

VALVES

For Fluid Power, Process and Other Industries

**DESIGN ENGINEERING, MANUFACTURING,
PROTOTYPING & TESTING**



Fluid Line Products, Inc.

Designer and Manufacturer of Fluid Power Components

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DEDICATED to ENHANCING your FLUID SYSTEM

Through Total Vendor Support, Design, Testing and Manufacturing

Fluid Line Products specializes in design, development, testing and manufacturing of check and relief valves and pressure regulators. Whether you need a component in a new product line, a replacement part, or have a special performance requirement, our worldwide engineering experience in the field will convert your needs into a reliable product.

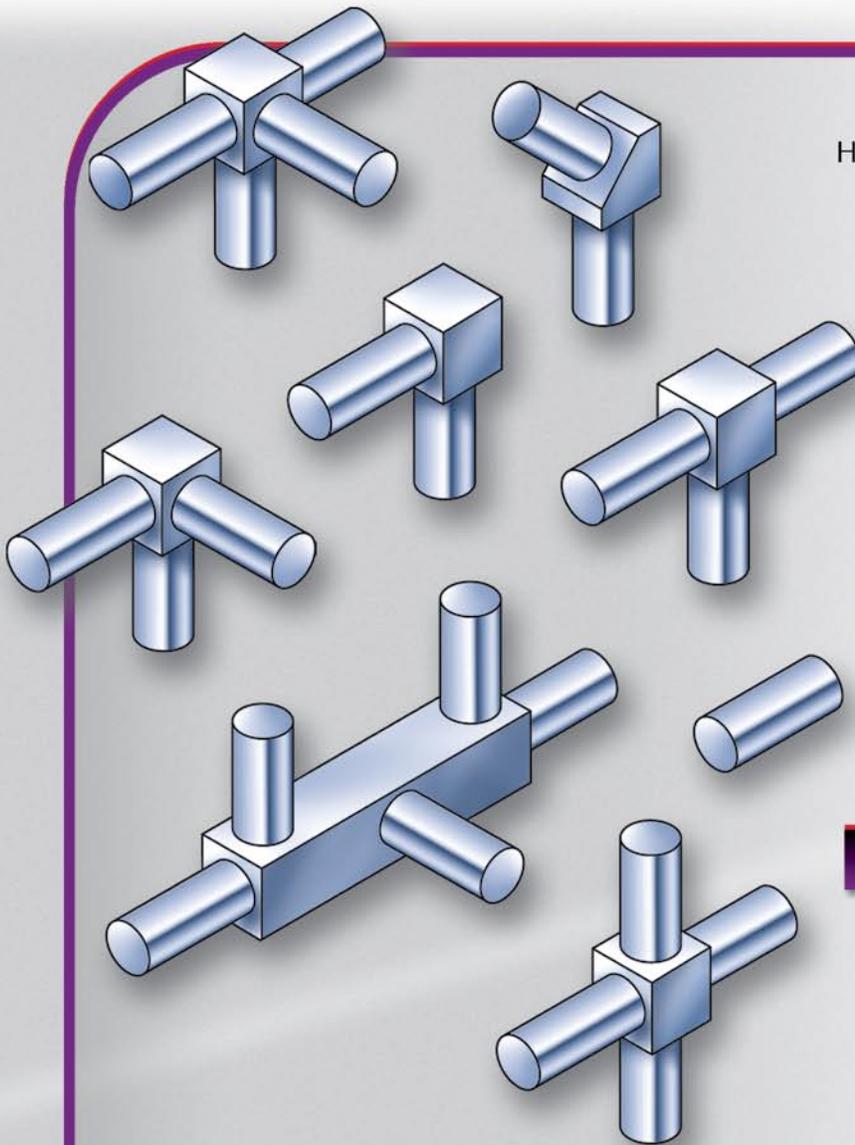
We pride ourselves in innovative design, high quality machining, and precise testing and inspection.

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PRODUCT TYPES



Hydraulic & Pneumatic Check Valves
 Hydraulic & Pneumatic Relief/Check Valves
 Hydraulic & Pneumatic Fixed & Adjustable Relief Valves
 Grease Fixed or Adjustable Relief Valves
 Fixed Orifice Flow Control Restrictor/Check Valves
 Bleeder Valves
 Oil Sampling Valves
 Pilot Operated Hydraulic & Pneumatic Relief Valves
 Check & Relief Valve – Filter Assemblies
 Valve Manifolds Drain Valves
 Velocity Fuse Valves Rollover Valves
 Charge Valves Shuttle Valves
 Pressure/Fuel Regulators

SERVICE APPLICATIONS

Hydraulic & General Purpose Oil
 Air & Other Gases
 Water, Fuel Oils,
 Chemicals, Grease

SPECIFICATIONS

Max. Operating Pressure	Determined by connection type
Flow Range	Liquid: 0 to 130 GPM, Gas: 0 to 600 SCFM
Fluid Temp. Range	Buna N: -40°F to 250°F, Viton: -10°F to 375°F Ethylene Propylene: -50°F to 300°F Neoprene: -40°F to 250°F
Metal/Metal Seal	-40°F to 850°F
Grafoil	-40°F to 840°F
External Leakage	Zero
Operating Fluids	Hydraulic fluid, oil, air, refrigerant, water, chemicals, fuel, gases
Liquid Viscosity Range	6×10^{-6} to 6×10^{-3} ft ² /sec
Mounting Position	Fittings may be installed in any position
Materials	Carbon Steel, Stainless Steel, Brass, Monel, Aluminum, Inconel, Hastelloy, Special
Connections	See Page 18
Sizes	1/16" – 3"



FAST TURNAROUND RELIABLE • PRECISE • COST EFFECTIVE

At Fluid Line Products, there is no alternative to thorough testing. Strict test standards are the foundation of our reputation for reliability. No test procedure is considered routine, and when existing methods are not considered adequate for some special applications, we engineer new, demanding procedures of our own.

Now your company can benefit from our expertise in fluid power testing. Whether prototype or production, we'll reliably test your

fluid power components to these standards:

SAE • ASTM • ANSI • ISO • DIN • JIS

When testing is completed, you'll receive exactly what you need: Detailed written reports with full documentation. And, you'll receive something no one else can offer – the confidence of knowing that at Fluid Line Products, we'll test your products like they were our own.

Capabilities

- Hydrostatic Proof Test (up to 60,000 PSI)
- Hydrostatic Burst Test (up to 60,000 PSI)
- Impulse Pressure Test (peak up to 20,000 PSI, max. cycle rate 1 Hz)
- Hydrodynamic Cycle Test (Flow Endurance Test)
- Repeated Assembly Test
- Overtorque Test
- Vacuum Test
- External and Internal Leakage Tests
- Cracking Pressure Test
- Pressure versus Flow Test - Prototype and Production
- Pressure Drop versus Flow Test
- Differential Pressure Test
- Calibration Tests (Flow and Pressure)
- Flow Test (max. 40 GPM)

Prototype and 100% production test reports available upon request.



TYPICAL RELIEF VALVE RESPONSE CHARACTERISTICS

Cracking pressure (C.P.) Tolerance:

Standard: $\pm 10\%$
Special: $\pm 5\%$

Cracking Pressure Definition:

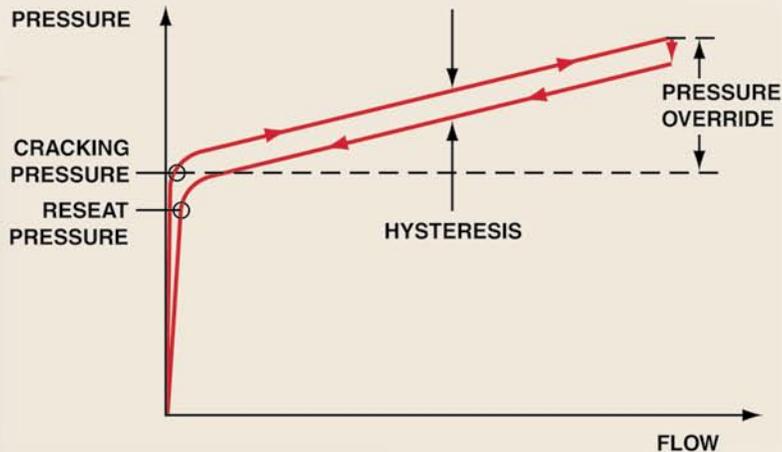
Pressure at which initial surge flow is detected as pressure was gradually increased from 0 to C.P. It is normal that some leakage exist below C.P. (Special relief valve, "High Precision Relief Valve," provides zero leakage up to 98% C.P. for liquids and gases).

Reseat Pressure Tolerance:

Standard: Min. 80% C.P.
Special: Min. 95% C.P.

Reseat Pressure Definition:

Pressure at which the valve closes after pressure was gradually decreased from full-flow condition. It is normal that some leakage exist below reseal pressure. (Special relief valve, "High Precision Relief Valve," provides zero leakage below 95% C.P. for liquids and gases).

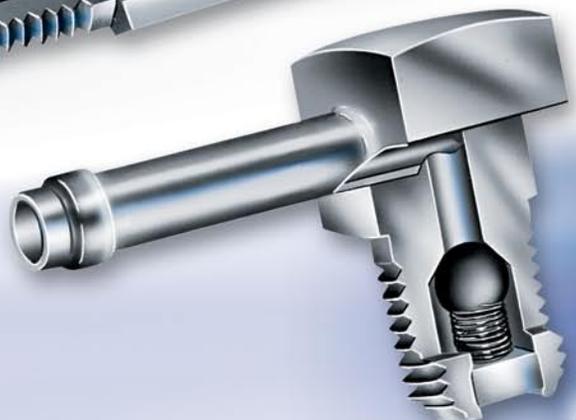
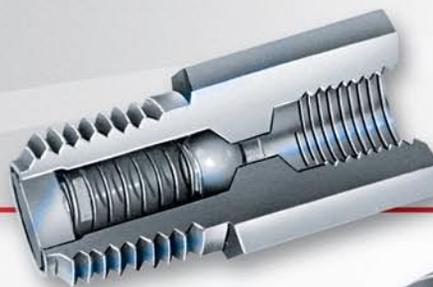


BALL CHECK VALVE

Direct Acting Ball Type



BALL SEAT



Description

Simple and cost-effective
Light service application
Low pressure application
for gas, oil and water

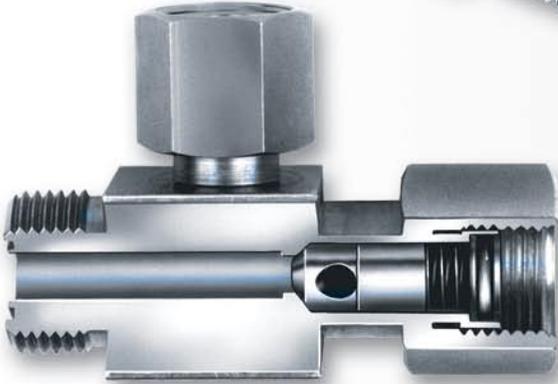
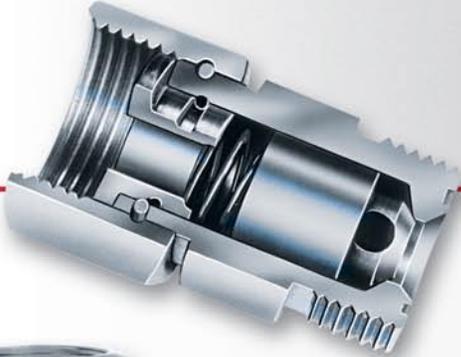
Performance Specifications

Cracking Pressure: Up to 10 PSI
Cracking Pressure Accuracy: $\pm 10\%$
Reseat Pressure: 80% of cracking pressure
Flow: Up to 1 GPM
Internal Leakage: (Steel ball) 1cc/min.



POPPET CHECK VALVE

Direct Acting Metal-to-Metal Seat
Poppet Type



Description

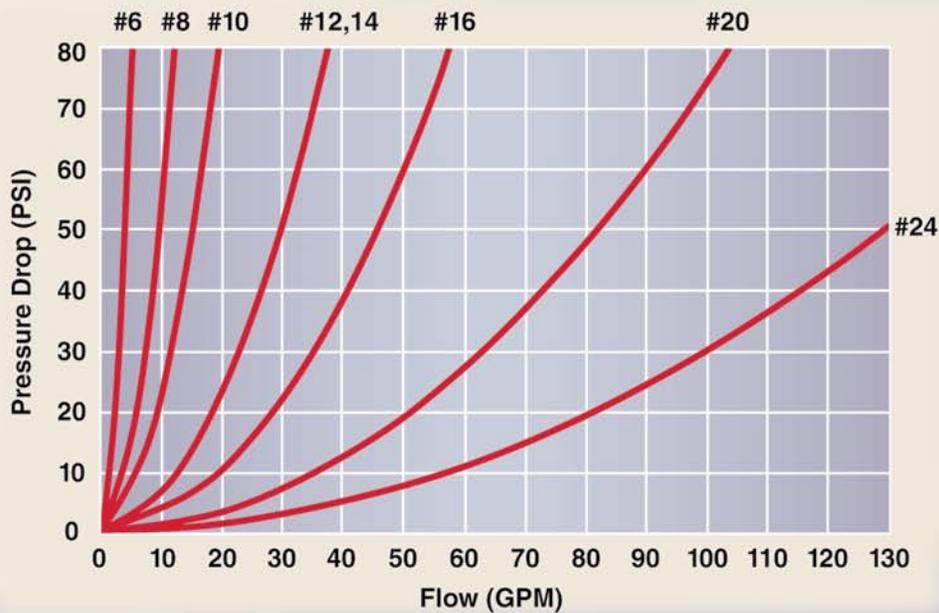
Long and maintenance-free service
High flow, severe application

Performance Specifications

- Cracking Pressure:** Up to 10 PSI
- Cracking Pressure Accuracy:** $\pm 10\%$
- Reseal Pressure:** 85% of cracking pressure
- Flow:** Up to 130 GPM
- Max. Internal Leakage:** 2 cc/min.
- Durability:** Higher than 1×10^6 cycles

PERFORMANCE CURVES

(Exact performance must be determined based on actual testing.)



SOFT SEAT POPPET CHECK VALVE

Direct Acting Metal to Soft Seat
Poppet Type



Description

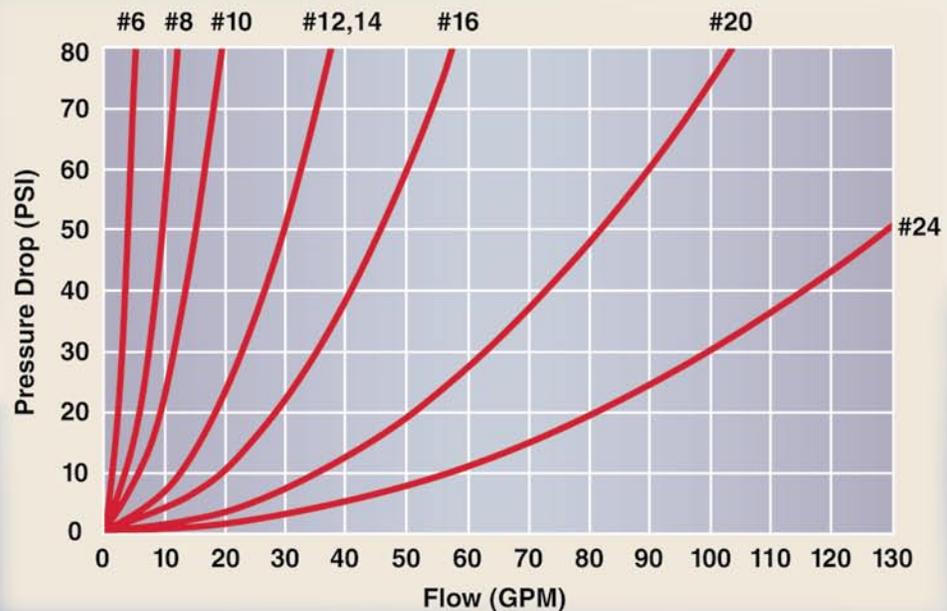
Severe applications
High durability
Shock-proof

Performance Specifications

Cracking Pressure: Up to 10 PSI
Cracking Pressure Accuracy: $\pm 10\%$
Reseat Pressure: 85% of cracking pressure
Flow: Up to 130 GPM
Internal Leakage: Zero

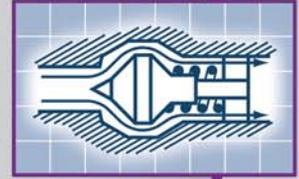
PERFORMANCE CURVES

(Exact performance must be determined based on actual testing.)



LOW PRESSURE DROP CHECK VALVE

Direct Acting Metal-to-Metal Seat
Poppet Type



Description

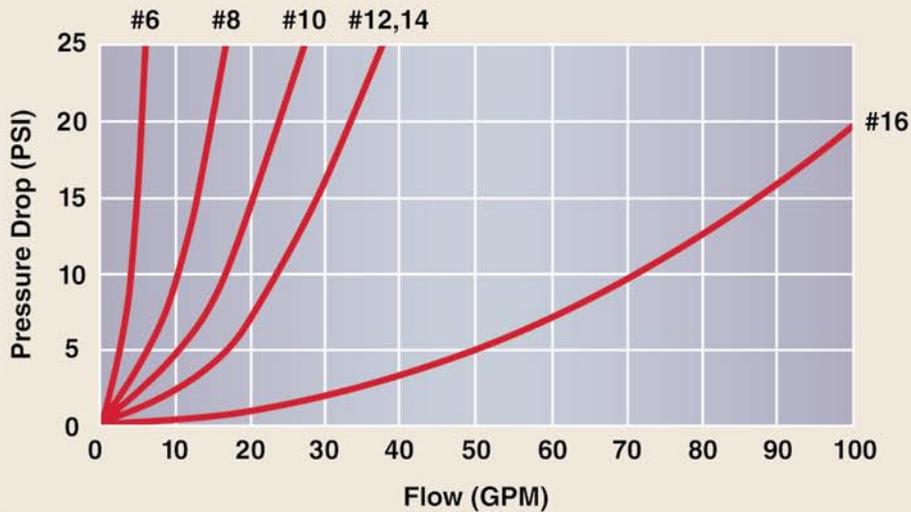
Low operating pressure
Extra low pressure drop
High flows

Performance Specifications

Cracking Pressure: Up to 10 PSI
Cracking Pressure Accuracy: $\pm 10\%$
Reseal Pressure: 85% of cracking pressure
Flow: Up to 130 GPM
Max. Internal Leakage: 20 cc/min.

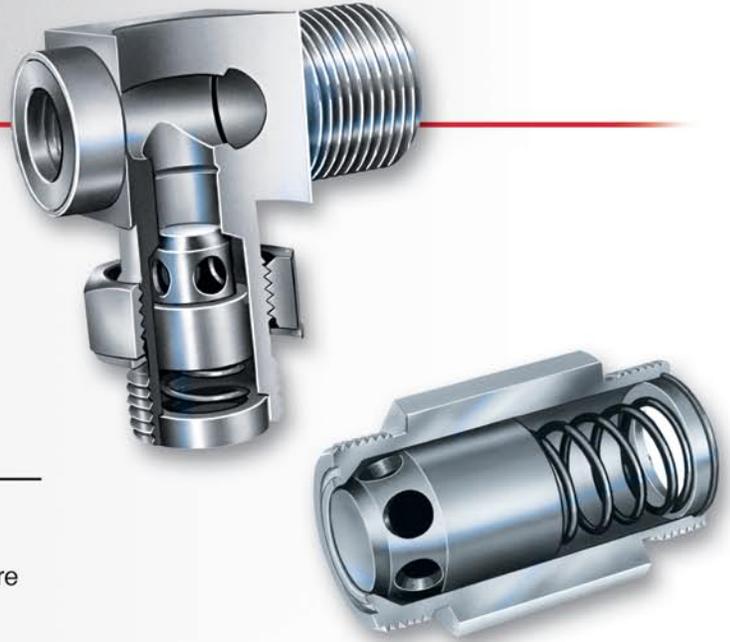
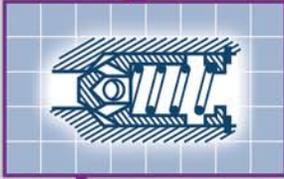
PERFORMANCE CURVES

(Exact performance must be determined based on actual testing.)



POPPET RELIEF VALVE

Direct Acting Metal-to-Metal Seat
Poppet Type



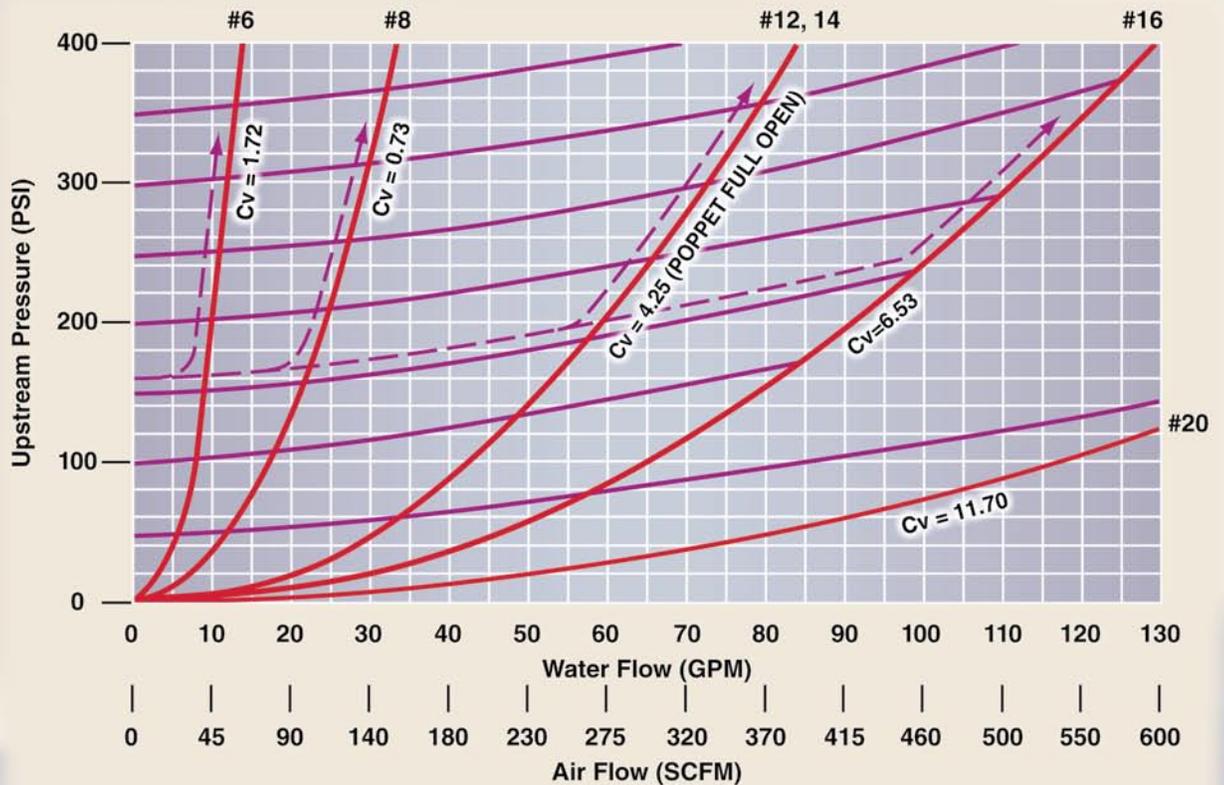
Description

- Long and maintenance-free service
- High precision relief pressure
- High relief pressure
- Silent operation
- Cost-effective
- High-flow

Performance Specifications

- Relief Pressure:** Up to 400 PSI
- Relief Pressure Accuracy:** $\pm 10\%$
- Reseal Pressure:** 85% of relief pressure
- Flow:** Up to 130 GPM
- Max. Internal Leakage:** 5 cc/min.

PERFORMANCE CURVES



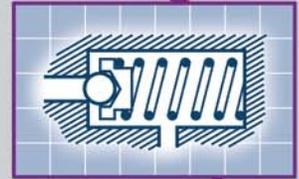
Viscosity Correction Factor							
Viscosity cSt	14	32	45	55	65	80	90
Factor	.93	1.12	1.20	1.28	1.34	1.39	1.43

Pressure drop correction factor for another specific gravity and viscosity = specific gravity X viscosity correction factor (from table). Curves represent typical values. Exact performance must be determined based on actual testing.



BALL SEAT RELIEF VALVE

Direct Acting Metal Ball Type



Description

Very high operating pressure
Cost effective

Performance Specifications

Relief Pressure: Up to 15,000 PSI
Relief Pressure Accuracy: $\pm 10\%$
Reseal Pressure: 85% of cracking pressure
Flow: Up to 6 GPM
Max. Internal Leakage: Low

ORIFICE CHECK / RELIEF VALVE

Direct Acting Metal-to-Metal
Poppet Type



Description

High precision orifice
Flow control
Filter screens used
in very sensitive applications

Performance Specifications

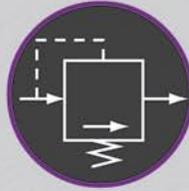
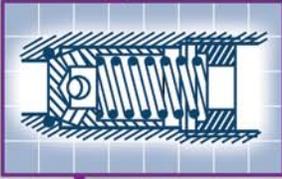
Relief Pressure: Up to 130 PSI
Relief Pressure Accuracy: $\pm 10\%$
Reseal Pressure: 85% of opening pressure
Flow: Up to 130 GPM

See page 6 for corresponding graph for check valves.
See page 9 for corresponding graph for relief valves.

HIGH PRECISION PRESSURE REGULATOR

For Liquids and Gases

**Special Poppet Nose Geometry
with O-ring Bedded in the Body**

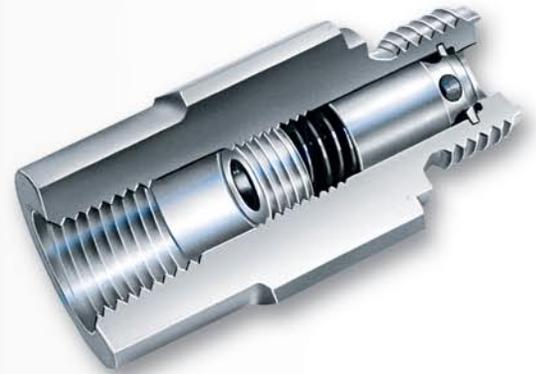


Description

Zero Leakage - Fluid Line Products precision pressure regulators provide a dead tight seal for the pressure range from 0 to 95-98% of the cracking pressure.

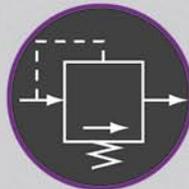
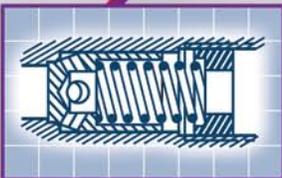
Positive reseal - Our precision pressure regulators reseal to a dead tight seal at 95% of the cracking pressure.

Cracking pressure repeatability is better than $\pm 5\%$ of the cracking pressure. NOTE: After a prolonged period of storage, the valve may initially crack at higher pressure; therefore, true cracking pressure should be determined after the first crack.



FUEL REGULATING VALVE

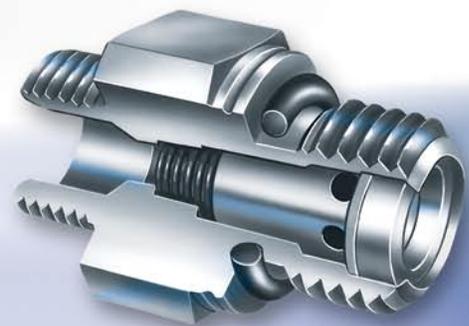
For the Engine Industry



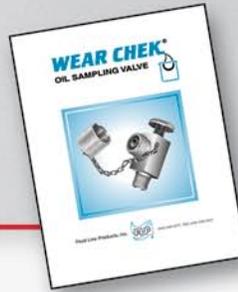
*Fluid Line Products is ready to team up with you to develop specific valves which meet your specifications. Our engineering expertise in **FUEL REGULATING VALVES** can help you achieve optimal engine performance.*

Description

Tight regulation
Precise cracking pressure
Low leakage (zero if desired)
High flow capacity
Extra high durability
for severe applications



OIL SAMPLING VALVE



See our
Wear Chek catalog
for more information

WEAR CHEK®
OIL SAMPLING VALVE

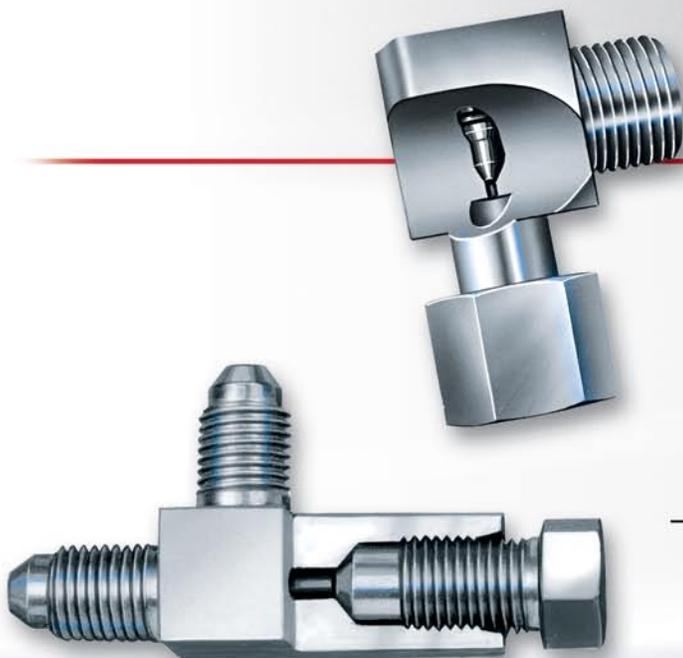
Description

Now leak-free sampling of system fluids couldn't be easier or more reliable. Only Wear Chek offers easy push button control - just push and release for sampling engine oil, transmission fluid and hydraulic fluids.

- *Eliminates system shutdown*
- *Compact, rugged T-shaped design*
- *Exclusive double seal and automatic positive closing for leak-free performance*

BLEEDER VALVE

Metal or Soft Seat Type



Description

To bleed entrapped air
or for sampling
Non-restrictive flow path
Long, maintenance-free service

Performance Specifications

Pressure: Specified by connection type
Flow: Up to 130 GPM
Internal Leakage: Zero

OIL DRAIN VALVE

See our
Waste Gard catalog
for more information

Environmental responsibility isn't an option any more, it's the law. Show your customers you care – help protect them and the environment with Waste Gard. It's the positive, practical, easy-to-use and easy-to-install way to drain oil without leaks or spills.

Available exclusively from Fluid Line Products




OIL DRAIN VALVE

AP 750 QUICK TURN DRAIN VALVE

Description

Replace drain plugs with quick action finger motion

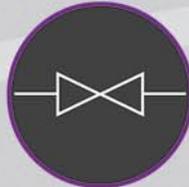
- **Variable control purging**
- **Inch, metric or NPTF threads**
- **High flow**
- **Quick Opening**
- **Vibration proof**
- **Compact design**



DRAIN VALVE

Metal Seat Type Stem

See our Safety Drain Valve product sheet for more information



Description

To shut off oil or fuel through a line

To drain fluids safely via a hose

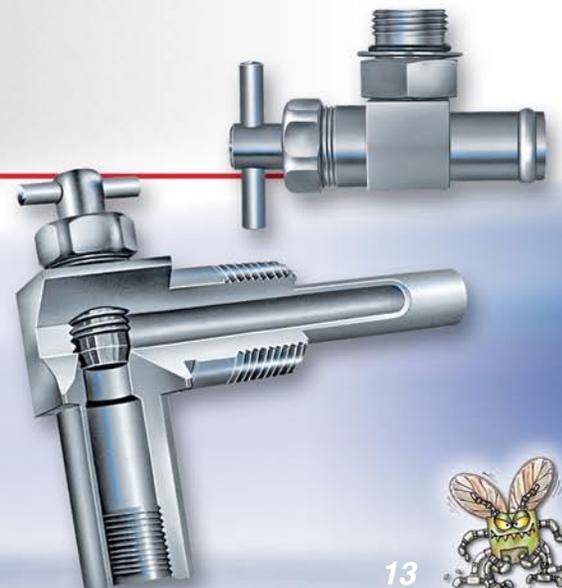
High flow rate, low pressure loss, extremely durable

Performance Specifications

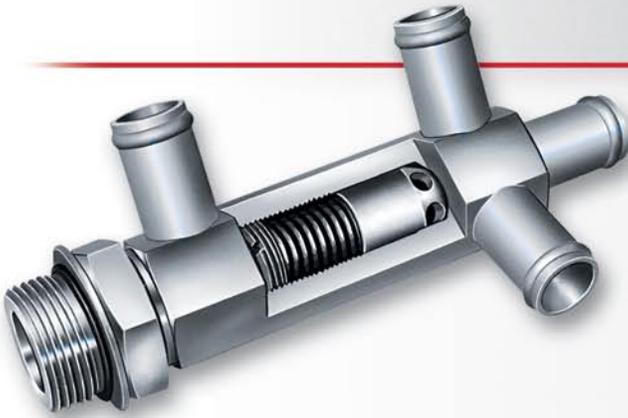
Pressure: Specified by connection type

Flow: Up to 130 GPM

Internal Leakage: Zero



VALVE MANIFOLDS



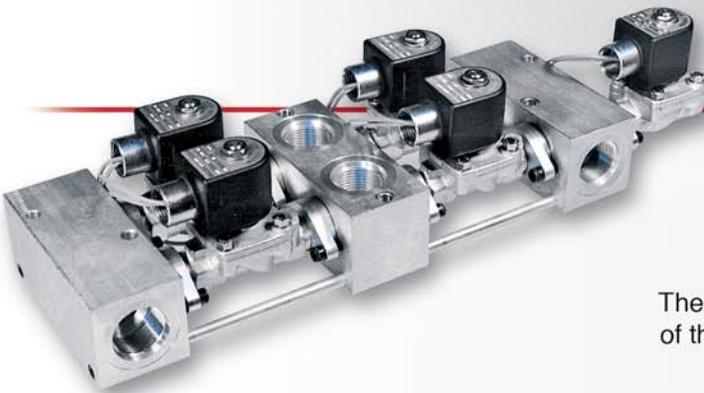
Description

Fluid Line Products can cut your costs and incorporate a valve into an existing manifold. We will also consolidate several fittings and valves into a compact, superior leak-free design.

See our Manifold Catalog for additional information.



ELECTROHYDRAULICS



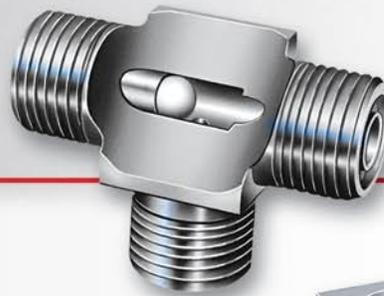
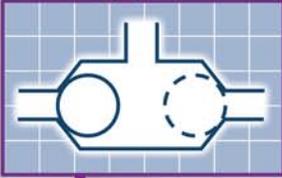
Description

The addition of electronics enhances control of the system; a greater amount of control is contained in a small envelope.

This manifolding concept also allows for cost reduction by eliminating numerous components and labor assembly on the production line. Warranty claims and system maintenance costs are held to a minimum.



SHUTTLE VALVE



Description

Alternates flow between two pathways ("or" logic element).

Non-restrictive flow path

Long, Maintenance-free service

Performance Specifications

Pressure: Specified by connection type

Flow: Up to 130 GPM

Internal Leakage: Low

PRESSURE PURGE VALVE

Description

To safely relieve stored pressure in hydraulic lines prior to performing maintenance

- **Pressure rating of 9,000 PSI (4:1 design factor)**
- **Variable flow rate controlled by operator**
- **Hose barb outlet for drain to container**

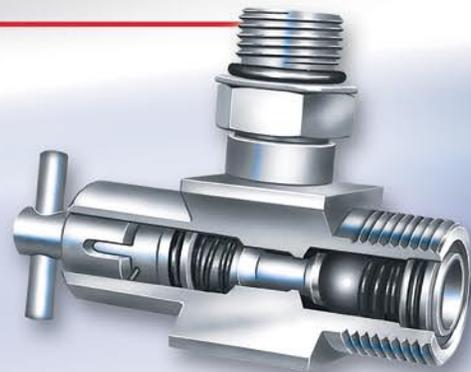


PUSH TO LOCK 3/2 FUEL VALVE

Description

Unique soft seal closes upstream flow with a push and lock safety detent feature.

The lock position allows downstream side to connect with the atmosphere.

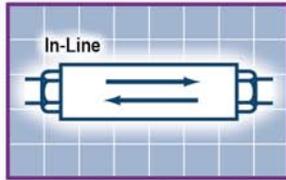
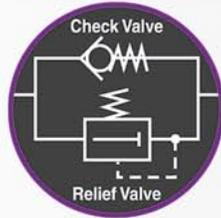


SPECIAL APPLICATIONS

Fluid Line Products is currently manufacturing and expanding to provide products to all types of fluid power and other process industries. The following photos show some of what we have designed in the past and are currently manufacturing.

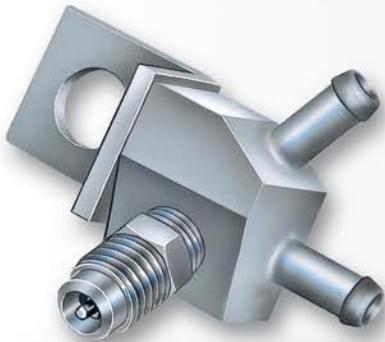


Check valve integrated in the relief valve poppet



IN-LINE CHECK AND RELIEF VALVE

In-line check and relief valves contain two valves in one housing. This cost-effective design reduces assembly time, weight, and space. The check valve permits flow in one direction when the pressure is low. In addition, the relief valve allows flow in the opposite direction at a higher set pressure.



CHARGE VALVE

A charge valve will allow you to purge air out of the system. This type of valve is primarily used in fuel applications.



VELOCITY FUSE

As a safety device for sudden uncontrollable, dangerous breaks in hydraulic lines, particularly applications involving dead weight cylinders, it stops any flow higher than certain fixed flow. Velocity fuses are installed between actuators and possible line breakage points.

QUICK DISCONNECT

Quick disconnects are used primarily to connect a line to drain fluid out of a system.



CHECK VALVE WITH INTEGRATED FILTER

The check valve permits free flow in only one direction. In addition, the filter eliminates dirt throughout the system. The combination of a valve and filter into one unit can tremendously reduce costs and assembly time. This unit is used in all types of industries including hydraulics, fuel systems and air systems.

See our filter catalog for more information.

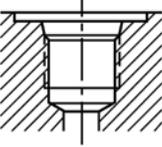
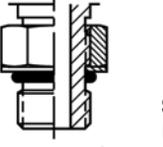
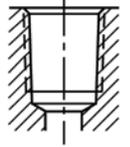
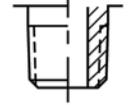
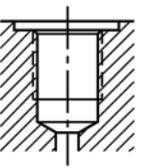
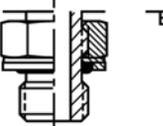
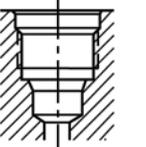
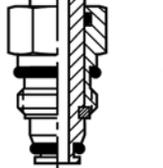


PILOT OPERATED RELIEF VALVE

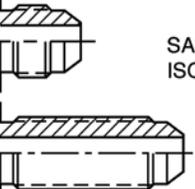
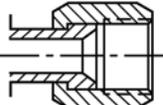
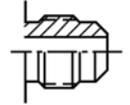
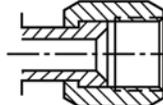
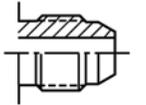
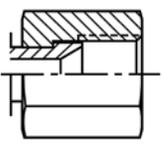
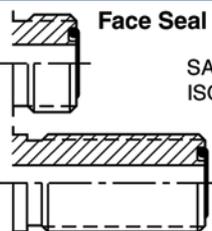
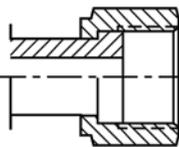
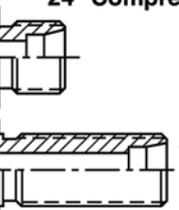
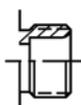
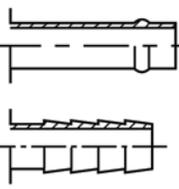
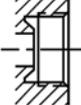
Pilot operated relief valves provide high and accurate pressure regulation under varying flow conditions.



PORT CONNECTIONS

<p>O-Ring Boss</p>  <p>SAE J1926 ISO 11926 SAE J2244* ISO 6149* DIN 3852-3* JIS B 2351**</p>	<p>O-Ring Boss</p>  <p>SAE J1926 ISO 11926 SAE J2244* DIN 3852-3*</p> <p>ISO 6149* JIS B 2351**</p>	<p>Conical Thread</p>  <p>SAE J476 DIN 3852-1 Type Z† DIN 3852-2 Type Z†† JIS B 8363††</p>	<p>Conical Thread</p>  <p>SAE J476 DIN 3852-1 Type C† DIN 3852-2 Type C†† JIS B 8363††</p>
<p>Parallel Thread</p>  <p>DIN 3852-1 Type X/Y* DIN 3852-2 Type X/Y**</p>	<p>Parallel Thread</p>  <p>DIN 3852-1* DIN 3852-2**</p> <p>ISO 1179** ISO 9974*</p>	<p>Bonded Seal</p>  <p>DIN 3852-1 Type A* DIN 3852-2 Type A** ISO 1179** ISO 9974*</p>	<p>Metal-to-Metal Seal</p>  <p>DIN 3852-1 Type B* DIN 3852-2 Type B** ISO 1179** ISO 9974*</p>
<p>Uniport 10K® Leak free double seal</p>  <p>SAE J2337</p>	<p>Uniport 10K® Leak free double seal</p>  <p>SAE J2337</p>	<p>The connections displayed are a sample of our manufacturing capabilities. For connections not shown, please contact our engineering department.</p>	

TUBE CONNECTIONS

<p>37° JIC</p>  <p>SAE J514 ISO 8434-2</p>	<p>37° Swivel</p>  <p>SAE J514 ISO 8434-2</p>	<p>45° Flare</p>  <p>SAE J512</p>	<p>45° Swivel</p>  <p>SAE J512</p>
<p>30° Flare</p>  <p>JIS B 8363**</p>	<p>30° Swivel</p>  <p>JIS B 8363**</p>	<p>Face Seal</p>  <p>SAE J1453 ISO 8434-3</p>	<p>Face Seal Swivel</p>  <p>SAE J1453 ISO 8434-3</p>
<p>24° Compression</p>  <p>SAE J514 ISO 8434-1* DIN 3861* JIS B 2351**</p>	<p>Tapered Sleeve Compression</p>  <p>SAE J512 DIN 2380</p>	<p>Low Pressure Hose</p>  <p>SAE J1231</p>	<p>Inverted Flare</p>  <p>SAE J512 DIN 74235</p>

* Metric Parallel Thread ISO 261

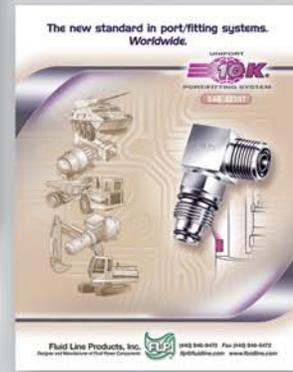
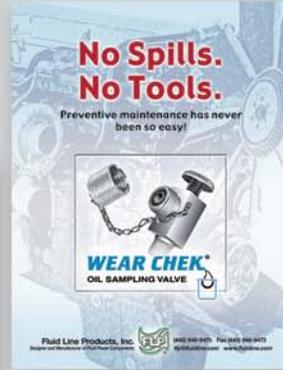
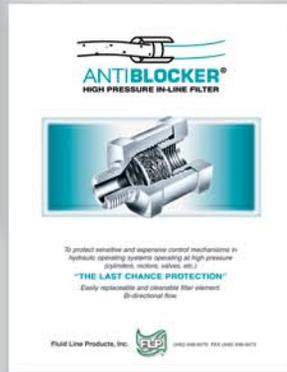
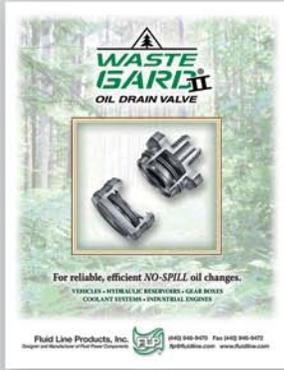
† Metric Conical Thread DIN 158

** BSP Parallel Thread (BSPP) JIS B 0203/BS 2279

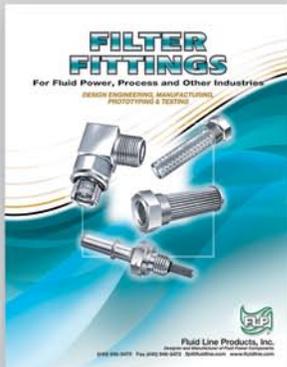
†† BSP Conical Thread (BSPT) JIS B 0202/BS 21

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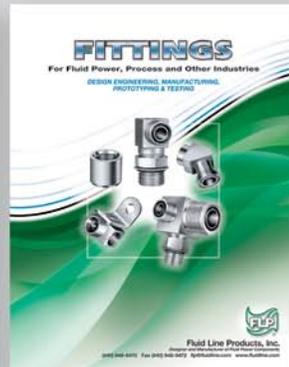
STANDARD PRODUCTS



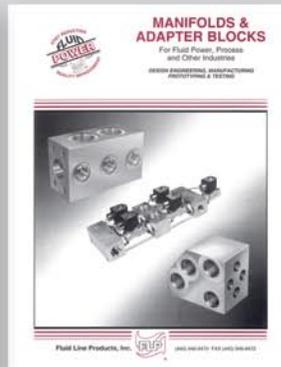
ENGINEERED PRODUCTS



Filter Fittings



Fittings



Manifolds



Metric Conversion Fittings



Fluid Line Products, Inc.

Designer and Manufacturer of Fluid Power Components

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