



The most **durable**
and reliable GC valves
on the market

2025 GC VALVES, FITTINGS,
TUBES AND ACCESSORIES CATALOG

CVP | An ASDevices
division

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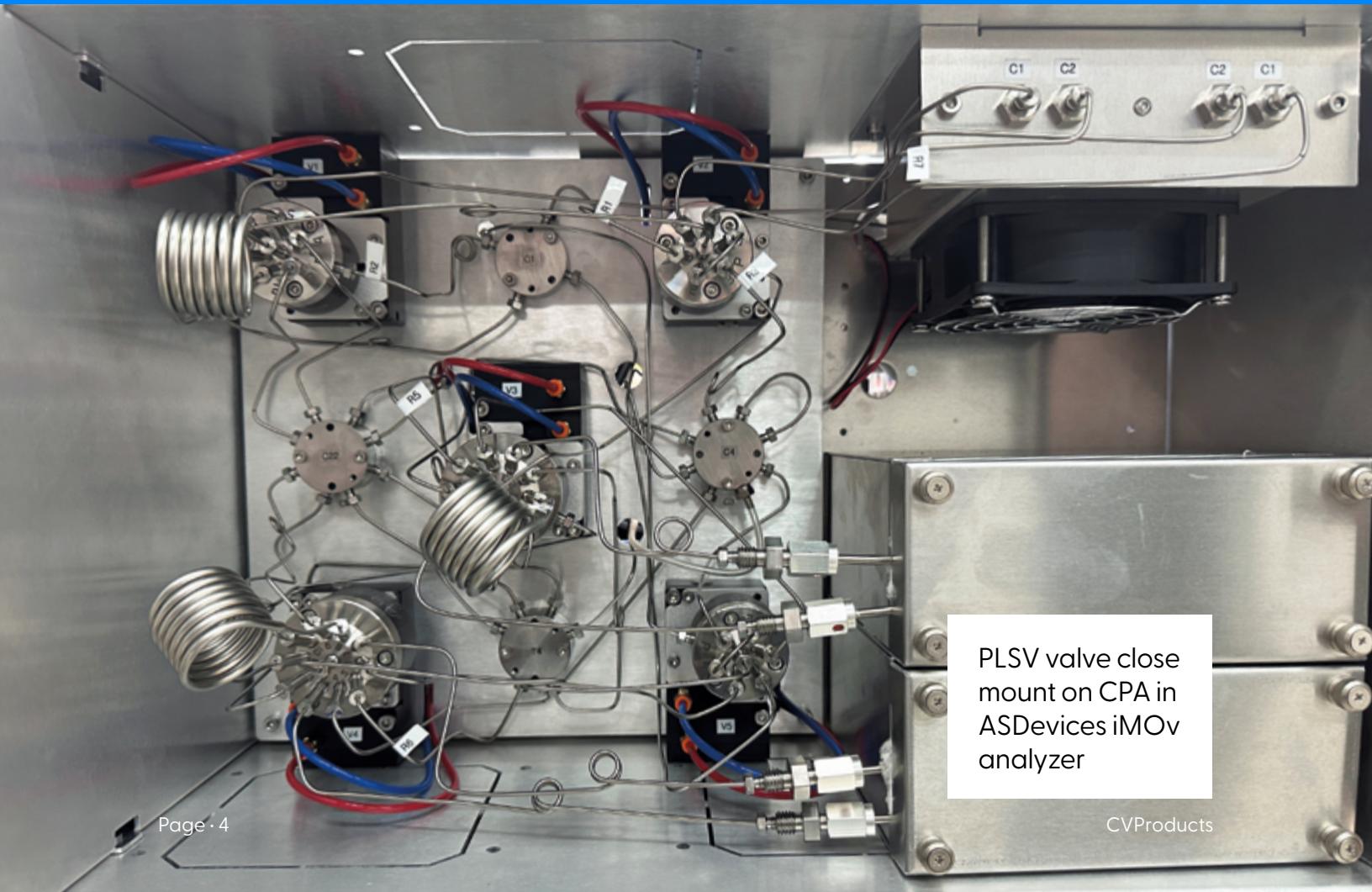
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CVP valve revolution explained

We are proud to show here the best GC valves available today on the market. Yes, the best, based on over 20 years of continuous R&D in the field. If you are not yet an CVP valued customer, most probably you don't get enough for your money! If you are not convinced about this fact after consulting our catalog, contact us and we will send you a free demo valve*, and you will become one of our satisfied customers.

- 4 Our innovations explained
- 5 Purged Lip Sealing Valve (PLSV)
- 12 Purged Pulse Diaphragm Valve (PPDV)

* Some conditions apply. Contact us for more details.



Purged Lip Sealing Valve (PLSV): new rotary valve products

We are pleased to introduce you to our groundbreaking GC valves technologies. The innovation resides not only in our valves' design but also in our patented valves' performance testing method that is used to control the quality at a level that no others can achieve. Indeed, our unique leak testing system has 4 times the sensitivity of a helium mass spectrometer leak testing equipment. We are the only one using this patented system. For more information on our unique leak testing method, read our publication "TN-01: Leak Detection System and Method" available on our website. **100% of our valves are tested during manufacturing.** This is not an option, it's our commitment to quality.



Invented by GC experts

to improve our own GC performance.

We are more than a GC valve manufacturer; we are a provider of ultra-trace purity gas chromatographs (GCs) that needs high quality GC valves. Our reputation was built on reliably measuring parts-per-trillions of N₂ impurities in electronics grade gases for semiconductor manufacturing. Without investing in GC valve R&D, we couldn't have achieved our current performance.

The PLSV is the result of over 20 years of GC valve technology testing, R&D and field validation. It was designed to overcome the valve issues we were facing. We're now making this innovation available to benefit ALL GC manufacturers and improve ALL GC applications. From ultra-trace GCs, to GC-MS and GC-FID for environmental analysis, they all benefit from the PLSV.



The PLSV is the only GC valve that addresses all key issues.

	PLSV	Diaphragm	Conical rotary	Purged Diaphragm	Purged Rotary
Inboard leak protection	✓	✗	✗	✓	✓
Outboard leak protection	✓	✗	✗	✓	✓
Crossport leak protection	✓	✗	✗	✗	✗
No unswept volume	✓	✗	✓	✗	✓
Low friction*	✓	✗	✗	✗	✗
Stable flow characteristics over time	✓	✗	✓	✗	✓

Diaphragm valve suffer from wearing due to plunger sealing force

* Multiple international patents

Upgrade your GC reliability and performance TODAY!

- **Simply no leaks:** the only purged valve that eliminates inboard, outboard and cross-port leaks
- **Long lifetime:**
 - 3 millions actuations for standard version
 - 5 millions with variable sealing force technology
- **No dead volume:** does not contain unswept volume
- **Constant performance:** across temperature range and lifespan
- **Extended valve head coating lifetime:** thanks to reduced friction technology. The best valve for sulfur applications.
- **Realtime valve diagnostic** avoiding system shutdown. Ideal for critical application like process GC



3-year warranty

Certain conditions apply.

Compatible with ALL actuators!



Now 100% backward compatible with all conical rotary valves and GC ovens!

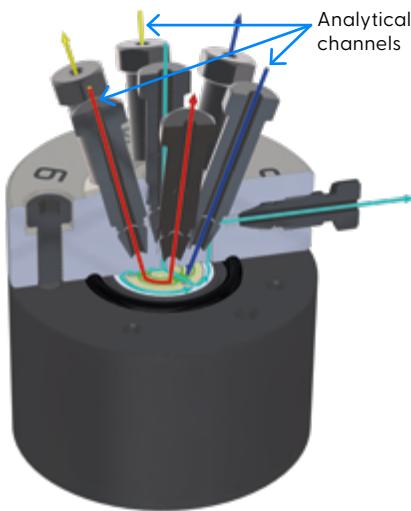
The form factor of the first PLSV valve iteration was optimized for ASDevices GC platforms. It was designed to be compact, with a close mount actuator, and to meet the stringent needs of our GC platforms. We listened to our growing list of PLSV valve customers who were asking us to make it backward compatible with the conical rotary valve form factor. Our customers quickly recognized the benefits of this new technology and were eager to upgrade their existing GCs and standardize on it for future ones.

The form factor, not the technology, was redesigned to be 100% backward compatible with conical rotary valves. It can now fit, without any mechanical modifications, on third party actuators or on our high quality and long lifetime actuators.

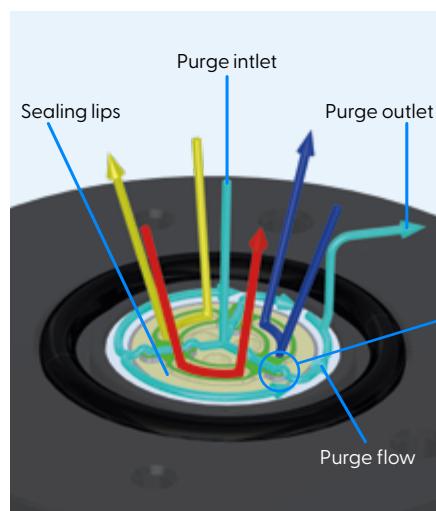
PLSV Purge Principle: leaks are virtually impossible by design

Our series of purged rotary valves, the patented Purged Lip Sealing Valve (PLSV), features our unique purge concept: the ONLY ONE that eliminates all leak types, inboard/outboard and cross port leaks. Our rotary valve product line is the perfect solution for trace and ultra-trace measurement applications when used with our line of detectors (EPD, eFID, ePID and competitors' like DID, PDHID, GC-MS, ECD and IMS have also seen their performance improve). It also improves chromatography by eliminating column pollution from atmospheric contamination. Our valve technology simply improves any applications: from ultra-trace to percentage, not only by elevating the analytical performance, but also by reducing instrument downtime and maintenance. Your instrument will perform for years without needing valve replacement.

6 PORTS PLSV VALVE



6 PORTS VALVE HEAD



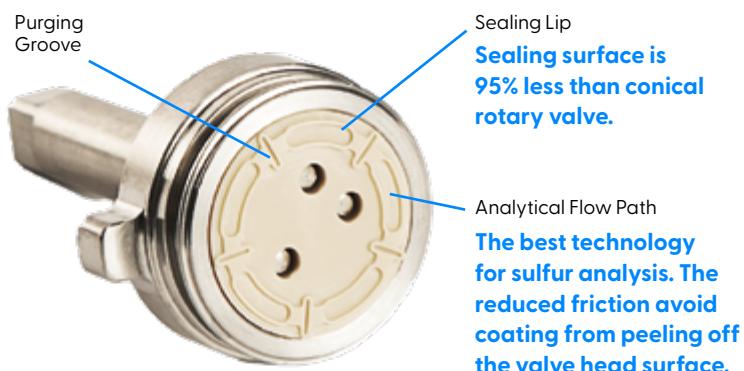
Purge pocket to allow purge flow between ports to eliminate cross-port leaks.

PLSV Rotor with insert: extended lifetime with reduced surface sealing area

In addition to our unique PLSV purge concept is the low friction surface area between the rotor and stator that reduces friction by 95%, compared to a standard commercial conical rotary GC valve. The rotor is an insert where the analytical flow path is embedded inside the volume defined by the sealing lips. Only the surface of the sealing lips is moved and pressed against the valve head, therefore dramatically reducing the friction and the torque required, resulting in extended lifetime and better sealing. This reduced friction also improves the lifetime of our valves with treated valve heads. With our technology, valves treated with coating for trace sulfur analysis, have longer-lasting coating due to reduced friction as it does not peel and doesn't create particulates.

This leads to a very low wearing of the insert, which translates into an extended lifetime, never achieved before with other GC rotary valves available on the market. Our PLSV valves, which have now exceeded 2 million actuations without any change in chromatographic performance, are still in use. This allows us to offer the best warranty on the market: a 3-year warranty. We are the only ones that can offer this.

Our rotary PLSV valves portfolio offers various configurations like the standard switching valve, available from 4 to 14 ports, the internal low-volume sampling loop switching valve and the sample stream selection valve. Our valves are offered with different inserts and valve head materials to accommodate temperature and chemical compatibility requirements as well as various port sizes to suit your chromatographic columns and carrier flow rate.



Trap and Release Valve

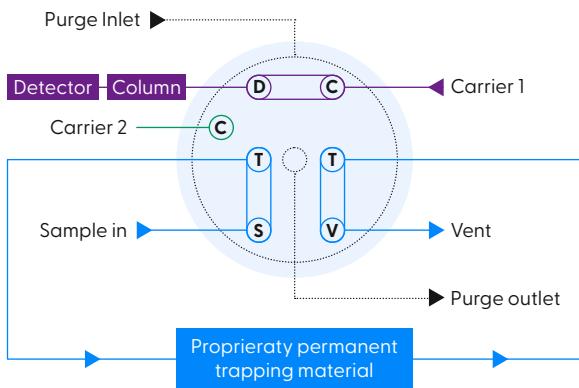
We are also offering a special valve configuration called the “trap and release” flow path. This unique valve configuration is designed to be used with our high-precision multi-position actuator. The valve embeds 4 steps: trapping, sample matrix venting, trap isolation and release. This valve is also available in a medical-grade version for exhaled breath analysis and similar applications.

This unique PLSV technology implementation is used in our patent pending sample concentration method to concentrate and isolate the impurities from the sample background while preserving their integrity.

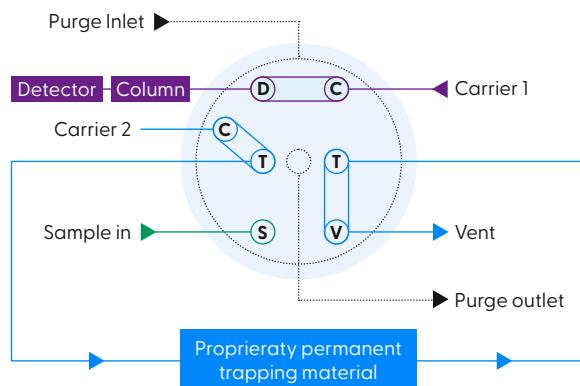


One valve with embedded 4 steps sequence

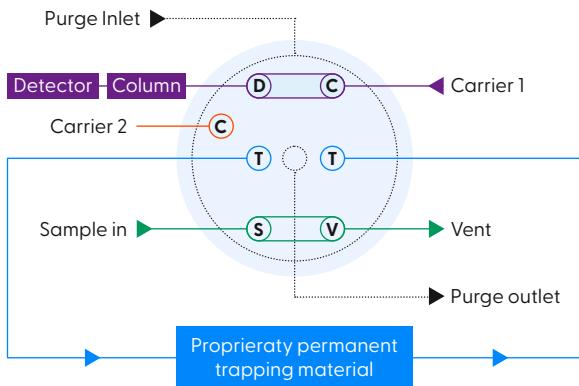
Step 1 – Sampling



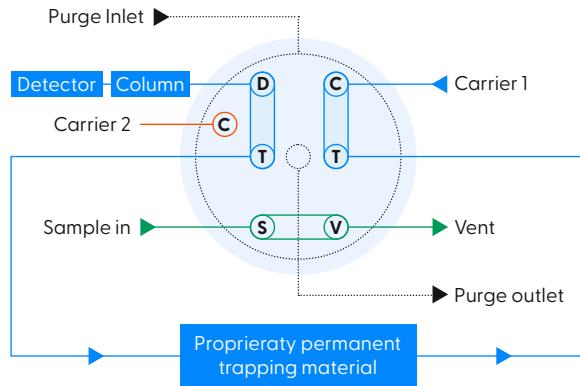
Step 2 – Vent



Step 3 – Isolate



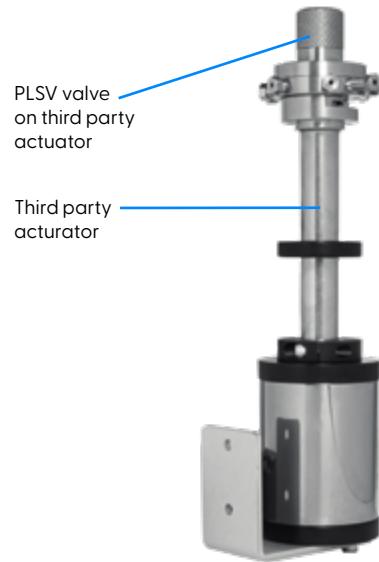
Step 4 – Release



To know more about our unique sample concentration method, see [AN-11 on our website](#).

PLSV Valve on third party actuator

Realizing the great benefits of our valve concept, many of our customers wanted to upgrade their existing GC featuring standard conical valves and pneumatic rotary actuators. This upgrade must be done without doing any mechanical modifications to reduce the instrument downtime. This is why we've introduced a direct drop-in replacement valve. So, when comes the time to replace the standard conical valves (in some cases, customers had to replace their conical rotary valves 3 times over a single year of operation), clients can mount our valves directly on the existing pneumatic rotary actuator and screw back the tubing and fittings in place. The port configuration is the same, so no retuning is needed and your instrument will now benefit from all our enhanced performances. Only the purge connection needs to be done and this is a low-cost and straightforward procedure.



Purged Lip Sealing Valve (PLSV) accessories

We are offering Compact Pneumatic Actuator (CPA) and Compact Electrical Actuator (CEA) for switching valves and Multi-Position Actuator (MPA) for sample stream selection and trap and release valve configurations. There is also a manual handle available for manual actuation. All our actuators are designed for an extended lifetime.

Compact Pneumatic Actuator (CPA)



Compact Electrical Actuator (CEA)

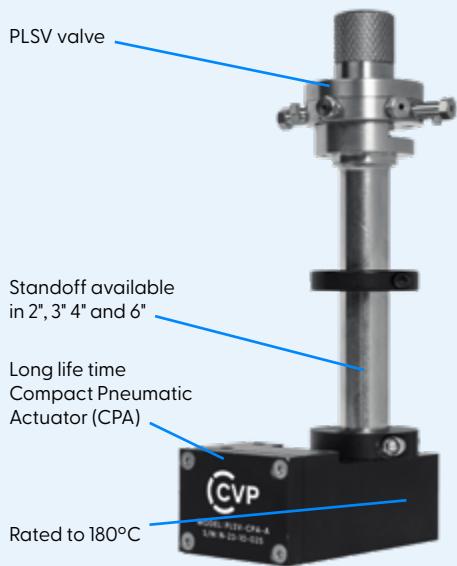


Multi-Position Actuator (MPA)



Manual Actuator





PLSV Valve with CPA and Standoff

Valve standoffs of various lengths are also available for installation inside an oven and housing. The actuator is mounted outside in such a case, at ambient temperature.

For those wanting a compact integration inside an oven, our CPA actuator can tolerate continuous temperatures up to 180°C. This is another innovation that allows the simplification of GC designs.

Our CPA actuator was also developed to allow a **close mount installation** for compact integration, like a diaphragm valve. Many of our customers are migrating their diaphragm valves for our PLSV with CPA due to its multiple benefits.

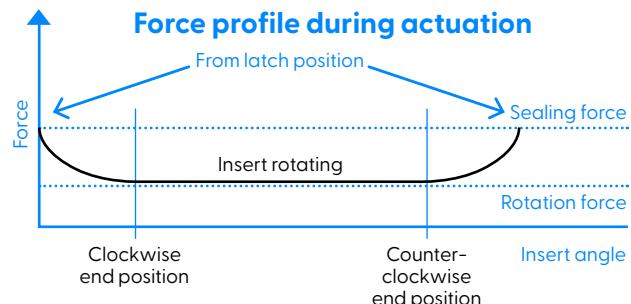
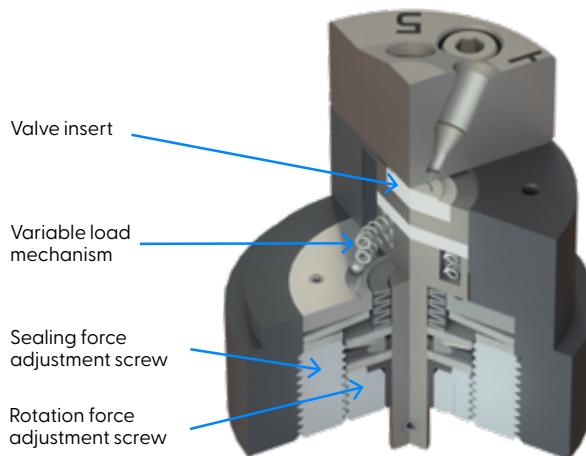


Wear-Proof Actuator (WPA): continuously pushing the limits!

And finally, we are proud to release a new type of actuator targeting extremely long valve lifetime for gas chromatography applications, and for HPLC.

It is a well-known fact that using a conical valve at high temperatures results in premature failure. Indeed, at high temperatures, stress on the valve rotor is much higher and friction force is also higher. The torque required to operate the valve is also much higher. The valve will eventually fail by becoming locked in place because the rotor becomes stuck to the stator or, the rotor material will peel off and coat the stator's conical metallic surface. This leads to a major leak and complete valve failure.

Our wear-proof actuator (WPA) is a revolutionary frictionless actuator mechanism with an adjustable sealing force. The sealing force is changed during actuation. When the final position is reached, the mechanism is latched in position.



HPLC applications

Our wear-proof actuator (WPA) is ideal for HPLC application. Indeed, the high pressure involved in such an application calls for a high sealing force, increasing the wearing. Our WPA could be adapted between the standard third-party actuator and an HPLC valve head. This increases the usable lifetime by, at least, a factor of two.

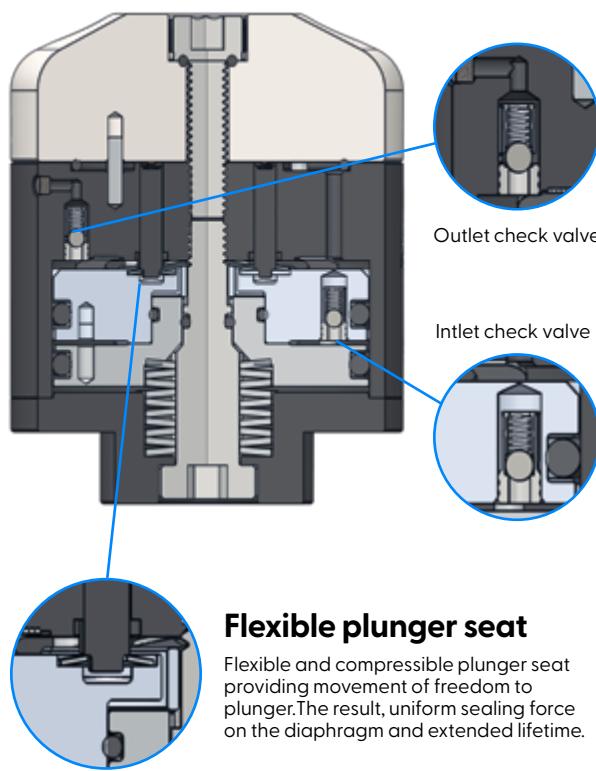
Patented

Purged Pulse Diaphragm Valve (PPDV) Technology

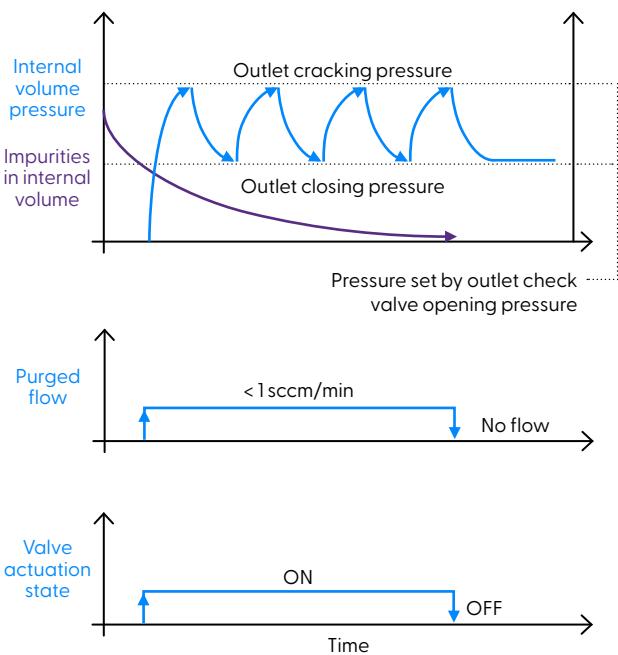
With our continuous innovation mindset, we have redesigned the existing principle of the diaphragm base GC valve technology. A concept that we invented two decades ago and that we have kept improving continuously. This is a purged valve that doesn't require any external tubing connection to allow purge gas to flow into it.

Instead of the competition's continuous purge gas flow design, which consumes gas continuously, our innovative PPDV valve uses a pulse scheme, also known as a static purging process. With our PPDV valve, the actuation gas and the purge gas are the same. As it is common practice to use the carrier gas for valve actuation, the valve's internal volume is continuously purged with that gas. The actuation pressure requirement is 65 PSIG.

Internally built into the valve body, there is a flow restrictor and two check valves having preset opening cracking pressures.



Static purge principle

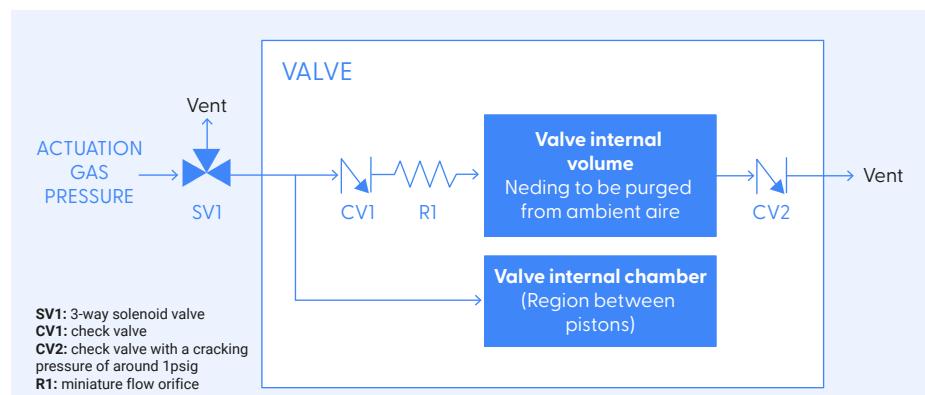


After a few actuations, all atmospheric air is evacuated out of the system. This process efficiently eliminates any outboard/inboard leaks and also any leak that can permeate through the diaphragm.

A drawback of the existing valve design offered on the market is due to a small length difference from plunger to plunger causing

some leaks through a closed port. In our proprietary design, each plunger is seated on a stack of Belleville washers to offer a flexible mechanism. This principle makes sure that we compress at the right required sealing force upon actuation. Our innovative design eliminates the problem associated with the tolerance of the length between plungers.

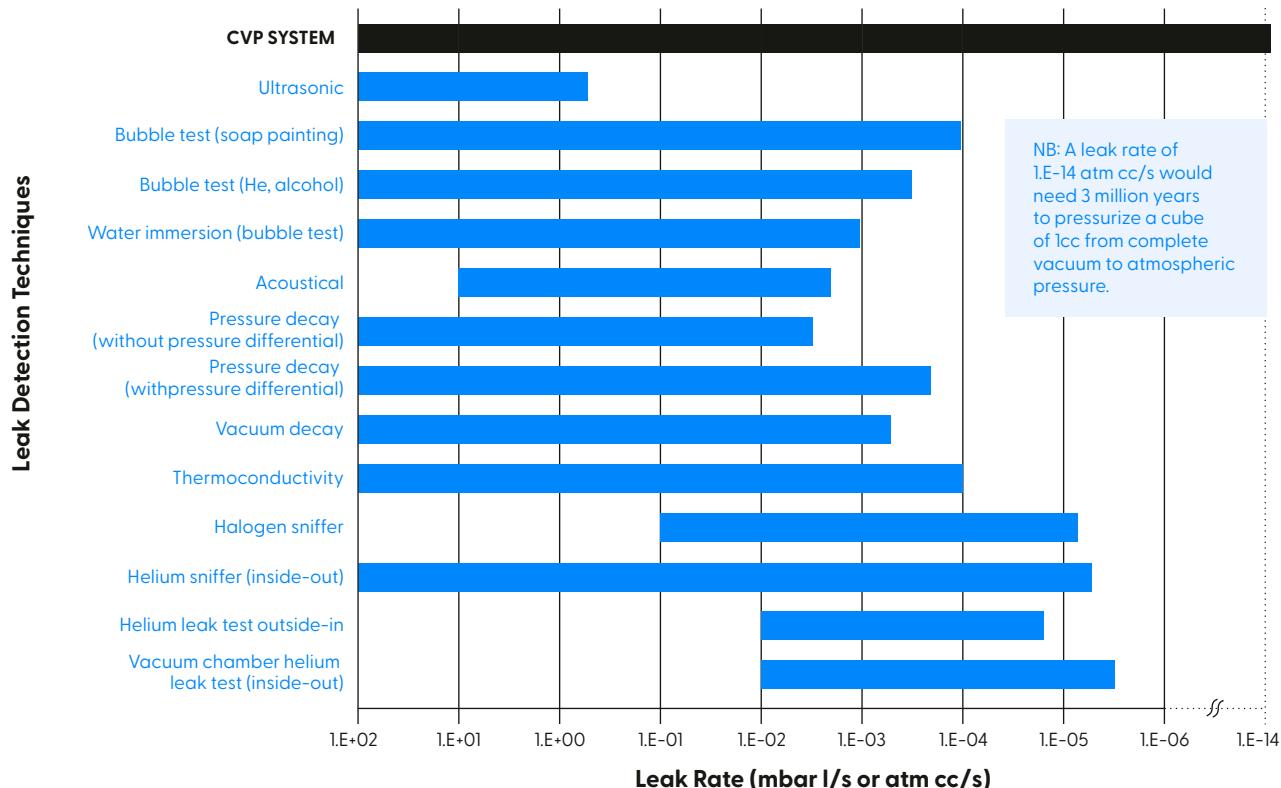
Upon injection, all the plungers are momentary down for a fraction of a second allowing the sweeping of the dead volume between ports. Therefore, upon valve actuation release, there will be no unwanted re-injection of any sample trapped into this dead volume.



Leak detection system for Quality Control Patented

100% of our valves are tested for leak integrity (inboard, outboard, cross port) and performance. We test our valve leak integrity to such high standards that we even had to develop our own leak testing methodology as existing tools, such as helium leak detectors, are not sensitive enough.

Our technology is called pressure stepping plateau leak detection method and it is based on our patented Enhanced Plasma Discharge (Epd) technology, known to be highly sensitive to traces of N₂. This method is based on using N₂ as a tracer gas. N₂, having 4 times less viscosity than helium, achieves a much better sensitivity for capillary leak type. Our system has 4 times the sensitivity of a helium mass spectrometer base leak detection device.



Our roots

In 1992, our CEO Yves Gamache developed the plasma emission detector (PED) which is the predecessor of our new Scalable Enhanced Plasma Discharge Detector (SePdd) that is revolutionizing the industry. Our sensing technology, which rapidly became a standard for ultra-trace N₂ analysis at the ppt level, led to the development of the most advanced ultra-trace gas chromatograph in its field, especially for the semiconductor industry. We have made our reputation with our ability to detect ppt N₂ and Ar in various sample matrices by chromatography. This could not have been achieved without a journey that we began well over 20 years ago.

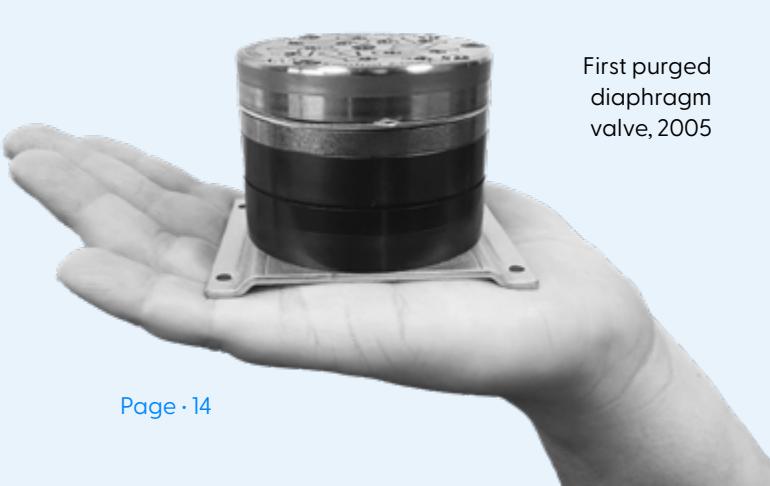
At the time, the existing valve technologies were not cutting it for our target market: ultra-trace gas analysis, more specifically, sub-ppb trace N₂ analysis in bulk electronics gases. It resulted in many problems with the existing valves offered on the market and not meeting the requirements of our highly demanding customers.

The valves then available on the market were the weak link in our GC design. It has been and is still the weak link for many chromatographers who still rely on older technologies such as the conical rotary valve.

Commercially available conical rotary valves were simply not adequate in terms of lifetime and leak integrity and still are. Commercially available diaphragm valves offered better lifetime but still, leak integrity and pressure/flow characteristics caused by the change in the diaphragm shape were a problem.

We used our expertise to design the revolutionary CVP chromatographic valve portfolio to be cost-effective, of high quality and to improve any GC applications. Our valves are designed to overcome the issues we were facing before as chromatographers; the same one you are facing:

- **Leak integrity issue;**
- **Early valve failure;**
- **Pressure / flow characteristics change over time;**
- **Constant performance, regardless of the temperature;**
- **Unswept volume.**



First purged diaphragm valve, 2005

Our valves revolution throughout the years

2003

Begin R&D to innovate in GC valve technologies

2005

Release first commercial GC purged diaphragm valve that eliminated inboard leaks

2007

Release first commercial sample selection valve that eliminated inboard leaks

2010

Release first commercial GC purged rotary valve that eliminated inboard leaks

2018

Release PLSV technology first chromatographic valve to eliminate all possible leak sources

2021

Development of wear-proof actuation mechanism

2023

New PLSV valve compatible with third-party actuators

Our valve collection at a glance

PLSV Series		PPDV Series	
Rotary Valves		Diaphragm Valves	
<ul style="list-style-type: none">Switching and Injection<ul style="list-style-type: none">With Side FittingsWith Top Fittings100% conical rotary compatible versionSample Stream SelectionTrap and Release	<ul style="list-style-type: none">Compact Pneumatic Actuator (CPA)Compact Electrical Actuator (CEA)Multi-Position Actuator (MPA)Manual Actuator (MA)	<ul style="list-style-type: none">Wear-proof ActuatorStandoff	<ul style="list-style-type: none">Switching and Injection
    	   	 	
			Tubes and fittings
			<ul style="list-style-type: none">Analytical TubesCompression FittingsAnalytical Fittings
			  

Purged Lip Sealing Valves (PLSV)

The most reliable and durable GC valves

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Our patented compact Purged Lip Sealing Valve (PLSV) is a disruptive analytical valve that offers the best of both worlds: a longer lifetime than a diaphragm valve along with the constant pressure drop and simplicity of a conical rotary valve.

Designed to meet our high standards, this revolutionary technology is based on an innovative purge system and the valve insert's reduced sealing surface area that replaces the traditional rotor. By design, it's impossible for this valve to develop a cross-port leak.

Why upgrade to PLSV valves?

- Reduce detector noise by avoiding carrier gas contamination from air (inboard leak) and sample (cross port leak).
- Extend column lifetime by avoiding air and moisture contamination from air leaks into the valve.
- Reduce maintenance with extended valve lifetime.
- Extend your treated valve head coating lifetime due to our reduced insert and valve head friction surfaces.
- Purge valve with inert gas to capture and safely dispose of hazardous sample leaks.
- Replace both conical rotatory and diaphragm valves.

Features and benefits

- **Simply no leaks:** Unique purge technology eliminates inboard, outboard and cross-port leaks
- **Long lifetime:** Over 2 million actuations in UHP applications due to unique reduced surface area
- **No dead volume:** Internal analytical flow path does not contain unswept volume
- **Constant pressure drop:** No pressure/flow change across temperature range and lifespan.

Valve head mechanical configuration



PLSV valves

Designed for compact mount and replace diaphragm valves

- Analytical ports located on the top
- Compact, optimized to reduce space in your chromatograph.
- Compatible with CPA, CEA and MA actuators
- Available with 1/16" and 1/32" fittings
- Available with 0.03" and 0.016" port sizes

Drop-in replacement for conical rotary valves

- Analytical ports located on the side
- Drop-in replacement for conical rotary valve
- Compatible with Third Party Actuators and CVP CPA, CEA and MA actuators
- Available with 1/16" and 1/32" fittings
- Available with 0.03" and 0.016" port sizes

Materials

We offer our PLSV valves in various materials to suit your application requirements.

Materials available:

- 300 Series Stainless Steel
- Hastelloy
- Inconel
- Monel
- Titanium

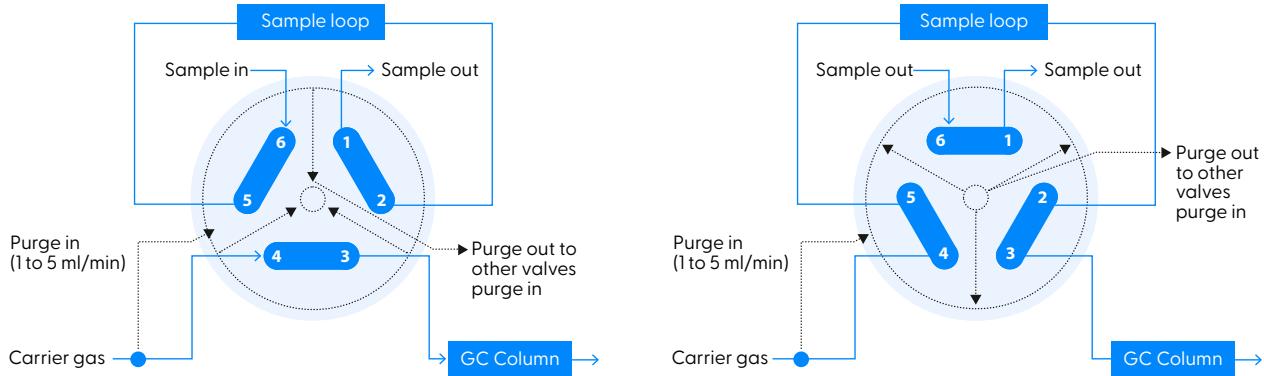
[Contact us for other special valve head material requirements.](#)

Rotor insert flow path configuration and materials

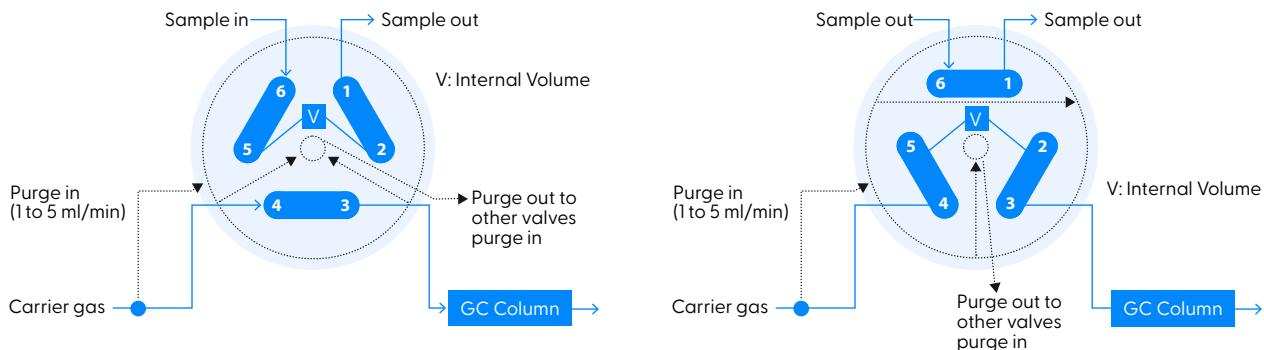
Our PLSV valves are offered with various flow paths, from switching valves to sample stream selection and specialized valves like the Trap and Release model. For simplicity purposes, the examples shown in the next few pages were made with the same purged and carrier gas. However, another gas can be used if it is compatible with the application.

Insert flow path configurations

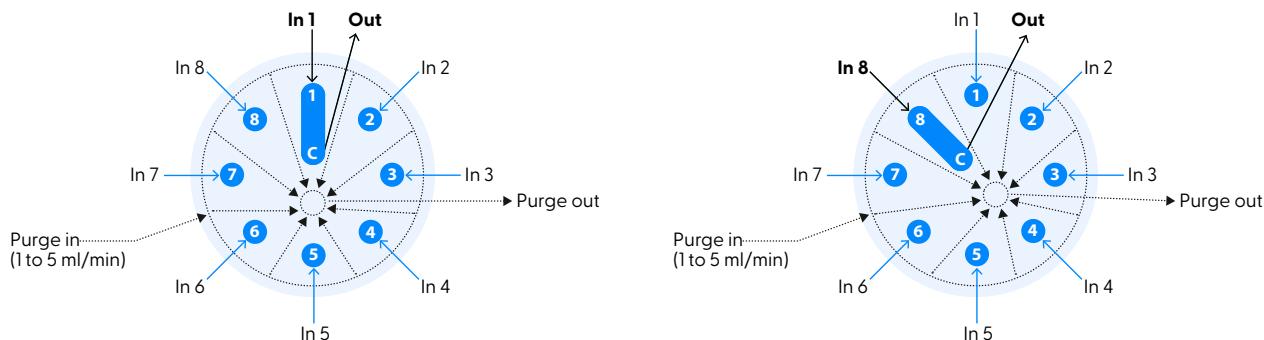
Switching flow path valve example



Internal volume flow path example



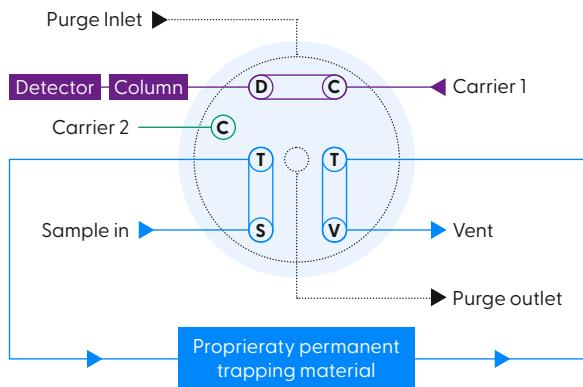
Sample Stream Selection valve example



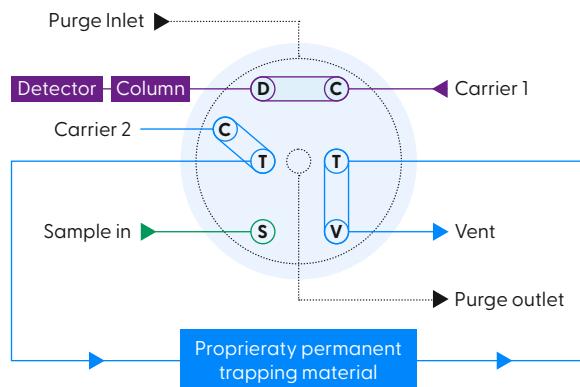
Trap and Release flow path

One valve with embedded 4 steps sequence

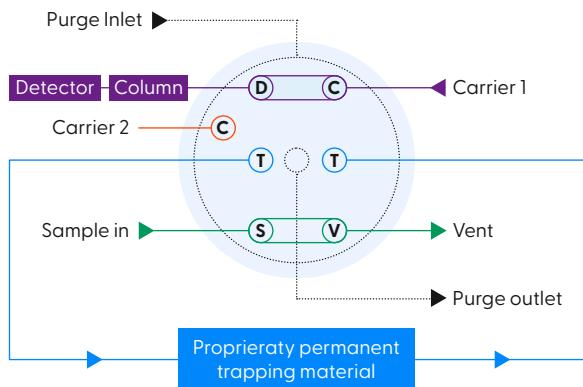
Step 1 – Sampling



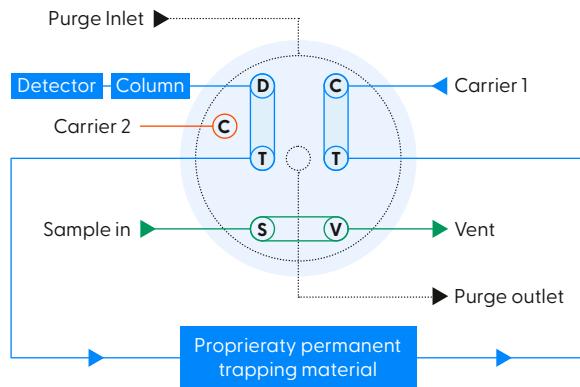
Step 2 – Vent



Step 3 – Isolate



Step 4 – Release



Insert materials

Material	Maximum Temperature Range
PEEK	180 °C / 356 °F
Vespel™	260 °C / 500 °F

Contact us for other material requirements.

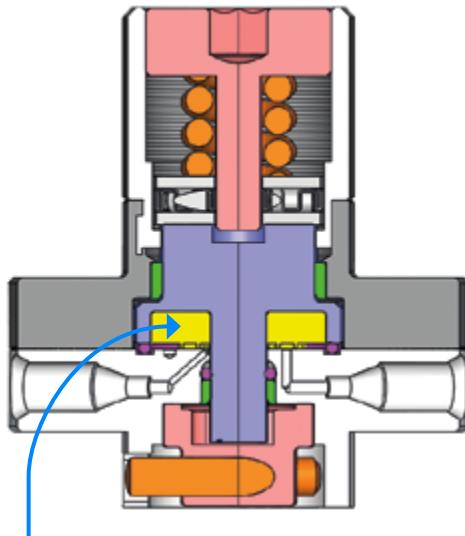
PLSV drop-in replacement for rotary valves



Upgrade your GC performance

Our PLSV technology was designed to improve UHP gas analysis applications, but it also benefits all other applications.

PLSV technology: the secret behind our impressive GC performance



Low friction, long lasting purged
disk rotor

Optimized for compact pneumatic actuator (CPA)

Because third-party actuators failed to fulfill our requirements, we designed a high-quality, long-lasting actuator. It can do over 2,000,000 actuations at extreme temperatures (180 °C) and is built to survive as long as our valves. Upgrade to our CPA for a longer lifetime.

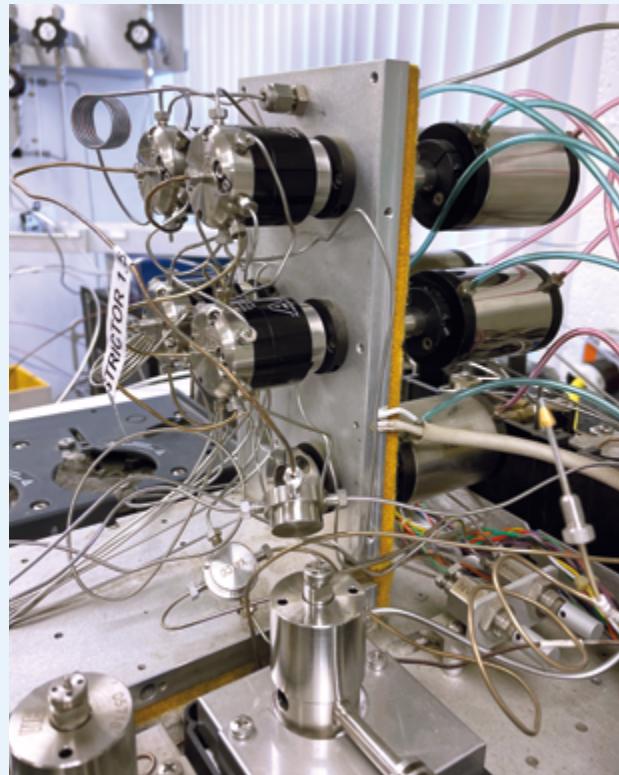
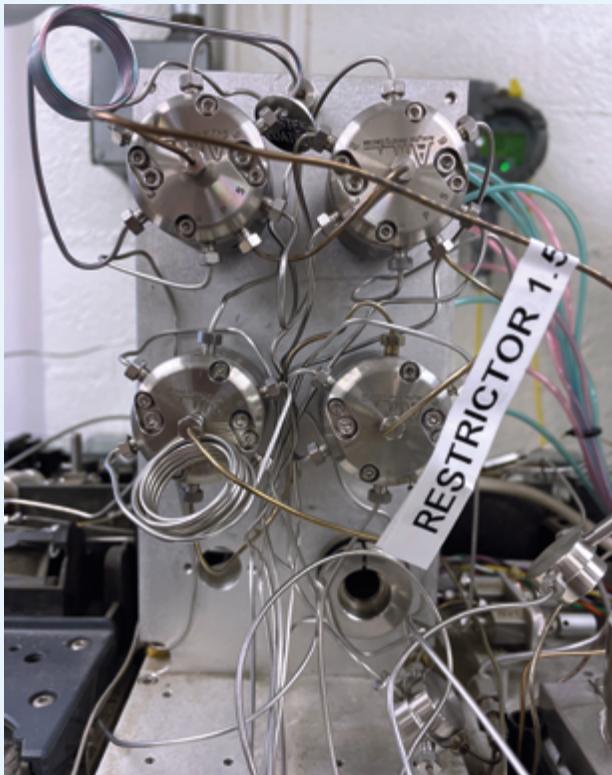




Satisfied customer with our worry-free PLSV valve upgrade

"Thanks again for the valves.
It's nice to see a clean baseline for a change."

– Pete, Senior Product Development Chemist



PLSV valve **actuators**

We are offering a Compact Pneumatic Actuator (CPA) and a Compact Electrical Actuator (CEA) for switching valves and a Multi-Position Actuator (MPA) for sample stream selection and trap and release valve configuration. There is also a manual handle available for manual actuation purposes. All our actuators are designed for an extended lifetime.



Compact Pneumatic Actuator (CPA)

Designed to survive the lifetime of our PLSV valve. It can do well over 1,000,000 actuations and this, even at high temperature (180 °C).

- Compact integration with valve head, alternative to diaphragm valves.
- Can exceed well over 1,000,000 actuations
- Can operate continuously at up to 180 °C.
- 40 to 75 PSIG Actuation pressure range



Compact Electrical Actuator (CEA)

This is the most compact GC valve electrical actuator. Designed to offer the same long-term performance as the CPA, the CEA has been designed for portable application where actuation gas is not available.

- Smallest electrical actuator footprint on the market.
- Can exceed well over 1,000,000 actuations
- Low power, 24 VDC
- Digital dry contact actuation



Multi-Position Actuator (MPA)

Designed for our sample stream selection and Trap and Release valves, this multi-position actuator has been designed to offer high precision with a long lifetime.

- High precision stepper motor
- Position feedback encoder for precision
- Auto-calibration feature
- Available communication: USB, RS-485, Ethernet



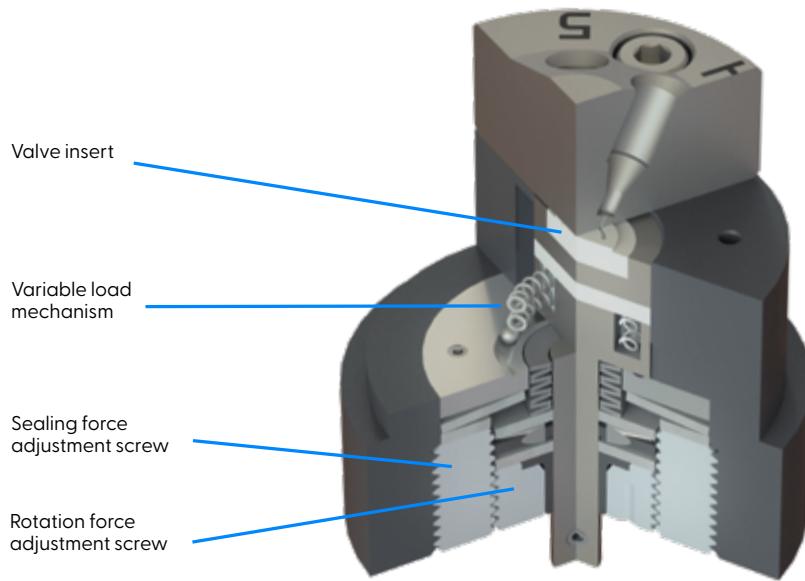
Manual Actuator (MA)

Sometimes, there is no need to automate the actuation. For those applications, we offer a simple, yet robust handle.

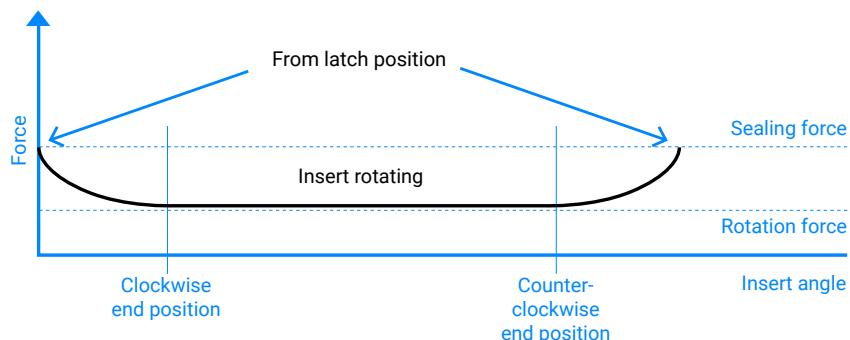
Wear-Proof Actuation Mechanism add-on for PLSV (WPA)

In addition to our long-lifetime actuator, we are offering an optional PLSV valve with a built-in variable sealing pressure mechanism. This revolutionary frictionless actuator mechanism, located inside the valve body, has an adjustable sealing force. The sealing force is changed during actuation. When the final position is reached, the mechanism is latched in position.

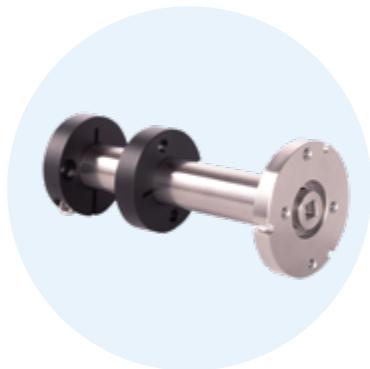
This results in less wearing and thus much longer lifetime for highly critical applications.



Force profile during actuation



Other PLSV accessories



Standoff

For applications that require the actuator to be separated from the valve body, we offer a comprehensive line of standoff from 2" up to 6".

5 ways PLSV makes a difference

1

Eliminating air pollution benefits all GC applications, regardless of measurement ranges

Problematic

Air contaminant such as H_2O and CO_2 are contained in any air ingress. Those contaminants, even if small, will accumulate in your system and chromatographic columns.

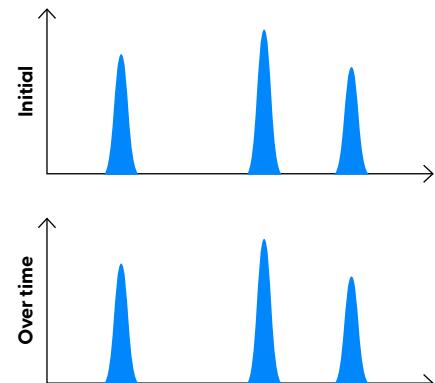
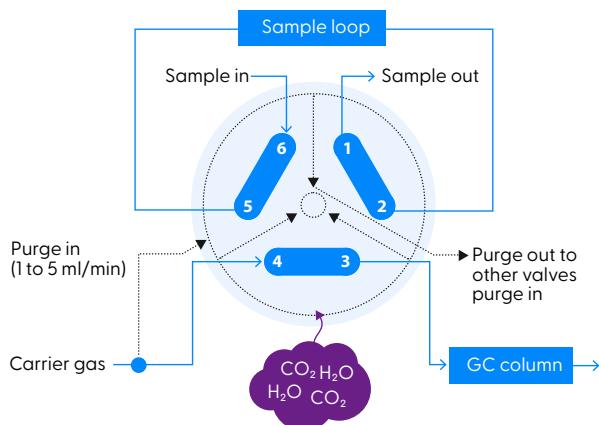
Impact

Your chromatographic system performance will degrade overtime leading to poor results and instrument shutdown.

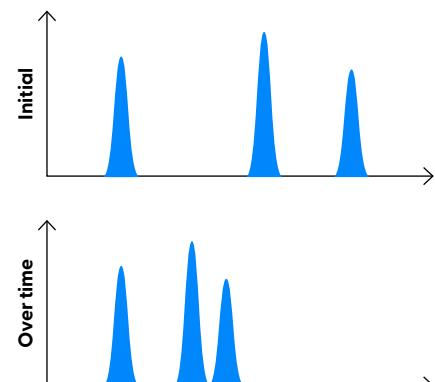
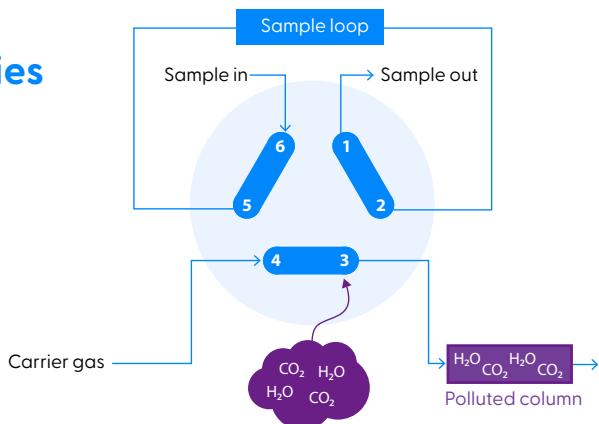
PLSV Benefits

- PLSV shields from all leaks
- Better long-term performance
- More instrument up time
- Less maintenance

PLSV



Other technologies



Applications where the PLSV can make a difference

- Ultra-trace N_2 in electronics bulk gases allows to achieve < 100 ppt limit of detection
- Trace impurities in bulk electronics gases, improving detector sensitivity for all impurities

2

Avoiding carrier gas contamination by cross-port sample gas leaks

Problematic

Sample gas can leak into your carrier gas.

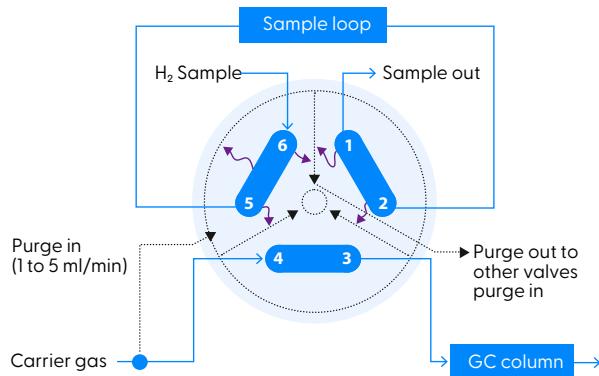
Impact

With polluted carrier gas, your GC system performance will degrade rapidly, impacting analytical performance and lifetime.

PLSV Benefits

- PLSV shield from all leaks.
- Outboard leak impossible. Sample can't leak into carrier gas.
- Less detector noises.
- More stable GC baseline
- No negative peaks cause by carrier gas contamination.

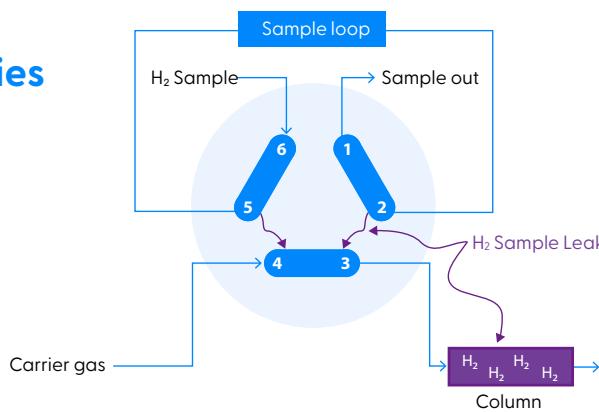
PLSV



Legend

↗ Micro leaks that are captured to avoid impact on GC performance

Other technologies



Legend

↗ Micro leaks that are not captured and therefore impacting GC performance

Applications where the PLSV has made a difference

- **Trace impurities in H₂**, avoiding sample contamination from small H₂ molecules.
- **Trace impurities in bulk electronic gases**, improving detector sensitivity

5 ways PLSV makes a difference

3

Improving safety: isolating, capturing and disposing of hazardous leaks

Problematic

Hazardous samples such as pyrophoric Silane (SiH_4) or other toxic or flammable mixture can leak into your gas chromatograph.

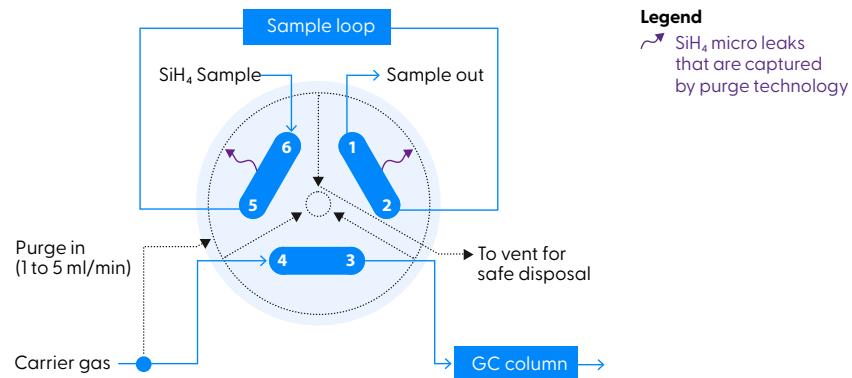
Impact

Such hazardous gas can be a safety issue.

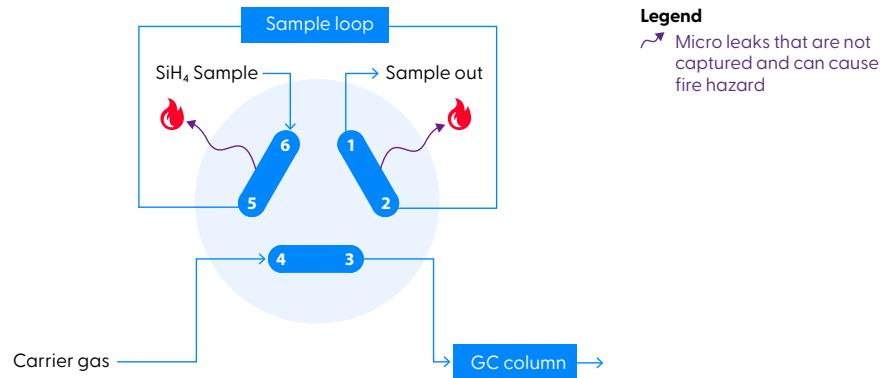
PLSV Benefits

- PLSV shield from all leaks.
- Capture sample leaks and safely dispose them.
- Detect leak by monitoring vent port.
- Improve instrument design safety.

PLSV



Other technologies



Applications where the PLSV has made a difference

- Trace impurities in SiH_4 , avoiding possible fire hazards.
- Trace impurities in PH_3 , improving user safety.
- Trace impurities in CO , improving user safety.
- Trace impurities in propylene, avoiding possible fire hazards.

4

Sub-atmospheric sample: avoid costly false alarms due to ambient air pollutant contamination

Problematic

Pumps are often used to draw the sample into the sample loop. The resulting negative pressure inside the valve increases the risk of air ingress.

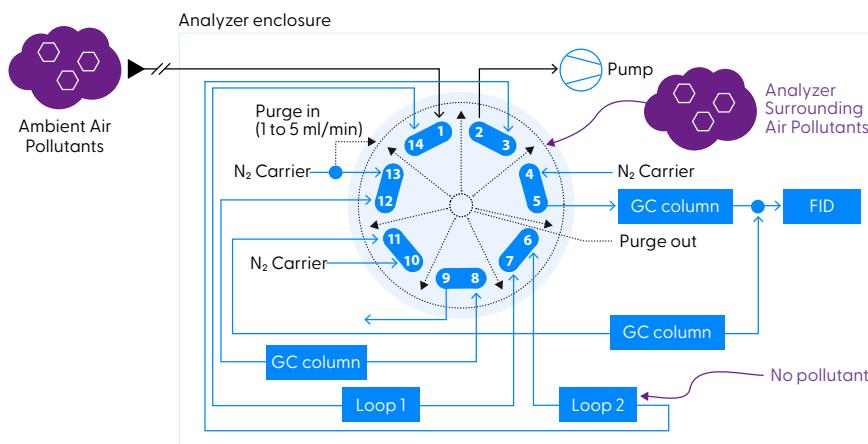
Impact

The result is a high risk of sample and carrier gas pollution.

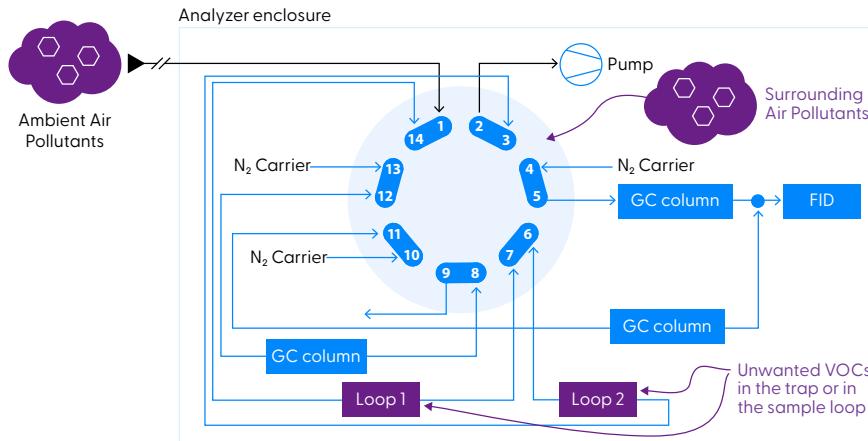
PLSV Benefits

- PLSV shield from all leaks.
- Prevent sample and carrier gas contamination by air ingress and its pollutants.
- More accurate measurements.
- No pressure/flow characteristic changes like diaphragm valves.

PLSV



Other technologies



Applications where the PLSV has made a difference

- CH_4/NMHC pollution in the air
- Speciated VOC in air
- Speciated sulfurs in the air

5 ways PLSV makes a difference

5

Improving sulfur analysis

Problematic

Valve head surface treatment peels from valve head or stator surface.

Impact

The performance and valve lifetime rapidly degrades resulting in poor analytical performance and instrument failure.

PLSV Benefits

- Valve head treatment last longer due to our reduced sealing surface area and reduced friction.
- Better performance for any application requiring valve head treatment.
- Better trace sulfur analysis performance.
- No particulates generated from treatment.

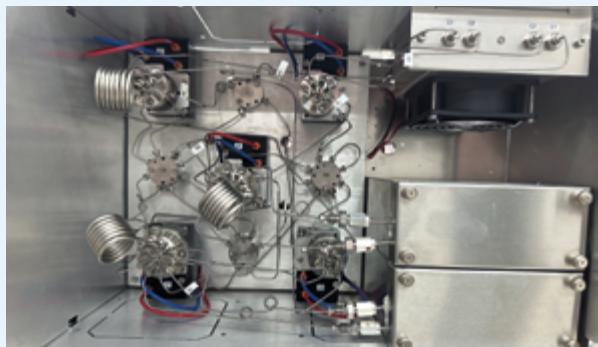
The PLSV valve is one of the key technologies that have established CVP as the market leader along with the world's first process-oriented solution for **Fuel-grade H₂ quality analysis**.

ASDevices world's first process-oriented fuel-cell hydrogen purity analysis solution rely on CVP valves

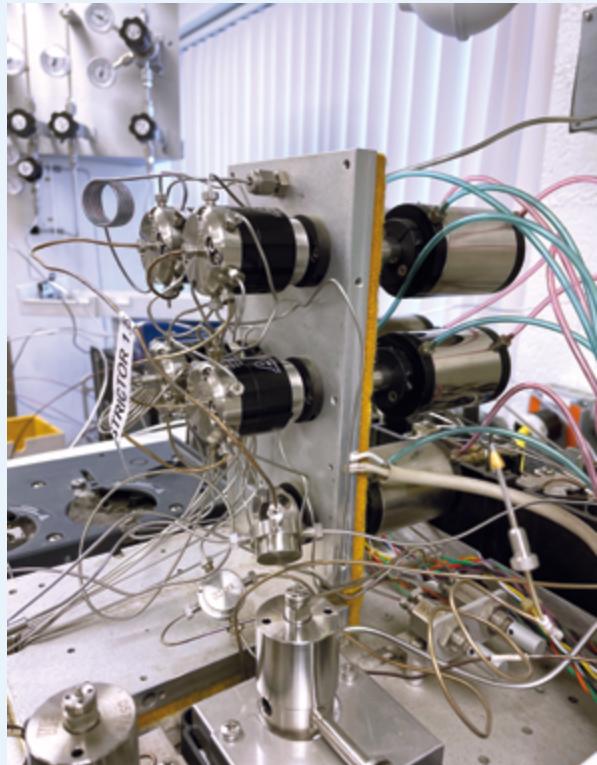
Customers are enjoying our leak-free durable valves



On PerkinElmer GC



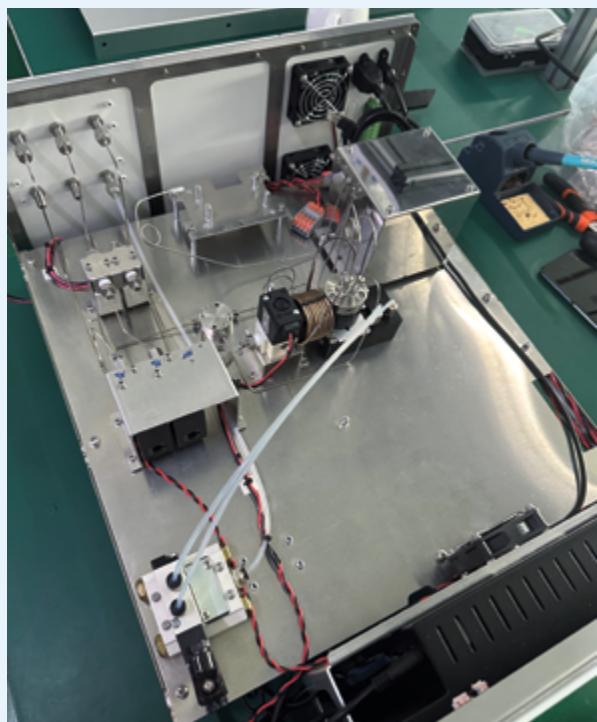
On ASDevices GC



On Agilent GC



On ASDevices SCS Concentrator



On GC for ambient air monitoring

PLSV valves

PLSV performance and specifications

Valve heads

General valve specification	
Maximum operating pressure	300 PSIG / 2068 kPa
Leak rate (Atm-cc/sec He)	6×10^{-13}
Number of actuations**	3,000,000
Standard valve head material	300 series Stainless steel
Valve body material	Anodized aluminum
Switching and injector valve configuration	
Number of analytical ports	4, 6, 10, 14 (4 on request)
Ports size	0.75 mm and 0.41 mm / 0.030" and 0.016"
Fitting size	1/16" in or 1/32"
Purge fitting size	1/16"
Purge flow requirement	1 to 5 ml/min
Available material	PEEK, Vespel™
Internal sampling volume available	0.06, 0.1, 0.2, 0.5, 1, 2 μ L
Actuator compatibility	CPA, CEA, MA, Third party
Dimensions (diameter x height)	4 ports: 39 x 38 mm 6 ports: 39 x 38 mm 10 ports: 48 x 38 mm 14 ports: 48 x 38 mm
Sample Stream Selection valve configuration	
Number of sample port inlets	6, 8 (other on request)
Ports size	0.75 mm / 0.030"
Fitting size	1/16"
Purge fitting size	1/16"
Purge flow requirement	1 to 5 ml/min
Available material	300 Series Stainless Steel, Hastelloy, Inconel, Monel and Titanium
Maximum operating pressure	300 PSIG / 2068 kPa
Actuator compatibility	MPA
Dimensions (diameter x height)	4 ports: 48 x 38 mm 6 ports: 48 x 38 mm 8 ports: 48 x 38 mm

* Achieved with dry, clean and particle free inert gas. Operating conditions may impact lifetime.

Trap and Release valve configuration

Number of analytical ports	7
Ports size	0.51 mm / 0.020"
Fitting size	1/16"
Purge fitting size	1/16"
Purge flow requirement	1 to 5 ml/min
Dimensions (diameter x height)	48 x 38 mm
Available material	See table
Maximum operating pressure	300 PSIG / 2,068 kPa
Actuator compatibility	MPA

Actuators

Compact Pneumatic Actuator (CPA)

Actuation pressure range	40 to 75 PSIG / 276 to 517 kPa
Maximum Operating temperature range	180 °C / 350 °F
Dimensions (Height x Width x Depth)	32 x 45 x 74 mm
Material	Anodized aluminum
Actuation ports	M5 tube fitting

Compact Electrical Actuator (CEA)

Operating voltage	24 VDC @ 3A
Operating temperature range	45 °C / 113 °F
Dimensions (Height x Width x Depth)	64 x 54 x 80 mm
Input	Dry contact, open drain

Multi-Position Actuator (MPA)

Operating voltage	24 VDC
Operating temperature range	45 °C / 113 °F
Dimensions (Height x Width x Depth)	84 x 56 x 120 mm
Input	Dry contact, open drain
Communications	RS-485, USB, Ethernet (MQTT protocol)

PLSV Ordering information

To order our products:

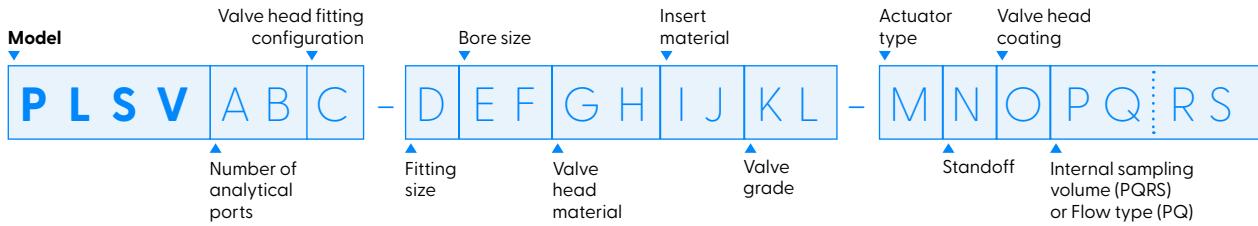
Call or email us with the product numbers you desire to acquire or let us assist you. Our team is at your disposal to answer your questions and evaluate your needs.

Monday to Friday from 9:00 am to 5:00 pm EST

sales@CVProducts.com + 1 418 338-0299



Here's how to indicate your choice of valve when you order:



For example, if you want to order:

Injection valve, 6 ports located on side of valve head, 1/16" fittings, 0.030" bore, Stainless, PEEK, Silconert, CPA actuator with 2" Standoff

PLSV06V-630SSPKST-P2S0000

Selection valve, 8 ports on top of valve head, 1/16" fittings, 0.030" bore, Stainless, Vespel, multi-position actuator, Dead end

PLSVS08T-630SSVPST-M00DE00

Trap and Release Valve, PEEK, Stainless steel, 0.02" bore, 1/16", no standoff, no coating

PLSVT-07T-620SSPKST-M00

The product number is:

PLSV Switching Valve

Model	
PLSV	
AB	Number of analytical Ports
04	4 ports valve
06	6 ports valve
10	10 ports valve
14	14 ports valve
C	Number of analytical Ports
T	Top fitting orientation on valve head
C	Conical rotary footprint compatible
S	Side fitting orientation on valve head
D	Fitting size
3	1/32"
6	1/16"
EF	Bore Size
16	0.016"
30	0.030"

GH	Valve head material
SS	Stainless Steel 300 Series
HC	Hastelloy
IN	Inconel
MO	Monel
TI	Titanium
IJ	Insert material
PK	PEEK
VP	Vespel™
KL	Valve grade
ST	Standard grade with stainless steel ferrules
HP	High purity grade with gold plated ferrules
M	Actuator type
O	No
P	Pneumatic
E	Electrical
H	Manual handle

N	Standoff (ASDevices actuator only)
0	No standoff
2	2" standoff
3	3" standoff
4	4" standoff
6	6" standoff
O	Valve head coating
O	No coating
S	Silconert 2000
D	Dursan
PQRS	Internal sampling volume
0000	No standoff
1006	0.06 ul
1010	0.10 ul
1020	0.20 ul
1050	0.50 ul
1100	1.00 ul
1200	2.00 ul

PLSV Sample Stream Selection Valve

Model
PLSVS
AB Number of analytical Ports
04 4 ports valve
06 6 ports valve
08 8 ports valve
C Number of analytical Ports
T Top fitting orientation on valve head
S Side fitting orientation on valve head
D Fitting size
3 1/32"
6 1/16"
EF Bore Size
16 0.016"
30 0.030"

GH	Valve head material
SS	Stainless Steel 300 Series
HC	Hastelloy
IN	Inconel
MO	Monel
TI	Titanium
IJ	Insert material
PK	PEEK
VP	Vespel™
KL	Valve grade
ST	Standard grade with stainless steel ferrules
HP	High purity grade with gold plated ferrules
M	Actuator type
0	No
M	Multi-Position

N	Standoff
0	No standoff
2	2" standoff
3	3" standoff
4	4" standoff
6	6" standoff
O	Valve head coating
O	No coating
S	Silconert 2000
D	Dursan
PQ	Flow Type
DE	Dead End

PLSV Trap and Release valve

Model
PLSVT
AB Number of analytical Ports
07 7 ports valve
C Number of analytical Ports
T Top fitting orientation on valve head
S Side fitting orientation on valve head
D Fitting size
3 1/32"
6 1/16"
EF Bore Size
20 0.020"

GH	Valve head material
SS	Stainless Steel 300 Series
HC	Hastelloy
IN	Inconel
MO	Monel
TI	Titanium
IJ	Insert material
PK	PEEK
VP	Vespel™
KL	Valve grade
ST	Standard grade with stainless steel ferrules
HP	High purity grade with gold plated ferrules
M	Actuator type
0	No
M	Multi-Position

N	Standoff
0	No standoff
2	2" standoff
3	3" standoff
4	4" standoff
6	6" standoff
O	Valve head coating
O	No coating
S	Silconert 2000
D	Dursan

Accessories

Standoff

PLSV-SO-2	2" standoff
PLSV-SO-3	3" standoff
PLSV-SO-4	4" standoff
PLSV-SO-6	6" standoff

Actuator

PLSV-CPA	Compact pneumatid actuator
PLSV-CEA	Compact electrical actuator
PLSV-MPA	Multi-position actuator
PLSV-MA	Manual handel

Purged Pulse Diaphragm Valves (PPDV)

The latest innovation in diaphragm valve technology

- 30 Valve head and diaphragm types
- 31 Performance and specifications
- 32 PPDV ordering information

The first purged diaphragm valve was introduced over a decade ago. Despite offering a variety of benefits, its technology main disadvantage was that a separate purged flow path was necessary. This meant integration costs, carrier flow consumption costs and manufacturing complexity. Our patented Purge Pulse Diaphragm Valve (PPDV), changed all that. Using the static purge principle to purge the valve's inner volume through the actuation gas, our PPDV works for applications that require the features of a diaphragm valve and also when better performance is needed from existing applications without design changes.

Feature and benefits

- Static purge design:
 - Minimizes purge gas consumption, and reduces operation costs (especially when helium is used)
 - No extra plumbing hardware is required to supply the purge gas, reducing overall integration cost
 - Always keeps an inert atmosphere inside the valve
- New plunger design improves diaphragm lifetime
- Long-term storage pressure relief: eliminates diaphragm deformation when the valve is at rest
- Switching valves available as 6 and 10 ports

Diaphragm types

As a standard, we are offering two types of diaphragm material. The choice of diaphragm is influenced by the intended operating temperature.

Type	Maximum temperature range
Low temperature (LT)	100 °C / 212 °F
Medium temperature (MT)	180 °C / 356 °F
Other material available on request	



Head materials

We offer our PPDV valves in various materials to suit your application requirements.

Head materials available:

- 300 Series Stainless Steel
- Hastelloy
- Inconel
- Monel
- Titanium

[Contact us for other special valve head material requirements.](#)

PPDV performance and specifications

Switching and injection valve specifications

Maximum operating pressure	300 PSI / 2068 kPa
Low temperature (LT diaphragm)	100 °C / 212 °F
Medium temperature (MT diaphragm)	180 °C / 356 °F
Leak rate	
- Cross port (Atm-cc/sec He)	4.7x10 ⁻¹¹
- Inboard and outboard (Atm-cc/sec He)	4.7x10 ⁻¹²
Rated number of actuations	Up to 1,000,000
Standard valve head material	300 series stainless steel
Number of analytical ports	6, 10
Port fitting size	1/16"
Port bore size	0.030"
Actuation pressure	65 PSI / 450 kPa
Cylinder body material	Anodized aluminum

PPDV Ordering information

To order our products:

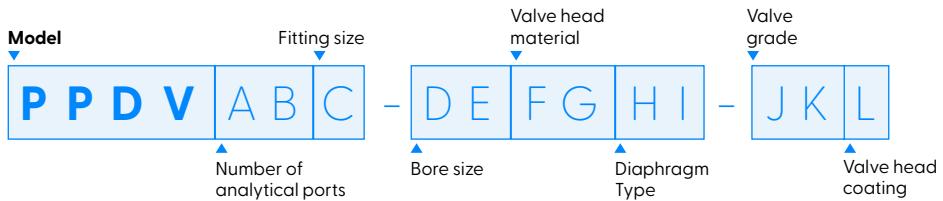
Call or email us with the product numbers you desire to acquire or let us assist you. Our team is at your disposal to answer your questions and evaluate your needs.

Monday to Friday from 9:00 am to 5:00 pm EST

sales@CVProducts.com + 1 418 338-0299



Here's how to indicate your choice of valve when you order:



For example, if you want to order:

10 ports PPDV standard grade valve with Hastelloy head and no coating

The product number is:

PPDV106-30HCMT-ST0

PPDV Valves

Model	
PPDV	
AB	Number of analytical Ports
06	6 ports valve
10	10 ports valve
C	Fitting size
6	1/16"

DE	Bore Size
30	0.030"
FG	Valve head material
SS	Stainless Steel 300 Series
HC	Hastelloy
IN	Incone
MO	Monel
TI	Titanium
HI	Diaphragm Type
LT	100 °C / 212 °F
MT	180 °C / 356 °F

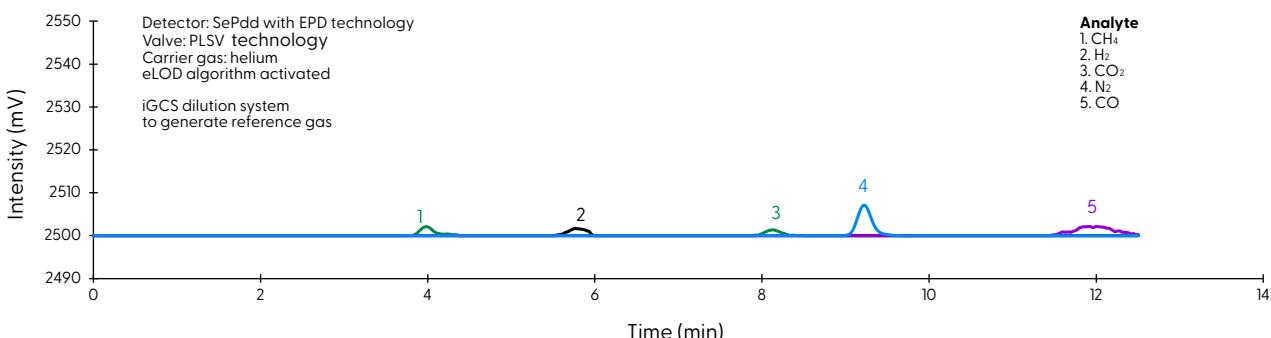
JK	Valve grade
ST	Standard grade with stainless steel ferrules
HP	High purity grade with gold ferrules
L	Valve head coating
O	No coating
S	Silconert 2000
D	Dursan

Real-life examples where our valves are making the difference

Leak integrity benefit

700 ppt H₂, N₂, CH₄, CO and CO₂ analysis in helium

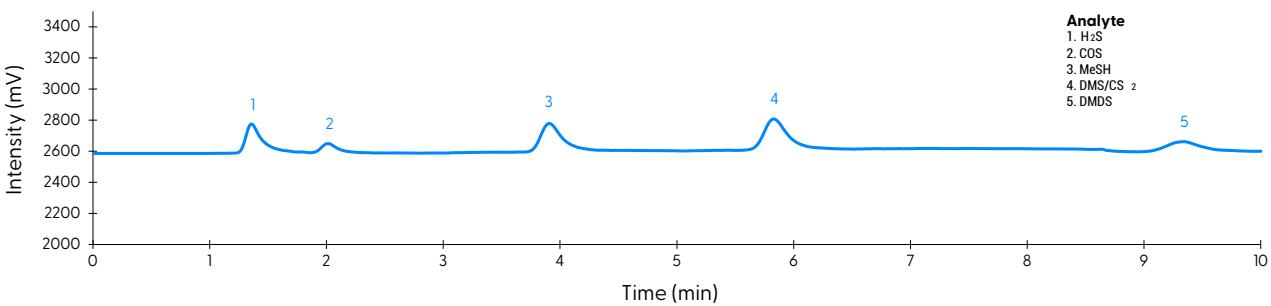
Without the leak integrity of our valve, it is not possible to do reliable analysis without our valve.



Low friction benefit

10 ppb trace sulfurs in hydrogen with SCS concentration system

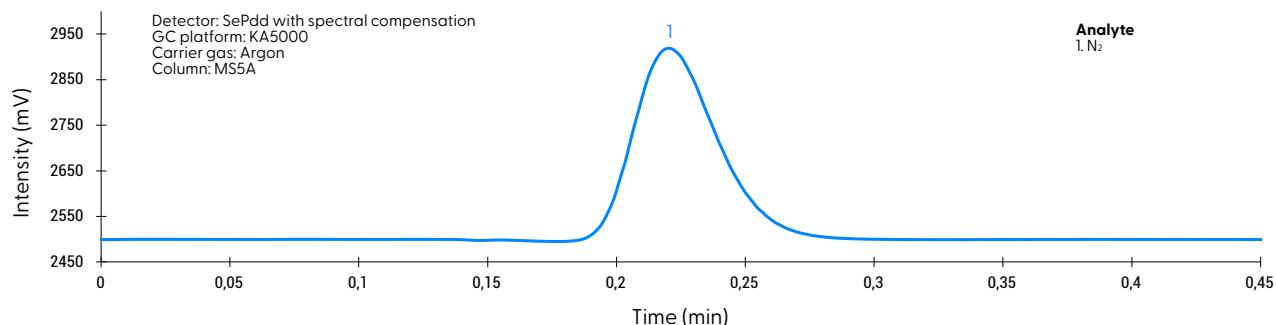
The robustness of this measurement is down to the low friction of the valve that does not peel off the coating. This has been a major breakthrough in H₂ fuel grade analysis.



Long life time

50 ppm N₂ Crude Argon

This analysis is performed every 30 sec and this 24/7, 365 day a week. This over 1,000,000 actuations a year. Only our valve can achieve this performance and work well for many years without change.



Analytical fittings and tubes

Analytical **fittings**

We've been designing high-performance analytical instruments for decades, so we know how important fittings are. From surface finish to leak integrity to dead volumes, all factors are taken into account and must meet our very high standards. What's more, we use only the best quality materials and employ strict quality control processes, so you're sure to achieve optimum performance, every time.

- 316L stainless steel
- 15 RA average inside-surface finish
- No dead volume
- Steam-cleaned with deionized water
- Designed for 1/16" tubes (1/32" also available)
- Optional surface treatment available

Available models and accessories

- Tee
- Cross
- Union
- Nuts: short and long
- Ferrules: stainless or gold plated.



Analytical **tubes**

We offer a range of seamless, stainless steel straight-length tubing for chromatography, sampling systems and other applications that require high-quality tubing. Our tubes can also be treated for special applications such as sulfur analysis. Quality control processes are integral to our manufacturing, so whatever tubes you choose, they'll be dimensionally consistent and straight as well as suitable for all assembly methods.

- 316L stainless steel
- 15 RA average inside-surface finish
- Smooth and straight end
- Electrically cut
- Steam-cleaned with deionized water
- Standard length: 10, 20, 30 and 50 cm (other sizes available)
- Standard internal diameter: 0.005", 0.010", 0.020", 0.030", 0.040"
- Standard outside diameter: 1/16", 1/8", 1/4"

Cutting or not cutting?

How to prevent valve failures caused by tube cutting.

Author: Yves Gamache, 2015, reviewed in 2024.

System integrators, end users or OEMs generally use stainless steel tubing to interconnect various parts of a GC system. From sample and carrier inlet through column, valves, flow or pressure regulator and finally detector. Tubing is omnipresent. Tubing is, obviously connected to fitting.

Everybody recognizes the importance of high-quality tubing. Special coating is also available to inert the internal surface of the tube. The inner surface inertness of the tubing reduces analyte absorption and peak tailing. A lot of energy is spent to achieve this high level of chemical inactivity. Polishing could also improve inner surface finish, purging time, and coating effectiveness. Great care is also taken to avoid longitudinal scratches or surface porosity on the outside diameter.

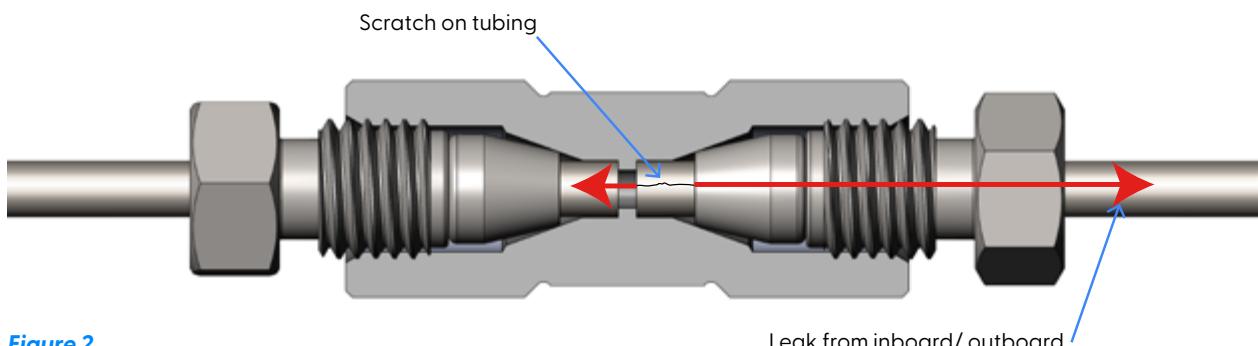
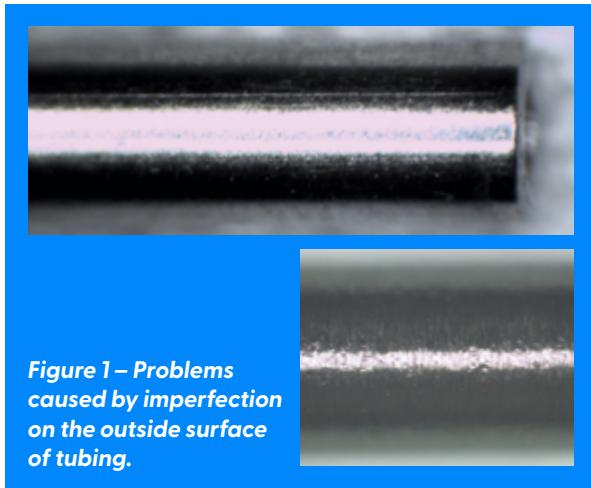


Figure 1 shows the obvious problem caused by such imperfection on the outside surface of the tubing.

Outboard or inboard leaks will occur through the path provided by these imperfections, shown in Figure 2. In all interconnections between fittings, valves, detectors and columns, there is tubing involved. Tubing is most of the time connected to an interface with the help of ferrules and nuts. If not, tube welding is required.

In all cases, the tubing is a part of the fitting connection system, whatever the fitting type or model. While everybody agrees on the importance of the degree of cleaning inertness of tubing, the absolute necessity to have a leakproof connection through fittings and the prime importance of working with GC valves that have no cross-port leak; it is paradoxical to realize that very little is done to maintain the high level of integrity upon system assembly.

Indeed, for cost consideration, many integrators use mechanical means to cut their tubing to the desired lengths. Using mechanical means to cut tube of 1/32", 1/16" or 1/8" O.D. will invariably lead to a valve failure or, at the minimum, reduce system performance.

As a valve and fitting manufacturer, we can confirm that valves that fail before their specified number of actuations under defined operating parameters fail because particle contamination usually comes from bad tubing manipulations. Of course, we assume the use of particle filters on various gas inlets and column end connections.

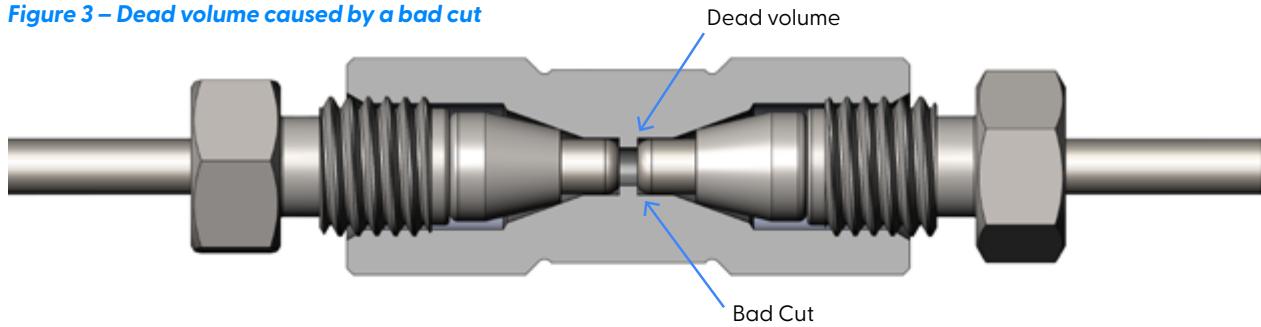
Fitting union, that doesn't seal when specified nut rotation torque is used, doesn't seal because of damaged tube surface finish.

Furthermore, cutting tubes mechanically is the cause of dead volumes inside a fitting union shown in Figure 3. The following figures will show what are the most common mechanical cutting procedures we have encountered by visiting customers or responding to customer calls.

Whatever of the above technic used, the butt end of the stainless-steel tube is no more passivated but becomes an active surface, available to react with low levels of impurities. Low level sulfur compounds will be affected, as well as many others, like O₂. The repeatability of the system will suffer mainly if tubing is used at elevated temperatures. Hydrogen could also diffuse axially into the tube wall.

To protect and maintain fittings, valves, and analytical system performance, perfect-cut tubes with straight butt ends must be used. Tube butt end surface finish and passivation are of prime importance. The tube will seat properly in the fitting and will not expose reactive surfaces.

Figure 3 – Dead volume caused by a bad cut



As shown in Figure 4, cutting tubes with mechanical means has serious drawbacks:

- Plier causes deformation of the tube. The tube is now oval rather than round.
- It pinches the end of the tube. Using a plier with a small internal diameter tube closes or reduces the opening.
- Using a saw generates a lot of particles.
- Circular cutting tube causes scratches on the outer diameter of the tube. The final cuts have a sharp edge.

Figure 5 shows the butt end cutting tube causing such problems as restriction inside the system.

Most of the time, the users will attempt to improve the result of the cut, i.e. the tube end, by using sandpaper or a file.

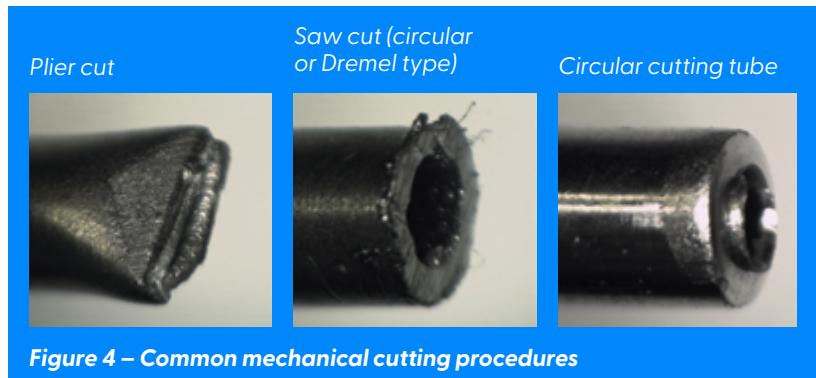


Figure 4 – Common mechanical cutting procedures

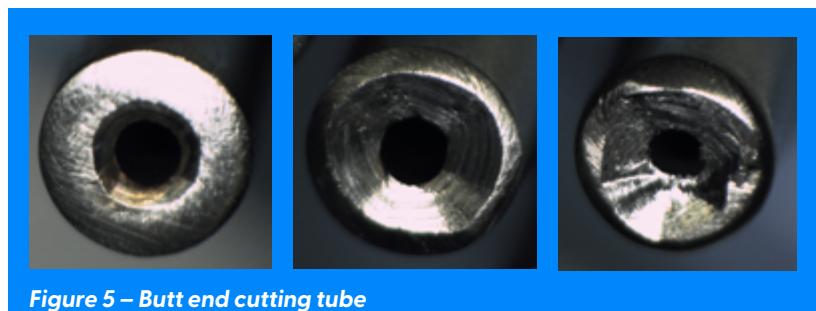


Figure 5 – Butt end cutting tube

Furthermore, there will be no particle generation, which could damage valves, columns and detectors. Only tubes cut with EDM (electric discharge machine) or ECM (Electrochemical machining) must be used. After the cut, the tubing is cleaned with a proprietary process and the tube end passivated to eliminate surface activity. Then, the tube may be further processed by coating the inner surface to eliminate surface activity. This is mandatory when working with low level impurities, or corrosive chemical compounds. Precut tubing is available in various lengths from CVP, from 10 cm to 2 meters. When choosing tubing length, one needs only to select a tube just a little longer than required to make the connection and make a loop or "S" shape to compensate for the extra length. It is faster and safer, and most importantly, it doesn't void your valve warranty.

LipLOK compression fittings

Industry standard compatible, UHP leak integrity, leak detection capability with analytical performance.

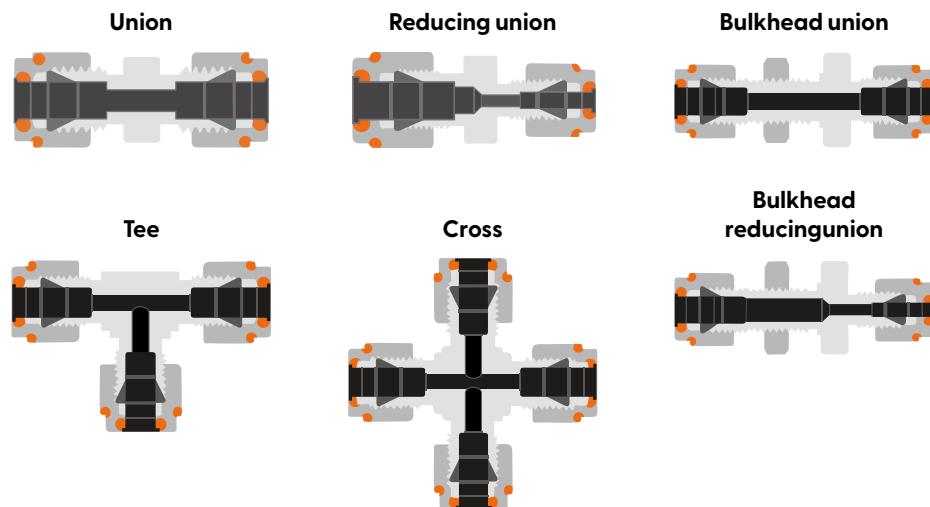
Our patented LIPLOK double ferrule compression fittings bring together analytical performance and the robustness of legacy industrial design with improved leak detection. As a significant advancement over the universal industrial ferrule fitting design, the LIPLOK uses two seal points for better sealing integrity, all while maintaining existing system compatibility.



Features

- Backward compatible industrial/instrumentation fitting with the sensitivity of an analytical one
- Sealing ring design provides better sealing integrity
- Unlike with face seal fittings, no welding is required
- Sniffing port through the nut has a septum for leak detection
- Leak concentration chamber provides better leak detection
- Direct flow-through and no dead volume effect

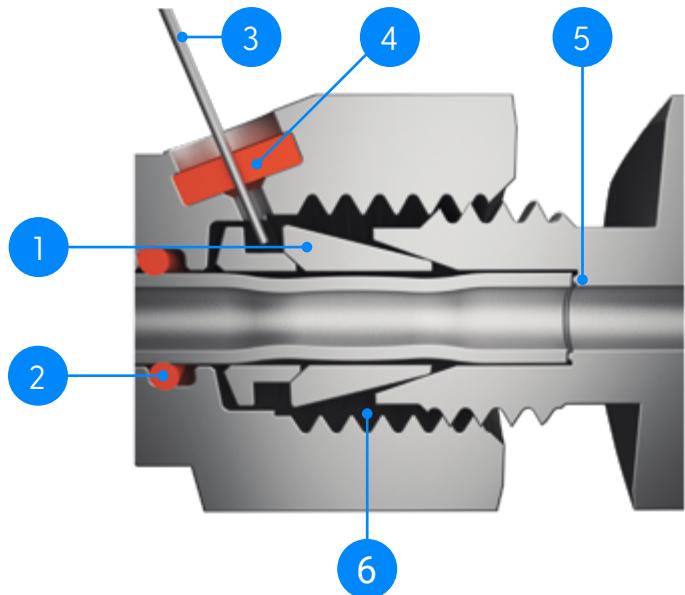
Available models



Leak detection port

Technology principles

No unswept volume and optimized for leak integrity



- 1 **Standard front ferrules**
Second level of sealing and tubing swaging action that prevents tube expulsion under high pressure/vibration environment
- 2 **Tubing surface seal and nut sealing ring**
Provide concentration chamber sealing
- 3 **Syringe needle for leak detection**
- 4 **Septum**
Leak detection sniffing with syringe
- 5 **Coated sealing ring**
First level of sealing
- 6 **Leak concentration chamber**
Sniffing: Detect the smallest leaks by accumulating and concentrating them
Tracer: Pressurize the chamber with a tracer gas for leak integrity test

A new era of compression fittings:

The easy-to-use leak and dead-volume free **LipLOK double ferrule compression fitting**

Author: Yves Gamache, 2018, reviewed in 2024.

The well-known double ferrule assembly has a “swaging” action, i.e. it compresses the tube in at some points and increases the tube outside diameter beyond those points, as shown in Figure 1. This design has worked well for industrial applications such as high-pressure systems and/or when there is a high level of vibration. The oversize section of the tube beyond the front ferrule makes it very difficult to eject the fitting even if the nut loosens over time. With this safe assembly, these types of fitting are universally used in process plants today.

The general acceptance of this design and its easy availability have led analytical system designers to integrate it into analytical instruments and sampling systems. This design has worked well for many early analytical systems with the then-available instrument detection limits.

However, by today's standards such fitting design is problematic for instrument manufacturers, system integrators and sampling system builders.

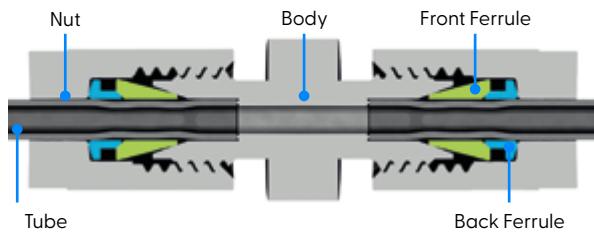


Figure 1 – Typical double ferrule fitting

The Problem With Dead Volume

One of the major drawbacks is the dead volume. Indeed, problems caused by dead volumes are much more subtle, sometimes these situations are confused with leaks. In fact, dead volumes may be thought of as virtual leaks.

Here are some real situations that have happened to many of us. To explain this, refer to Figure 2, which shows the simplest gas chromatographic configuration. Let's select a very common GC application, where the carrier is helium, the column is based on a 1/8"OD molecular sieve and the detector is a helium ionization type. Such a configuration is used for permanent gas measurements. On both ends of the column, there is a double ferrule type column end fitting.

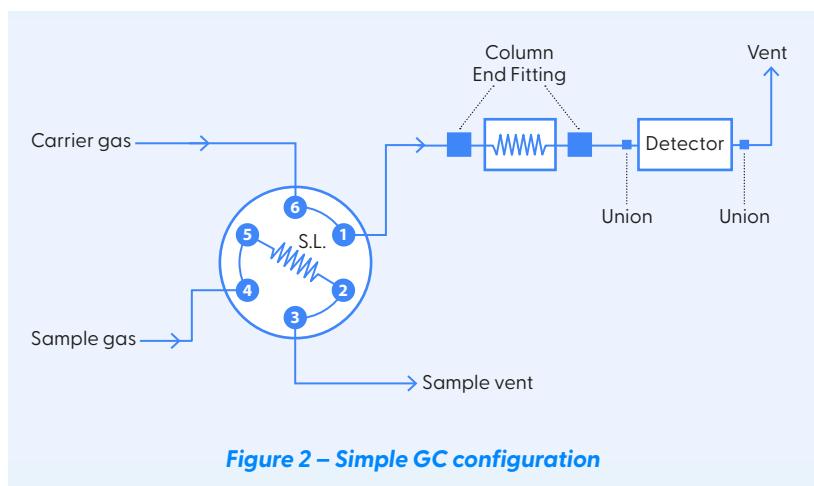


Figure 2 – Simple GC configuration

After the system starts, helium is passed through, and the column is regenerated to purge away any contaminants. Figure 3 shows the detector signal after system stabilization.

Figure 4 shows the same signal when carrier flow is decreased and then restored. When carrier flow is decreased, the signal increases due to dead volume accumulated gas diffusing back into the carrier. This increases the impurity level into the detector, hence increasing the signal.

Restoring the flow dilutes the impurity level into the carrier gas, so the signal goes down. As can be observed in Figure 4, the signal is now lower compared to the beginning of the trend. This is because there is less contaminant entrapped in the dead volume. Varying system flow or pressure is an excellent method for finding leaks into a gas chromatographic system.

Looking at the signal trend of Figure 4, it would lead you to think that there are leaks and air diffusion into the system. The normal reaction would be to retighten the fittings until the signal goes down.

By retightening the fittings, the ferrules are pushed forward and tubing OD increases once again, decreasing dead volumes. This causes the entrapped contaminant to be forced back into the carrier gas and detector. The signal shown in Figure 5 is typical of such a situation.

Varying the flow or pressure to recheck for leaks would again generate a signal similar to Figure 4 but with less amplitude. Once more, with the best of intentions, someone observing this would retighten further the fittings, thinking that there are leaks. Since there are also unions and other fittings at various points in the system, it makes the problem even worse! Eventually, while attempting to resolve these virtual leaks, fittings will become overtightened, and real leaks will be generated.

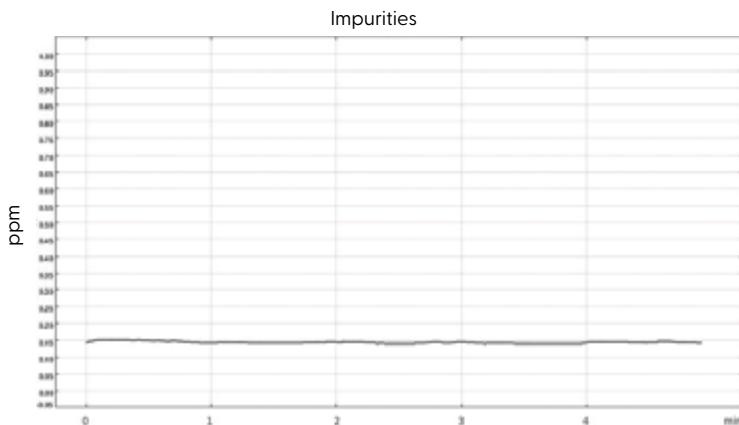


Figure 3 – Stabilized detector signal after start-up

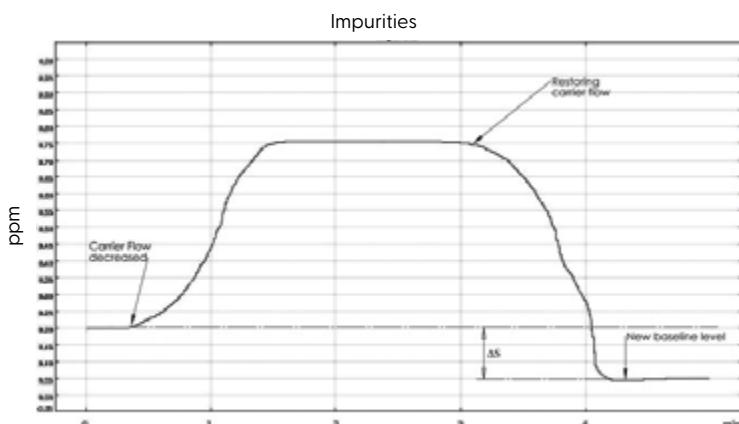


Figure 4 – Effect of flow variation over signal

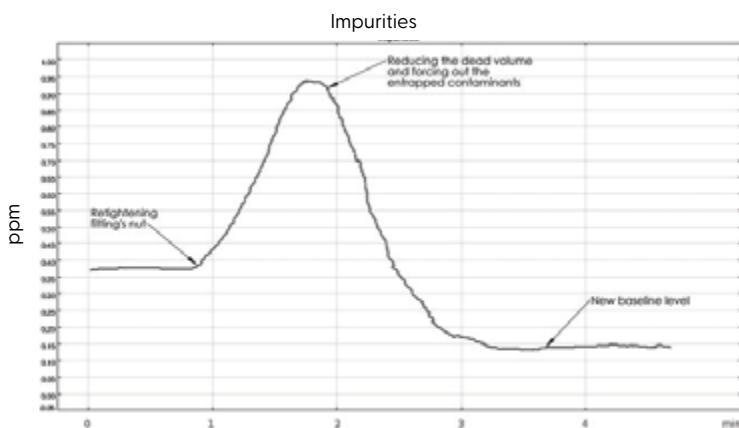


Figure 5 – Effect of retightening double ferrules fitting

GC System Erratic Working Behaviour Caused By Dead Volume

Another erratic result can appear when injecting a relatively large sample volume. Injecting such a large volume suddenly reduces system pressure, generating a «ghost» peak. This results from trapped contaminants in dead volume diffusing back into the carrier. The larger the tubing size or higher the system sensitivity, the worse the problem.

As process GC manufacturers, we have experienced these problems many times before. Colleagues in the field have reported similar system issues.

Our Double Ferrule Fitting Design

Combine analytical performances and the proven robustness of the industrial design, with improved leak detection capability while maintaining existing system compatibility.

As an improvement to the universal industrial double ferrule fitting design, we have patented the LipLOK design. This design uses two seal points, the first being the 'coated sealing ring' which is compression fitted to the tube end. Having the seal point placed here allows minimum loss of analytical performance. This fitting is similar to the VCR™ fitting but has less dead volume in the flow path. This analytical grade seal performance is achieved between the tube end and the sealing ring feature, by using a very low torque- almost finger tight.

There is now a surface seal added to the fitting nut and a seal or septum in the sniffing hole. Any leak developing inside the fitting will be forced to accumulate in the leak chamber space. The pressure will build up in this chamber until a value where it will go through or around the septum. Inserting the needle of a sniffer or leak detection apparatus allows sensitive leak detection since the leak is concentrated into this chamber. This is shown in Figure 7.

Features & Benefits

- No dead volume effect
- Better sealing integrity
- Lower torque
- Sniffing hole through the nut having a septum, for leak detection purposes

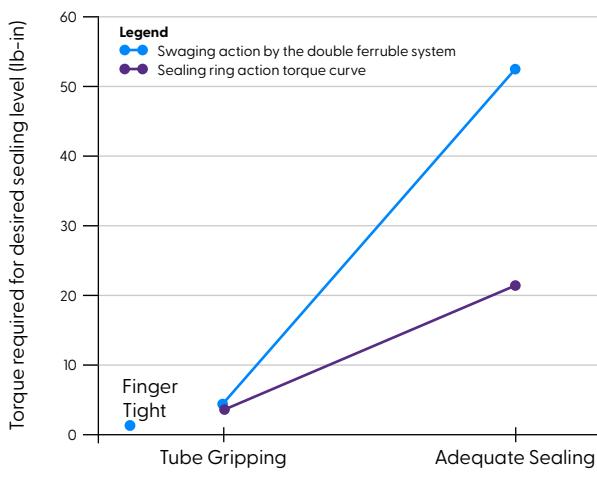
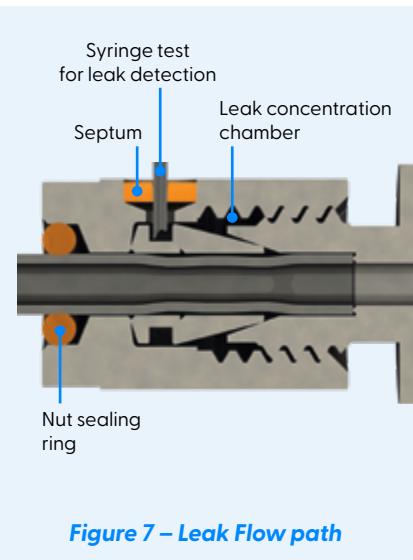
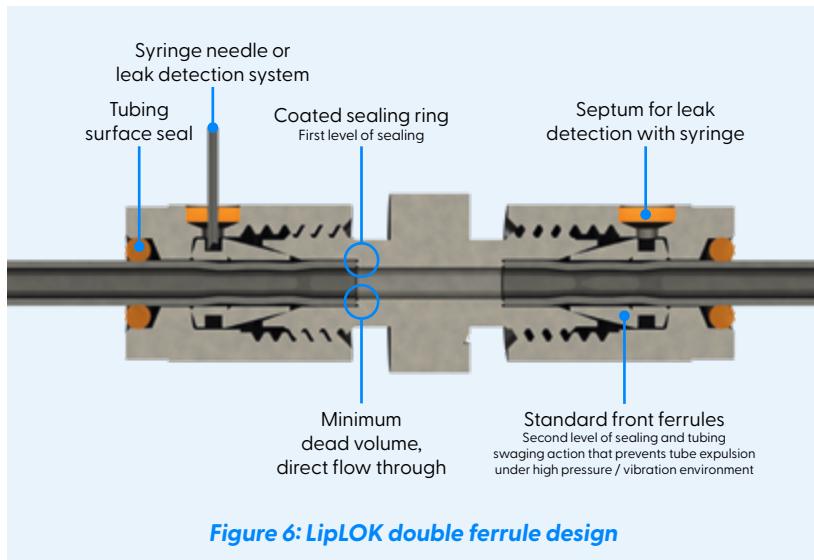
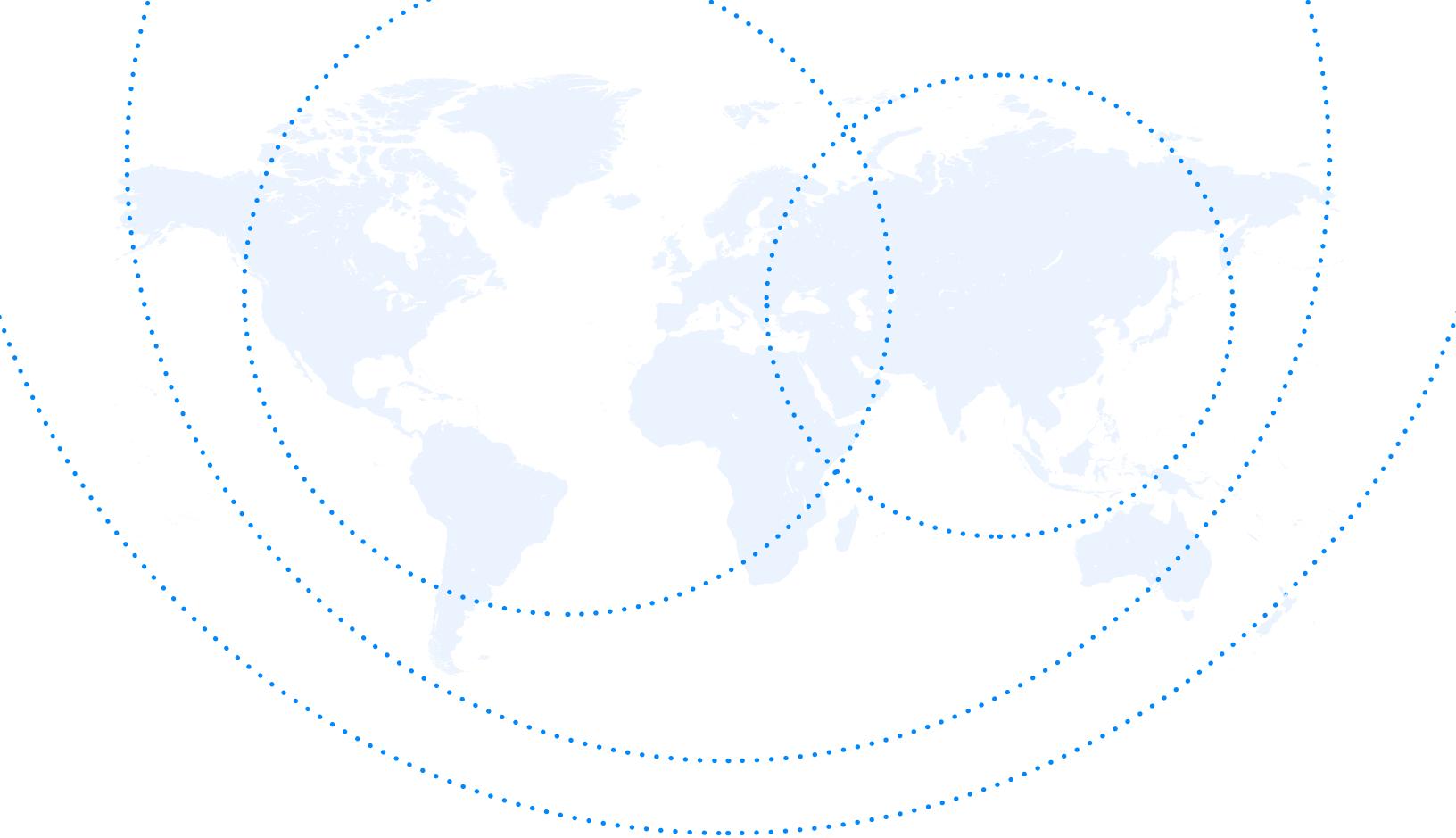


Figure 8 shows the combined effect on the assembly torque of the sealing ring and the double ferrule. Only a very low torque is required to make a tight connection at the sealing ring feature. Tests have demonstrated that a finger-tight torque will seal. However, high pressures require a more robust hold on the tubing. The swaging action of the ferrules achieves this. Additionally, the sealing ring keeps the pressure exerted by the fluid inside the tube and not in the fitting body. Consequently, when a fitting is properly mated, the front ferrule is not exposed to process pressure.

All ASD products respect CE/RoHS (CSA optional) standards.



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No matter where you are, our team of experts and local business centers in the Americas, Europe and Asia can help.

CVP HQ and innovation centre

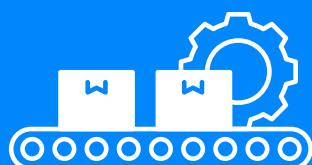
Located in North America, our team of experts provides after-sales support, GC tuning, applications development and great innovations with our R&D.

CVP Manufacturing

Our quality GC products are manufactured in Quebec City (Canada).

CVP Business Centers

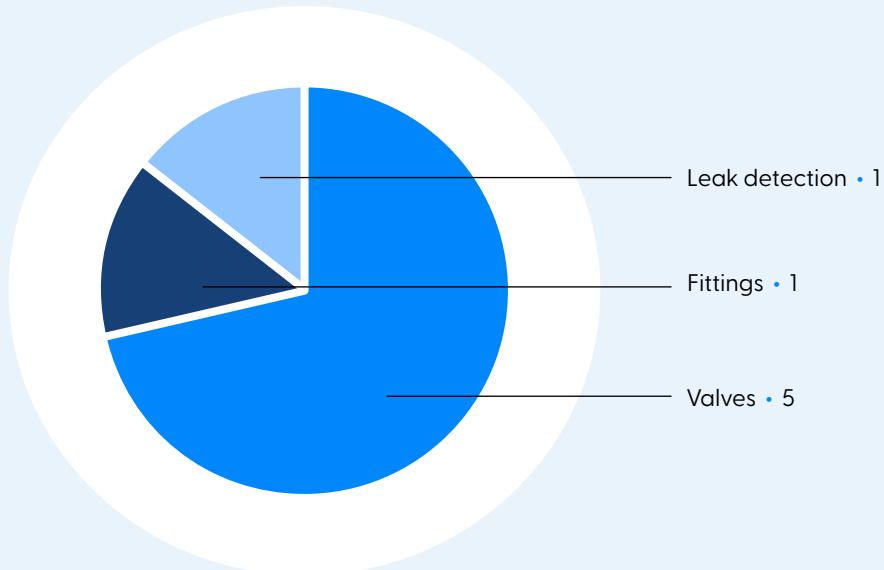
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- Pulsing purge diaphragm valve and related method PATENTED
- Variable load chromatography valve for fluid analysis PATENT PENDING
- Actuator PATENTED
- Ball valve with load varying mechanism, and method of operating the same PATENTED

Fittings

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Leak detection

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