

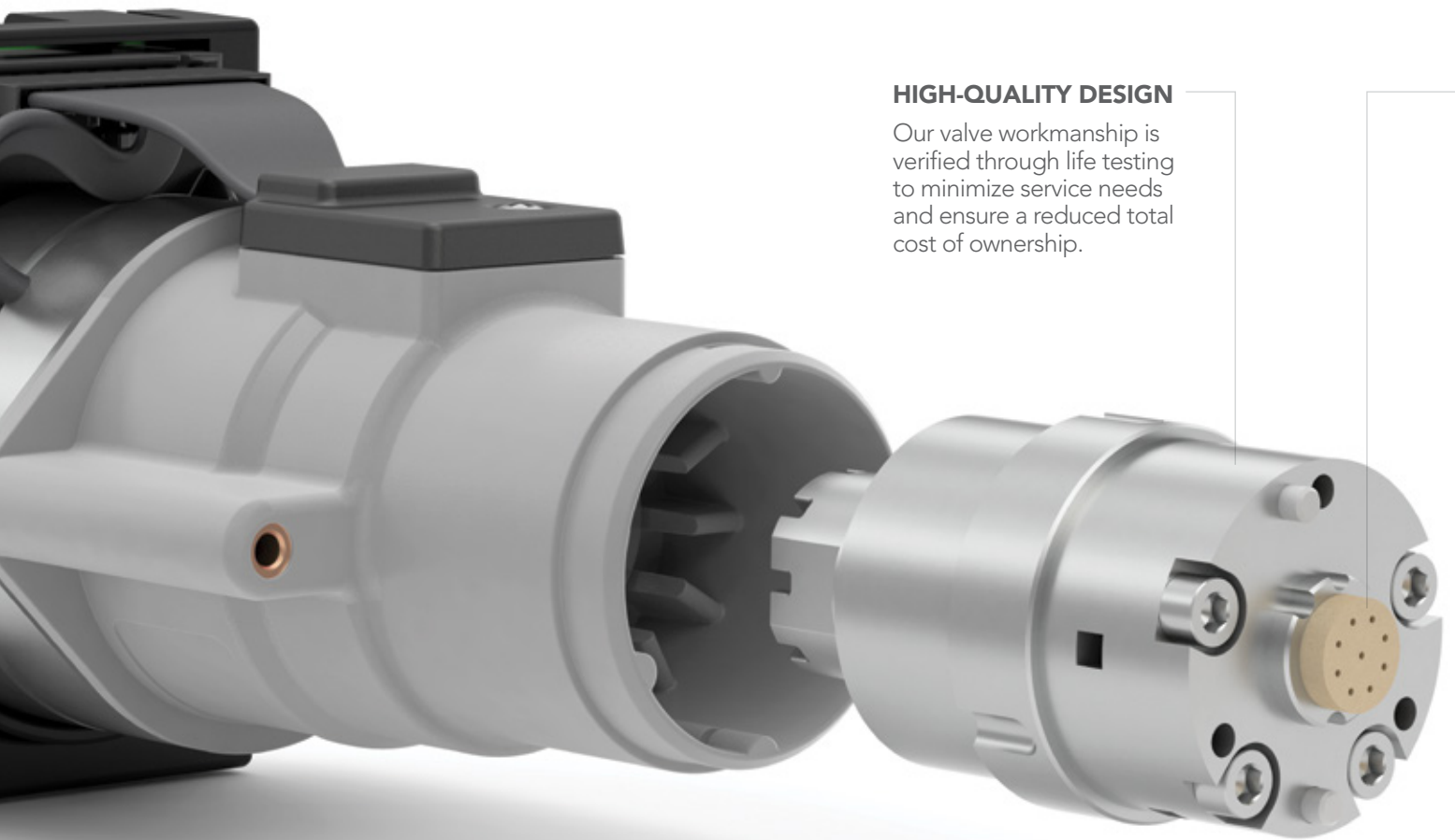
# Valve Solutions

FOR LIFE SCIENCE  
INSTRUMENTATION



# Life Science Instrumentation Valve Solutions

Adeptly meet the lifetime requirements of your workflow with IDEX Health & Science fluidic control valves. A single valve enables the discrete distribution of up to 24 system buffers, reagents, or wash solutions, simplifying the flow selection pathway and ensuring precise fluid delivery. Whether your application demands salt solutions, fast cycle times, or zero carryover, IDEX Health & Science has a proven valve solution, tested to millions of cycles, ensuring maximum system uptime.



## HIGH-QUALITY DESIGN

Our valve workmanship is verified through life testing to minimize service needs and ensure a reduced total cost of ownership.

## Discover Why Engineers Turn to IDEX Health & Science for Reliable Fluid Management

With a strong commitment to delivering quality products and 50 years of rotary shear valve manufacturing experience, IDEX Health & Science is an integral part of the advanced fluid handling componentry for many life science platforms.

# Discover the Valve for Your Project

To be your trusted valve partner, IDEX Health & Science designs are stringently tested in the lab to ensure they meet your system needs. The combination of advanced polymer valve-sealing surfaces ensures complete biocompatibility and longevity. Specifically designed for systems operating at pressures from vacuum to 2.76 bar, our distribution valves are verified through rigorous durability testing to ensure they deliver a robust distribution solution. A smart closed-loop control logic allows users to track the valve positioning in the system, whether controlled by RS232, I<sup>2</sup>C, or UART.

**Simplify your instrument design** — a single rotary distribution valve replaces a bank of up to 24 solenoid valves, affording a cost reduction as well as:

- › Low swept volume
- › Eliminate carryover concerns
- › Enable the use of air gaps for segmented flow
- › Compatible with magnetic beads
- › No holding current, low current draw for delayed valve movements
- › No pulsation, pumping action
- › Each valve is factory-tested to specifications
- › Available as standalone (for use with tubing and fittings) or manifold mountable

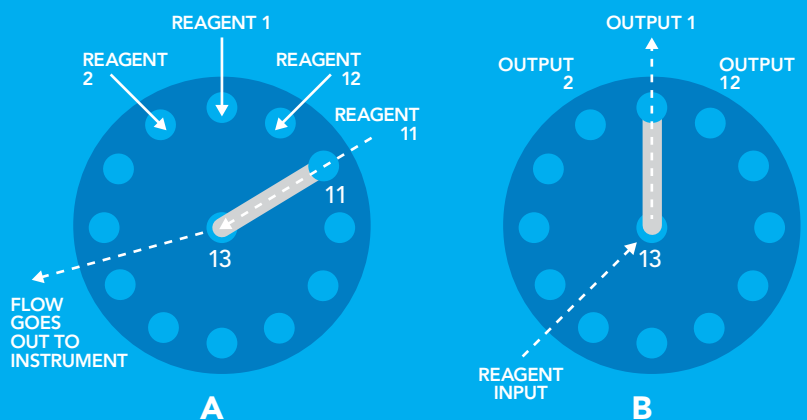
## OPTIMIZED FLUID PATHS

Minimizes pressure constrictions, ensures consistent reagent usage, and eliminates reagent crossover concerns.



## BIOCOMPATIBLE MATERIALS

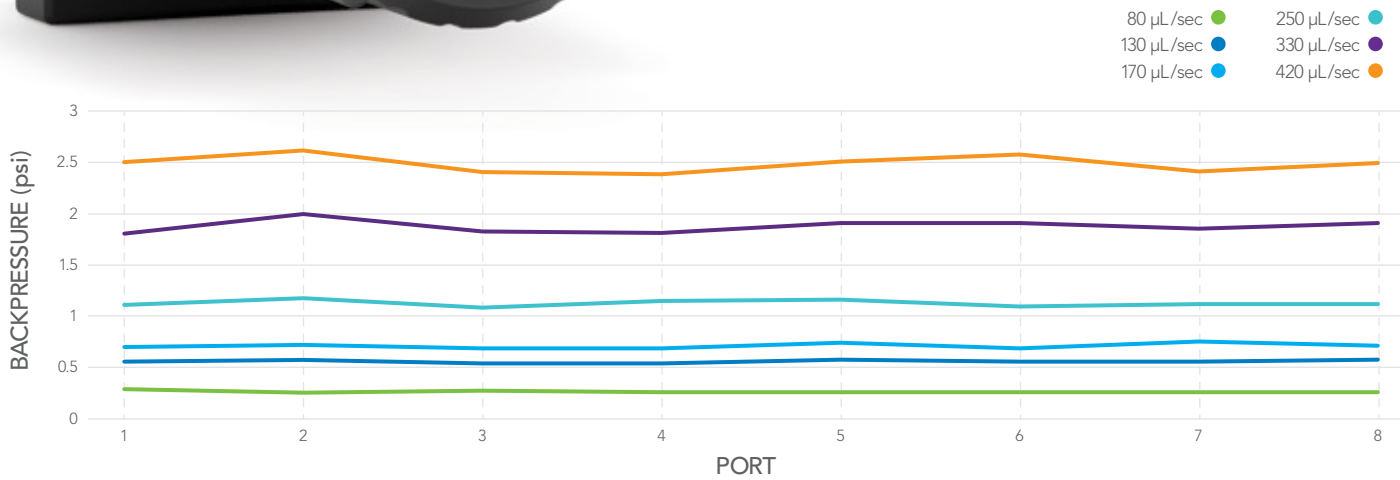
Ensures a metal-free, ion-free pathway with full pH range compatibility.



**Figure 1.** Selection valves offer the discrete connection of multiple fluids to a common center outport (A) or can be used to direct fluids to different flow paths in the instrument (B). All valves are customizable to your specific fluid distribution needs, whether integrated on a push or pull flow system. Customization information can be found on page 8.

# 8/9 & 12/13 Valves

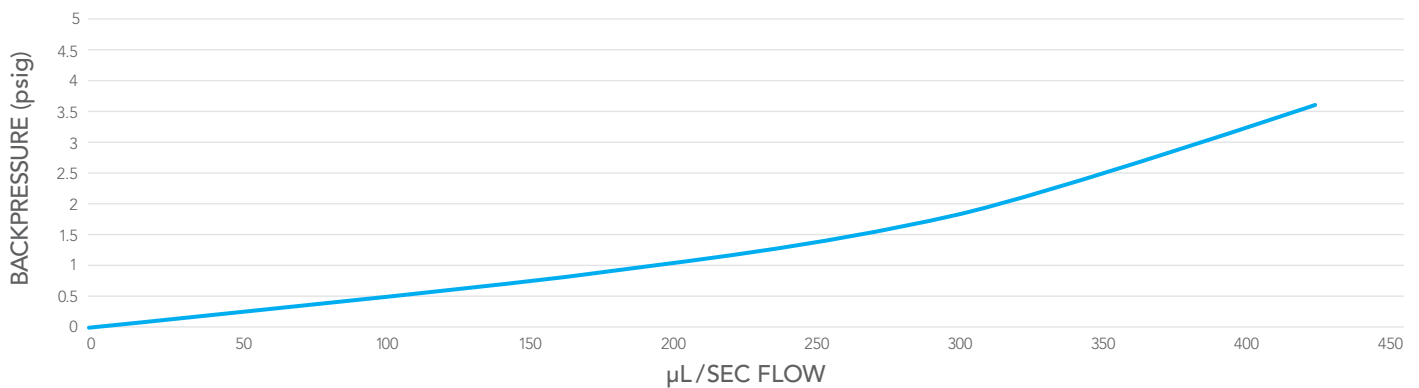
Designed and tested to ensure reproducibility, our TitanHP 8/9 (8 positions/9 ports) and TitanHP 12/13 (12 positions/13 ports) valves deliver predictable performance in instruments distributing reagents in low numbers. The valve flow path is optimized to reduce system pressure and includes a pre-mounted PCB board for seamless system breadboarding with our complimentary Python® based IDEX Health & Science Library.



**Figure 2.** All selector valve designs are thoroughly tested to ensure best in class port-to-port reproducibility. As demonstrated, regardless of the flow rate selected (80 µL – 420 µL/sec, 20 – 22°C, 1X PBS), all ports on the TitanHP 8/9 valve offer consistent, reliable fluidic distribution, giving you confidence even in your most challenging applications.

# 24/25 Valve

A proven workhorse, our TitanHT 24/25 (24 positions/ 25 ports) valve is integrated into leading multiomic applications, including next-generation sequencing (NGS), flow cytometry, and spatial biology systems. A perfect choice for instrument developers requiring a high number of reagents distribution, this valve handles up to 24 different fluid lines. TitanHT includes a free-standing PCB board for simple system integration allowing clockwise and counterclockwise valve movements.

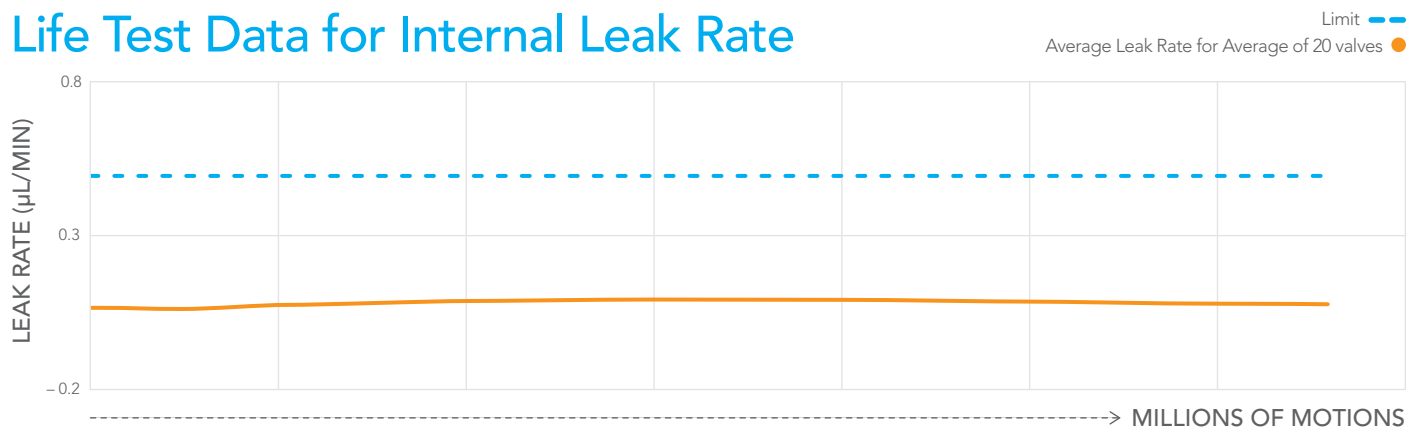


**Figure 3.** Understanding the relationship of valve backpressure to flow ensures you meet the pressure requirements for your system design. This chart represents the relationship of flow and backpressure, tested at 20 – 22°C with a 1X PBS solution. Should you have requirements that necessitate lower backpressure at higher flows, contact us for a custom valve solution.

# Valve Performance

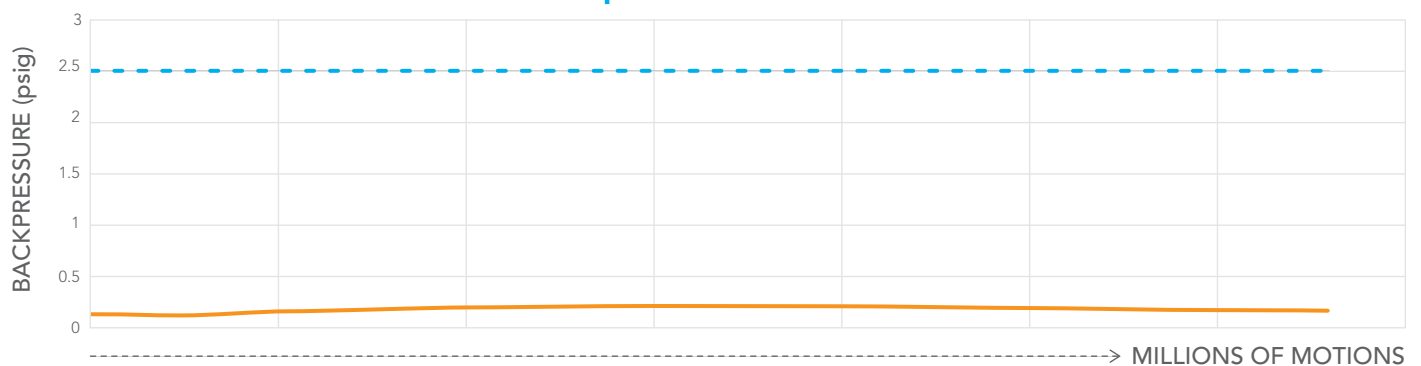
Meticulously designed to ensure proper gear movement, IDEX Health & Science valves provide robust actuation and years of maintenance-free operation. The sealing surfaces of the valve create a chemically inert pair capable of millions of motions of lifetime. Internal testing with 1X PBS solution at a controlled flow rate shows our valves exhibit low leak rates and minimal pressure changes over millions of actuation cycles.

## Life Test Data for Internal Leak Rate

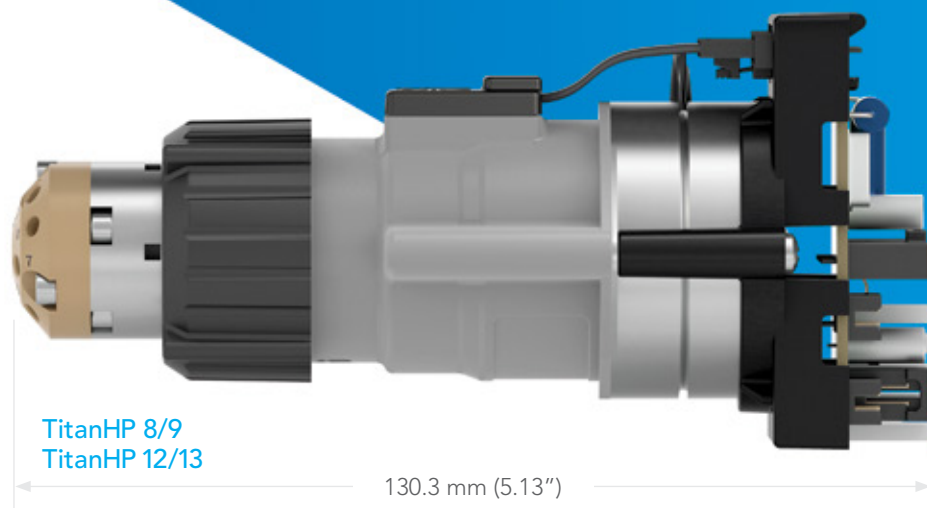
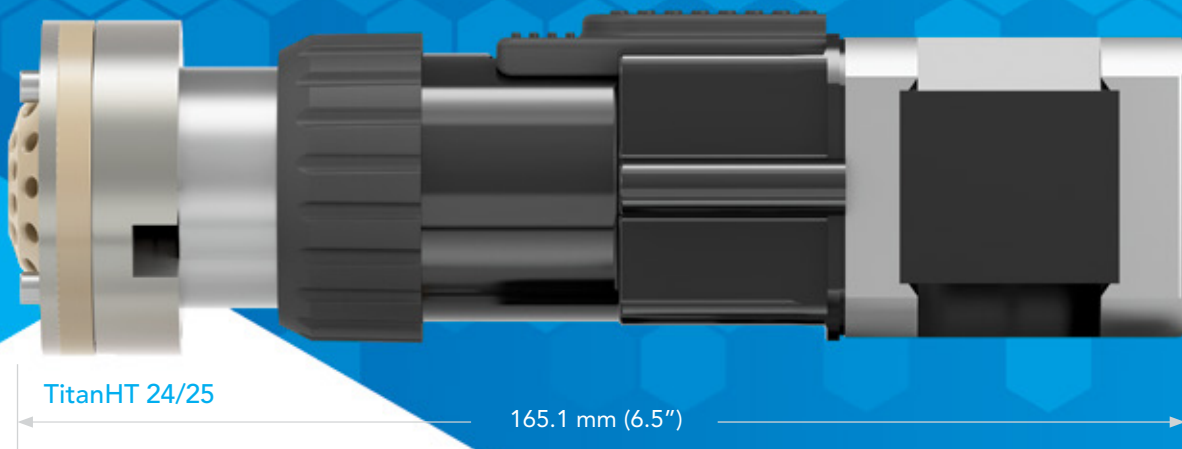


**Figure 4.** During development valve sealing materials are tested to ensure long lifetime and robust performance. This graph illustrates the average of 20 valves cycled with a 1X PBS solution over millions of cycles. Interval testing looks for internal port-to-port leakage. The rugged sealing surfaces did not suffer from scoring or internal leak failures over the course of the run.

## Lifetime Test Data for Backpressure



**Figure 5.** Our valve development process tests the durability of sealing surfaces for blockages that can increase system backpressure over time. From this plot of the average of 20 valves cycled with a 1X PBS solution at 80 µL/sec over millions of cycles, it is seen that there are minimal increases to the system backpressure, demonstrating material ruggedness and performance.



	MHP7790-002-3 Valve (TitanHP 8/9)	MHP7790-002-5 Valve (TitanHP 12/13)	HT2425-915-3 Valve (TitanHT 24/25)
Number of Ports	9	13	25
Number of Positions	8	12	24
Length*	130.3 mm (5.13")	130.3 mm (5.13")	165.1 mm (6.5")
Width*	56.85 mm (2.2")	56.85 mm (2.2")	57.3 mm (2.3")
Weight*	90 g	90 g	294 g
Liquid Contact Material	PEEK, RPC-7**	PEEK, RPC-7	PEEK, RPC-7
Swept Volume*	5 µL port to port	5 µL port to port	5.5 µL port to port
Liquid Connection	6-40 UNF-2b Male Threaded Fittings	6-40 UNF-2b Male Threaded Fittings	6-40 UNF-2b Male Threaded Fittings
Motor	7.5 Degree Stepper, 13 ohm	7.5 Degree Stepper, 13 ohm	1.8 Degree Stepper, 12 ohm
Max Pressure*	276 kPa (40psi)	276 kPa (40psi)	276 kPa (40psi)
Includes PCB	✓	✓	✓
RoHS-Compliant	✓	✓	✓
REACH Compliant	✓	✓	✓
Power Consumption Actuation Typical (Max)	2 Watts Typical / 5 Watts Max	2 Watts Typical / 5 Watts Max	12 Watts Typical / 48 Watts Max
Power Consumption Holding	0 Watts	0 Watts	0 Watts
Biocompatible, Metal Free Flow Path	✓	✓	✓
Compatible with Bleach Cleaning Solutions (~6% NaClO)	✓	✓	✓
Organic Solvent Compatibility	MeOH, ACN, IPA	MeOH, ACN, IPA	MeOH, ACN, IPA

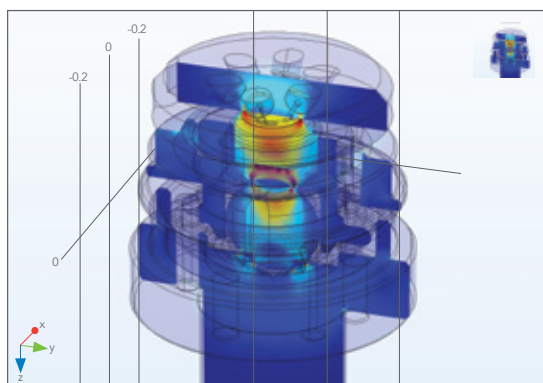
\* Represents nominal value.

\*\* RPC-7 is an IDEX Health & Science-specific engineered polymer combination compatible with most common life science application reagents.

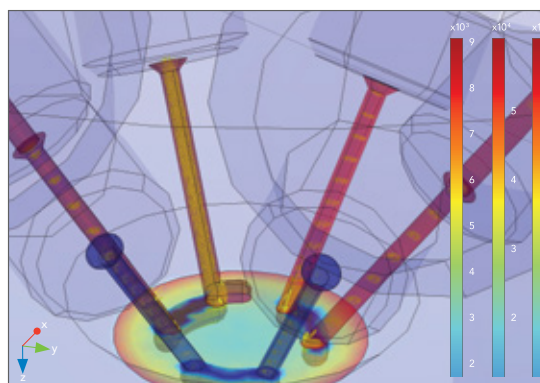
# Customization for Your System



Our design team works with you to develop an optimized valve for your system. Using state-of-the-art modeling systems and computational fluid dynamic (CFD) software, we design for minimum reagent usage and maximum lifetime. Seals are fully customized to direct fluid as required across your platform, and passage sizes are optimized for flow needs. A wide range of materials provides the flexibility to design for cost and performance.



**Figure 6:** Slice von Mises stress (psi);  
Surface von Mises stress (psi)



**Figure 7:** Surface pressure (psi); Surface shear stress (psi);  
Arrow volume velocity field (spatial frame);  
Surface contact pressure (psi).

**The diagrams left are computational models simulating fluid flow rate, pressure, forces, and mechanical stress run on complex flow paths.**



# Manifold Mount Customization



For instrument engineers looking to reduce the amount of tubing, installation time, and servicing points on their platform, valves can be mounted conveniently to a bonded or cross-drilled manifold. Our design team works with you to create a custom manifold that meets your fluidic needs, considering your pressure and material compatibility concerns. Manifolds can integrate other fluidic components, such as degassers, sensors, probes, or pumps.

Designs can be verified with computational fluid dynamic (CFD) modeling for proactive fluid analysis of your custom design.

Typical characteristics we look for include:

- › Backpressure
- › Fluid forces
- › Mechanical stress
- › Dilution
- › Unswept volume
- › Cross-contamination

# Valve Parts & Accessories

## Fittings

M-644-03 nut and M-650 ferrules.

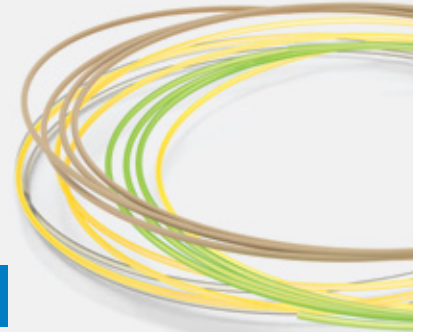


[Shop Fittings](#)

[Shop Ferrules](#)

## Tubing

For use with tubing ODs of 1/16".



[Shop Tubing](#)

## Plugs

Our P-558 green plugs are designed to close off unused ports in valves and multi-port connectors.



[Shop Plugs](#)

## Torque Wrench Tool

Our N-291 extended tool torque wrench is designed to ensure a strong connection.



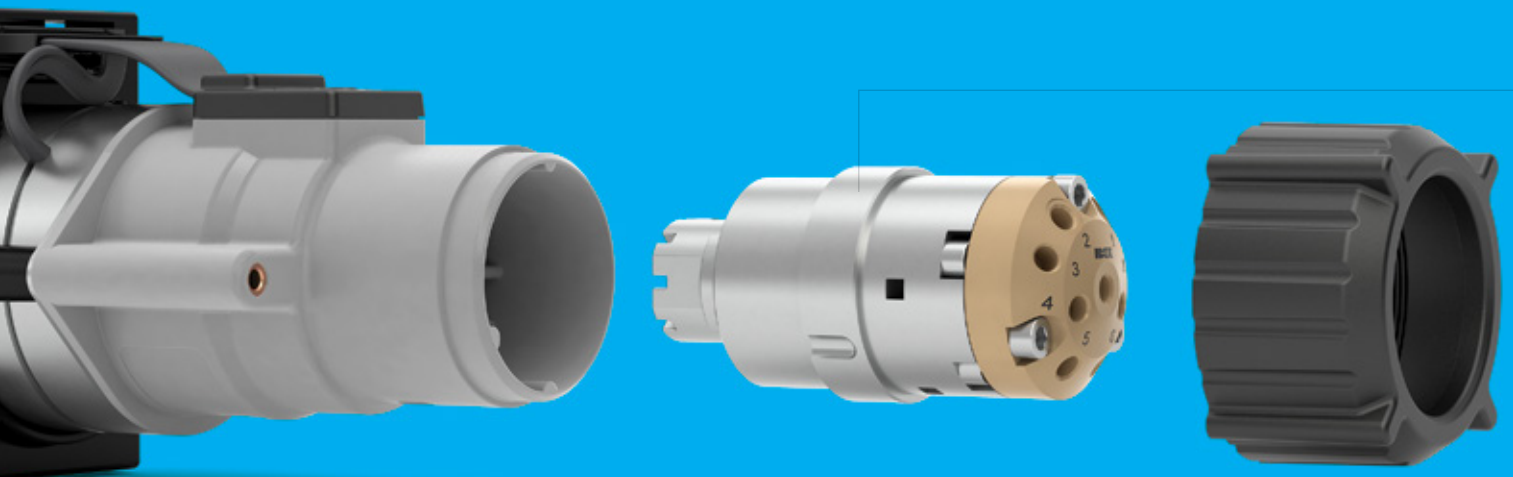
[Shop Wrench](#)

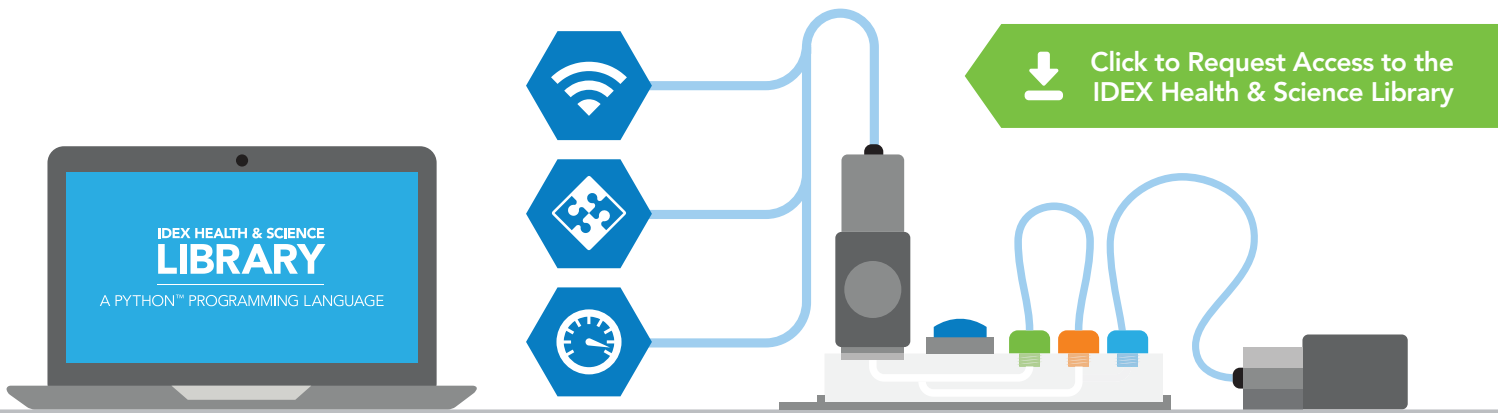
## Bracket

Optional Bracket for the HT2425-915-3 PCB board (part number 3618042).

## TitanHT Demo Kit

Includes cables and power supply (part number 7770-052).





# IDEX Health & Science Library

Programming and integrating fluidic hardware components can be a major time burden. Without devoted resources and a specialized team to handle the coding necessary for complex tasks and equipment functions your instrument development schedule may be unnecessarily delayed. Configuring hardware and interactions without knowledge of the specific components and compatibility may seem daunting and challenging. Overcome these hurdles with our complementary Python® based IDEX Health & Science Library.

## Benefits of the IDEX Health & Science Library

- › Powerful syntax, easy to use for fast development
- › Allows for complex logic programming and data processing
- › Simplified out-of-the-box experience for quickly programming IDEX pumps, valves, degassers, and sensors
- › Fast edit-test-debug cycle

## Rapid Replacement Pods for Standalone Valves

Replacement pods are exchanged easily during scheduled preventive maintenance or in an emergency. A pod is substituted quickly while the original is examined and maintained at your convenience. The pod kit contains complete instructions for removal and replacement.

### RAPID REPLACEMENT PODS FOR STANDALONE VALVES

HT2425-915-3 Valve	PD2425-900
MHP7790-002-3 Valve	PD7790-101
MHP7790-002-5 Valve	PD7790-103



For ordering, technical support, and contact information  
please visit [www.idex-hs.com/rotary-shear-valves](http://www.idex-hs.com/rotary-shear-valves)