITTINGS

Only available with tubing assemblies, our flanged connections use the flared end of the tube to seal against the bottom of the receiving port. Flanged fittings are also compatible with shallow port design.

High Pressure Fittings

Spearheaded by our series of MarvelX™ and MarvelXACT™ connection systems, our full line of high pressure fittings deliver next generation technology to give you maximum performance in even the most demanding applications. Our high pressure fittings range from thousands to tens-of-thousands in psi pressure, and are developed and tested to the highest safety factors to ensure robust and easy connections.

Tubing

Our high quality, versatile tubing is offered in a variety of materials and styles to meet your system requirements. It is manufactured to precision-tight tolerances to ensure dependable product consistency, and can be ordered separately or as part of tubing assemblies.

Other Connections

We engineer components that result in innovative and optimized fluidic systems, available for a wide range of applications that require precise control and measurement. Learn more about our complete line of connections at idex-hs.com/connections.

Tubing Assemblies

HOW DO YOU REDUCE COMPLEXITY WHEN CONDITIONS KEEP CHANGING?

During the development phase, connecting components along your breadboard usually seems like an easy task in the beginning. But, ever changing requirements and unavoidable issues occur, which make the process longer and increasingly more complex. The key to fast iterations is to incorporate a vast portfolio of fluidic connection components and flawless third-party components.

IDEX Health & Science can help you achieve optimal solutions very quickly, while supporting your development from the start, with an emphasis on manufacturing efficiency and system reliability. By utilizing outstanding quality processes, we help you stay focused on mission-critical aspects rather than reinventing the wheel and wasting valuable manufacturing resources. When you move towards industrializing your instrument or platform, our engineering experts provide cost-effective tubing assemblies that improve your system's reliability and uptime with tight connections that stay protected from various thermomechanical loads. We provide unbeatable convenience for the assembly line, too. Many assembly situations — ranging from tool-less to tight-spaced — can benefit from our full spectrum of fittings. Our thermoformed tubing is ideal for densely packed components in space-efficient instruments and our assemblies come packaged and labeled to fit your needs. We utilize various identification systems, such as tags, labels, and color-coding, to reduce errors and misconnections. Our tubing assemblies are built for quality, consistency, and longevity so you can focus on your process or assay right from the start, while we take care of connecting your components.

Custom Tubing Assemblies

When it comes to custom tubing assemblies, our manufacturing team is fully equipped to construct to your exact specifications, saving you time and complexity. We cut, form, produce, test, and label every piece, so you receive a single assembly that's ready to integrate directly into your system.

Learn more at idex-hs.com/tubing-assemblies

START THE TUBING ASSEMBLY PROCESS

We provide tubing assemblies and kits to the life science market across a multitude of application types. If you're ready to create a custom tubing assembly, there are two ways to get started:

OPTION 1:
Send us your drawings and our experts will review and provide redlines and guidance.

›

OPTION 2:
Sketch what you need and send it with your system requirements, then let us make the drawings.

›

EXPERT GUIDANCE:
Whichever option you choose, our team of experts will evaluate your drawings and system requirements then provide guidance for the most cost-effective way for us to produce your custom tubing assemblies. If an assembly design is complex and it is necessary to engage with external suppliers, we utilize industry-leading partners to keep your pricing competitive.

Capabilities

- Wide Range of Conventional Fitting Choices
- Choice of In-House-Extruded Polymer and Stainless Steel Tubing
- Tube Thermoforming
- Component Customization, if Needed
- Identification Coding
- Packaging, Labeling and Kitting

Instrument Development

- Support for Assessing Capabilities and Choosing the Right Components
- Cost Optimization
- Custom Components, if Needed
- Minimize Time to Market
- Supply Chain Involvement Early in the Process

Manufacturing

- Simplify the Assembly Process
- Scalability with Product Launch Ramp
- Manage Revision Changes During Continuous Improvement

Preventative Maintenance

- Intuitive Service Kits to Meet the Needs of Your Service Team
- Custom Labeling to Ensure the Right Connections
- Product Testing Ensure Specifications Are Met

DEDICATED ENGINEERING SUPPORT

INTERNAL OR EXTERNAL COMPONENTS

CONTROLLED PROTOTYPE AND MANUFACTURING RELEASE PROCESS

COST OPTIMIZATION

Manifolds

HOW DO YOU SIMPLIFY YOUR REAGENT FLOW PATH AND INSTALLATION PROCESS WHILE ALSO IMPROVING RELIABILITY?

The answer is simple: Manifolds – and the design and integration possibilities are endless. A key advantage of manifolds is the flexibility to integrate multiple fluidic components into a unified fluidic module. They can be used in fluidic instrumentation to achieve consistent performance, reduce instrument footprint, and enhance system reliability. Manifolds enable the consolidation of fluidic connections by reducing the number of leak points while also maximizing the use of space with a dense fluidic pathway design. A wide range of fluidic components can be integrated into a manifold, such as sensors, heaters, solenoid valves, shear valves, dispense pumps, degassers, and debubblers.

Learn more at idex-hs.com/RPM

Rapid Prototype Manifolds (RPM)

Need to test fit, form, or function before investing time and energy in what's likely the first of many design iterations? Optimize your fluidic pathway with an RPM:

- 3D Printed Manifolds
- Rapid Turn Around Time PO to Delivery
- Manifolds up to 15" x 15" x 10" can be Printed
- Extensive Range of Custom-Machined Ports to Accommodate Various Fluidic Components

Materials

- Acrylic
- Ultem
- PEEK, PVC, Polycarbonate and Others Available for Machining

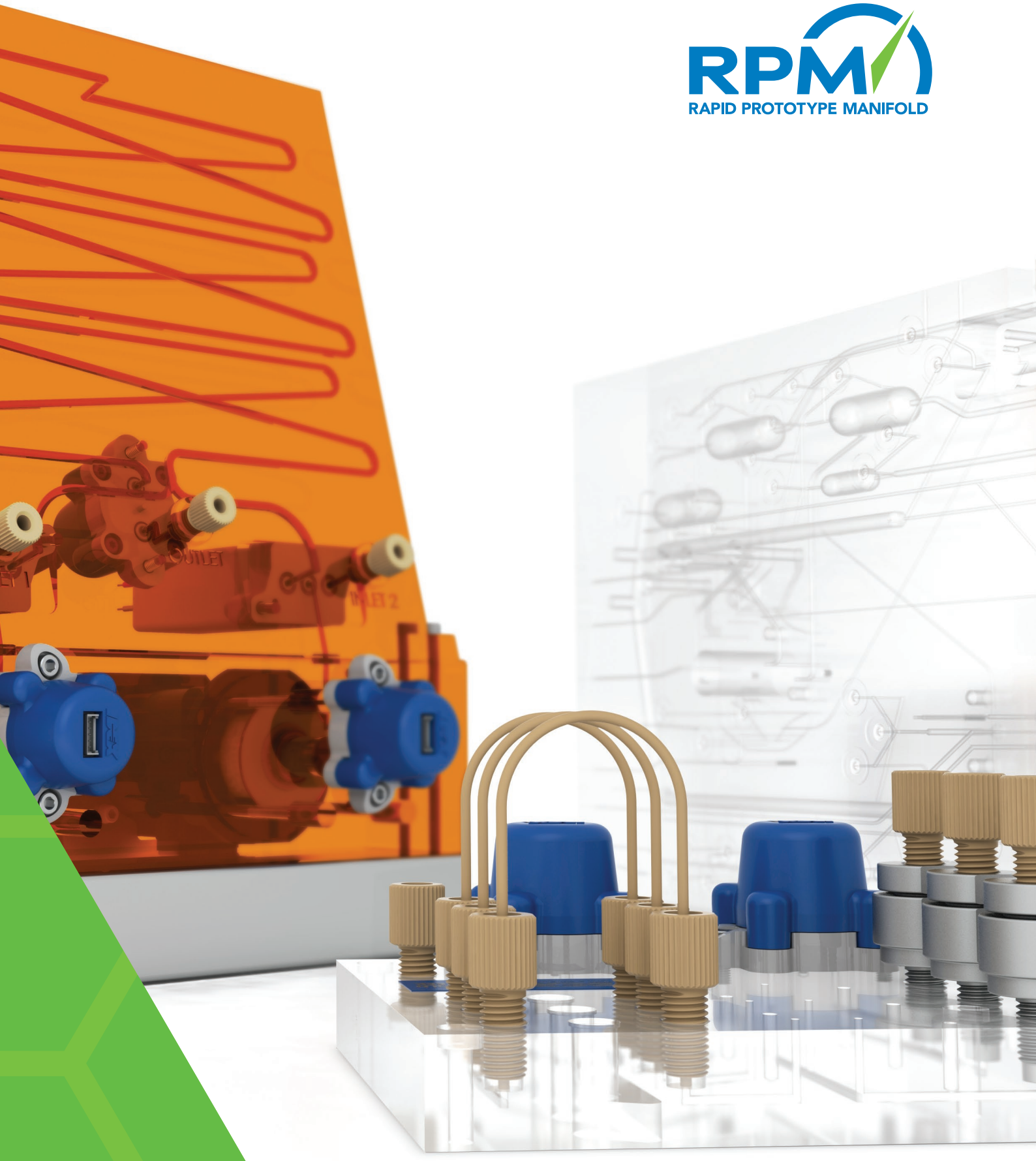
Capabilities

- 0.020" Minimum Bonded Channel ID
- ± 0.005" on Bonded Features
- 16 µin Channel Surface Roughness
- <20 µin External Surface Finish
- 60+ Years of DFM Experience

CUSTOMIZED | CHEMICALLY COMPATIBLE | RELIABLE TESTING | SYSTEM INTEGRATION | EASILY SERVICED

RPM

RAPID PROTOTYPE MANIFOLD



Degassers

DID YOU KNOW BUBBLES CAN NEGATIVELY IMPACT THE FUTURE OF INSTRUMENT DEVELOPMENT AND COMMERCIALIZATION?

Changes to key solution characteristics – such as pressure, temperature or reagent concentration – alter a fluids' ability to dissolve gases. The result is a reduced saturation level that causes the formation of bubbles due to outgassing. These bubbles can form anywhere in the flow path, leading to dispensing imprecision, problems with detection, and other unpredictable issues within a fluidic system. Any of these can increase inaccuracy in instrument results.

Eliminate bubbles before they occur by using a degasser from IDEX Health & Science. We offer a broad portfolio of vacuum degassing assemblies to control bubbles in a wide range of system-fluids and flow-rates. Our degassers greatly improve precision by degassing fluids far below the saturation point, so your operations remain bubble-free.

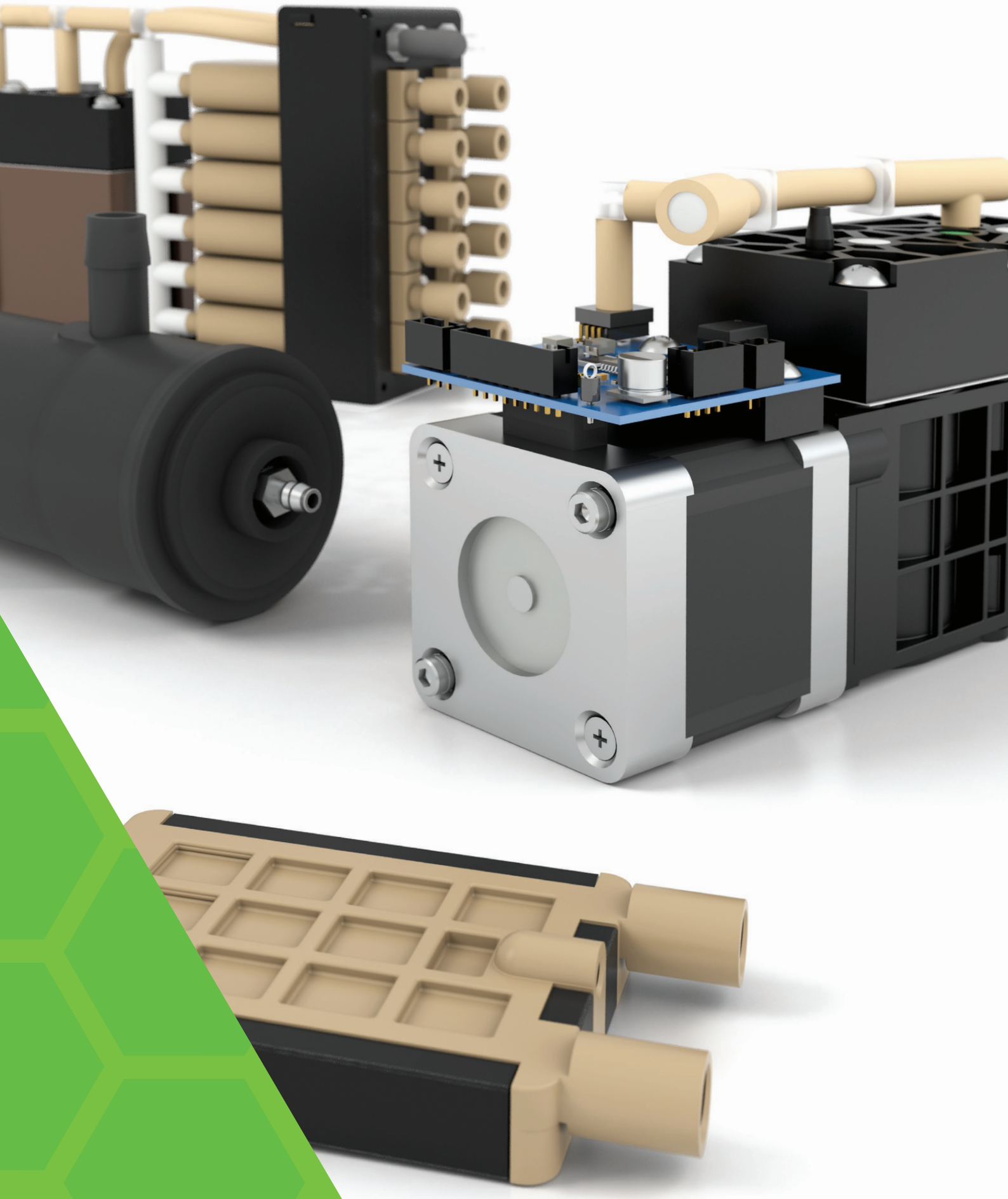
Learn more at idex-hs.com/degassers

RECOMMENDED FLOW RATES

TEFLON AF
0 mL – 40 mL
Broadest Reagent Compatibility

SILICONE
40 mL – 600 mL/min
Aqueous Based Solutions

For flow rates in between, please contact us at IHSDegassers-Valves@idexcorp.com or +1 707 588 2000



Sensors

HOW CAN YOU SAVE DEVELOPMENT TIME WHILE ALSO PROTECTING YOUR INSTRUMENT FROM POTENTIAL SYSTEM FAILURES?

Instrument designers and manufacturers need to accurately monitor, diagnose, and control fluid flow and pressure. Error detection requires time consuming manual inspections which can, depending on frequency, go undetected and cause major problems. When a system fails to perform, the consequences can be costly and catastrophic. Incorporating ordinary sensors can be a major development project on their own, competing with resources and timelines.

QuickStart™ Sensors from IDEX Health & Science allow you to quickly monitor and control your fluid pressure to achieve accurate instrument output and maximized system capabilities. Our sensors use advanced transducer technology in a compact, plug-and-play package. A fusion of modularity and intelligent sensing make demanding tasks effortless, giving you exceptional control over any region of your flow path. Each sensor automatically monitors and provides accurate, real-time data with digital output, allowing you to predict failure, mitigate risk of damage, and optimize your system to maintain maximum performance with ease.

Learn more at idex-hs.com/sensors

Simple Integration

Our modular sensors are available as a stand-alone inline component or can be directly mounted to a manifold via ¼-28 flat bottomed connections.

Specifications

- Plug and Play Package
- True Inline, Fully Swept, Low Volume Design
- Stand Alone or Manifold Mount
- Accurate Digital Output
- 3.6 – 200 psi (0.25 – 14 Bar) Range

Partnership Studies

WE ENABLE YOUR PROGRESS BY OPTIMIZING YOUR FLUIDIC SYSTEMS

Through strategic partnerships, IDEX Health & Science engineers innovative fluidic components and subassemblies that result in optimized optofluidic systems. We don't just build components, we also create leading-edge solutions that maximize performance and enable the complete optimization of the optofluidic pathway. We manufacture highly trusted devices for life science instruments that perform precision fluidic analysis tasks.

Browse through our partnership case studies on the next few pages to see how partnership is the new innovation for fluidics.

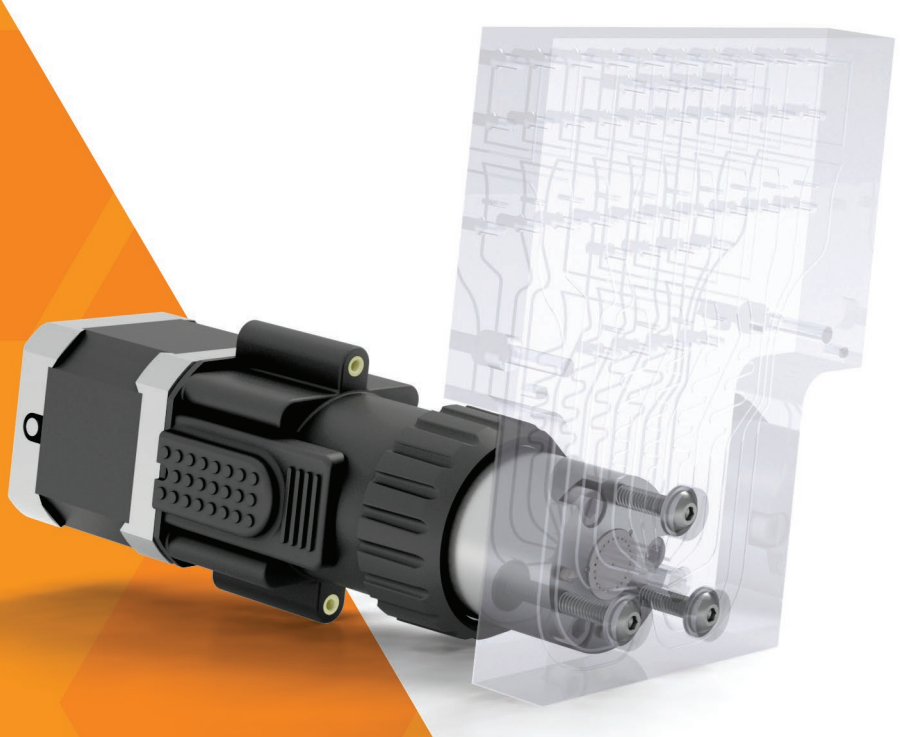
Reducing Complexity

CUSTOMER REQUIREMENT:

Market leaders continue to innovate and evolve their instrument platforms, but using numerous solenoid valves and connections can put a system at risk by breaking up samples and working fluid in an undesirable way. One IDEX Health & Science customer needed our help to reduce fluid path complexity when aspirating patient samples.

SOLUTION:

Our design team worked collaboratively with the customer to reduce complexity by developing a custom rotary shear valve to replace many solenoid valves. Operating like a rotating manifold-on-manifold, our team helped to identify individual valve states for each configuration required in the instrument. We then designed custom valve groove options to achieve all the necessary valve states, reviewing trade-offs and options along the way. In parallel with comprehensive testing at IDEX Health & Science, our customer further tested rapid prototypes of various valve options to validate every improvement. The end result was a simpler system with greater capabilities, which allowed our customer to aspirate patient samples much more efficiently.



Increased Performance in a Smaller Footprint

CUSTOMER REQUIREMENT:

Developers constantly drive to increase performance and throughput with smaller instrumentation which continually reduces available space for individual fluidic components. This was especially true in a degassing situation where a customer desired to maintain long-life performance and dispensing precision with high-flow degassers from IDEX Health & Science. Our customer asked us to seek a solution that would meet or exceed current performance, but significantly decrease the size to fit in their system.

SOLUTION:

Our degassing team accepted this challenge and ultimately reinvented the way we degas fluids. After a serious design upgrade, we introduced our new 500W degasser, based on our same IDEX Health & Science proven membrane material, but with thousands of lumens instead of the typical 100 or less used in other degassers. This technology greatly increased surface areas, leading to an innovative degasser with comparable reliability you expect from our product line, but in a much smaller size. Our 500W degasser delivers a high flow rate and very low back pressure in a compact design that maximizes our customers' system performance.

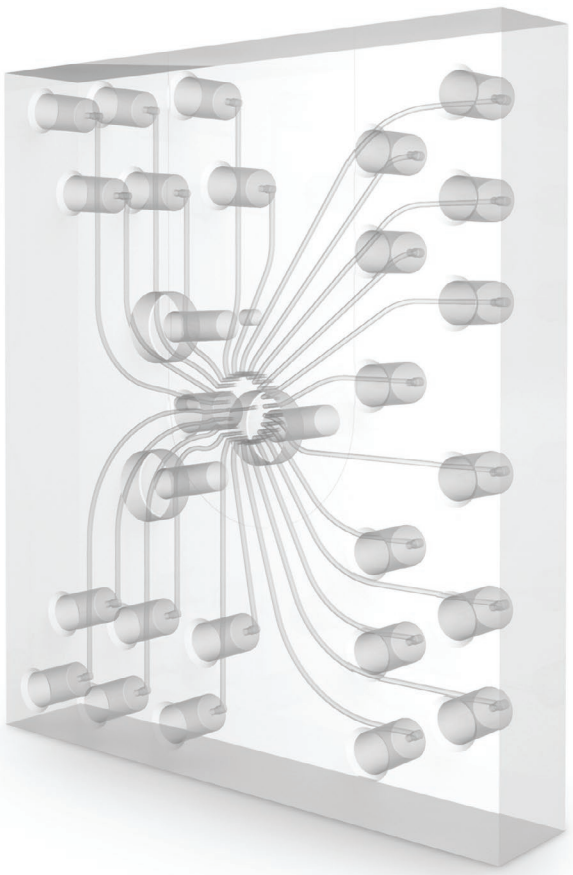
Rapid Development Iteration

CUSTOMER REQUIREMENT:

To achieve high throughput and precise fluidic delivery, instrument developers often run into a problem: when all fluidic pathways are defined late in the development cycle, there ends up being a complicated assortment of tubing, fittings, and valves. This takes up a significant footprint and makes troubleshooting and serviceability difficult. Manifolds are a known solution, but when left to the end of a development process, there's very little time for design iterations. This was the case for one of our customers, who asked us for help when developing an integrated manifold to serve the life science market.

SOLUTION:

Our design team worked closely with the customer to develop a fluidic subsystem to replace a cluster of tubing and pinch valves. Using our Rapid Prototype Manifolds (RPM), the customer was able to test several different options in parallel, of which we could then make further iterations quickly until the unit had the desired result. The outcome was a diffusion-bonded manifold with integrated valves and external connections, in a compact, easy-to-service reagent delivery module. Our fast iteration process allowed the customer to stay within their existing development schedule and move to a final manifold design in a short period of time.



Intuitive Assembly

CUSTOMER REQUIREMENT:

Our customer needed help simplifying a complex fluidic instrument that had components spread out across the floor-standing unit, making it a challenge to assemble and service. Their instrument design was also large and didn't lend itself to using manifolds to consolidate. As a consequence, mistakes were occurring during assembly and the unit required increased service visits. Our customer asked us to find a solution that would prevent costly mistakes and ensure the right connections were being made.

SOLUTION:

Our support team collaborated with the customer to review their fluidic schematics and pinpoint the key challenges caused by components, assemblies, and replacement frequencies. From there, we were able to devise a plan to significantly simplify their instrument using custom tubing assemblies and color-coded fittings to match each individual component. With this strategy in place, the customer's assemblers and service groups were no longer forced to repeatedly trace tubing back to the origin to make connections, as the improved design made the process simple and highly efficient. Ultimately, our team created over one hundred unique part numbers and drawings to fully outfit the instrument.

Manufacturing & Quality

WE ARE YOUR HIGH QUALITY SINGLE-SOURCE PARTNER FOR THE ENTIRE FLUIDIC PATHWAY

The accuracy and precision of any instrument in the *in vitro* diagnostic and biotechnology field is heavily, if not completely, reliant on the tools of the fluidic management system. Our manufacturing facilities utilize the latest technologies to ensure market-leading capabilities. From precision molding and 5-axis CNC automation, to clean assembly and reliable product quality control, IDEX Health & Science possesses a full spectrum of capabilities to fulfill the needs of customized life science and IVD instrumentation.

Having the technology available to meet the precise specifications of our customers is a critical aspect of being an effective partner, but is only one piece of the puzzle. Understanding critical parameters and being able to translate them into manufacturable and scalable solutions is a critical facet that can make or break a platform. IDEX Health & Science R&D engineering works closely with the manufacturing engineering and operations teams from the very beginning of every project to ensure design for manufacturability is considered, from initial conception through full production and platform launch.

HIGH QUALITY STANDARDS

IDEX Health & Science ensures the quality of both new and existing product designs using Statistical Quality Control (SQC) methods to monitor our processes. We are committed to providing top-quality components and subassemblies. We pride ourselves on our commitment to quality and reliability. This is why we've undertaken accreditation from the International Organization for Standardization (ISO) for ISO 9001:2008.

OPERATIONAL EXCELLENCE

- Six Sigma
- 5S
- Kaizen
- Documented and Benchmarked Processes
- Routine Audits
- Sophisticated, accurate measuring and inspection equipment
- Statistical Quality Control (SQC) Methods
- Lean Manufacturing
- Value Stream Mapping
- Visual Controls
- One Piece Flow
- Team Building
- Quality at the Source
- Quick Changeover and Setup Reduction
- Kanban and Pull Systems
- Cellular Manufacturing
- Total Productive Maintenance
- Continuous Improvement and Kaizen

Global Leaders

YOU SEE INNOVATION, WE SEE INTEGRATION

Whether you're pursuing a complex consumables design or a life-of-instrument flow cell, we support and guarantee your success with extensive experience that unites the intersections of fluidics, optics, and chemistry. We are a strong force of committed people and innovative products for your complete optofluidic pathway, continually increasing our product offering, expanding our market relevance by connecting to new customers, and positioning ourselves as global leaders in optofluidics engineering.

WORLDWIDE OPTOFLUIDICS

As a global company, IDEX Health & Science has an international network of direct sales professionals and distribution partners in place to provide personal service to every customer. Our experts are ready to visit your operation, assess your needs, and develop intelligent solutions for your challenges.

CORPORATE RESPONSIBILITY

IDEX Health & Science is committed to preserving the environment. Our continuous improvement programs hold our facilities accountable to reduce waste, prevent pollution, and conserve resources. Many products comply with REACH and RoHS regulations.

North America

Bristol, CT, USA
Carlsbad, CA, USA
Middleboro, MA, USA
Oak Harbor, WA, USA
Rochester, NY, USA
Rohnert Park, CA, USA

Europe

Zweibrücken, Germany

Asia

Saitama, Japan
Shanghai, China
Beijing, China
Singapore, SG

IDEX HEALTH & SCIENCE

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