Catalog L-500

REGO® PRODUCTS

LP-GAS & ANHYDROUS AMMONIA EQUIPMENT

ECII® Engineered Controls International, Inc.

REGO® LP-GAS & ANHYDROUS AMMONIA EQUIPMENT

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- Service Manuals
- Application Guides
- Product Literature
- Product Updates
- Technical Guides

Foreword

This catalog describes a complete line of equipment available from Engineered Controls International, Inc. for use with LP-Gas and anhydrous ammonia (NH_3). The following points are important to know for proper use of the catalog:

1. *Illustrations and drawings of individual products are representative of "product groups" and all products within a product group are similar in construction.*
2. *Materials used for construction of products in this catalog are suitable for rated service pressure at temperatures of -40° F. to +165° F., unless otherwise specified.*
3. *Products in this catalog are only intended for use in LP-Gas and/or anhydrous ammonia service as follows.*
   - **a.** *"A" or "AA" prefix — Products with this prefix are suitable for NH_3 service (i.e., contain no brass parts).*
   - **b.** *"AA" prefix on relief valves — These valves are NOT suitable for use with LP-Gas service. These are of partial aluminum materials and are listed by Underwriters Laboratories (UL) for NH_3 service only.*
   - **c.** *All other products are suitable for use with LP-Gas service.*
   - **d.** *"SS" prefix—Hydrostatic relief valve with this prefix are suitable for NH_3 service (i.e., they have stainless steel materials).*

NOTE: Though this catalog as you see it is a complete collection, each major section was designed to stand on its own. Therefore, you will find some redundancy among the sections, especially in the general cautionary statements and warnings.

Caution

Do not use any product contained in this catalog with any service commodity other than LP-Gas or NH_3. If you have a need for use of another application, contact Engineered Controls International, Inc., 100 RegO Drive, Elon College, NC 27244, (336) 449-7707 before proceeding.

Proper application, installation and maintenance of products in this catalog are essential. Users of these products should obtain further information if there are any doubts or questions.

Notice

Installation, usage, and maintenance of all ECII® products must be in compliance with all Engineered Controls International, Inc. instructions as well as requirements and provisions of NFPA #54, NFPA#58, DOT, ANSI, and all applicable federal, state, provincial and local standards, codes, regulations, and laws.

Inspection and maintenance on a periodic basis is essential. Installation and maintenance should be performed only by qualified personnel.

Be sure all instructions are read and understood before installation, operation and service.

Warning

All ECII® products are mechanical devices that will eventually become inoperative due to wear, corrosion and aging of components made of materials such as rubber. The environment and conditions of use will determine the safe service life of these products. Periodic inspection and maintenance are essential to avoid serious injury and property damage.

Many ECII® products are manufactured for storage, transport, transfer and use of toxic flammable and dangerous liquids and gases. Such substances should be handled by experienced and trained personnel only, using accepted governmental and industrial safety procedures. Never vent LP-Gas near any possible source of ignition.

Filters

ECII® LP-Gas equipment is designed to operate in a system free from contamination. A variety of in-line filters are commercially available to the LP-Gas industry for installation in domestic systems.
The use of an in-line filter should be considered when other system components may be unclean and the system contaminated by rust, scale, dirt, debris or other foreign material.

Determining the Age of Products

All ECII® products are mechanical devices that will eventually become inoperative due to wear, contaminants, corrosion and aging of components made of material such as metal and rubber.

The environment and conditions of use will determine the safe service life of these products. Periodic inspection and maintenance are essential.

Because ECII® products have a long and proven record of quality and service, LP-Gas dealers may forget the hazards that can occur because products are used beyond their safe service life.

The life of a product is determined by the environment in which it "lives." The LP-Gas dealer knows better than anyone what this environment is.

Since 1960, most RegO® / ECII® products are identified with an alphabetical code indicating the month and the year they were manufactured.

Check the product for this code to determine age. If valves or regulators are repainted, take care to keep the date code clear for later identification and inspection.

1960 to 1985 — Two-Letter Date Code

First letter in date code is the month

A — January	G — July
B — February	H — August
C — March	I — September
D — April	J — October
E — May	K — November
F — June	L — December

Relief valves used on ASME tanks carry a numerical code indicating month and year such as 1-75 means January, 1975.

Second letter in date code is the year

R — 1960	A — 1969	J — 1978
S — 1961	B — 1970	K — 1979
T — 1962	C — 1971	L — 1980
U — 1963	D — 1972	M — 1981
V — 1964	E — 1973	N — 1982
W — 1965	F — 1974	O — 1983
X — 1966	G — 1975	P — 1984
Y — 1967	H — 1976	Q — 1985
Z — 1968	I — 1977	

EXAMPLE: DL = April of 1980

From 1985 to 1990 — Digit Date Code

First digit in date code is the month

1 — January	7 — July
2 — February	8 — August
3 — March	9 — September
4 — April	10 — October
5 — May	11 — November
6 — June	12 — December

Second 2 digits in date code are the year

86 — 1986	89 — 1989
87 — 1987	90 — 1990
88 — 1988	

EXAMPLE: 5-87 = May of 1987

After 1990 — Digit-Letter-Digit Date Code

First digit in date code is the month

1 — January	7 — July
2 — February	8 — August
3 — March	9 — September
4 — April	10 — October
5 — May	11 — November
6 — June	12 — December

Letter in date code is the week

A — 1st week
B — 2nd week
C — 3rd week
D — 4th week
E — 5th week

Second 2 digits in date code are the year

91 — 1991	97 — 1997
92 — 1992	98 — 1998
93 — 1993	99 — 1999
94 — 1994	00 — 2000
95 — 1995	01 — 2001
96 — 1996	etcetera . . .

EXAMPLE: 6A92 = First week of June, 1992

RegO® Regulator Color Coding

RegO® domestic first stage, second stage, single stage, and integral twin stage LP-Gas regulators are easy to identify. In addition to a standard part number marking, each regulator is color coded to indicate the proper application and to help minimize misapplication in the field that can lead to accidents and costly service callbacks. The color coding system is standard on all 404, LV404, 2302, LV2302, 2403, 2503, LV4403, and LV5503 series domestic LP-Gas regulators manufactured after May of 1986.

Brilliant Red – First Stage High Pressure Regulators. Normally used in two-stage applications in conjunction with a second stage low pressure regulator.

Select Brown – Regulators with Low Pressure delivery range. Select Brown color is found on both:

- Second Stage Low Pressure Regulators. Normally used in two-stage applications in conjunction with a first stage high pressure regulator.
- Integral Twin Stage Regulators. Designed to provide benefits of two-stage regulation in one compact unit.

Select Blue – Second Stage Regulators for 2 PSIG Systems. Designed to reduce first stage pressure down to 2 PSIG. Normally used in conjunction with a first stage high pressure regulator.

Classic Gold – Single Stage Regulators. Designed to use alone in Single Stage Systems.

L-500 Catalog Cross Reference by Part Number

Limited Warranty and Limitation of Liability

LIMITED WARRANTY

Engineered Controls International, Inc. warrants products and repair kits manufactured by it to be free from defects in materials and workmanship under normal use and service for a period of 12 months from the date of installation or operation or 18 months from the date of shipment from the factory, whichever is earlier. If within thirty days after buyer's discovery of what buyer believes is a defect, buyer notifies Engineered Controls International, Inc. thereof in writing, Engineered Controls International, Inc., at its option, and within forty-five days, will repair, replace F.O.B. point of manufacture, or refund the purchase price of that part or product found by it to be defective. Failure of buyer to give such written notice within thirty days shall be deemed an absolute and unconditional waiver of any and all claims of buyer arising out of such defect.

This warranty does not extend to any product or part that is not installed and used in accordance with Engineered Controls International, Inc.'s printed instructions, all applicable state and local regulations, and all applicable national standards, such as those promulgated by NFPA, DOT and ANSI. This warranty does not extend to any product or part that has been damaged by accident, misuse, abuse or neglect, nor does it extend to any product or part which has been modified, altered, or repaired in the field.

Except as expressly set forth above, and subject to the limitation of liability below, Engineered Controls International, Inc. makes NO OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, with respect to its products and parts, whether used alone or in combination with others. Engineered Controls International, Inc. disclaims all warranties not stated herein.

LIMITATION OF LIABILITY

Engineered Controls International, Inc.'s total liability for any and all losses and damages arising out of any cause whatsoever shall in no event exceed the purchase price of the products or parts in respect of which such cause arises, whether such cause be based on theories of contract, negligence, strict liability, tort or otherwise.

Engineered Controls International, Inc. shall not be liable for incidental, consequential or punitive damages or other losses. Engineered Controls International, Inc. shall not be liable for, and buyer assumes liability for, all personal injury and property damage connected with the handling, transportation, possession, further manufacture, other use or resale of products, whether used alone or in combination with any other products or material.

If Engineered Controls International, Inc. furnishes technical advice to buyer, whether or not at buyer's request, with respect to application, further manufacture or other use of the products and parts, Engineered Controls International, Inc. shall not be liable for such technical advice and buyer assumes all risks of such advice and the results thereof.

NOTE: Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. The warranty gives you specific legal rights, and you may have other rights that vary from State to State. The portions of this limited warranty and limitation of liability shall be considered severable and all portions which are not disallowed by applicable law shall remain in full force and effect.

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Many Engineered Controls International, Inc. products are manufactured components which are incorporated by others on or in other products or systems used for storage, transport, transfer and otherwise for use of toxic, flammable and dangerous liquids and gases. Such substances must be handled by experienced and trained personnel only, using accepted governmental and industrial safety procedures.

NOTICE TO USERS OF PRODUCTS

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Because of a policy of continuous product improvement, Engineered Controls International, Inc. reserves the right to change designs, materials or specification without notice.

Catalog L-500

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ECII® Engineered Controls International, Inc.

Section A

Regulators and Accessories

RegO® Regulator Color Coding

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Except as expressly set forth above, and subject to the limitation of liability below, Engineered Controls International, Inc. makes NO OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, with respect to its products and parts, whether used alone or in combination with others. Engineered Controls International, Inc. disclaims all warranties not stated herein.

LIMITATION OF LIABILITY

Engineered Controls International, Inc.'s total liability for any and all losses and damages arising out of any cause whatsoever shall in no event exceed the purchase price of the products or parts in respect of which such cause arises, whether such cause be based on theories of contract, negligence, strict liability, tort or otherwise.

Engineered Controls International, Inc. shall not be liable for incidental, consequential or punitive damages or other losses. Engineered Controls International, Inc. shall not be liable for, and buyer assumes liability for, all personal injury and property damage connected with the handling, transportation, possession, further manufacture, other use or resale of products, whether used alone or in combination with any other products or material.

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NOTE: Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. The warranty gives you specific legal rights, and you may have other rights that vary from State to State. The portions of this limited warranty and limitation of liability shall be considered severable and all portions which are not disallowed by applicable law shall remain in full force and effect.

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ECII® LP-Gas equipment is designed to operate in a system free from contamination. A variety of in-line filters are commercially available to the LP-Gas industry for installation in domestic systems.
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A

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RegO® Regulator Dependability

When RegO® LP-Gas Regulators are properly installed, safe, precise, trouble-free service is the result.

Dependability is built into every regulator ... the result of rigid standards of quality control and close tolerance machining. And this has been true for more than 60 years.

RegO® Products are manufactured from the finest materials, and assembled and tested using procedures second to none.

All give you a product that provides accurate gas delivery under varying pressure ranges and load conditions.

RegO® LP-Gas Regulators are UL listed and comply with applicable code requirements.

RegO® Products offer a complete line of LP-Gas Regulators with capacities for almost every application.

RegO® Regulator Selection

In order to properly size the RegO® Regulator, find the total load of the installation. The total load is calculated by adding up the input ratings (BTU or CFH) of all appliances in the installation. Input ratings may be obtained from the nameplates on the appliances or from the manufacturers' literature.

Determine the type of regulation needed referring to the chart below.

Type of System	Maximum Load	Suggested Regulator
First Stage in a Two Stage System	1,500,000 (a)	LV3303TR
	2,500,000 (b)	LV4403SR Series LV4403TR Series
Second Stage in a Two Stage System	935,000 (c)	LV4403B Series
	1,600,000 (c)	LV5503B4/B6
	2,300,000 (c)	LV5503B8
	9,800,000	LV6503B Series
Second Stage in a 2 PSIG System	1,000,000	LV4403Y4/Y46R
	2,200,000	LV5503Y6/Y8
Integral Twin Stage	200,000 (d)	LV404B23/29 Series
	525,000 (d)	LV404B4/B9 Series
Automatic Changeover	200,000 (d)	7525B23 Series
	450,000 (d)	7525B4 Series

*** See catalog page for inlet and delivery specifications.**

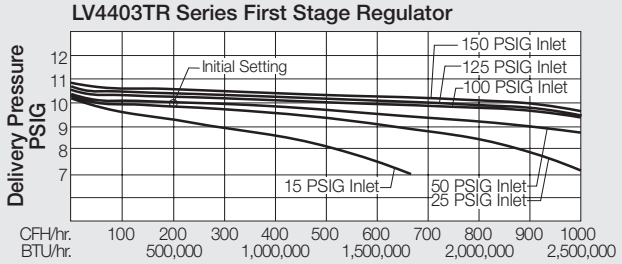
Now determine which regulator in the Series would be most suitable. Turn to the individual product pages and refer to the Performance Curves. Check the performance of the regulator with your actual load conditions at the minimum LP-Gas inlet pressure for the regulator. Use the pressure corresponding to your lowest winter temperatures shown in the chart below or refer to the delivery pressure of your first stage regulator.

Temperature		Approx. Pressure (PSIG)		Temperature		Approx. Pressure (PSIG)	
°F	°C	Propane	Butane	°F	°C	Propane	Butane
-40	-40	3.6		40	4	72	3.0
-30	-34	8		50	10	86	6.9
-20	-29	13.5		60	16	102	12
-10	-23	23.3		70	21	127	17
0	-18	28		80	27	140	23
10	-12	37		90	32	165	29
20	-7	47		100	38	196	36
30	-1	58		110	43	220	45

Example for a First Stage Regulator

1. Assume a load of 500,000 BTU's per hour.
2. Assume a minimum delivery pressure of 9.5 PSIG.
3. Assume a minimum tank pressure of 15 PSIG.
4. For these conditions, refer to chart for the LV4403TR Series, First Stage Regulator, shown below.
5. Find the line on the chart corresponding to the lowest anticipated winter tank pressure (note that each performance line corresponds to and is marked with a different inlet pressure in PSIG).
6. Draw a vertical line upward from the point of assumed load (500,000 BTU's per hour) to intersect with the line corresponding to the lowest tank pressure.
7. Read horizontally from the intersection of these lines to the delivery pressure at the left side of the chart. In this example the delivery pressure will be 9.7 PSIG. Since the delivery pressure will be 9.7 PSIG at the maximum load conditions and lowest anticipated tank pressure, the regulator will be sized properly for the demand.

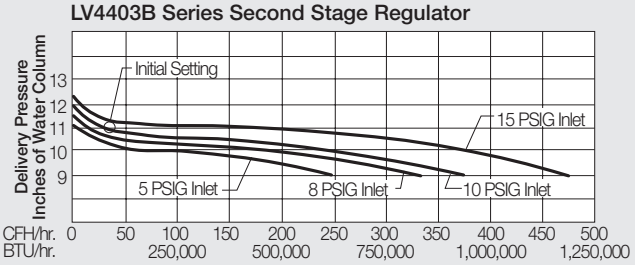
LV4403TR Series First Stage Regulator



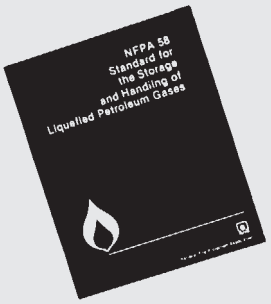
Example for a Second Stage Regulator

1. Assume load of 250,000 BTU's per hour.
2. Assume a minimum delivery pressure of 10" w.c.
3. Assume a minimum inlet pressure of 10 PSIG.
4. For these conditions, refer to chart for the LV4403B Series, Second Stage Regulator, shown below.
5. Find the line on the chart corresponding to the anticipated inlet pressure.
6. Draw a vertical line upward from the point of assumed load (250,000 BTU's per hour) to intersect with the line corresponding to the lowest inlet pressure.
7. Read horizontally from the intersection of these lines to the delivery pressure at the left side of the chart. In this example the delivery pressure will read 10.6" w.c. Since the delivery pressure will be 10.6" w.c. at the maximum load condition and lowest anticipated inlet pressure, the regulator is sized properly for the demand.

LV4403B Series Second Stage Regulator



Safety Warnings



Purpose

In its continuing quest for safety, Engineered Controls International, Inc. publishes a series of bulletins explaining the hazards associated with the use, misuse, and aging of LP-Gas valves and regulators. It is hoped that these factual bulletins will make clear to LP-Gas dealer managers and service personnel, that the utmost care and attention must be used in the installation, inspection, and maintenance of these products, or problems could occur which would result in injuries and property damage.

The National Fire Protection Association Pamphlet #58, "Liquified Petroleum Gas Code" states in section 1, "persons who transfer liquid LP-Gas who are employed to transport LP-Gas, or whose primary duties fall within the scope of this standard shall be trained in proper handling procedures. Refresher training shall be provided at least every three years The training shall be documented". These "ECII® Safety Warnings" may be useful in training new employees and reminding older employees of hazards that can occur.

It is recommended that all employees be furnished with a copy of NPGA Safety Pamphlet 306 "LP-Gas Regulator and Valve Inspection and Maintenance."

Nature of Warnings

It is recognized that warnings should be as brief as possible, but the factors involved in regulator failures are not simple. They need to be fully understood so that proper maintenance programs can be established. If there is a simple warning, it would be:

Inspect regulators regularly as outlined in this safety warning and replace as required per these recommendations. When all of these recommendations are followed, the recommended service life of an ECII/RegO® regulator (except single stage) manufactured after 1995 is 25 years. The recommended service life of all other ECII/RegO® regulators is 15 years.

LP-Gas Regulators

This bulletin applies most particularly to permanent LP-Gas installations of cylinders and tanks. The warnings also apply in most cases to portable installations of recreational vehicles, barbecue grills, etc.

This bulletin is not intended to be an exhaustive treatment of the subject of regulators and certainly does not cover all safety practices that should be followed in the installation and maintenance of LP-Gas systems.

It should not be necessary to remind readers of this bulletin that regulators must be installed in strict conformance with NFPA Pamphlets 54 and 58, and all other applicable codes and regulations. Codes, regulations and manufacturer's recommendations have been developed by experts with many years of experience in the LP-Gas industry.

Failure to fully follow these codes, regulations and recommendations could result in hazardous installations.

Pamphlet 58 states "All regulators for outdoor installations, except regulators used for portable industrial applications, shall be designed, installed or protected so their operation will not be affected by the elements (freezing rain, sleet, snow, ice, mud or debris). This protection may be integral with the regulator."

Failed and/or Inoperative Regulators

Failed regulators can cause three kinds of hazards:

- High pressure LP-Gas in a system downstream of the regulator; and
- Leaks of LP-Gas to atmosphere from the regulator itself.
- Loss of pressure due to a "freeze-up" in the orifice.

High Pressure LP-Gas in a System

Anything that prevents a regulator from regulating properly could result in high pressure gas at the regulator outlet and thus in a system.

High pressure gas into piping and appliances could cause piping leaks and damage to appliance burner controls with the potential for fires and explosions.

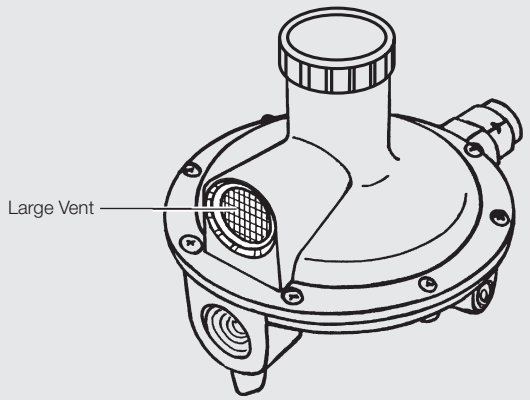
The Causes of High Pressure Gas in a System are:

1. Regulator vents that are clogged or obstructed.

Vents must be clear and fully open at all times.

Many regulators are equipped with a pressure relief valve which discharges to atmosphere through the vent. Ice, snow drifts, dirt, bugs, paint, or other foreign material can clog the vents.

An obstructed vent may prevent the pressure relief valve from operating properly.



Regulators should be installed with the vent facing down or protected so their operation will not be affected by the elements. In cases where the regulator vent is equipped with a discharge tube, the outlet of this tube must be facing down. The vents and/or discharge tubes must be protected from the elements and must be equipped with a screen to prevent bugs from obstructing the opening.

Action Required: Regulators should be properly installed and regularly inspected when tanks or cylinders are filled. If vents are clogged or the screen is missing, they must be cleaned or replaced. If the vent screen is missing and there is evidence of foreign material around the vent, the regulator should be replaced.

2. Foreign material lodging between the regulator nozzle and seat disc:

When this occurs, the regulator can remain open, allowing high pressure gas into the system.

This material can come from system piping between the container shut-off valve and the regulator. Chips created during piping installation or dirty piping can create this hazard. Corrosion inside of copper pigtails and piping can cause problems. This can occur particularly when LP-Gas contains high sulphur or excessive moisture.

Action Required: Make sure regulator inlet piping is clean at the time of installation. Periodic checks should be made to assure piping remains clean without corrosion. Never use old pigtails on new LP-Gas installations. Old pigtails can also work harden and crack if they have been bent and twisted several times.

3. Wrong regulator installed for the application:

The proper regulator must be used for each system.

For example, installation of high pressure regulators not designed to reduce gas pressure to an appliance requirement of 11" w.c. will cause a hazard. Installing a regulator undersized for the load can cause improper combustion at the appliance burner with a potential for carbon monoxide poisoning.

Action Required: Make sure the regulator is correct for each application and test the system with a pressure gauge or a manometer.

4. Failure to external mechanical parts due to corrosion:

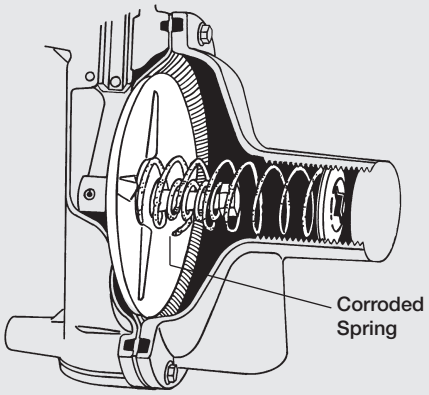
Adjusting springs and relief valve springs can rapidly corrode if exposed to salt air or industrial pollution. Even moisture condensation on these springs can cause them to rust and fail.

Failure of these springs will result in failure of the regulator to control the pressure.

With the vent of a regulator facing down, corrosion products from the springs could clog the regulator vent screen blocking the vent.

Action Required: Regulator inspection for corrosion should be made according to the guidelines listed below:

- For underground installations subject to submersion, the regulator should be inspected **every** time the container is filled.
- For known corrosive atmospheres of salt air or chemical pollution, the regulator should be inspected at least once a year.
- For other applications, the regulator should be inspected every 3 years.



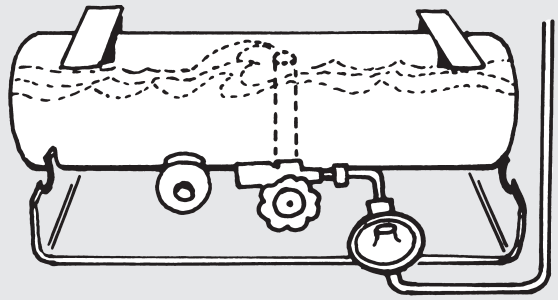
A casual inspection for corrosion can be made by examining the surface and looking into the bonnet after the bonnet cap has been removed. This sometimes will alert the inspector to corrosive conditions. Certainly, the regulator should be examined in more detail by a qualified and trained technician. For single stage, second stage and twin stage regulators remove the bonnet cap and examine the inside of the bonnet with a strong flashlight. For first stage regulators that have a bonnet cap, shut down the system, remove the bonnet cap and spring and examine the inside of the bonnet with a strong flashlight. After the inspection, the regulator must be adjusted to the proper pressure.

If any corrosion is evident, replace the regulator.

It is essential that the regulator bonnet cap be tightly in place at all times to prevent the entrance of water, bugs, dirt, etc. Foreign material can cause the regulator to function improperly with potentially hazardous results.

5. Liquid propane in the regulator:

This can occur on recreational vehicles, unless the regulator is installed substantially higher than the container shut-off valve. Here, sloshing propane could get into the regulator with the resulting high pressure downstream of the regulator. It could also occur on stationary installations if the regulator is installed below the shut-off valve and the container is over-filled.



Action Required: Be careful of regulator installation and never overfill any LP-Gas container.

Leaks of LP-Gas to Atmosphere

While the occurrences of leaking regulators are rare, they can and do occur with a potential for fires and explosions.

These leaks can be caused by:

1. Corrosion of the relief valve spring or foreign material on the seat disc which causes the relief valve to open, will cause LP-Gas to escape through the regulator vent, as well as permitting high pressure into the system.

Action Required: Regulator inspection for corrosion should be made according to the guidelines listed below:

- For underground installations subject to submersion, the regulator should be inspected **every** time the container is filled.
- For known corrosive atmospheres of salt air or chemical pollution, the regulator should be inspected at least once a year.
- For other applications, the regulator should be inspected every 3 years.

A casual inspection for corrosion can be made by examining the surface and looking into the bonnet after the bonnet cap has been removed. This sometimes will alert the inspector to corrosive conditions. Certainly, the regulator should be examined in more detail by a qualified and trained technician. For single stage, second stage and twin stage regulators remove the bonnet cap and examine the inside of the bonnet with a strong flashlight. For first stage regulators that have a bonnet cap, shut down the system, remove the bonnet cap and spring and examine the inside of the bonnet with a strong flashlight. After the inspection, the regulator must be adjusted to the proper pressure.

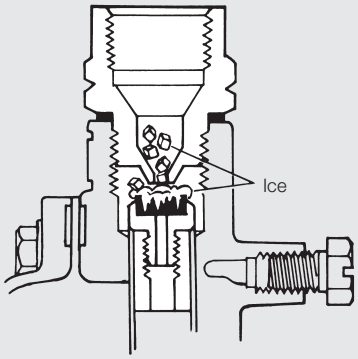
If any corrosion is evident, replace the regulator.

2. Bad piping connections at the regulator inlet and outlet. This can occur at the time of installation where connections are loose or the regulator may have been overstressed by excessive wrenching. It is important that proper wrenches, both on the piping and on the regulator inlet and outlet, be used when connecting the system piping, and that the regulator die cast body is not cracked by wrenching the pipe too deeply into the body.

Action Required: Always test for leaks at time of installation and inspect for leaks if there is reason to believe that pipe connections could cause a hazard.

Loss of Pressure

Freeze-up inside the regulator.



This will prevent the regulator from regulating properly.

Regulator freeze-ups occur because there is excessive moisture in the gas. Freeze-ups can also occur in pigtails that are kinked or bent where free flow of the LP-Gas is restricted. These freeze-ups can occur when the moisture, gas flow and temperature combine to create a hazardous condition. Freeze-ups can occur at temperatures above 32° F.

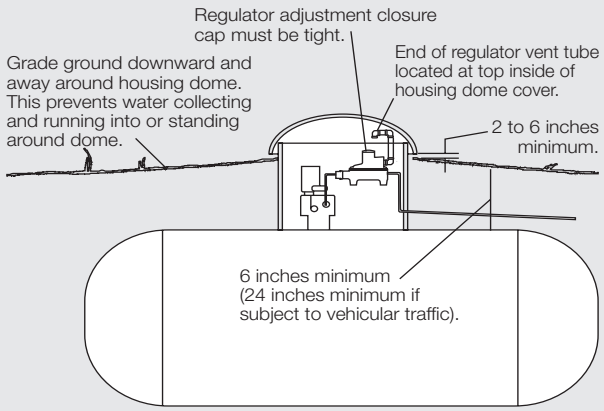
Action Required: All LP-Gas should be checked for moisture content prior to delivery to consumers and proper amounts of anhydrous methanol added if the gas cannot be returned to the supplier. Any container suspected of having excessive moisture should be treated with the proper amount of methanol.

Underground Installations

Special hazards can occur if regulators are not properly installed in underground systems. Water, dirt, mud and insects can get into the regulator if the bonnet cap is not tightly in place and the vent is not protected with a proper vent tube, opening above any potential water level.

Most problems occur because the waterproof dome on the buried storage tank does not extend above the ground level sufficiently to keep out water and mud.

Refer to NPGA No. 401.



Note: Water mark left in housing dome at level above regulator vent, or end of vent tube requires replacement of regulator. Then correct installation.

Customer Safety

Since regulators are often used by consumers without previous knowledge of the hazards of LP-Gas, and the LP-Gas dealers are the only ones who have direct contact with the consumers,

It is the dealer's responsibility to make sure that his customers are properly instructed in safety matters relating to their installation.

At the very minimum, it is desirable that these customers:

1. **Know the odor of LP-Gas and what to do in case they smell gas. Use the NPGA "Scratch 'n Sniff" leaflet.**
2. **Are instructed to never tamper with the system.**
3. **Know that when protective hoods are used to enclose regulators and/or valves, that these hoods must be closed, but not locked.**
4. **Keep snow drifts from covering regulators.**
5. **Know the location of the cylinder or tank shut-off valve in emergencies.**

General Warning

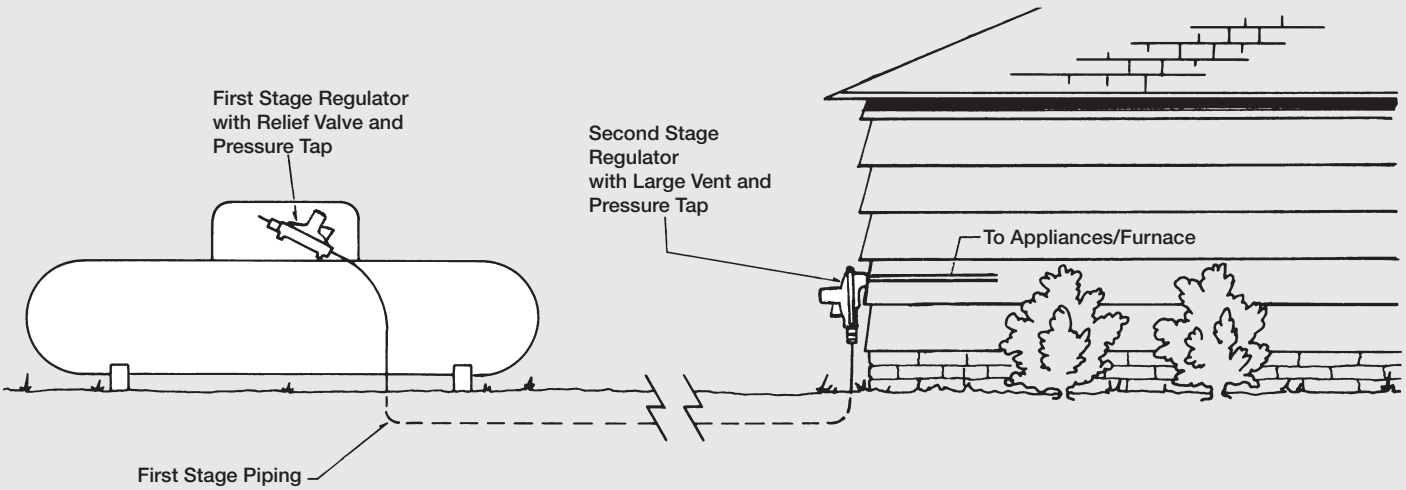
All ECII® Products are mechanical devices that will eventually become inoperative due to wear, contaminants, corrosion and aging of components made of materials such as metal and rubber. As a general recommendation, regulators should be replaced in accordance with all of the recommendations outlined in this safety warning. The recommended service life of a regulator is one of many factors that must be considered in determing when to replace a regulator.

The environment and conditions of use will determine when a regulator should be replaced and these are best determined by the LP-Gas dealer. Periodic inspection and maintenance per this safety warning is essential.

Because ECII® Products have a long and proven record of quality and service, LP-Gas dealers may forget the hazards that can occur because a regulator is used beyond its safe service life. Life of a regulator is determined by the environment in which it "lives." The LP-Gas dealer knows better than anyone what this environment is.

NOTE: There is a developing trend in state legislation and in proposed national legislation to make the owners of products responsible for replacing products before they reach the end of their safe useful life. LP-Gas dealers should be aware of legislation which could affect them.

Advantages of Two-Stage Regulation



The regulator is truly the heart of an LP-Gas installation. It must compensate for variations in tank pressure from as low as 8 PSIG to 220 PSIG – and still deliver a steady flow of LP-Gas at 11" w.c. to consuming appliances. The regulator must deliver this pressure despite a variable load from intermittent use of the appliances.

Though a single-stage system may perform adequately in many installations, the use of a two-stage system offers the ultimate in pin-point regulation. Two-stage regulation can result in a more profitable LP-Gas operation for the dealer resulting from less maintenance and fewer installation callbacks – and there is no better time than now for installing RegO® Regulators in two-stage systems.

Uniform Appliance Pressure

The installation of a two-stage system – one high pressure regulator at the container to compensate for varied inlet pressures, and one low pressure regulator at the building to supply a constant delivery pressure to the appliances – helps ensure maximum efficiency and trouble-free operation year-round. It is important to note that while pressure at the appliances can vary up to 4" w.c. using single-stage systems, two-stage systems keep pressure variations within 1" w.c. New high-efficiency appliances require this closer pressure control for proper ignition and stable, efficient operation. In fact, one major manufacturer requires the use of two-stage systems with their appliances.

Reduced Freeze-ups/Service Calls

Regulator freeze-up occurs when moisture in the gas condenses and freezes on cold surfaces of the regulator nozzle. The nozzle becomes chilled when high pressure gas expands across it into the regulator body. This chilling action is more severe in single-stage systems as gas expands from tank pressure to 11" w.c. through a single regulator nozzle.

Two-stage systems can greatly reduce the possibility of freeze-ups and resulting service calls as the expansion of gas from tank pressure to 11" w.c. is divided into two steps, with less chilling effect at each regulator. In addition, after the gas exits the first-stage regulator and enters the first-stage transmission line, it picks up heat from the line, further reducing the possibility of second-stage freeze-up.

Service calls for pilot outages and electronic ignition system failures are also reduced as a result of more uniform appliance pressure from two-stage systems.

Economy of Installation

In a single-stage system, transmission line piping between the container and the appliances must be large enough to accommodate the required volume of gas at 11" w.c. In contrast, the line between the first and second stage regulators in two-stage systems can be much smaller as it delivers gas at 10 PSIG to the second-stage regulator. Often the savings in piping cost will pay for the second regulator.

As an additional benefit, single-stage systems can be easily converted to two-stage systems using existing supply lines when they prove inadequate to meet added loads. This is the least expensive and best method of correcting the problem.

Allowance for Future Appliances

A high degree of flexibility is offered in new installations of two-stage systems. Appliances can be added later to the present load – provided the high pressure regulator can handle the increase – by the addition of a second low pressure regulator. Since appliances can be regulated independently, demands from other parts of the installation will not affect their individual performances.

Size The System Correctly

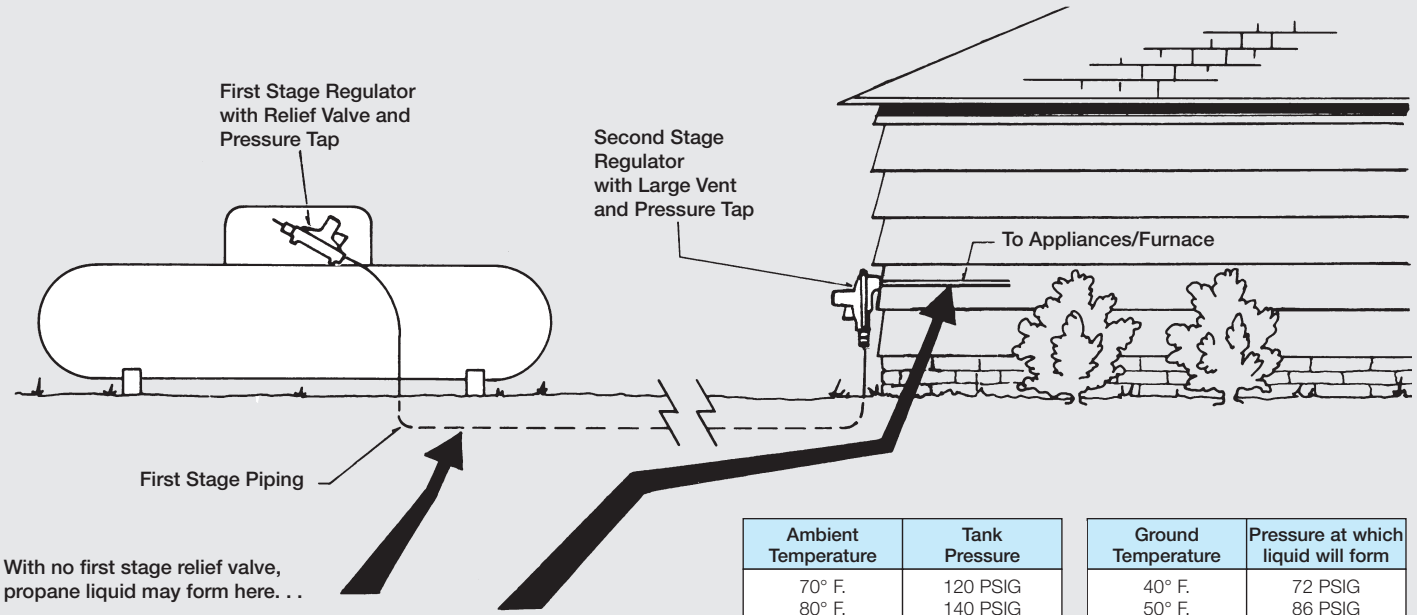
Prior to installing your two-stage system, be sure the system pipe and tubing is properly sized. Proper sizing will help ensure constant delivery pressure to the appliances during fluctuating loads at all times. Just as important, be sure the RegO® Regulators you choose are capable of handling the desired load. This is another advantage of two-stage systems – they are capable of handling much more BTU's/hr. than single-stage systems. The RegO® "LP-Gas Serviceman's Manual" provides complete information on pipe sizing and proper regulator selection.

Replace Pigtails

If you are replacing an old regulator, remember to replace the copper pigtail. The old pigtail may contain corrosion which can restrict flow. In addition, corrosion may flake off and wedge between the regulator orifice and seat disc – preventing proper lock-up.

Two-Stage LP-Gas Systems ...

Require First Stage Regulators with Built-in Relief Valves



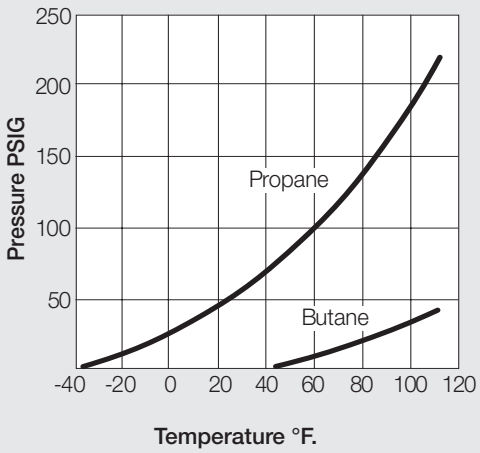
Resulting in sudden pressure surge due to flashing into vapor here! First stage relief can prevent liquid from forming in first stage piping during periods with no gas demand! ! !

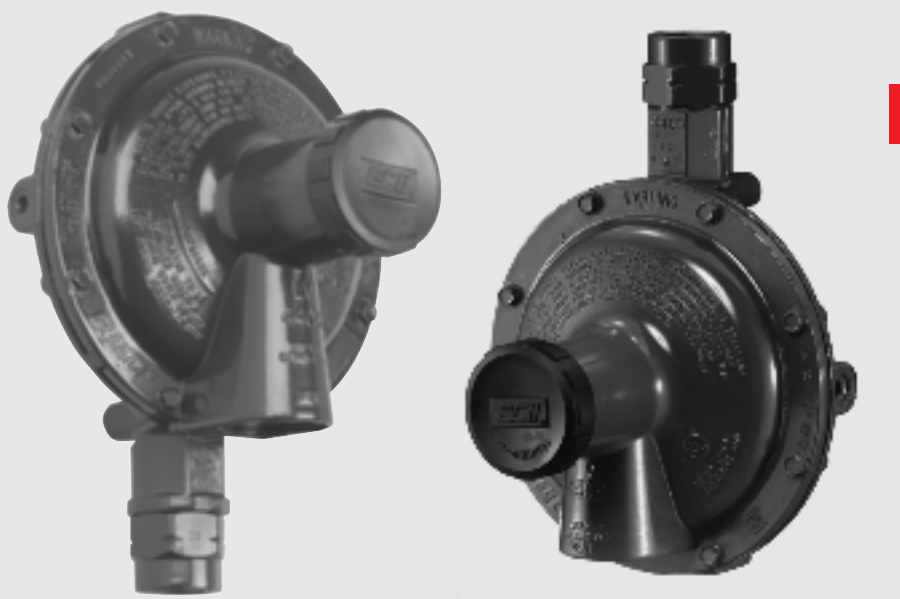
Ambient Temperature	Tank Pressure
70° F.	120 PSIG
80° F.	140 PSIG
90° F.	165 PSIG

Ground Temperature	Pressure at which liquid will form
40° F.	72 PSIG
50° F.	86 PSIG
60° F.	102 PSIG

Pressure at which liquid can form at various temperatures.

Vapor Pressures of LP Gases





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The Problem

Many modern LP-Gas appliances are equipped with pilotless ignition systems. Water heaters and older appliances use pilot lights, but it has become a common practice for energy conscious homeowners to shut-off the pilot when leaving home for extended periods of time. In each instance, there is **no gas demand at all** for extended periods.

The Consequences

If the first stage regulator fails to lock-up tight, usually as a result of a worn seat disc or foreign material lodged between nozzle and seat disc, pressure will build-up in the first stage piping – possibly to a level that approaches tank pressure. Combining this with warm ambient temperatures and cool ground, **propane liquid may form** in the first stage piping.

When gas demand resumes, this liquid may pass through the second stage regulator into the appliances and furnace. NOTE – the second stage regulator will not relieve the pressure in first stage piping. The rapid vaporization of the liquid may cause a rapid pressure surge that could seriously damage critical components of the appliance and furnace controls.

A fire or explosion could occur as a consequence.

The Solution

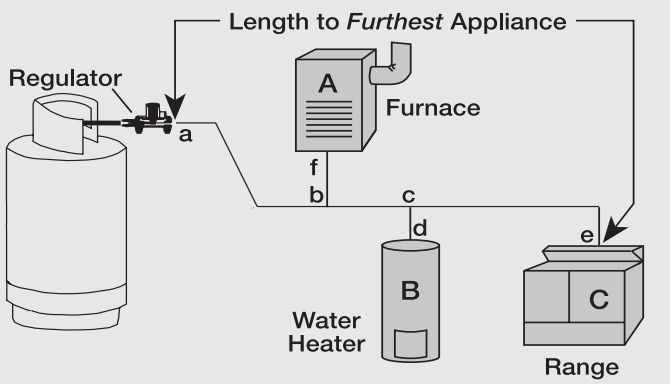
RegO® LV4403 Series First Stage Regulators with Built-In Relief Valves reduce the possibility of this serious hazard in two stage applications. The built-in relief valve is designed to vent as needed and reduce the possibility of first stage piping pressure from becoming high enough to form liquid.

Pipe and Tubing Selection Guide

Use the following simple method to assure the selection of the correct sizes of piping and tubing for LP-Gas vapor systems. Piping between first and second stage regulators is considered, as well as low pressure (inches water column) piping between second stage, single stage, or integral twin stage regulators and appliances.

Instructions:

1. Determine the total gas demand for the system by adding up the BTU/hr input from the appliance nameplates and adding demand as appropriate for future appliances.
2. For second stage or integral twin stage piping:
   A. Measure length of piping required from outlet of regulator to the appliance *furthest away. No other length is necessary to do the sizing.*
   B. Make a simple sketch of the piping, as shown.
   C. Determine the capacity to be handled by each section of piping. For example, the capacity of the line between a and b must handle the total demand of appliances A, B, and C; the capacity of the line from c to d must handle only appliance B, etc.
   D. Using Table 3 select proper size of tubing or pipe for each section of piping, using values in BTU/hr for the length determined from step #2-A. If exact length is not on chart, use next longer length. Do not use any other length for this purpose! Simply select the size that shows at least as much capacity as needed for each piping section.
3. For piping between first and second stage regulators
   A. For a simple system with only one second stage regulator, merely measure length of piping required between outlet of first stage regulator and inlet of second stage regulator. Select piping or tubing required from Table 1.



   B. For systems with multiple second stage regulators, measure length of piping required to reach the second stage regulator that is furthest away. Make a simple sketch, and size each leg of piping using Table 1, 2, or 3 using values shown in column corresponding to the length as measured above, same as when handling second stage piping.

Example 1

Determine the sizes of piping or tubing required for the twin-stage LP-Gas installation shown.

Total piping length = 84 feet (use Table 3 @90 feet)

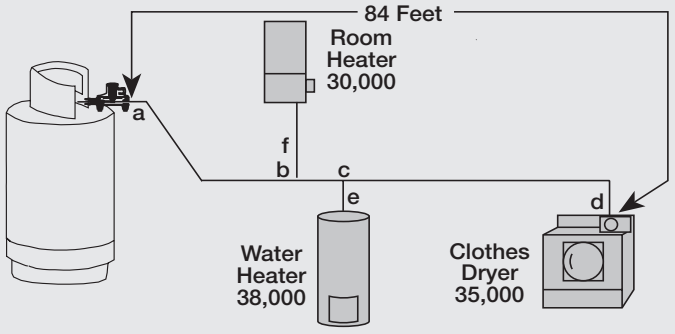
From a to b, demand = 38,000 + 35,000 + 30,000
= 103,000 BTU/hr; use 3/4" pipe

From b to c, demand = 38,000 + 35,000
= 73,000 BTU/hr; use 1/2" pipe or 3/4" tubing

From c to d, demand = 35,000 BTU/hr; use 1/2" pipe or 5/8" tubing

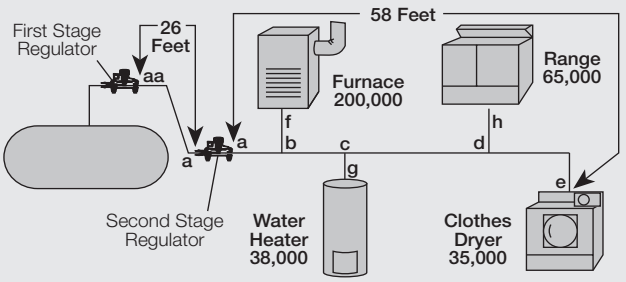
From c to e, demand = 38,000 BTU/hr; use 1/2" pipe or 5/8" tubing

From b to f, demand = 30,000 BTU/hr; use 1/2" pipe or 1/2" tubing



Example 2.

Determine the sizes of piping or tubing required for the two-stage LP-Gas installation shown.



Total first stage piping length = 26 feet; first stage regulator setting is 10psig (use Table 1 or 2 @ 30 feet)

From aa to a, demand = 338,000 BTU/hr; use 1/2" pipe, 1/2" tubing, or 1/2" T plastic pipe.

Total second stage piping length = 58 feet (use Table 3 @ 60 feet)

From a to b, demand = 338,000 BTU/hr; use 1" pipe

From b to c, demand = 138,000 BTU/hr; use 3/4" pipe or 7/8" tubing

From c to d, demand = 100,000 BTU/hr; use 1/2" pipe or 3/4" tubing

From d to e, demand = 35,000 BTU/hr; use 1/2" pipe or 1/2" tubing

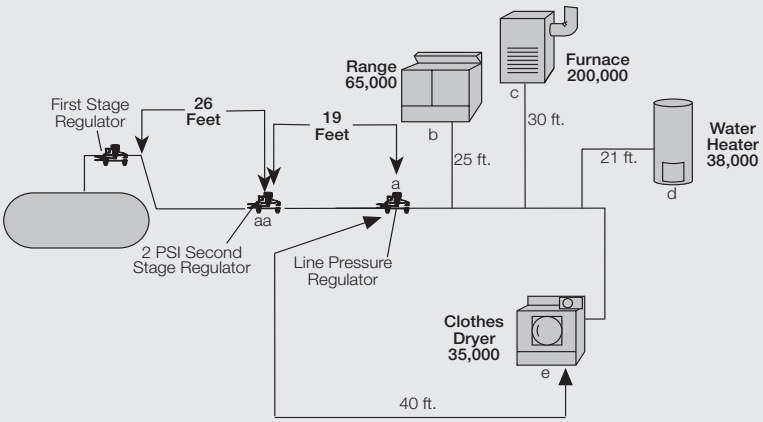
From b to f, demand = 200,000 BTU/hr; use 3/4" pipe or 7/8" tubing

From c to g, demand = 38,000 BTU/hr; use 1/2" pipe or 1/2" tubing

From d to h, demand = 65,000 BTU/hr; use 1/2" pipe or 5/8" tubing

Example 3

Determine the sizes of piping or tubing required for the 2 PSI LP-Gas installation shown.



Total first stage piping length = 26 feet; first stage regulator setting is 10psig (use Table 1 or 2 @ 30 feet)

Total 2 PSI Piping Length = 19 ft. (use Table 4 @ 20 ft. or Table 6 @ 20 ft.)

From aa to a, demand= 338,000 BTU
use 3/8" CSST or 1/2" copper tubing or 1/2" pipe

From Regulator a to each appliance:

From a to b, demand= 65,000 BTU; length = 25 ft. (Table 5),
use 1/2" CSST

From a to c, demand= 200,000 BTU; length = 30 ft. (Table 5)
use 3/4" CSST

From a to d, demand= 38,000 BTU; length = 21 ft.* (Table 5)
use 3/8" CSST *use 25 ft. column

From a to e, demand= 35,000 BTU; length = 40 ft. (Table 5)
use 1/2" CSST

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Table 1 – First Stage Pipe Sizing (Between First and Second Stage Regulators)

10 PSIG Inlet with a 1 PSIG Pressure Drop
Maximum capacity of pipe or tubing, in thousands of BTU/hr or LP-Gas

Size of Pipe or Copper Tubing, Inches		Length of Pipe or Tubing, Feet*																			
		10	20	30	40	50	60	70	80	90	100	125	150	175	200	225	250	275	300	350	400
Copper	3/8	558	383	309	265	235	213	196	182	171	161	142	130	118	111	104	90	89	89	82	76
Tubing	1/2	1387	870	700	599	531	481	443	412	386	365	323	293	269	251	235	222	211	201	185	172
(O.D.)	5/8	2360	1622	1303	1115	988	896	824	767	719	679	601	546	502	467	438	414	393	375	345	321
	3/4	3993	2475	2205	1887	1672	1515	1394	1297	1217	1149	1018	923	843	790	740	700	664	634	584	543
Pipe Size	1/2	3339	2295	1843	1577	1398	1267	1165	1084	1017	961	852	772	710	660	619	585	556	530	488	454
	3/4	6982	4799	3854	3298	2923	2649	2437	2267	2127	2009	1780	1613	1484	1381	1296	1224	1162	1109	1020	949
	1	13153	9040	7259	6213	5507	4989	4590	4270	4007	3785	3354	3039	2796	2601	2441	2305	2190	2089	1922	1788
	1-1/4	27004	18560	14904	12756	11306	10244	9424	8767	8226	7770	6887	6240	5741	5340	5011	4733	4495	4289	3945	3670
	1-1/2	40461	27809	22331	19113	16939	15348	14120	13136	12325	11642	10318	9349	8601	8002	7508	7092	6735	6426	5911	5499
	2	77924	53556	43008	36809	32623	29559	27194	25299	23737	22422	19871	18005	16564	15410	14459	13658	12971	12375	11385	10591

* Total length of piping from outlet of first stage regulator to inlet of second state regulator (or to inlet of second stage regulator furthest away).
Notes: 1) To allow 2 PSIG pressure drop, multiply total gas demand by .707, and use capacities from table.
2) For different first stage pressures, multiply total gas demand by the following factors, and use capacities from table.
Ex: 1,000,000 BTU load at 5 PSI: 1,000,000 (1.12) = 1,200,000 BTU then use chart bases on 1,200,000 BTU

First Stage Pressure PSIG	Multiply By
20	.844
15	.912
5	1.120

Data Calculated per NFPA #54 & 58

Table 2 – First Stage Plastic Tubing Sizing

10 PSIG Inlet with a 1 PSIG Pressure Drop
Maximum capacity of plastic tubing in thousands of BTU/hr of LP-Gas

Size of Plastic Tubing		Length of Tubing, Feet*																			
NPS	SDR	10	20	30	40	50	60	70	80	90	100	125	150	175	200	225	250	275	300	350	400
1/2T	7.00	1387	954	766	655	581	526	484	450	423	399	354	321	295	274	257	243	231	220	203	189
1/2	9.33	3901	2681	2153	1843	1633	1480	1361	1267	1188	1122	995	901	829	772	724	684	649	620	570	530
3/4	11.00	7811	5369	4311	3690	3270	2963	2726	2536	2379	2248	1992	1805	1660	1545	1499	1369	1300	1241	1141	1062
1T	11.50	9510	6536	5249	4492	3981	3607	3319	3088	2897	2736	2425	2197	2022	1881	1765	1667	1583	1510	1389	1293
1T	12.50	10002	6874	5520	4725	4187	3794	3490	3247	3046	2878	2551	2311	2126	1978	1856	1753	1665	1588	1461	1359
1	11.00	14094	9687	7779	6658	5901	5346	4919	4578	4293	4055	3594	3257	2996	2787	2615	2470	2346	2238	2059	1916
1¼	10.00	24416	16781	13476	11534	10222	9262	8521	7927	7438	7026	6226	5642	5190	4829	4531	4280	4064	3878	3567	3318
2	11.00	66251	45534	36566	31295	27737	25131	23120	21509	20181	19063	16895	15308	14084	13102	12293	11612	11028	10521	9680	9005

* Total length of piping from outlet of first stage regulator to inlet of second state regulator or to inlet of second stage regulator furthest away.

First Stage Pressure PSIG	Multiply By
20	.844
15	.912
5	1.120

Data Calculated per NFPA #54 & 58

Table 3 – Second Stage or Integral Twin Stage Pipe Sizing

11 Inches Water Column Inlet with a 1/2 Inch Water Column Drop
Maximum capacity of pipe or tubing in thousands of BTU/hr of LP-Gas

Size of Pipe or Copper Tubing, Inches		Length of Pipe or Tubing, Feet*																			
		10	20	30	40	50	60	70	80	90	100	125	150	175	200	225	250	275	300	350	400
Copper	3/8	49	34	27	23	20	19	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tubing	1/2	110	76	61	52	46	42	38	36	33	32	—	—	—	—	—	—	—	—	—	—
(O.D.)	5/8	206	151	114	97	86	78	71	67	62	59	—	—	—	—	—	—	—	—	—	—
	3/4	348	239	192	164	146	132	120	113	105	100	—	—	—	—	—	—	—	—	—	—
	7/8	536	368	296	253	224	203	185	174	161	154	—	—	—	—	—	—	—	—	—	—
Pipe	1/2	291	200	161	137	122	110	102	94	87	84	74	67	62	58	54	51	48	46	43	40
Size	3/4	608	418	336	287	255	231	212	198	185	175	155	141	129	120	113	107	101	97	89	83
	1	1146	788	632	541	480	435	400	372	349	330	292	265	244	227	213	201	191	182	167	156
	1-1/4	2353	1617	1299	1111	985	892	821	764	717	677	600	544	500	465	437	412	392	374	344	320
	1-1/2	3525	2423	1946	1665	1476	1337	1230	1144	1074	1014	899	815	749	697	654	618	587	560	515	479
	2	6789	4666	3747	3207	2842	2575	2369	2204	2068	1954	1731	1569	1443	1343	1260	1190	1130	1078	992	923

* Total length of piping from outlet of regulator to appliance furthest away.

Data Calculated per NFPA #54 & 58

Table 4-Maximum Capacity of CSST

In Thousands of BTU per hour of undiluted LP-Gases
Pressure of 2 psi and a pressure drop of 1 psi (Based on a 1.52 Specific Gravity Gas)*

Size	EHD** Flow Designation	Length of Tubing, Feet													
		10	25	30	40	50	75	80	110	150	200	250	300	400	500
3/8	13	426	262	238	203	181	147	140	124	101	86	77	69	60	53
	15	558	347	316	271	243	196	189	169	137	118	105	96	82	72
1/2	18	927	591	540	469	420	344	333	298	245	213	191	173	151	135
	19	1106	701	640	554	496	406	393	350	287	248	222	203	175	158
3/4	23	1735	1120	1027	896	806	663	643	578	477	415	373	343	298	268
	25	2168	1384	1266	1100	986	809	768	703	575	501	448	411	355	319
	30	4097	2560	2331	2012	1794	1457	1410	1256	1021	880	785	716	616	550
1	31	4720	2954	2692	2323	2072	1685	1629	1454	1182	1019	910	829	716	638

Table does not include effect of pressure drop across the line regulator. If regulator loss exceeds 1/2 psi (based on 13 in. water column outlet pressure), **DO NOT USE THIS TABLE.** Consult with regulator manufacturer for pressure drops and capacity factors. Pressure drops across a regulator may vary with flow rate.
CAUTION: Capacities shown in table may exceed maximum capacity for a selected regulator. Consult with regulator or tubing manufacturer for guidance.
*Table includes losses for four 90-degree bends and two end fittings. Tubing runs with larger number of bends and/or fittings shall be increased by an equivalent length of tubing according to the following equation: L-1.3n where L is additional length (ft) of tubing and n is the number of additional fittings and/or bends.
**EHD — Equivalent Hydraulic Diameter — A measure of the relative hydraulic efficiency between different tubing sizes. The greater the value of EHD, the greater the gas capacity of the tubing.

Table 5-Maximum Capacity of CSST

In Thousands of BTU per hour of undiluted LP-Gases
Pressure of 11 Inch Water Column and a Pressure Drop of 0.5 Inch Water Column
(Based on a 1.52 Specific Gravity Gas)*

Size	EHD** Flow Designation	Length of Tubing, Feet																
		5	10	15	20	25	30	40	50	60	70	80	90	100	150	200	250	300
3/8	13	72	50	39	34	30	28	23	20	19	17	15	15	14	11	9	8	8
	15	99	69	55	49	42	39	33	30	26	25	23	22	20	15	14	12	11
1/2	18	181	129	104	91	82	74	64	58	53	49	45	44	41	31	28	25	23
	19	211	150	121	106	94	87	74	66	60	57	52	50	47	36	33	30	26
	23	355	254	208	183	164	151	131	118	107	99	94	90	85	66	60	53	50
3/4	25	426	303	248	216	192	177	153	137	126	117	109	102	98	75	69	61	57
	30	744	521	422	365	325	297	256	227	207	191	178	169	159	123	112	99	90
1	31	863	605	490	425	379	344	297	265	241	222	208	197	186	143	129	117	107

*Table includes losses for four 90-degree bends and two end fittings. Tubing runs with larger number of bends and/or fittings shall be increased by an equivalent length of tubing according to the following equation: L = 1.3n where L is additional length (ft) of tubing and n is the number of additional fittings and/or bends.
**EHD — Equivalent Hydraulic Diameter — A measure of the relative hydraulic efficiency between different tubing sizes. The greater the value of EHD, the greater the gas capacity of the tubing.

Table 6 – Copper Tube Sizing or Schedule 40 Pipe Sizing*

In Thousands of BTU per hour of undiluted LP-Gases
2 PSIG inlet with a 1PSIG pressure drop

Size of Pipe or Copper Tubing, Inches		Length of Pipe or Tubing, Feet*																			
		10	20	30	40	50	60	70	80	90	100	150	200	250	300	350	400	450	500	600	700
Copper	3/8	451	310	249	213	189	171	157	146	137	130	104	89	79	72	66	61	58	54	49	45
Tubing	1/2	1020	701	563	482	427	387	356	331	311	294	236	202	179	162	149	139	130	123	111	102
(O.D.)	5/8	1900	1306	1049	898	795	721	663	617	579	547	439	376	333	302	278	258	242	229	207	191
	3/4	3215	2210	1774	1519	1346	1219	1122	1044	979	925	743	636	563	511	470	437	410	387	351	323
Pipe	1/2	2687	1847	1483	1269	1125	1019	938	872	819	773	621	531	471	427	393	365	343	324	293	270
Size	3/4	5619	3862	3101	2654	2352	2131	1961	1824	1712	1617	1298	1111	985	892	821	764	717	677	613	564
	1	10585	7275	5842	5000	4431	4015	3694	3436	3224	3046	2446	2093	1855	1681	1546	1439	1350	1275	1155	1063
	1-1/4	21731	14936	11994	10265	9098	8243	7584	7055	6620	6253	5021	4298	3809	3451	3175	2954	2771	2618	2372	2182
	1-1/2	32560	22378	17971	15381	13632	12351	11363	10571	9918	9369	7524	6439	5707	5171	4757	4426	4152	3922	3554	3270
	2	62708	43099	34610	29621	26253	23787	21884	20359	19102	18043	14490	12401	10991	9959	9162	8523	7997	7554	6844	6297

RegO® Regulator Designs

Typical of the LV4403 Low Pressure Regulators and LV4403 High Pressure Regulators.

RegO® LP-Gas Regulators have been designed to give outstanding performance and dependability with a minimum of maintenance.

Nozzle Orifice
Replaceable and precision machined to prevent scoring of the seat disc.

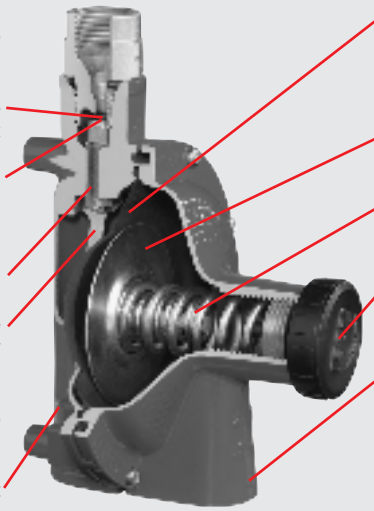
Seat Disc
Replaceable, resilient construction gives sure closing at lock up pressure. Straight line seat disc to nozzle operation provides even seat disc wear and positive lock up.

Pivot Pin
Fully enclosed in regulator body.

Control Linkage
Provides quick response to diaphragm movement; moves directly perpendicular to nozzle orifice to meter gas flow, give positive closure and reduce seat disc wear.

Built-In Pressure Tap
Provides a convenient way to check downstream pressure on both high and low pressure models.

Body & Bonnet
Painted, heavy-duty zinc resists corrosion and gives long-life protection, even under "salty air" conditions.



Molded Diaphragm Assembly
Twin layers of molded synthetic rubber sandwich a tough, flexible fabric to give super sensitive response in a temperature range of -40° to +165°F. Molded diaphragm seals in a groove between the body and bonnet.

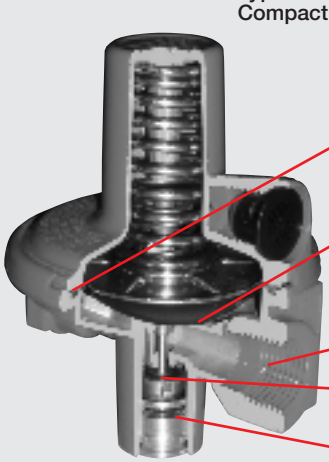
Diaphragm Plate
Rigid diaphragm plate transmits pressure variations to control linkage.

Relief Valve
It is built in and tamper resistant. Large bonnet vent allows high capacity relief on second stage regulators.

Bonnet Cap
Bonnet cap incorporates travel stop to help control downstream pressure in the unlikely event of a regulator malfunction.

Large Bonnet Vent
Large vent is equipped with protective screen and threaded for ¾" F. NPT vent piping. Large vent helps prevent ice from building up and blocking the vent during inclement weather. The regulator should be installed with vent down and the vent protected against blockage.

Typical of the LV3303TR & 597 Series Compact High Pressure Regulators.



RegULok Seal System
Patented tamper resistant body/bonnet joint connection for leak free performance.

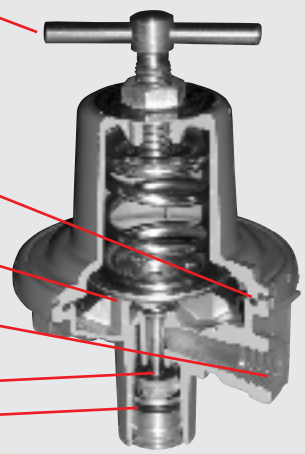
Molded Diaphragm Assembly
Twin layers of molded synthetic rubber sandwich a tough, flexible fabric to give super sensitive response in a temperature range of -40° to +165°F. Molded diaphragm seals in a groove between the body and bonnet.

Connections
Machined and threaded into the body casting.

Molded Seat Disc
Provides even lockup at low or high delivery pressures.

Integral O-Ring
Minimizes tendency to vibrate or hum under extreme loads.

Adjusting Assembly
Large handle with lock-nut release allows easy resetting of delivery pressure.



A

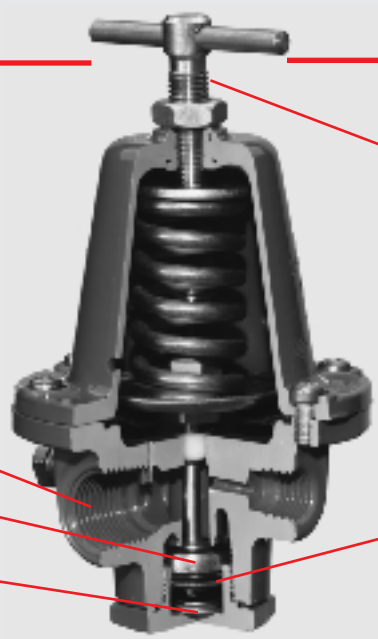
Typical of the 1580 Industrial High Pressure Regulators

The pounds-to-pounds, industrial regulator gives higher delivery pressure as tank pressure decreases, thus permitting full use of the gas in the tank. Most units are field adjustable to meet changing conditions.

Connections
Machined and threaded into the body casting; also includes ¼" NPT pressure gauge ports.

Seat Disc
Synthetic rubber assembly attached directly to the yoke assembly to ensure proper movement and regulation.

Back Cap Spring
Provides added upward force to help provide a positive lock-up.



Adjusting Assembly
Large handle with lock-nut release allows easy resetting of delivery pressure.

Integral O-Ring
Minimizes tendency to vibrate or hum under extreme loads.

Sensitivity

In those cases where there is a choice of delivery pressure ranges, the **lowest** spring range which will fulfill your requirements is recommended because the sensitivity of a regulator decreases as the range of the adjusting spring increases.

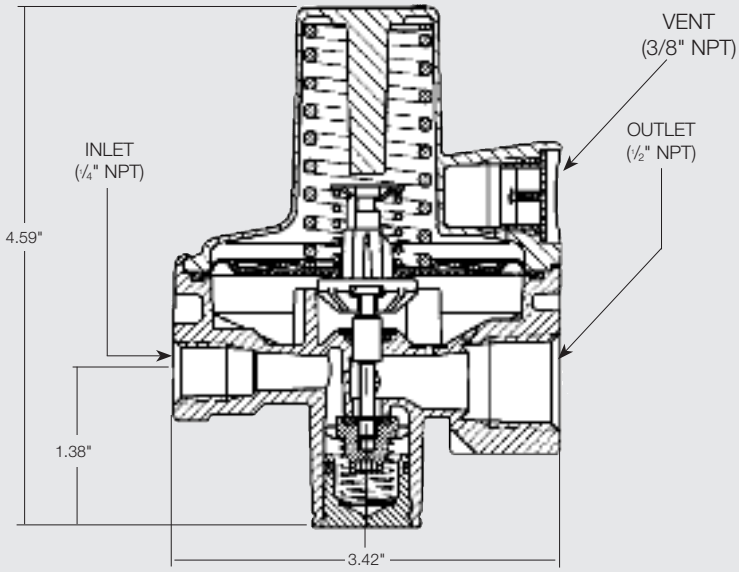
Relief Valves

Most high pressure regulators are not equipped with integral relief valves. For certain applications where it is desirable to protect equipment downstream of the regulator, relief valves must be installed in the line.

REGO PRODUCTS

Compact High Pressure First Stage Regulator

LV3303TR



Application

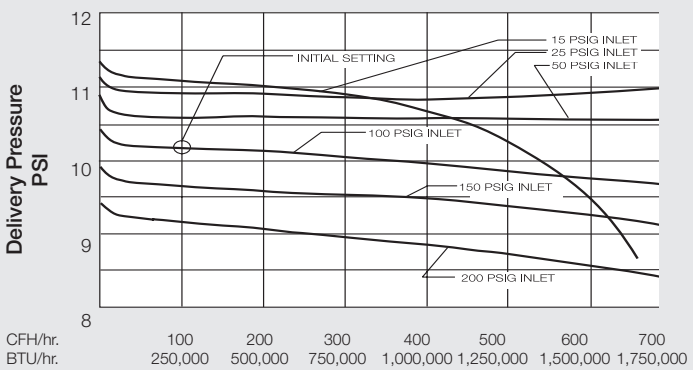
Ideal for use as a first stage regulator on any domestic size ASME or DOT container in propane gas installations requiring no more than 1,500,000 BTUs/hour. These regulators are factory set to reduce tank pressure to an intermediate pressure of approximately 10 PSIG.

Features

- Compact design can be connected to the service valve using either a POL adapter or a Rego® Products pigtail.
- Ideal size fits easily inside of domes and collars.
- Large threaded 3/8" bonnet vent can be easily piped-away in underground installations without the need for glue kits or extra adapters.
- Non-adjustable negative direct acting design helps to keep regulator delivery pressures constant even as tank pressures drop.
- Negative direct acting design provides for excellent performance when needed most–in cold weather, when tank pressures are lowest and system demands are highest.
- Consistent delivery pressure, especially in cold weather, helps assure maximum performance from the second stage regulator.
- Large 1/4" orifice helps protect against regulator freeze-ups.
- Built-in relief valve and travel stop comply with NFPA 58 overpressure requirements.
- Incorporates built-in 1/4" FNPT downstream pressure tap for easy in-line checks of the regulator's downstream delivery pressure.
- Molded diaphragm provides an o-ring like seal between the body and the bonnet.
- Fully painted in brilliant red for complete corrosion protection.
- Bonnet and body are assembled in the USA using the unique, patented RegULok℠ Seal System.

Materials

Body . . . . . Zinc
Bonnet . . . . . Zinc
Spring . . . . . Steel
Valve Seat Disc . . . . . Resilient Rubber
Diaphragm . . . . . Integrated Fabric & Synthetic Rubber



Ordering Information

Part Number	Inlet Connection	Outlet Connection	Orifice Size	Factory Delivery Pressure	Bonnet Vent Position	Vapor Capacity BTU/hr. Propane*
LV3303TR	1/4" F.NPT	1/2" F.NPT	1/4"	10 PSIG	Over Outlet	1,500,000

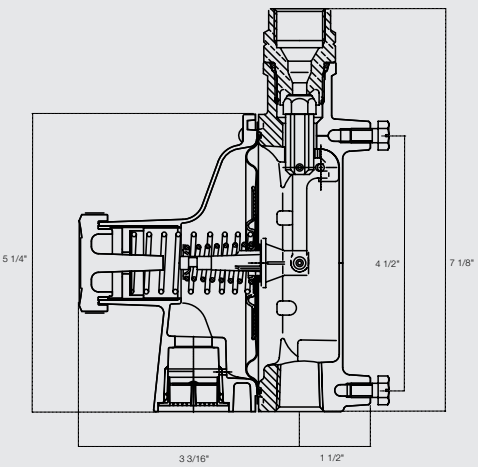
* Maximum flow based on 15 PSIG inlet pressure and 8 PSIG delivery

Application

Provides accurate first stage regulation in two-stage bulk tank systems. Reduce tank pressure to an intermediate pressure of 5 to 10 PSIG. Also used to supply high pressure burners for applications like industrial furnaces or boilers. Also incorporated in multiple cylinder installations.

Features

- Incorporate integral relief valves for added system protection.
- Large vent helps prevent blockage and has ¾" F.NPT thread for vent piping.
- Bonnet vent positioned over outlet to avoid icing and contamination by foreign material.
- Unique bonnet vent profile designed to minimize vent freeze over when properly installed.
- Replaceable valve orifice and valve seat disc.
- Straight-line valve closure reduces wear on seat disc.
- Large molded diaphragm is extra sensitive to pressure changes.
- Built in pressure tap has plugged ⅛" F.NPT outlet. Plug can be removed with a 3⁄16" hex allen wrench.
- Extra long lever arm provides uniform delivery pressure.
- Brilliant red finish.



Materials

Body	Die Cast Zinc
Bonnet	Die Cast Zinc
Nozzle Orifice	Brass
Spring	Steel
Valve Seat Disc	Resilient Rubber
Diaphragm	Integrated Fabric and Synthetic Rubber

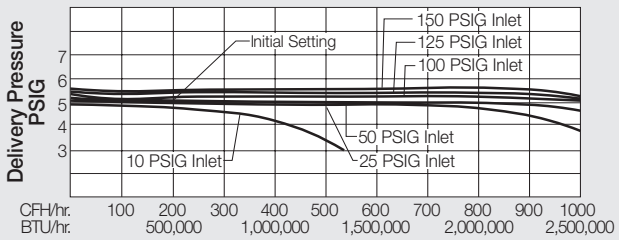
Ordering Information

Part Number	Inlet Connection	Outlet Connection	Orifice Size	Factory Delivery Pressure (PSIG)	Adjustment Range* (PSIG)	Integral Relief Included	Vapor Capacity BTU/hr. Propane**
LV4403SR4	½" F. NPT	½" F. NPT	¼"	5	1-5	Yes	2,500,000
LV4403TR4				10	5-10		
LV4403SR9	F. POL			5	1-5		
LV4403TR9				10	5-10		
LV4403SR96		¾" F. NPT		5	1-5		
LV4403TR96				10	5-10		

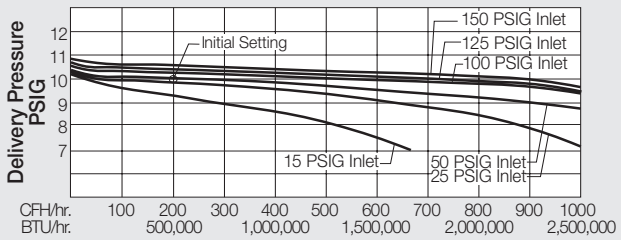
* When used for final stage pressure control, must either incorporate integral relief valve or separate relief valve should be specified in accordance with NFPA Pamphlet 58.

** Maximum flow based on inlet pressure 20 PSIG higher than the regulator setting and delivery pressure 20% lower than the setting.

LV4403SR



LV4403TR



A

Low Pressure Second Stage Regulators

LV4403B Series

Application

Designed to reduce first stage pressure of 5 to 20 PSIG down to burner pressure, normally 11" w.c. Ideal for medium commercial installations, multiple cylinder installations and normal domestic loads.

Features

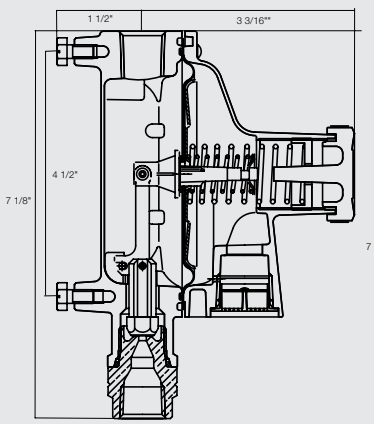
- Large vent helps prevent blockage and has ¾" F.NPT for vent piping.
- With 15 PSIG inlet pressure, regulator is designed to not pass more than 2 PSIG with the seat disc removed.
- Incorporates integral relief valves.
- Replaceable valve orifice and valve seat disc.
- Straight line valve closure reduces wear on seat disc.
- Unique bonnet vent profile minimizes vent freeze over when properly installed.
- Large molded diaphragm is extra sensitive to pressure changes.
- Built in pressure tap has plugged ⅛" F.NPT outlet. Plug can be removed with a 3⁄16" hex allen wrench.
- Select brown finish.

Materials

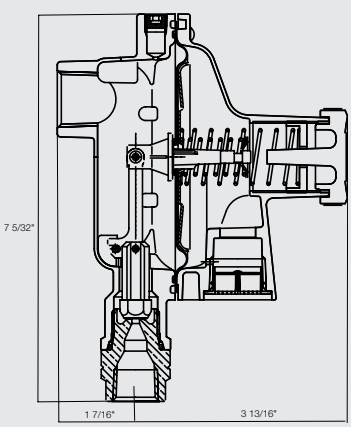
Body ..... Die Cast Zinc
Bonnet ..... Die Cast Zinc
Nozzle Orifice ..... Brass
Spring ..... Steel
Valve Seat Disc ..... Resilient Rubber
Diaphragm ..... Integrated Fabric and Synthetic Rubber

Backmount Design

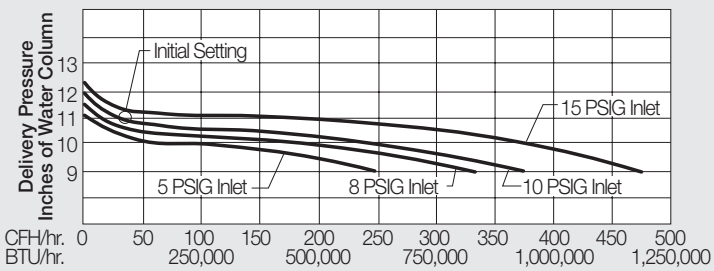
Mounts directly to house line piping. Eliminates need for union joints, elbows, and mounting brackets. Quick and easy to install.



LV4403B



LV4403BR



Ordering Information

Part Number	Inlet Connection	Outlet Connection	Orifice Size	Factory Delivery Pressure	Adjustment Range	Bonnet Vent Position	Vapor Capacity BTU/hr. Propane**
LV4403B4	½" F. NPT	½" F. NPT	#28 Drill	11" w.c. at 10 PSIG Inlet	9" to 13" w.c.	Over Inlet	935,000
LV4403B46		¾" F. NPT					
LV4403B46R*							
LV4403B66	¾" F. NPT						
LV4403B66R*							

* Backmount design.

** Maximum flow based on 10 PSIG inlet and 9" w.c. delivery pressure.

LV4403B66RA Series

Application

Designed to reduce first stage pressure of 5 to 20 PSIG down to appliance pressure, normally 11" w.c. Ideal for medium commercial installations, vapor meter installations and normal domestic loads.

Features

- 90 degree right angle inlet to outlet connection for meter or standard installations.
- Large vent helps prevent blockage and has ¾" F.NPT for vent piping.
- With 15 PSIG inlet pressure, regulator is designed to not pass more than 2 PSIG with the seat disc removed.
- Replaceable valve orifice and valve seat disc.
- Straight line valve closure reduces wear on seat disc.
- Unique bonnet vent profile minimizes vent freeze over when properly installed.
- Large molded diaphragm is extra sensitive to pressure changes.
- Built in pressure tap has plugged ⅛" F.NPT outlet. Plug can be removed with a 3/16" hex allen wrench.
- Select brown finish.

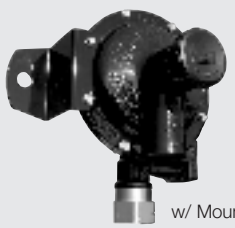
Materials

Body ..... Die Cast Aluminum
Bonnet ..... Die Cast Zinc
Nozzle Orifice ..... Brass
Spring ..... Steel
Valve Seat Disc ..... Resilient Rubber
Diaphragm ..... Integrated Fabric and Synthetic Rubber

Right Angle Design

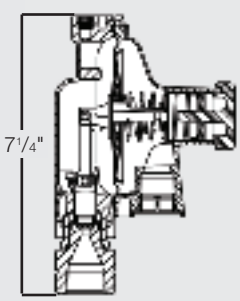
Can mount directly to a vapor meter. It is also suitable for mounting directly to the house piping. It will retrofit into exsisting installations that are currently using a 90 degree, right angle regulator.

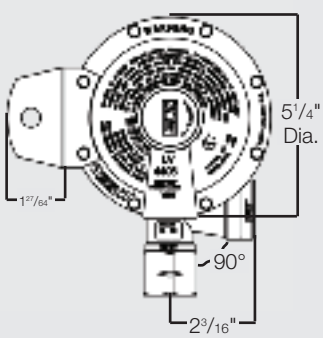
Attached to Vapor Meter

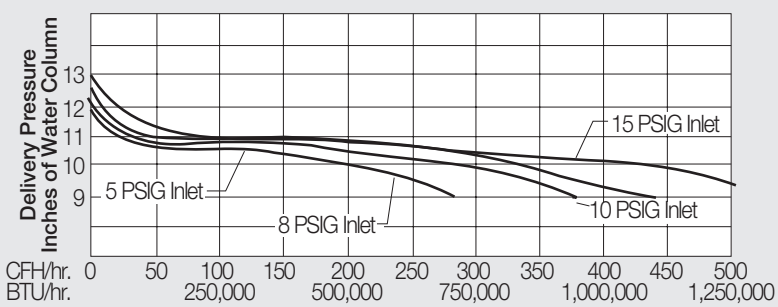


w/ Mounting Bracket

A







Ordering Information

Part Number	Inlet Connection	Outlet Connection	Orifice Size	Factory Delivery Pressure	Adjustment Range	Bonnet Vent Position	Vapor Capacity BTU/hr. Propane*
LV4403B66RA	3/4" F. NPT	3/4" F. NPT	3/16"	11" w.c. at 10 PSIG Inlet	9" to 13" w.c.	Over Inlet	1,000,000
LV4403B66RAB**							

* Maximum flow is based on 10 PSIG inlet and 9" w.c. delivery pressure.
**** Mounting Bracket Included.**

Second Stage Regulator For 2 PSIG Systems

LV4403Y and LV5503Y Series

Application

Designed to reduce first stage pressure of 10 PSIG down to 2 PSIG. A line pressure regulator is required downstream to reduce the 2 PSIG to a nominal 11" W.C.

Features

- Large vent helps prevent blockage and has ¾" F.NPT for vent piping.
- With 15 PSIG inlet pressure, regulator is designed to not pass more than 5 PSIG with the seat disc removed.
- Incorporates integral relief valves.
- Replaceable valve orifice and valve seat disc.
- Straight line valve closure reduces wear on seat disc.
- Unique bonnet vent profile minimizes vent freeze over when properly installed.
- Large molded diaphragm is extra sensitive to pressure changes.
- Built in pressure tap has plugged ⅛" F.NPT outlet. Plug can be removed with a 3/16" hex allen wrench.
- Select blue finish.

Materials

Body (LV4403Y Series)	Die Cast Zinc
Body (LV5503Y Series	Die Cast Aluminum
Bonnet (LV4403Y Series)	Die Cast Zinc
Bonnet (LV5503Y Series)	Die Cast Aluminum
Nozzle Orifice	Brass
Spring	Steel
Valve Seat Disc	Resilient Rubber
Diaphragm	Integrated Fabric and Synthetic Rubber

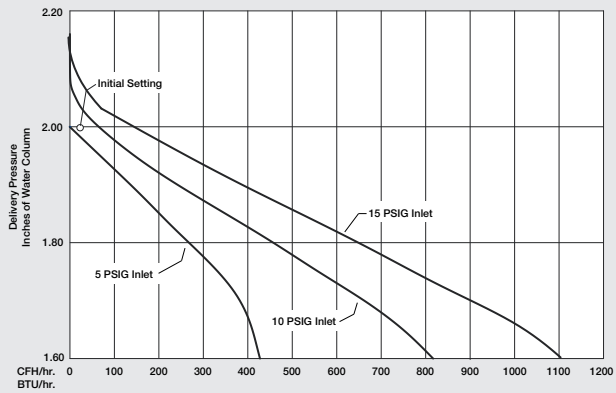
Backmount Design

Mounts directly to house line piping. Eliminates need for union joints, elbows, and mounting brackets. Quick and easy to install.

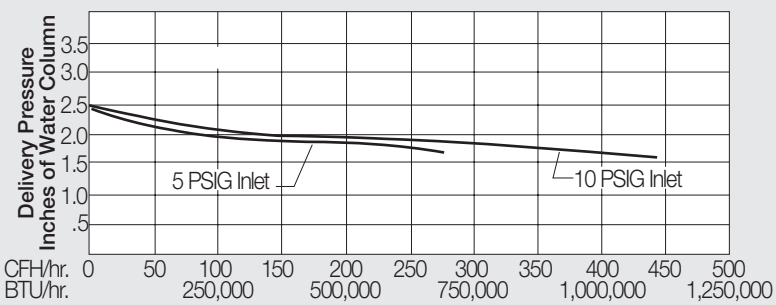
LV4403Y Series

LV5503Y Series

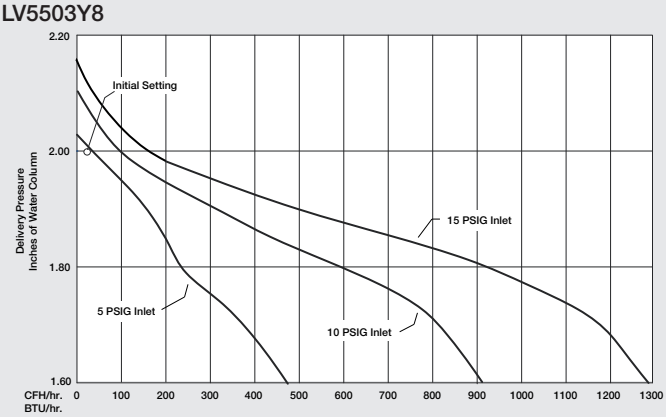
LV5503Y6



LV4403Y4, LV4403Y46R



LV5503Y8



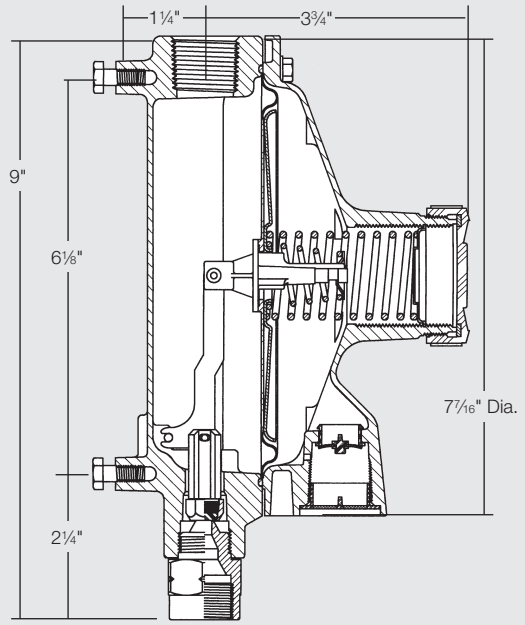
Ordering Information

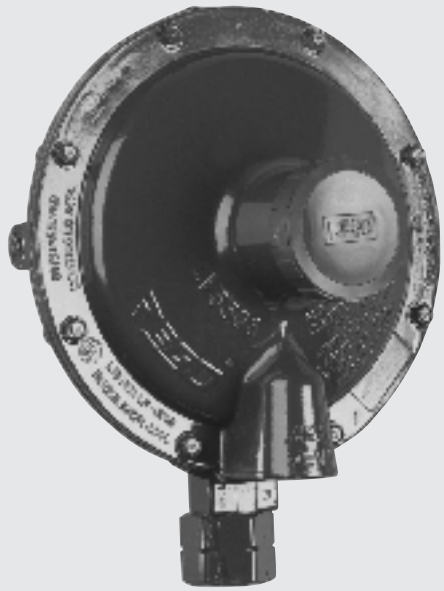
Part Number	Inlet Connection	Outlet Connection	Orifice Size	Adjustment Range	Bonnet Vent Position	Vapor Capacity BTU/hr. Propane***
LV4403Y4	1/2" F. NPT	1/2" F. NPT	1/4"	2 PSIG @ 10 PSIG Inlet	Over Inlet	1,000,000
LV4403Y46R	1/2" F. NPT	3/4" F. NPT	1/4"	2 PSIG @ 10 PSIG Inlet	Over Inlet	1,000,000
LV5503Y6	3/4" F. NPT	3/4" F. NPT	1/4"	2 PSIG @ 10 PSIG Inlet	Over Inlet	2,200,000
LV5503Y8	3/4" F. NPT	1" F. NPT	9/32"	2 PSIG @ 10 PSIG Inlet	Over Inlet	2,200,000

** Maximum flow based on 10 PSIG inlet and 2 PSIG delivery pressure.

Low Pressure Second Stage Regulators

LV5503B Series





Application

Designed to reduce first stage pressure of 5 to 20 PSIG down to burner pressure,normally 11" w.c. Ideal for larger commercial and industrial applications, multiple cylinder installations and large domestic systems.

Features

- Incorporates integral relief valve.
- With 15 PSIG inlet pressure, regulator is designed to not pass more than 2 PSIG with the seat disc removed.
- Replaceable valve orifice and valve seat disc.
- Straight line valve closure saves wear on seat disc and orifice.
- Built in pressure tap has plugged ⅛" F.NPT outlet. Plug can be removed with a ³⁄₁₆" hex allen wrench.
- Large bonnet vent profile minimizes vent freeze over when properly installed.
- Extra long lever arm for uniform delivery pressure.
- Large diaphragm is extra sensitive to pressure changes.

Materials

Body	Die Cast Aluminum
Bonnet	Die Cast Aluminum
Nozzle Orifice	Brass
Spring	Steel
Valve Seat Disc	Resilient Rubber
Diaphragm	Integrated Fabric and Synthetic Rubber

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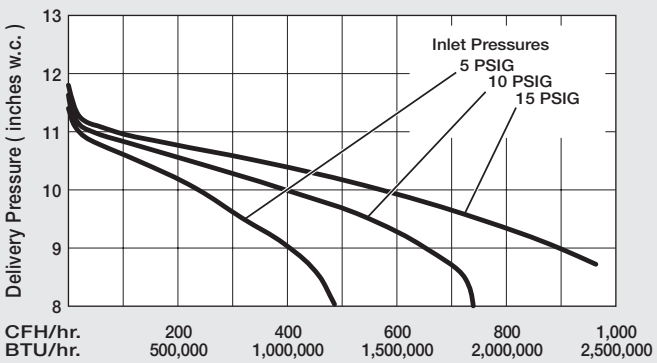
Ordering Information

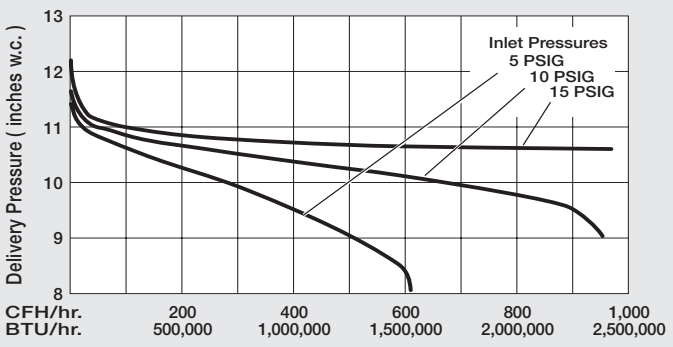
Part Number	Inlet Connection	Outlet Connection	Orifice Size	Factory Delivery Pressure	Adjustment Range	Bonnet Vent Position	Vapor Capacity BTU/hr. Propane*
LV5503B4	½" F. NPT	¾" F. NPT	¼"	11" w.c. at 10 PSIG Inlet	9" - 13" w.c.	Over Inlet	1,600,000
LV5503B6	¾" F. NPT						
LV5503B8		1" F. NPT	⁹⁄₃₂"				2,300,000

* Maximum flow is based on 10 PSIG inlet and 9" w.c. delivery pressure.

LV5503B4, LV5503B6



LV5503B8



Low Pressure Second Stage Tobacco Barn Regulator

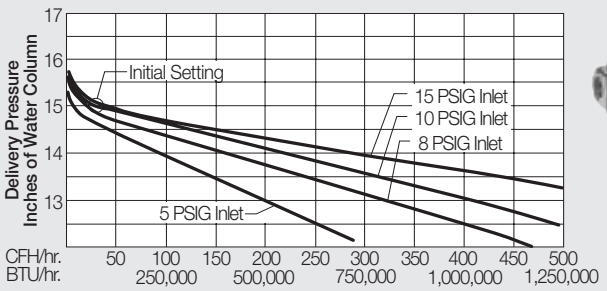
LV5503G4 Series

Application

Especially developed for drying barns in the tobacco industry. The LV5503G4 regulator will supply a steady and constant flow of fuel to as many as 12 to 20 burners throughout the barn.

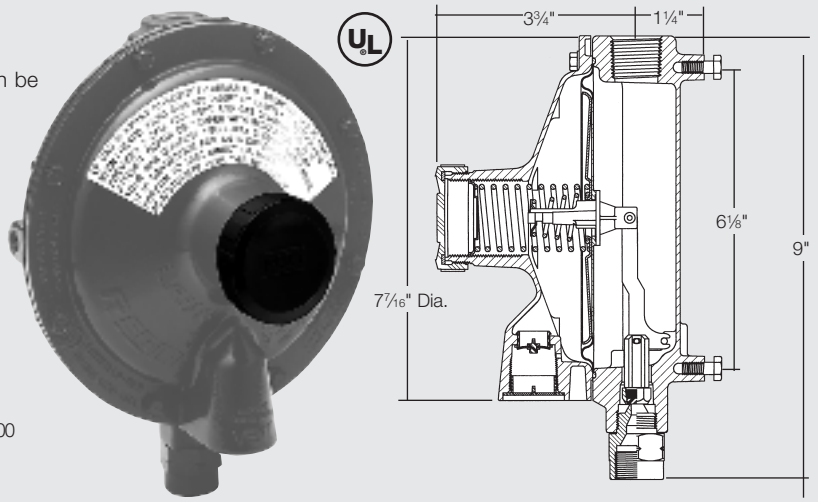
Features

- Similar to construction of the LV5503B Series. Provides the same stability, low lock-up, and sensitive performance.
- Equipped with integral relief valve.
- Built in pressure tap has plugged 1/8" F.NPT outlet. Plug can be removed with a 3/16" hex allen wrench.
- Distinctive yellow finish.



Materials

Body . . . . . Die Cast Aluminum
Bonnet . . . . . Die Cast Aluminum
Nozzle Orifice . . . . . Brass
Spring . . . . . Steel
Valve Seat Disc . . . . . Resilient Rubber
Diaphragm . . . . . Integrated Fabric and Synthetic Rubber



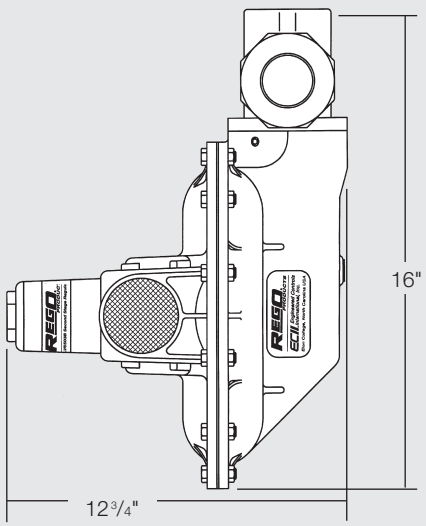
Ordering Information

Part Number	Inlet Connection	Outlet Connection	Orifice Size	Factory Delivery Pressure	Adjustment Range	Bonnet Vent Position	Vapor Capacity BTU/hr. Propane*
LV5503G4	½" F. NPT	¾" F. NPT	¼"	15" w.c. at 15 PSIG Inlet	8" - 18" w.c.	Above Inlet	1,750,000

* Maximum flow is based on 15 PSIG inlet and 13" w.c. delivery pressure.

Large Capacity Second Stage Regulators

LV6503B Series



Application

These regulators are designed to reduce gas pressure from the first stage regulator down to appliance pressure, normally 11" w.c. They are for use in LP-Gas applications.

Features

- Tee style inlet and outlet connections – made from ductile iron.
- Incorporate integral large 2" F.NPT relief vents.
- Built in pressure taps for both inlet and outlet pressure.
- Full capacity relief at 10 psig inlet will keep the down stream pressure at less than 2 PSIG per NFPA 58.

Materials

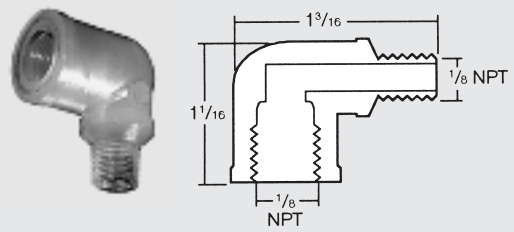
Inlet Body . . . . . Ductile Iron
Body . . . . . Cast Aluminum
Bonnet . . . . . Cast Aluminum

Ordering Information

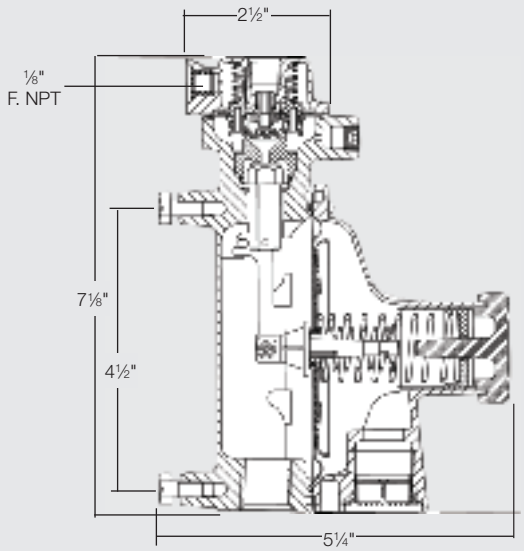
Part Number	Inlet Connection	Outlet Connection	Orifice Size	Factory Delivery Pressure	Adjustment Range	Vapor Capacity BTU/hr. Propane*
LV6503B14	1½" F. NPT	1½" F. NPT	5/8"	11" w.c. at 10 PSIG Inlet	8½" to 14" w.c.	8,000,000
LV6503B16	2" F. NPT	2" F. NPT				9,750,000

* Maximum flow is based on 10 PSIG inlet and a 20% droop.

LV404B4 and LV404B9 Series



404PE Vent Pipe-away for first stage vent.



Application

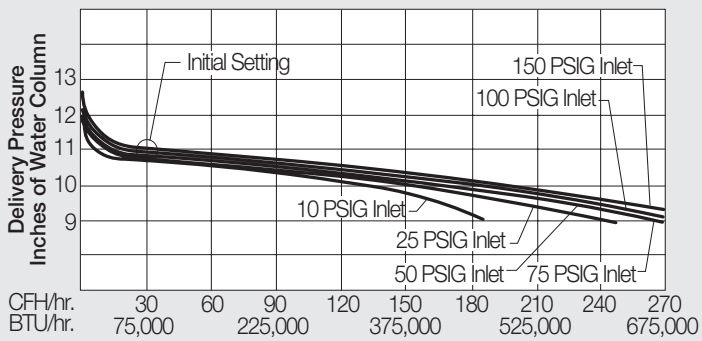
This compact two-stage regulator is designed to reduce container pressure down to 11" w.c. delivery pressure. It is ideal for "on-site" cylinder applications, mobile homes and average domestic service including small ASME and 100 to 420 pound DOT cylinders.

Features

- Incorporates integral relief valves.
- With 15 PSIG inlet pressure, regulator is designed to not pass more than 2 PSIG with the seat disc removed.
- Large vent helps prevent blockage and has ¾" F. NPT for vent piping.
- Compact size allows for easy installation — especially under container hoods and within collars.
- Relief vent on the first stage is consistently in the down position.
- Built in pressure taps on both first and second stage regulators have plugged ⅛" F.NPT outlets. Plugs can be removed with a 3/16" hex allen wrench.
- Select brown finish.

Materials

Body (First Stage) ..... Brass
Body (Second Stage) ..... Die Cast Zinc
Bonnets ..... Die Cast Zinc
Diaphragms ..... Integrated Fabric and Synthetic Rubber
Springs ..... Steel



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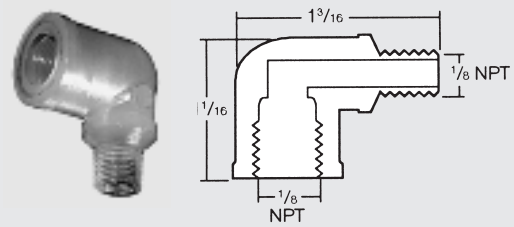
Ordering Information

Part Number	Inlet Connection	Outlet Connection	Orifice Size	Factory Delivery Pressure	Adjustment Range 2nd Stage	Bonnet Vent Position 1st Stage	Bonnet Vent Position 2nd Stage	Capacity BTU/hr. Propane*	Accessories
									1st Stage Vent Pipe-Away
LV404B4	¼" F. NPT	½" F. NPT	.219	11" w.c. at 100 PSIG Inlet	9" - 13" w.c.	Down	Over Outlet	525,000	404PE
LV404B4V9						9 o'clock	9 o'clock		
LV404B46		¾" F. NPT				Down	Over Outlet		
LV404B46V9						9 o'clock	9 o'clock		
LV404B9	F. POL	½" F. NPT				Down	Over Outlet		
LV404B9V9						9 o'clock	9 o'clock		
LV404B96		¾" F. NPT				Down	Over Outlet		
LV404B96V9						9 o'clock	9 o'clock		

* Maximum flow based on 25 PSIG inlet pressure and 9" w.c. delivery pressure.

Compact Twin Stage Regulators

LV404B23 and LV404B29 Series



404PE Vent Pipe-away for first stage vent.

LV404B23 **LV404B23V9** **LV404B29**

Application

The LV404B23 and LV404B29 Series Regulators are designed for small domestic applications with flow requirements up to 200,000 BTU's/hr. These regulators are ideal for mobile homes, cottages and "on-site" cylinder applications.

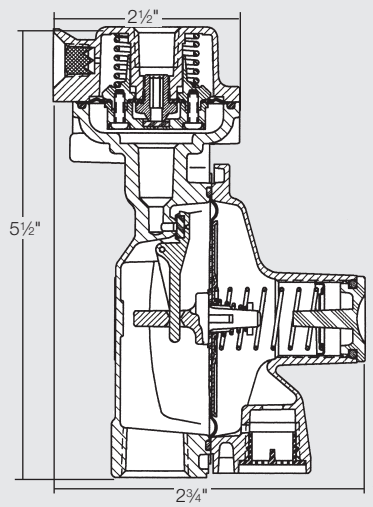
These regulators can also be used in RV applications if a protective cover is also supplied.

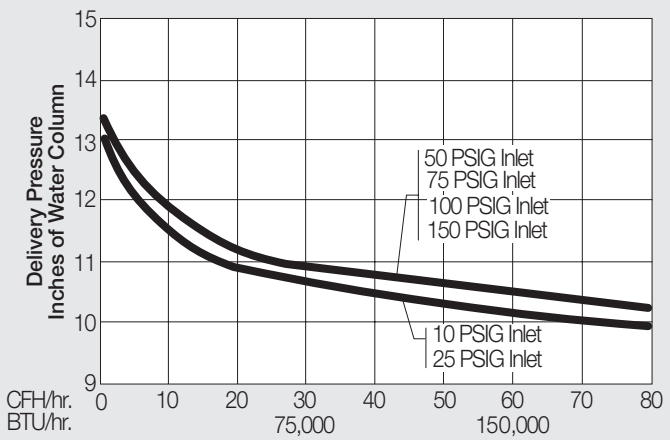
Features

- Provides all the benefits of two-stage regulation in one compact unit (for small size loads) at a reasonable cost.
- Incorporates integral relief valve in second stage.
- With 15 PSIG inlet pressure, regulator is designed to not pass more than 2 PSIG with the seat disc removed.
- Full size vents on the first and second stage are both tapped ⅛" F.NPT.
- Built in pressure taps on both first and second stage regulators have plugged ⅛" F.NPT outlet. Plugs can be removed with a 3/16" hex allen wrench.
- Compact size allows for easy installation – especially under container hoods and within collars.
- May be used with a variety of pigtails, inlet adapters and manifolds. POL type pigtails can be used in LV404B29 Series.
- Select brown finish.

Materials

Body, First Stage ..... Die Cast Zinc
Body, Second Stage ..... Die Cast Zinc
Bonnet LV404B23, First Stage ..... Die Cast Zinc
Bonnet LV404B29, First Stage ..... Brass
Bonnet, Second Stage ..... Die Cast Zinc
Diaphragms ..... Integrated Fabric and Synthetic Rubber
Springs ..... Steel
Valve Seat Discs ..... Resilient Rubber





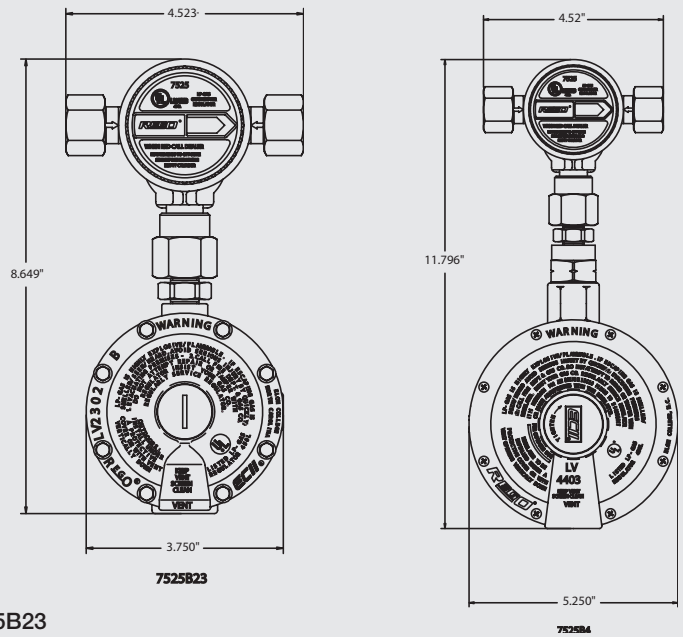
Ordering Information

Part Number	Inlet Connection	Outlet Connection	Orifice Size	Factory Delivery Pressure	Adjustment Range 2nd Stage	Bonnet Vent Position 1st Stage	Bonnet Vent Postion 2nd Stage	Capacity BTU/hr. Propane*	Accessories		
									1st Stage Vent Pipe-Away	2nd Stage Vinyl Cover	Bracket
LV404B23	¼" F. NPT	½" F. NPT	.100	11" w.c. at 100 PSIG Inlet	9-13" w.c.	Rear	Over Outlet	200,000	404PE	2302-55	2302-31
LV404B29	F. POL										
LV404B23V9	¼" F. NPT					Left	9 o'clock				
LV404B29V9	F. POL										

* Maximum flow based on 25 PSIG inlet pressure and 9" w.c. delivery pressure.

Twin Stage Automatic Changeover Regulators

7525B Series



Application

These combination automatic changeover, two stage regulators are especially suitable for homes, mobile homes, cottages, construction and other portable two cylinder installations. Empty containers may be replaced without interrupting customer's gas service.

Features

- Automatic changeover switches from "service" to "reserve" cylinder automatically without interrupting service.
- The Second Stage Incorporates wide bonnet drip lip vent to guard against freeze-up when properly installed.
- With 15 PSIG inlet pressure the second stage, regulator is designed to not pass more than 2 PSIG with the seat disc removed.
- Allows "reserve" cylinder to supplement the flow of gas from the "service" cylinder during extreme load or severe cold conditions.
- Incorporates molded diaphragm in second stage regulators.
- Integral indicator gauge.
- Change over knob and indicator are integral to the first stage.
- Select brown finish on first stage.

Materials

Body (First Stage) ..... Die Cast Zinc.
Body (Second Stage) ..... Die Cast Zinc
Bonnet (First Stage) ..... Die Cast Zinc
Bonnet (Second Stage) ..... Die Cast Zinc
First Stage Nozzle Orifice ..... Brass
Spring ..... Steel
Valve Seat Disc ..... Resilient Synthetic Rubber
Diaphragm ..... Integrated Fabric & Synthetic Rubber

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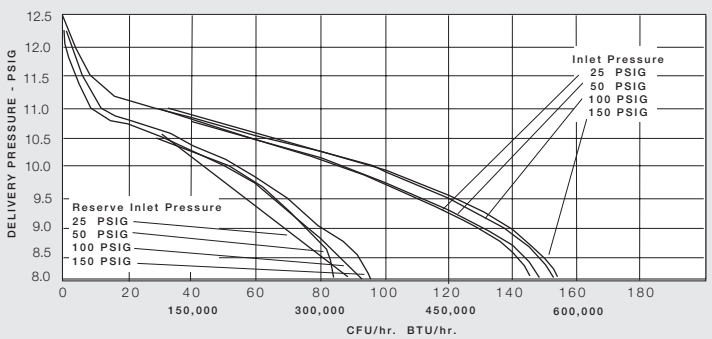
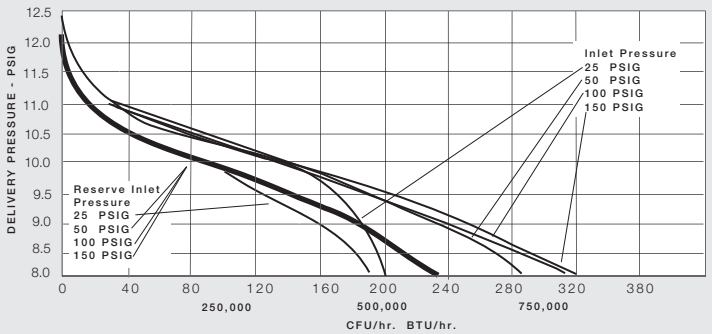
7525B23



7525B4



Ordering Information

Part Number	Service & Reserve Indicator	Inlet Connections	Outlet Connections	Factory Delivery Pressure*	Adjustment Range	Bonnet Vent Position	Bracket Included	Capacity BTU/hr. Propane**
7525B23	Integral	1/4" Inverted Flare	1/2" F. NPT	11" w.c.	9"-13" w.c.	over outlet	2302-31	200,000
7525B4							2503-22A	450,000

* Set at 100 PSIG inlet pressure.

** Maximum flow based on 25 PSIG inlet pressure and 9" water column delivery pressure.

Two Stage Regulator Outfits

5807, 5808, 5820 Series

Application

These outfits contain the equipment required to provide two-stage regulation.

Features

- Includes a new pigtail. This helps ensure that a new pigtail is installed along with the regulator.
- Features, designs, and performance characteristics of the individual components may be found under the appropriate section of this catalog.

Kit Number	1st Stage Regulator Included		2nd Stage Regulator Included		Bracket Included	Pigtail Included	Capacity BTU / hr. Propane
	Part Number	Inlet x Outlet Female	Part Number	Inlet x Outlet F. NPT			
5807	LV4403TR9	POL x ½" NPT	LV4403B4	½" x ½"	2503-22	913PS12	935,000
5808			LV4403B46R	½" x ¾"	Not Required		
5820	LV4403TR96	POL x ¾" NPT	LV4403B66R	¾" x ¾"			

Twin Stage Regulator Outfit

5828 and 5832

Application

This outfit contains the equipment required to provide twin-stage regulation.

Features

- Includes a new pigtail. This helps ensure that a new pigtail is installed along with the regulator.
- Features, designs, and performance characteristics of the individual components may be found under the appropriate section of this catalog.

Kit Number	Twin Stage Regulator Included	Inlet F. NPT	Outlet F. NPT	Pigtails Included	Capacity BTU / hr. Propane
5828	LV404B4	¼"	½"	912JS12	525,000
5832	LV404B23V9				200,000

Automatic Changeover Regulator Outfits

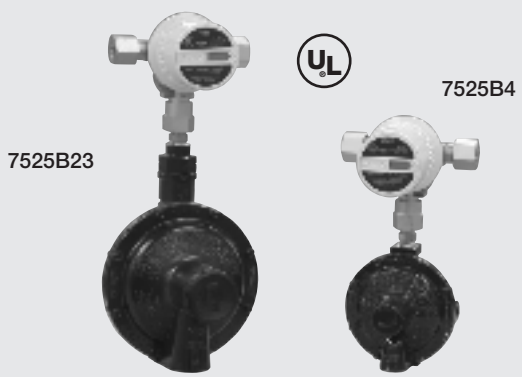
5726B23, 5727B23, 5754B4, 5755B4

Application

These outfits contain the equipment required to provide automatic changeover regulation.

Features

- Includes new pigtails. This helps insure that new pigtails are installed along with the regulator.
- Features, designs, and performance characteristics of the individual components may be found under the appropriate section of this catalog.



Ordering Information

Kit Number	Automatic Changeover Regulator Included	Inlet	Outlet	Pigtails Included-2	Bracket Included	Capacity BTU/hr. Propane
5726B23	7525B23	1/4" Inverted Flare	1/2" F. NPT	912FA20	2302-31	200,000
5727B23	7525B23			912FS20		
5754B4	7525B4			912FA20	2503-22	450,000
5755B4	7525B4			912FS20		

Application

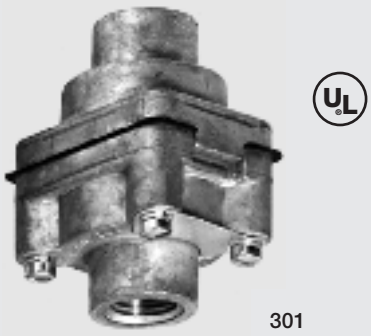
These compact regulators are designed for smaller outdoor grills and fish cookers. It is intended for use on small portable appliances that use 100,000 BTU's/hr. or less. It may not be used on fixed pipe systems per NFPA 58, 1995 edition.

Features

- All metal, die cast construction.
- Molded diaphragms assure close control of burner pressure.
- Durable valve levers.
- Variety of model configurations and sizes available.
- All POL inlet connections are soft nose.

Materials

Body ..... Die Cast Zinc
Bonnet ..... Die Cast Zinc
Spring ..... Steel
Valve Seat Disc ..... Resilient Rubber
Diaphragm ..... Molded Synthetic Rubber



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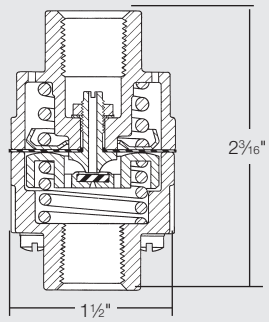

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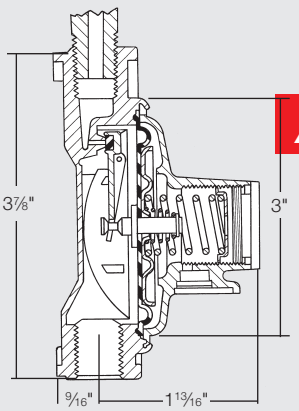

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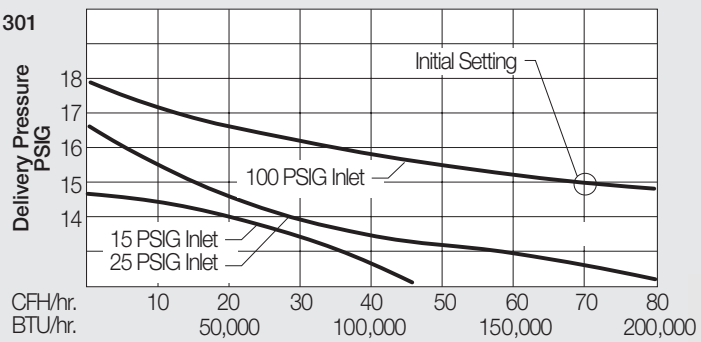

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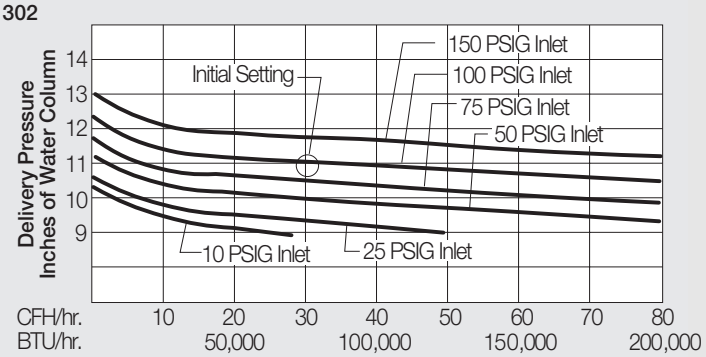


302V

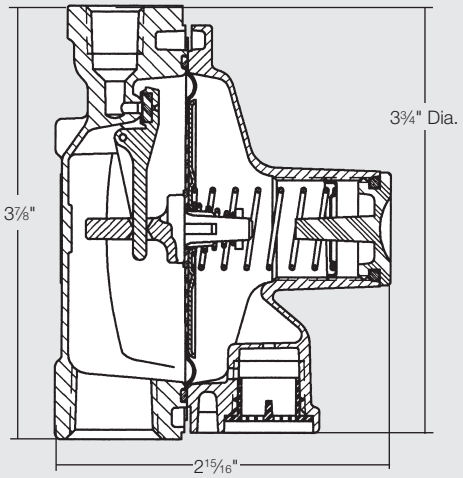
Ordering Information

Part Number	Type	Inlet Connection	Outlet Connection	Orifice Size	Factory Delivery Pressure	Adjustment Range	Bonnet Vent Position	Vapor Capacity BTU/hr. Propane*
301	High Pressure	1/4" F. NPT	1/4" F. NPT	No. 50 Drill	15 PSIG at 100 PSIG inlet	Non adjustable	Small Vent	125,000
301S		Soft M. POL w/60 DMS orifice						
302	Single Stage	1/4" F. NPT	3/8" F. NPT		11" w.c. at 100 PSIG Inlet	9-13" w.c.	Small Vent Above Inlet	
302S		Soft M. POL w/60 DMS orifice						
302V		1/4" F. NPT					Drip Lip Above Inlet	
302VS		Soft M. POL w/60 DMS orifice						
302V9		1/4" F. NPT						
302V9S		Soft M. POL w/60 DMS orifice					Drip Lip at 9 o'clock	
302V9LS		Soft POL w/o orifice						

* Maximum flow based on 25 PSIG inlet and factory delivery pressure.

Low Pressure Single Stage Regulators

LV2302 Series



Application

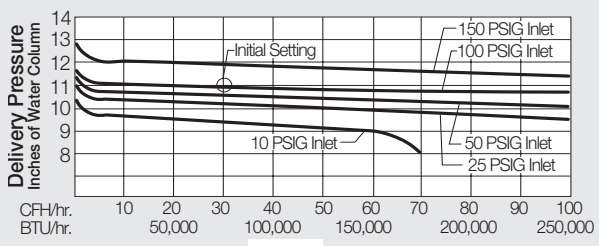
A compact, sturdy regulator incorporating many of the quality features found in larger domestic regulators. Ideal for outdoor LP-Gas grills. The regulator reduces cylinder pressure down to burner pressure, normally 11" w.c. It is intended for use on small portable appliances that use 100,000 BTU's/hr. or less. It may not be used on fixed pipe systems per NFPA 58, 1995 edition.

Features

- Compact size with large capacity rating.
- Equipped with integral relief valve.
- Unique bonnet vent profile minimizes vent freeze over when properly installed.
- Built in pressure tap has plugged ⅛" F.NPT outlet.
- Large diaphragm provides better regulation and lower lock-up.
- Classic gold finish.

Materials

Body . . . . . Die Cast Zinc
Bonnet . . . . . Die Cast Zinc
Spring . . . . . Steel
Valve Seat Disc . . . . . Resilient Rubber
Diaphragm . . . . . Integrated Fabric and Synthetic Rubber



Ordering Information

Part Number	Inlet Connection	Outlet Connection	Orifice Size	Factory Delivery Pressure	Adjustment Range	Bonnet Vent Position	Vapor Capacity BTU/hr. Propane*
LV2302A2	¼" F. NPT	⅜" F. NPT	No. 49 Drill	11" w.c. at 100 PSIG Inlet	9" - 13" w.c.	Over Outlet	150,000
LV2302P	M. POL						

* Maximum flow based on 10 PSIG inlet and 9" w.c. delivery pressure.

597F Series

Application

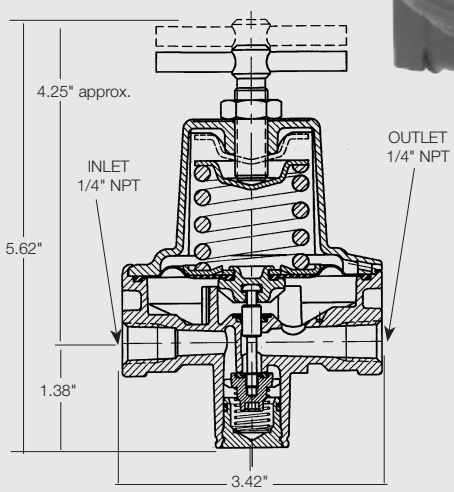
Designed to reduce propane gas container pressure down to between 3 and 100 PSIG. Ideal for liquid or vapor service, they can be used in a variety of applications including salamander heaters, weed burning torches, fish cookers, tar pot heaters, and other industrial type services.

Features

- Provides high capacity performance at a reasonable price.
- Suitable for both liquid and vapor service.
- Compact design provides for easy installation.
- Negative direct acting design helps to keep regulator delivery pressures constant even as tank pressures drop.
- Negative direct acting design provides for excellent performance when needed most – in cold weather, when tank pressures are lowest and system demands are highest.
- Consistent delivery pressure, especially in cold weather, helps assure maximum performance from the second stage regulator.
- Can be readily fitted with a pressure gauge in the 1/4" F.NPT port.
- Molded diaphragm provides an o-ring like seal between the body and the bonnet.
- Fully painted in brilliant red for complete corrosion protection.
- Available in four adjustable ranges for maximum performance.
- Bonnet and body are assembled in the USA using the unique, patented RegULok℠ Seal System.

Materials

Body . . . . . Zinc
Bonnet . . . . . Zinc
Spring . . . . . .Steel
Valve Seat Disc . . . . . .Resilient Rubber
Diaphragm . . . . . Integrated Fabric
. . . . . & Synthetic Rubber
Adjusting Screw . . . . . Brass



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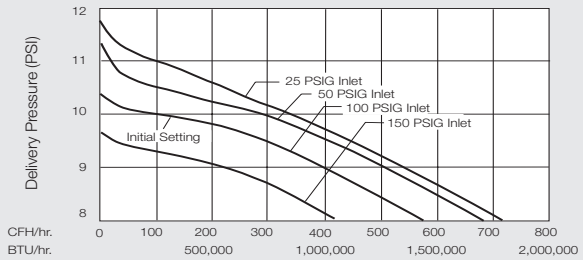
Ordering Information

Part Number	Adjustment Method	Inlet Connection	Outlet Connection	Recommended Delivery Pressure Range (PSIG)	Capacity Determined at Set Pressure of PSIG*	Capacity BTU/hr. Propane**
597FA	Tee Handle	1/4" NPT	1/4" NPT	1-15	10	1,750,000
597FB				10-30	20	3,000,000
597FC				20-45	30	3,500,000
597FD				40-100	40	4,500,000

* Set pressure established at 100 PSIG inlet and a flow of 250,000 BTU/hr.
** Capacity determined at actual delivery pressure 20% less than set pressure with inlet pressure 20 PSIG higher than the set pressure.

597FA



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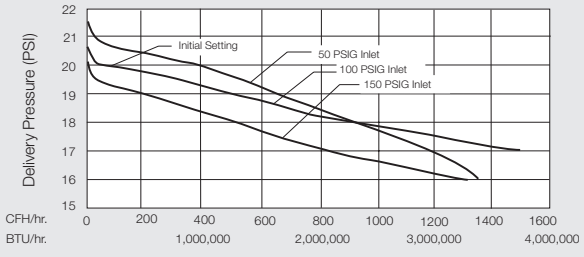

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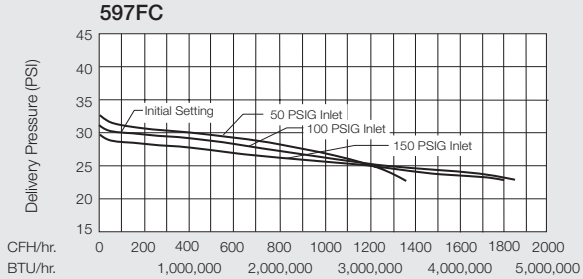

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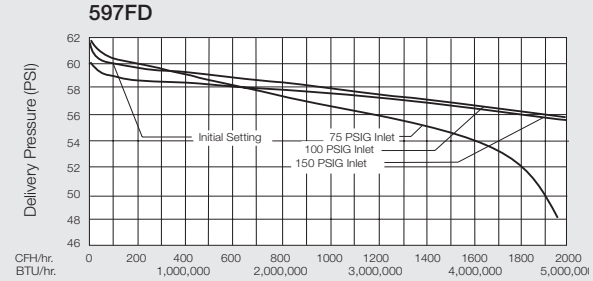
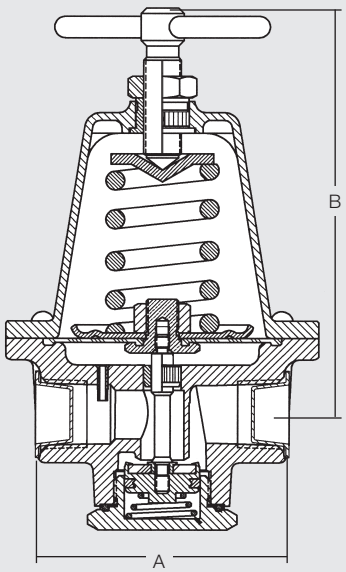


High Pressure Industrial / Commercial Pounds-to-Pounds Regulators

1580M Series and AA1580M Series



Application

Designed to reduce LP-Gas and anhydrous ammonia container pressures to between 3 and 125 PSIG. Precision-built with a multi-million BTU capacity, the 1580M series is perfect for such big, tough jobs as crop dryers, asphalt batch mixing plants, road building "tar wagons", heat treating and other large industrial and commercial loads. It's also ideal as a first stage regulator in large multiple operations. The AA1580M series is ideal for use in anhydrous ammonia applications such as blue print machines and heat treating.

Features

- Large nozzle and straight through flow provides high capacity and resistance to freeze-up.
- O-ring on retainer assembly provides a dampening effect to reduce vibration.
- Suitable for both liquid and vapor service.
- Can be readily fitted with pressure gauge in ¼" F. NPT port.

Materials

Body ..... Forged Aluminum
Bonnet ..... Die Cast Aluminum
Spring ..... Steel
Valve Seat Disc ..... Resilient Rubber
Diaphragm ..... Integrated Fabric and Synthetic Rubber

Ordering Information

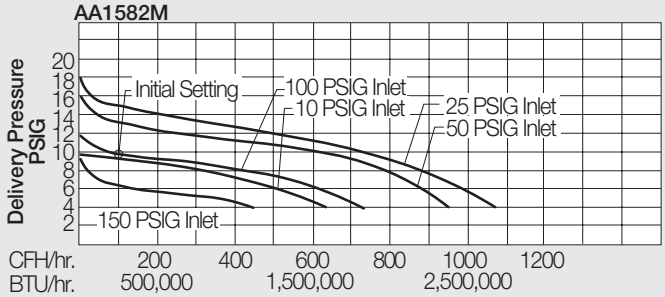
Part Number	Service	Adjustment Method	Inlet & Outlet Connections	Recommended Delivery Pressure Range (PSIG)	Width A	Height (max.) B	Capacity Determined at Set Pressure of PSIG	Capacity**
AA1582MW	NH_3	Tee Handle	¼" F. NPT	3-25	2 3/16"	4⅛"	20	2,100 CFH NH_3
AA1582MK		Hex Head						
AA1582ML		Tee Handle		20-50			30	2,400 CFH NH_3
AA1582MH				45-125			60	2,600 CFH NH_3
1584MN	LP-Gas		½" F. NPT	3-30	2 15/16"	4⅞"	20	7,000,000 BTU/hr. LPG
1584ML				25-50			30	7,500,000 BTU/hr. LPG
1584MH				45-125			60	8,000,000 BTU/hr. LPG
AA1584MW	NH_3			3-25			20	4,500 CFH NH_3
AA1584ML				20-50			30	4,800 CFH NH_3
AA1584MH				45-125			60	5,100 CFH NH_3
1586MN	LP-Gas		¾" F. NPT	3-30	3½"	7"	20	11,000,000 BTU/hr. LPG
1586ML				25-50			30	12,000,000 BTU/hr. LPG
1586MH				45-125			60	14,000,000 BTU/hr. LPG
AA1586MW	NH_3			3-25			20	7,000 CFH NH_3
AA1586ML				20-50			30	7,700 CFH NH_3
AA1856MH				45-125			60	8,900 CFH NH_3
1588MN	LP-Gas		1" F. NPT	3-30			20	11,000,000 BTU/hr. LPG
1588ML				25-50			30	12,000,000 BTU/hr. LPG
1588MH				45-125			60	14,000,000 BTU/hr. LPG

* Set pressure is established with 100 PSIG inlet pressure and a flow of 500,000 BTU/hr. propane for 1580M Series, 90 CFH/hr. NH_3 for AA1582M Series and 180 CFH/hr. NH_3 for AA1584M and AA1586M Series.

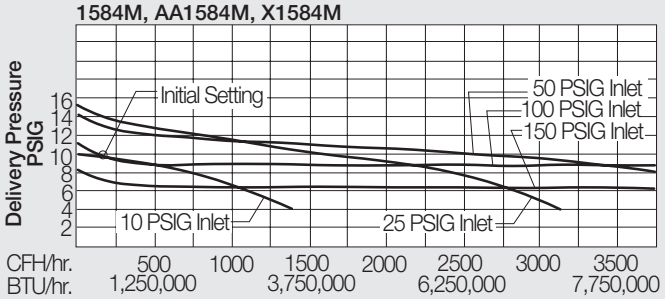
** Capacities determined at actual delivery pressure 20% less than set pressure with inlet pressure 20 PSIG higher than set pressure.

NOTE: Care must be taken to prevent re-liquification of propane at normal temperatures by heat tracing or other effective means. Use of a relief valve upstream or downstream of these regulators is recommended in accordance with NFPA 58.

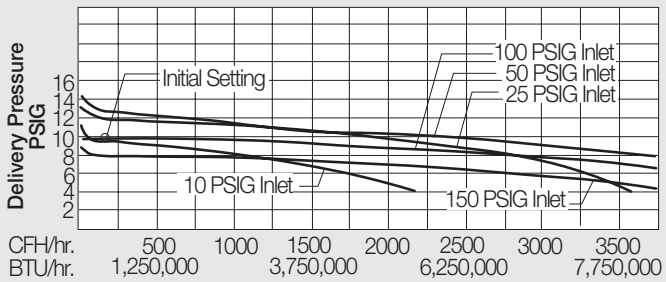
AA1582M



1584M, AA1584M, X1584M



1586M, AA1586M, X1586M, 1588M



High Pressure / High Temperature Industrial / Commercial Pounds-to-Pounds Regulators

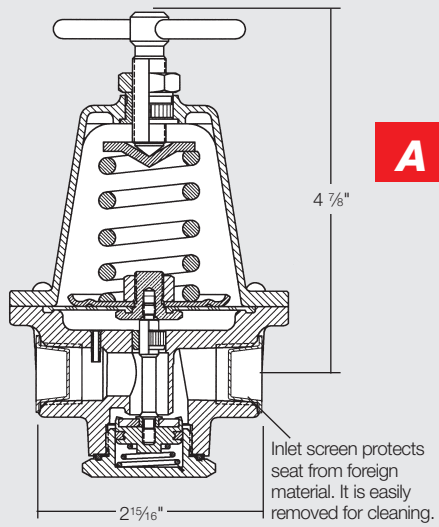
X1584M, X1586M Series

Application

Designed to reduce LP-Gas container pressures to between 3 and 50 PSIG. Ideal for crop drying, heat treating, asphalt batch mixing and other large industrial and commercial load application utilizing high temperature LP-Gas or high temperature atmosphere under conditions up to 300˚F. Also ideal as a first stage regulator in large multiple operations.

Features

- Special diaphragm and seat materials are suitable for up to 300˚F. temperatures.
- Large nozzle and straight through flow provides high capacity and resistance to freeze ups.
- Suitable for both liquid and vapor service.
- Can be fitted with high pressure gauge in ¼" F. NPT port. Engineered Controls International, Inc. recommends that these gauges use silver braze rather than soft solder construction.



Materials

Body ..... Forged Aluminum
Bonnet ..... Die Cast Aluminum
Spring ..... Stainless Steel
Diaphragm ..... High Temperature Synthetic Composition
Seat Disc ..... High Temperature Resilient Composition
Backup Seal ..... High Temperature Resilient Composition

A

Ordering Information

Part Number	Service	Adjustment Method	Inlet & Outlet Connections	Recommended Delivery Pressure Range (PSIG)	Capacity Determined at Set Pressure of PSIG*	Capacity BTU/hr. Propane**
X1584MN	LP-Gas	Tee Handle	1/2" F. NPT	3-30	20	7,000,000
X1584ML	LP-Gas	Tee Handle	1/2" F. NPT	25-50	30	7,500,000
X1586MN	LP-Gas	Tee Handle	3/4" F. NPT	3-30	20	11,000,000
X1586ML	LP-Gas	Tee Handle	3/4" F. NPT	25-50	30	12,000,000

* Set pressure is established with 100 PSIG inlet pressure and a flow of 500,000 BTU/hr. propane.

** Capacities determined at actual delivery pressure 20% less than set pressure with inlet pressure 20 PSIG higher than set pressure.

NOTE: Care must be taken to prevent re-liquification of propane at normal temperatures by heat tracing or other effective means. Use of a relief valve upstream or downstream of these regulators is recommended in accordance with NFPA 58.

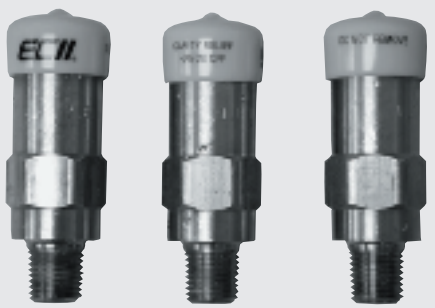
3139 Series
Vapor Relief Valves

Application

Designed for use as a relief valve on first stage regulators that comply with the NFPA 58 2.5.7.5 exception: "first stage regulators with a rated capacity of more than 500,000 BTU/hr. shall be permitted to have a seperate relief valve.

Features

- Pop-action design keeps product loss to a minimum.
- Suitable for use downstream of 1580 series regulators on vapor systems to comply with NFPA 58.
- May be installed with on either the regulator pressure gauge port or on a fitting downstream from the regulator outlet.
- Constructed of non-corosive brass.



3139-18 **3139-26** **3139-39**

Ordering Information

Part Number	Set Pressure	Regulator Settings	Connection Size	Height	Width	Flow Capacity at 120% of Set Pressure (SCFH Propane)
3139-18	18 PSIG	10 PSIG	1/4" M. NPT	2 27/32"	1 1/16"	1357*
3139-26	26 PSIG	26 PSIG				1725**
3139-38	38-PSIG	38 PSIG				2304***

* Flow recorded at 21.6 PSI inlet pressure for this valve.

** Flow recorded at 31.2 PSI inlet pressure for this valve.

*** Flow recorded at 45.6 PSI inlet pressure for this valve.

Copper Pigtails
912 and 913 Series

913PS12

Application

Pigtails are available in a variety of connections, sizes and styles. Care should always be taken in selecting the proper pigtail for a particular application.

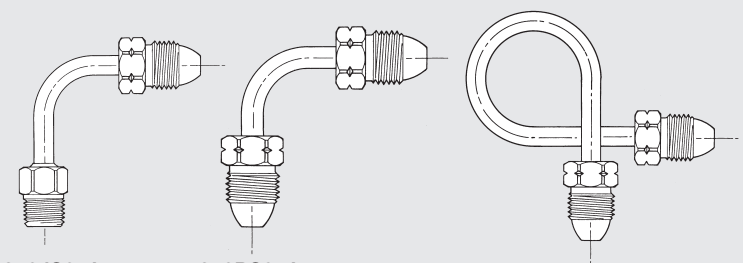
Note: Engineered Controls International, Inc. recommends a new pigtail be installed with every new and replaced regulator.

Features

- Heavy duty construction.
- Individually soldered connections to the copper tubing.
- Each pigtail is individually tested prior to shipment.

Materials

Tubing ..... Copper
Connections ..... Brass



913JS05A 913PS05A 913PS12G

Straight Pigtails
Ordering Information

Connections	Approximate Length	Part Number ¼" Tube ⅞" Hex Short Nipple	Part Number ¼" Tube 1⅛" Hex Long Nipple	Part Number ⅜" Tube ⅞" Hex Short Nipple
M.POL x M.POL	5"	—	—	913PS05
	12"	912PS12	—	913PS12
	20"	912PS20	912PA20	913PS20
	30"	912PS30	—	913PS30
	36"	912PS36	912PA36	913PS36
	48"	912PS48	912PA48	913PS48
¼" Inverted Flare x M.POL	12"	912FS12	—	—
	20"	912FS20	912FA20	—
	30"	912FS30	—	—
	36"	912FS36	—	—
¼" M.NPT x M.POL	5"	—	—	913JS05
	12"	912JS12	—	—
	20"	912JS20	—	—
	36"	912JS36	—	—
½" M.NPT x M.POL	12"	—	—	913LS12
½" M.NPT x ⅜" M.POL	12"	—	—	913KL12

Bent Pigtails
Ordering Information

Connections	Approximate Length	Part Number ⅜" Tube ⅞" Hex Short Nipple	Type/Degree of Bend
¼" M. NPT x M. POL	5"	913JS05A	90°
		913PS05A	
M. POL x M. POL	12"	913PS12G	270° Right Hand
		913PS12H	270° Left Hand
		913PS12S	360°

A

Inlet Fittings

These inlet fittings are available for assembly into either first stage of single stage regulators. All have ¼" M. NPT connections and are machined from brass.

Ordering Information

Part Number	UL Listed	Description
970	No	Hard nose POL with wrench nut.
970AX	Yes	Hard nose POL with wrench nut and excess flow.
970AXS		Soft nose POL with wrench nut and excess flow.
3199W		Heavy duty hard nose POL with wrench nut and excess flow.
970AW		Soft nose POL with handwheel.
970HT		Soft nose POL with handwheel and 60 DMS orifice.
970S	No	Soft nose POL with wrench nut and 60 DMS orifice.

970 970AX 970AXS 970AW 970HT 970S

3199W

Brackets

RegO® Brackets are especially designed for use in installing RegO® Regulators in applications requiring the use of a bracket.

Ordering Information

Part Number	Material	For Use With Regulator Model:
2302-31	Cadmium Plated Steel	2302 Series/404B23
2503-22		LV404 Series, 2503 Series LV4403 Series
2503-19	Aluminum	

2503-19

2503-22

2302-31

Tee Check Manifolds

1350R and 1450R

Application

For use in systems that require uninterrupted gas service during cylinder exchange. Especially for summer cottages, mobile homes and single appliance loads.

Features

- Floating disc check minimizes discharge of gas to the atmosphere when empty cylinder is being replaced.

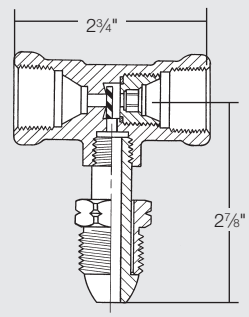
Materials

Body ..... Forged Brass
Seat Disc ..... Resilient Rubber

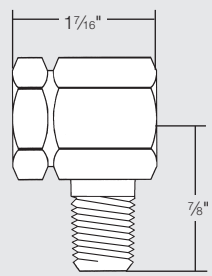
Ordering Information

Part Number	Inlet Connections	Outlet Connection
1350R	F. POL	M. NPT
1450R	¼" Inverted Flare	¼" M. NPT

1350R



1450R



Multiple Cylinder Manifolds

1350E and 1450E

Application

Use with suitable pigtails to connect multiple cylinders together. Ideal for loads that require more than one cylinder to be in service at a time.

Features

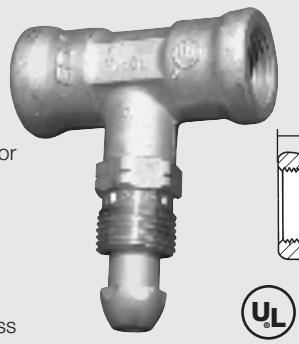
- Provides a three-way tee function without an internal disc check.

Materials

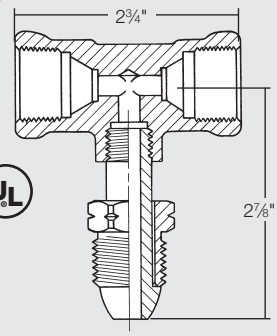
Body ..... Forged Brass

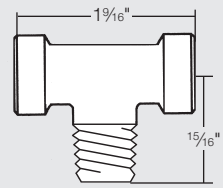
Ordering Information

Part Number	Inlet Connections	Outlet Connection
1350E	F. POL	M. POL
1450E	¼" Inverted Flare	¼" M. NPT



1350E





1450E

Low Pressure Test Set

2434A Series

This kit provides the equipment necessary for checking regulator delivery pressure (low pressure) at the appliances. The basic set contains a 2424A-2 low pressure gauge and a 3 foot — 3/16" O.D. flexible synthetic rubber tube. Adapters are also available.

Ordering Information

Part Number	Contents	Adapters
2434A	Test Kit	1328
		1331
		1332

2434A

Adapter

A

High Pressure Gauge Adapter

2962

Designed for testing high pressure lines. Adapter has 0 to 300 PSIG gauge. A bleeder valve allows you to bleed down to correct pressure during pressure tests.

Ordering Information

Part Number	Inlet Connection	Outlet Connection	Pressure Guage Range (PSIG)
2962	Soft Nose M. POL	F. POL	0 to 300

Water Manometer Kit
1212KIT

Application
The water manometer kit is especially suited for use with low pressure LP-Gas systems. It is ideal for pressure checks downstream of the low pressure regulator and at the appliances.

Features
- Flexible tube rolls up for convenient storage with accessories in compact carry case.
- Magnetic clips allow easy attachment to metal surfaces.
- Flexible spring steel scale is calibrated in inches of water column for reading to 16" w.c.
- Molded nylon tubing connectors incorporate a rapid shut-off design in an unbreakable molded top.
- Rapid pressure safety trap prevents loss of fluid due to pressure surges on both columns.
- Scale is center mounted between columns to eliminate parallax error and has a full two-inch sliding zero adjustment.

Contents
1—Flexible water manometer which reads up to 16" w.c. of pressure.
1—Heavy duty, compact carrying case.
1—¾ oz. bottle of Fluorescein Green color concentrate.
2—⅛" pipe thread barbed tubing adapters.
1—3 foot, 3⁄16" rubber tube.
1—Rubber tubing adapter and 7⁄16" spud.

Ordering Information

Part Number	Description
1212 KIT	Flexible Tube Water Manometer Kit

Adhesive Warning Labels

These adhesive warning labels are intended for application as close as possible to the LP-Gas regulator once the regulator has been installed.

The basic information contained on the label is intended for the benefit of the user of the product and is not intended to be an “all-inclusive” product warning.

The label is printed on a heavy duty material with pressure sensitive adhesive backing. The ultra-violet ink stands up well when exposed to the environment.

Ordering Information

Part Number	Description
L[illegible]3-400	Adhesive Warning Label

DANGER **WARNING**

LP-GAS IS EXTREMELY FLAMMABLE AND EXPLOSIVE

AVOID SERIOUS INJURY AND PROPERTY DAMAGE. IF YOU SEE, SMELL, OR HEAR ESCAPING GAS... *EVACUATE AREA IMMEDIATELY!* CALL YOUR LOCAL FIRE DEPARTMENT! DO NOT ATTEMPT TO REPAIR. DO NOT STORE IN BUILDING OR ENCLOSED AREA. DO NOT USE ON HOT AIR BALLOONS OR AIRCRAFT. V4403-400

Insist that your LP-Gas dealer regularly inspect and maintain this installation and properly instruct you in safety matters.

Make sure ice, snow drifts, dirt, bugs and other foreign material do not obstruct vent passage-ways and openings. The vent opening must have a screen installed. If screen is missing, call your gas dealer for immediate examination and replacement.

DO NOT REMOVE, DEFACE OR OBLITERATE THIS LABEL.
DO NOT FILL CONTAINER UNLESS THIS LABEL IS READABLE.

ADDITIONAL SAFETY INFORMATION IS AVAILABLE FROM

ECII Engineered Controls International, Inc.
Printed in U.S.A. 04-0994-1189
Part Number L
100 RegO Drive PO Box 247 Elon College, NC 27244 USA Phone (336) 449-7707 Fax (336) 449-6594 www.regoproducts.com

Warning Notice

The following warning information, Part Number LV4403-500, is included with each shipment of regulators to the first purchaser of the product from the factory.

This information is intended to be forwarded throughout the product distribution chain. Additional copies are available from Engineered Controls International, Inc. and Authorized Product Distributors.

DANGER **READ THIS FIRST** **WARNING**

LP-GAS IS EXTREMELY FLAMMABLE AND EXPLOSIVE

AVOID SERIOUS INJURY AND PROPERTY DAMAGE. IF YOU SEE, SMELL, OR HEAR ESCAPING GAS . . . *EVACUATE AREA IMMEDIATELY!* CALL YOUR LOCAL FIRE DEPARTMENT! DO NOT ATTEMPT TO REPAIR. DO NOT STORE IN BUILDING OR ENCLOSED AREA. DO NOT USE ON HOT AIR BALLOONS OR AIRCRAFT.

Make sure you are thoroughly trained before you attempt any regulator installation or maintenance. Improper conditions or procedures can cause accidents resulting in property damage and personal injury.

Become thoroughly familiar with NPGA Safety Pamphlet 306-79 "LP-Gas Regulator and Valve Inspection & Maintenance" and ECII® Safety Warning WB-1 "LP-Gas Regulators." Follow their recommendations.

Know and understand NFPA Pamphlet 58 "Storage and Handling Liquefied Petroleum Gases," which is the law in many states. This publication is available from NFPA, Batterymarch Park, Quincy, MA 02269. Following its requirements is essential in the safe use of LP-Gas. Section 15 states that "in the interest of safety, all persons employed in handling LP-Gases shall be trained in proper handling and operating procedures."

Pamphlet 58 also states that "All regulators for outdoor installations, except regulators used for portable industrial applications, shall be designed, installed or protected so their operation will not be affected by the elements (freezing rain, sleet, snow, ice, mud, or debris). This protection may be integral with the regulator."

Vents must be clear and fully open at all times. An obstructed vent will prevent the regulator from functioning properly and may result in property damage and personal injury.

Regulators should be installed with the vent facing down or otherwise covered for protection.

Twin-Stage Regulators should be installed completely under cover and/or with screened vent pipe-away adapters that position both vents in a down position without obstructing flow through the vents.

Make sure piping is clean and free from foreign material (such as dirt, corrosion, chips, pipe joint compound, etc.). Always replace the pigtail when replacing a regulator. Thread sealant used on piping must be compatible with LP-Gas.

Make sure the use and location of the regulator(s) as a component(s) of the LP-Gas system to be installed is proper. (Avoid misusing LP-Gas equipment.) See the following ECII® publications: Catalog L-500, Technical Guides 101 and 106, and the LP-Gas Serviceman's Manual.

For underground installations, make sure that water, mud, dirt, and insects cannot get into the regulator, and that the regulator is easily accessible for regular maintenance. Follow NPGA Bulletin 401. See ECII® Safety Warning WB-1 "LP-Gas Regulators."

Check regulator and installation for leaks following NFPA #54 and NPGA Bulletin 403 "Pressure Testing and Leak Checking LP-Gas Piping Systems."

In selecting a label for posting at the installation site, consider ECII® part number LV4403-400 along with your own, NPGA's, and others.

Remember to instruct the owner/user/customer in safety matters concerning LP-Gas and this equipment. See ECII® Safety Warning WB-1 "LP-Gas Regulators."

Engineered Controls International, Inc., ECII® requests that this information be forwarded to your customers. Additional copies are available from ECII® and your Authorized Product Distributor.

ECII Engineered Controls International, Inc.

Printed in U.S.A. 05-0298-0686
Warning LV4403-500

100 RegO Drive PO Box 247 Elon College, NC 27244 USA Phone (336) 449-7707 Fax (336) 449-6594 www.regoproducts.com

Cross Reference by Part Number

Limited Warranty and Limitation of Liability

LIMITED WARRANTY
Engineered Controls International, Inc. warrants products and repair kits manufactured by it to be free from defects in materials and workmanship under normal use and service for a period of 12 months from the date of installation or operation or 18 months from the date of shipment from the factory, whichever is earlier. If within thirty days after buyer's discovery of what buyer believes is a defect, buyer notifies Engineered Controls International, Inc. thereof in writing, Engineered Controls International, Inc., at its option, and within forty-five days, will repair, replace F.O.B. point of manufacture, or refund the purchase price of that part or product found by it to be defective. Failure of buyer to give such written notice within thirty days shall be deemed an absolute and unconditional waiver of any and all claims of buyer arising out of such defect.

This warranty does not extend to any product or part that is not installed and used in accordance with Engineered Controls International, Inc.'s printed instructions, all applicable state and local regulations, and all applicable national standards, such as those promulgated by NFPA, DOT and ANSI. This warranty does not extend to any product or part that has been damaged by accident, misuse, abuse or neglect, nor does it extend to any product or part which has been modified, altered, or repaired in the field.

Except as expressly set forth above, and subject to the limitation of liability below, Engineered Controls International, Inc. makes NO OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, with respect to its products and parts, whether used alone or in combination with others. Engineered Controls International, Inc. disclaims all warranties not stated herein.

LIMITATION OF LIABILITY
Engineered Controls International, Inc.'s total liability for any and all losses and damages arising out of any cause whatsoever shall in no event exceed the purchase price of the products or parts in respect of which such cause arises, whether such cause be based on theories of contract, negligence, strict liability, tort or otherwise.

Engineered Controls International, Inc. shall not be liable for incidental, consequential or punitive damages or other losses. Engineered Controls International, Inc. shall not be liable for, and buyer assumes liability for, all personal injury and property damage connected with the handling, transportation, possession, further manufacture, other use or resale of products, whether used alone or in combination with any other products or material.

If Engineered Controls International, Inc. furnishes technical advice to buyer, whether or not at buyer's request, with respect to application, further manufacture or other use of the products and parts, Engineered Controls International, Inc. shall not be liable for such technical advice and buyer assumes all risks of such advice and the results thereof.

NOTE: Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. The warranty gives you specific legal rights, and you may have other rights that vary from State to State. The portions of this limited warranty and limitation of liability shall be considered severable and all portions which are not disallowed by applicable law shall remain in full force and effect.

WARNING
All Engineered Controls International, Inc. products are mechanical devices that will eventually become inoperative due to wear, corrosion and aging of components made of materials such as rubber, etc. The environment and conditions of use will determine the safe service life of these products. Periodic inspection and maintenance are essential to avoid serious injury and property damage.

Many Engineered Controls International, Inc. products are manufactured components which are incorporated by others on or in other products or systems used for storage, transport, transfer and otherwise for use of toxic, flammable and dangerous liquids and gases. Such substances must be handled by experienced and trained personnel only, using accepted governmental and industrial safety procedures.

NOTICE TO USERS OF PRODUCTS
The Limited Warranty stated above is a factory warranty to the first purchasers of Engineered Controls International, Inc. products. Since most users have purchased these products from Engineered Controls International, Inc. distributors, the user must within thirty (30) days after the user's discovery of what user believes is a defect, notify in writing the distributor from whom he purchased the product/parts. The distributor may or may not at the distributor's option choose to submit the product/parts to Engineered Controls International, Inc., pursuant to its Limited Warranty. Failure by buyer to give such written notice within thirty (30) days shall be deemed an absolute and unconditional waiver of buyer's claim for such defects. Acceptance of any alleged defective product/parts by Engineered Controls International, Inc.'s distributor for replacement or repairs under the terms of Engineered Controls International, Inc.'s Limited Warranty in no way obligates Engineered Controls International, Inc. to the terms of the above warranty.

Because of a policy of continuous product improvement, Engineered Controls International, Inc. reserves the right to change designs, materials or specification without notice.

Foreword

This catalog describes a complete line of equipment available from Engineered Controls International, Inc. for use with LP-Gas and anhydrous ammonia (NH_3). The following points are important to know for proper use of the catalog:

1. *Illustrations and drawings of individual products are representative of "product groups" and all products within a product group are similar in construction.*
2. *Materials used for construction of products in this catalog are suitable for rated service pressure at temperatures of -40° F. to +165° F., unless otherwise specified.*
3. *Products in this catalog are only intended for use in LP-Gas and/or anhydrous ammonia service as follows.*

   a. *"A" or "AA" prefix — Products with this prefix are suitable for NH_3 service (i.e., contain no brass parts).*

   b. *"AA" prefix on relief valves — These valves are NOT suitable for use with LP-Gas service. These are of partial aluminum materials and are listed by Underwriters Laboratories (UL) for NH_3 service only.*

   c. *All other products are suitable for use with LP-Gas service.*

   d. *"SS" prefix—Hydrostatic relief valve with this prefix are suitable for NH_3 service (i.e., they have stainless steel materi-*

Caution

Do not use any product contained in this catalog with any service commodity other than LP-Gas or NH_3. If you have a need for use of another application, contact Engineered Controls International, Inc., 100 RegO Drive, Elon, NC 27244, (336) 449-7707 before proceeding.

Proper application, installation and maintenance of products in this catalog are essential. Users of these products should obtain further information if there are any doubts or questions.

Warning

All ECII® products are mechanical devices that will eventually become inoperative due to wear, corrosion and aging of components made of materials such as rubber. The environment and conditions of use will determine the safe service life of these products. Periodic inspection and maintenance are essential to avoid serious injury and property damage.

Many ECII® products are manufactured for storage, transport, transfer and use of toxic flammable and dangerous liquids and gases. Such substances should be handled by experienced and trained personnel only, using accepted governmental and industrial safety procedures. Never vent LP-Gas near any possible source of ignition.

Notice

Installation, usage, and maintenance of all ECII® products must be in compliance with all Engineered Controls International, Inc. instructions as well as requirements and provisions of NFPA #54, NFPA#58, DOT, ANSI, and all applicable federal, state, provincial and local standards, codes, regulations, and laws.

Inspection and maintenance on a periodic basis is essential. Installation and maintenance should be performed only by qualified personnel.

Be sure all instructions are read and understood before installation, operation and service.

Filters

ECII® LP-Gas equipment is designed to operate in a system free from contamination. A variety of in-line filters are commercially available to the LP-Gas industry for installation in domestic systems.
The use of an in-line filter should be considered when other system components may be unclean and the system contaminated by rust, scale, dirt, debris or other foreign material.

B

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Safety Warnings

Purpose

In its continuing quest for safety, Engineered Controls International, Inc. is publishing safety warning bulletins explaining the hazards associated with the use, misuse and aging of LP-Gas valves and regulators. It is hoped that these factual bulletins will make clear to LP-Gas dealer managers and service personnel that the utmost care and attention must be used in the installation, inspection and maintenance of these products, or problems could occur which would result in personal injury and property damage.

The National Fire Protection Association Pamphlet #58 "Storage and Handling of Liquefied Petroleum Gases" states in Section 1-6 that "In the interests of safety, all persons employed in handling LP-Gases shall be trained in proper handling and operating procedures." ECII® Warning Bulletins may be useful in training new employees and reminding older employees of potential hazards that can occur.

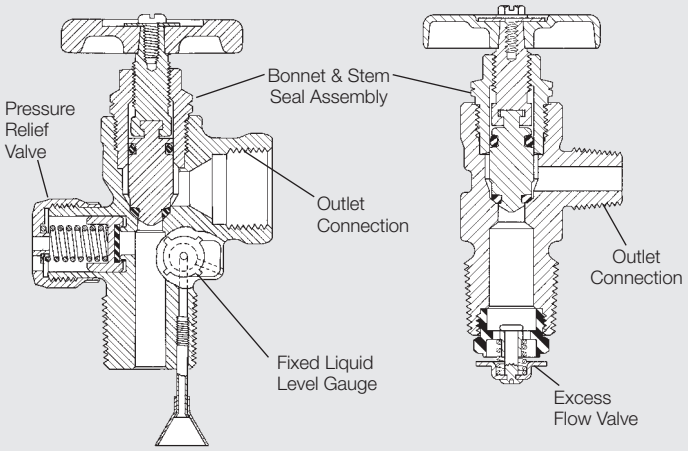
It is recommended that all employees be furnished with a copy of NPGA Safety Pamphlet 306-88 "LP-Gas Regulator and Valve Inspection and Maintenance."

Nature of Warnings

It is recognized that warnings should be as brief as possible, but the factors involved in cylinder valve failure are many because of the multiple functions the valve serves. If there is any simple warning, it would be:

Check cylinder valves for leaking components every time cylinders are filled.

The bulletin is not intended to be an exhaustive treatment of the subject of cylinder valves and certainly does not cover all safety practices that should be followed in installation, operation and maintenance of LP-Gas systems which include cylinder valves.



LP-Gas Cylinder Valves

These valves are mounted in DOT cylinders, and are intended to provide one or more of the following functions:

1. Vapor service shut-off
2. Liquid service shut-off (with excess flow valve)
3. Liquid filling
4. Pressure relief
5. Fixed liquid level gauge

These functions, although simple, are extremely critical in the safe operation of an LP-Gas cylinder system.

Abuse of these valves, failure to follow a good installation and maintenance program and attempting to use cylinder valves beyond their normal service life can result in extremely hazardous conditions.

Important Factors:

1. **Installation:** It should not be necessary to remind the readers that cylinder valves must be installed and used in strict conformance with NFPA Pamphlet 58, and all other applicable codes and regulations. Codes, regulations and manufacturers' recommendations have been developed by experts with many years of experience in the LP-Gas industry in the interest of safety for users of LP-Gas and all personnel servicing LP-Gas systems.

   Failure to fully follow these codes, regulations and recommendations could result in hazardous installations.

2. **The bonnet and stem seal assembly of a cylinder valve are extremely critical, since any malfunction could cause external leakage and spillage**.

   Check bonnet to see that it is in proper position. If there is any doubt about tightness of threaded connection between bonnet and body, valve must be repaired in accordance with manufacturers' repair instructions before cylinder is filled. Handwheel must be in good condition, stem threads must not be worn or damaged and bonnet must be properly assembled. This area should be examined **each time** the cylinder if filled. A leakage test should be conducted while the shut-off valve is in the open position during filling.

3. The cylinder outlet connection is usually a female POL. **Threads must be free of dents, gouges and any indication of excessive wear.** Seating surface inside this connection must be smooth and free of nicks and scratches to assure a gas tight seal when connected to a male POL cylinder adapter. Cylinder adapter must spin on freely all the way, without indication of drag, roughness or excessive looseness, and must then be tightened with a wrench. Connection must be checked for leakage.

4. **The pressure relief valve is of critical importance:** Its proper operation is vital in avoiding excessive pressures during emergencies, such as overfilling or exposure to excessive heat. **No repair of this device is allowable.** Relief valve should be visually inspected and checked for leaks each time the cylinder is returned for filling. All flow passages must be clean and free of foreign material.

Entire assembly must be free of dents, distortion or other indications of damage. **If relief valve appears to contaminated or damaged, the cylinder valve must be replaced.** (Caution: Eye protection must be used when examining relief valves under pressure.)

5. The liquid service shut-off valve, with excess flow valve provided on some cylinder valves, is also of critical importance. The excess flow valve must be periodically tested for proper performance, in addition to the inspection of the shut-off valve.
6. The fixed liquid level gauge on a cylinder valve is, when present, essential to prevent overfilling the cylinder. The gauging valve must operate freely, venting vapor when loosened, and sealing gas-tight easily when tightened with the fingers. Gauge valves meant for use with a socket key or screwdriver must also seal easily without excessive torque. The fixed liquid level gauge diptube must be of the proper length, and be in proper position. Periodic test should be conducted by weighing the cylinder after filling, to determine that it does not contain more than the allowable amount of LP-Gas. This check should be done periodically, and any time there is suspicion that the gauge diptube may be damaged or broken.

Do Not Overfill Cylinders

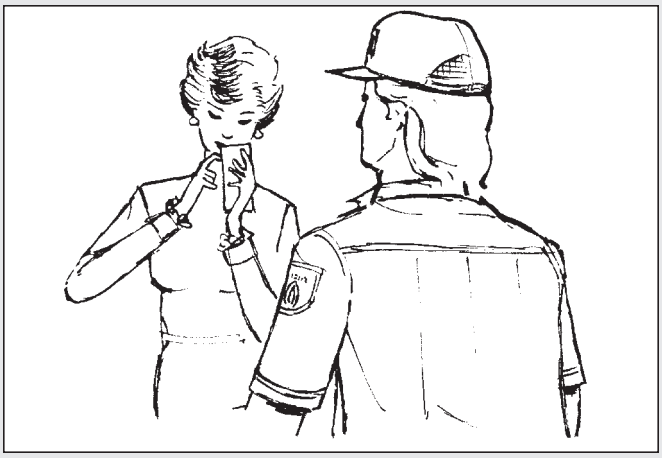
Do not fill a cylinder without first repairing or replacing the cylinder valve, as required, if any defect is noted.

While not required by codes, it is recommended that a plug or suitable protection be inserted in the POL outlet of the cylinder valve at all times except during filling and while connected for use. This will guard against discharge of gas should the handwheel be inadvertently opened while the cylinder is in storage or transit. **This is highly advisable for small cylinders that could be transported inside an automobile or trunk.**

It is important that proper wrenches and adapters be used when filling, servicing and installing cylinder valves in order to avoid damage to the valve or associated piping.

Customer Safety

Since cylinders are often used by consumers without previous knowledge of the hazards of LP-Gases and the LP-Gas dealers are the only ones who have direct contact with the consumers, **it is the dealers' responsibility to make sure that his customers are properly instructed in safety matters relating to their installation.**



At the very minimum, it is desirable that these customers:

1. Know the odor of LP-Gas and what to do in case they smell gas. Use of the NPGA "Scratch 'n Sniff" leaflet could be productive.
2. Are instructed never to tamper with the system.
3. Know that when protective hoods are used to enclose regulators and/or valves, that these hoods must be closed, but not locked.
4. Know the location of the cylinder shut-off valve in emergencies.

General Warning

All ECII® Products are mechanical devices that will eventually become inoperative due to wear, contaminants, corrosion and aging of components made of materials such as metal and rubber.

The environment and conditions of use will determine the safe service life of these products. Periodic inspection and maintenance are essential. Because ECII® Products have a long and proven record of quality and service, LP-Gas dealers may forget the hazards that can occur because a cylinder valve is used beyond its safe service life. Life of a cylinder valve is determined by the environment in which it "lives". The LP-Gas dealers know better than anyone what this environment is.

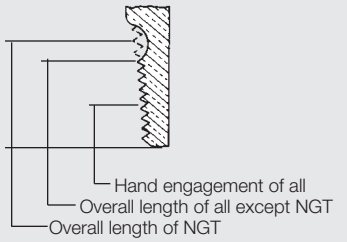
NOTE: There is a developing trend in state legislation and in proposed national legislation to make the owners of products responsible for replacing products before they reach the end of their safe useful life. LP-Gas dealers should be aware of legislation which could affect them.

Thread Specifications

Cylinder Valve Threads

Because of the many thread forms available on equipment used in the LP-Gas industry today, the maze of letters, numbers and symbols which make up various thread specifications becomes confusing. To help eliminate some of this confusion, a brief explanation of some of the more widely used thread specifications is shown below.

Inlet Connections

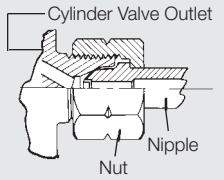


NGT and NPT Threads
The NGT (National Gas Taper) thread is the commonly used valve-to-cylinder connection. The male thread on the valve has about two more threads at the large end than the NPT in order to provide additional fresh threads if further tightening is necessary. Additionally, the standard ¾" NGT valve inlet provides the greater tightness at the bottom of the valve by making the valve threads slightly straighter than the standard taper of ¾" per foot in NPT connections. In all other respects NPT and NGT threads are similar.

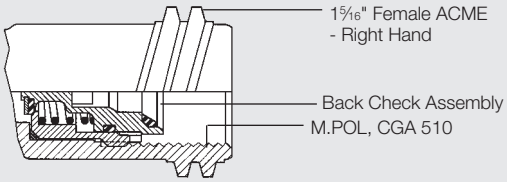
Outlet Connections

CGA Outlets
The CGA (Compressed Gas Association) outlets are standard for use with various compressed gases. The relation of one of these outlets to another is fixed so as to minimize undesirable connections. They have been so designed to prevent the interchange of connections which may result in a hazard.

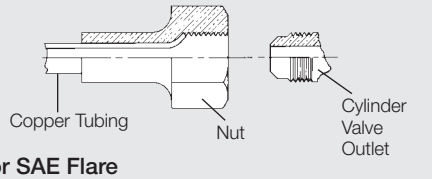
3/8"-18 NPT Thread Connection
This connection also is used for vapor or liquid withdrawal. It has a ⅜" diameter thread, and 18 threads per inch, National Pipe Taper Outlet form.



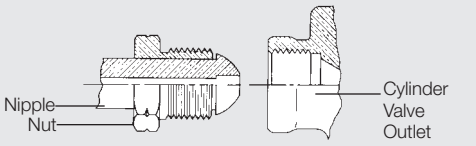
CGA 555
CGA 555 is the standard cylinder valve outlet connection for liquid withdrawal of butane and/or propane. Thread specification is .903" – 14 NGO – LH – EXT, which means .903" diameter thread, 14 threads per inch, National Gas Outlet form, left-hand external thread.



Type I Outlet
This connection is designed to mate with either a 1⁵⁄₁₆" Female ACME or a Male POL (CGA510). It complies with the ANSI Z21.58 Standard for Outdoor Cooking Appliances and the Can/CGA-1.6 Standard for Container Connections. A back check assembly in the outlet is designed to prevent gas flow until a leak free connection is made with an inlet adapter. These standards apply to barbecue grill cylinders manufactured after October 1994.



CGA 182, or SAE Flare
This connection assures a leak-tight joining of copper tubing to brass parts without need for brazing or silver soldering. The common size used on LP-Gas valves and fittings is ⅜" SAE (Society of Automotive Engineers) flare. Although this connection is referred to as a ⅜", because ⅜" OD tubing is used, the thread actually measures ⅝". The specifications are .625 – 18 UNF – 2A – RH – EXT, which means .625" diameter thread, 18 threads per inch, Unified Fine Series Class 2 Tolerances, right-hand, external thread.



CGA 510 or POL
Most widely used in this industry, POL is the common name for the standard CGA 510 connection. Thread specification is .885" – 14 NGO – LH – INT, meaning .885" diameter thread, 14 threads per inch, National Gas Outlet form, left-hand internal thread. ECII® POL outlet connections for LP-Gases conform to this standard.

General Information

The wide acceptance of ECII®/RegO® Cylinder Valves is based on their reliable performance as well as their reputation for engineering and manufacturing excellence. Together with thorough testing, these efforts result in years of trouble-free service.

ECII®/RegO® Cylinder Valves are listed by Underwriters' Laboratories and approved by the Bureau of Explosives for pressure relief valve operation, wherever applicable. See section on relief valves for important information.

Reliability

ECII®/RegO® Cylinder Valves are built with attention to each detail: Beginning with comprehensive inspection of forgings and machined parts, and ending with intense quality testing on each individual valve prior to shipment. Every valve must pass a stringent and comprehensive underwater leakage test.

Additionally, valves with pressure reliefs are tested for proper pressure and operation, including reseating to ensure proper opening and closing at required pressures. Those equipped with excess flow checks are tested for compliance with published closing specifications, and tested to ensure minimum leakage after closing.

Heavy-Duty Valve Stem Seals

ECII®/RegO® Cylinder Valves utilize seat discs and stem seals which resist deterioration and provide the kind of reliable service required for LP-Gas utilization. Diaphragm or O-Ring stem seals are available.

Valves with diaphragm stem seals are recognized for their heavy-duty body design and are suitable for use in cylinders up to 200 lbs. propane capacity.

O-Ring type stem seals are the most widely accepted in the industry. The simple, economical and long life design features a tapered and confined nylon seat disc which provides positive, hand-tight closings, and a faster filling cylinder valve.

Pressure Relief

ECII®/RegO® Valves have full-capacity "pop action" pressure reliefs with start to discharge settings at 375 PSIG.

A Valve for Every Need

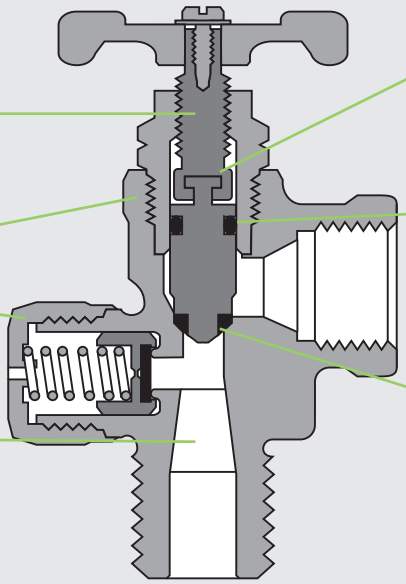
ECII®/RegO® Cylinder Valves are available for all LP-Gas services; a wide choice for domestic, commercial, industrial, RV, motor fuel, and lift truck applications. Valves are available with a combination of such options as pressure reliefs, liquid level gauges, and liquid withdrawal tubes.

Also available for special applications are plumbers' pot valves, tamper-resistant valves for field service, and dual valves for simultaneous liquid and vapor service.

Instructions for the Proper Use and Applications of ECII®/RegO® Cylinder Valves

1. Containers and pipe line should be cleaned thoroughly before valves are installed. Large particles of solid foreign matter can cut the seating surface of any resilient seat disc, causing the valve to leak. Care must be exercised in inserting valves into lines or containers to avoid damaging or exerting pressure against pressure relief valves and outlet connections. Use a minimum amount of a suitable luting compound on the *cylinder valve threads only*. Excess amounts of luting compound can foul the operating parts of the valves.
2. *Do not* use excessive force in opening or closing the valves. The seat disc and diaphragm materials permit the valves to be opened and closed easily by hand. Never use a wrench on wheel handle valves.
3. When the design of the piping installation allows liquid to be locked between two valves, a hydrostatic relief valve must be installed in the line between the two valves. The pressures which can develop due to temperature increase in a liquid full line are tremendous and can cause rupture of the line or damage to the valves.
4. The valves are designed to withstand normal atmospheric temperatures. They should not, however, be subjected to abnormally high temperatures.

Design Features of ECII® / RegO® Cylinder Valves



Valve Stems On 901, 903, 9101 and 9103 Valves
Are machined with a double lead thread for quick opening and closing as well as high lift.

Forged Brass Body

Pressure Relief
Provides quick discharge of excess pressure. Relief seat disc is special resilient composition rubber.

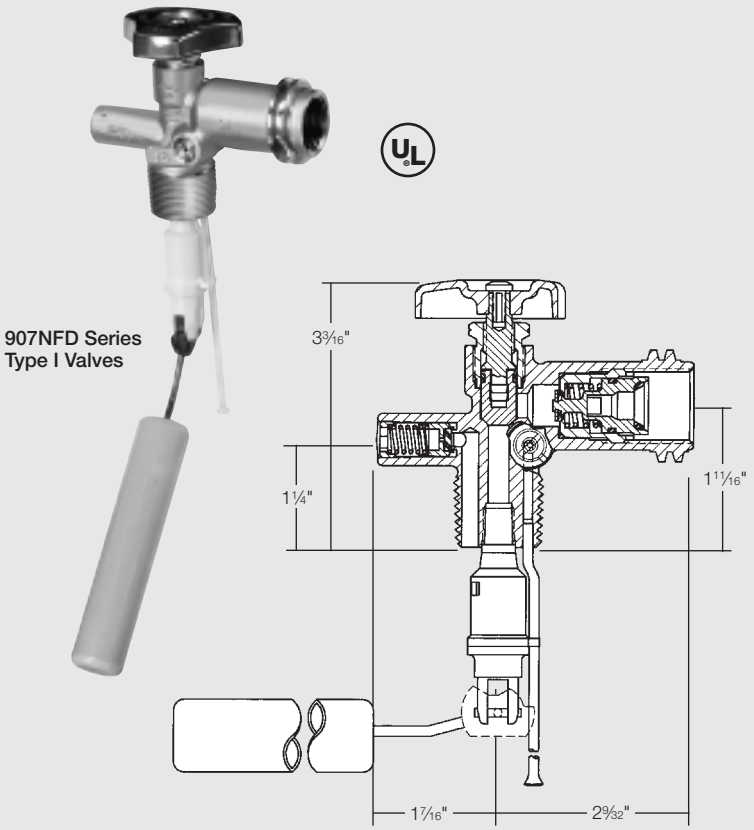
Tapered Seat Openings On 9101 and 9103 Valves
Permit increased flow rates resulting in faster charging.

Back Seat On 901, 903, 9101 and 9103 Valves
Is metal-to-metal seating to provide added protection against leakage while the valve is open. Back seat the valve while in operation.

O-Rings
For positive leak-proof seals under temperature and pressure variations.

Seat Disc
Is a tapered nylon in a fully confined seat to ensure easy, leak-free, positive shut-offs. Seat disc also provides a separate swivel action to minimize scoring by impurities.

907NFD Series



Application

The 907NFD Series Cylinder Valves are designed for use on DOT LP-Gas Cylinders up to 40 lbs. The outlet features a back check assembly - designed to prevent gas flow until a leak free connection is made with an inlet adapter.

These valves comply with both the ANSI Z21.58 Standard for Outdoor Cooking Appliances and the CAN/CGA-1.6 Standard for Container Connections which apply to new barbecue grill cylinders manufactured after October 1994. They also conform to requirements in the edition of NFPA 58.

Features

- Nylon tapered seat disc on shut-off provides positive closing.
- Full size 1¼" wrenching boss located at rear of the valve minimizes possible damage to valve outlet when installing into cylinder.
- Relief valve is recessed in body forging to resist damage and tampering.
- Low profile fits within cylinders' protective collars.
- Self tapping screw secures handwheel to stem.
- Available with a variety of dip tube lengths.
- Slotted vent reduces possibility of tampering.

Materials

Body ..... Forged Brass
Handwheel .....Aluminum Die Cast
Stem ..... Brass
Seat Disc, Shut-Off..... Nylon
Relief Spring .....Stainless Steel
O-Rings, Seats .....Resilient Rubber
Back Check Module ..... Brass
OPD Stems ..... Nylon or Brass
OPD Float..... Nylon

B

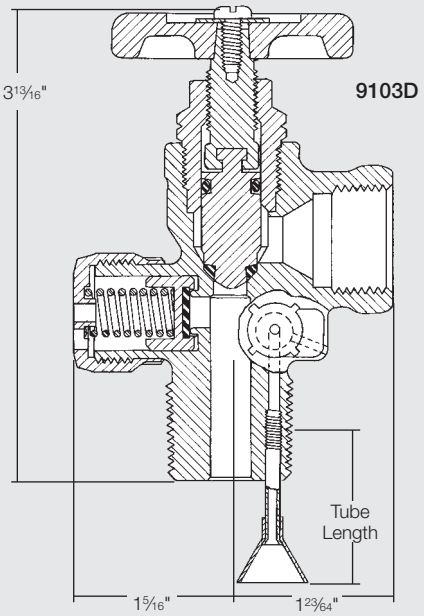
Ordering Information

Part Number	Dip Tube Length with Deflector	For use on DOT Cylinders Up To:	Container Connection	Service Connection		Fixed Liquid Level Vent Valve Style	Pressure Relief Valve Setting	Accessories
				Type	Description			ACME Dust Cap
907NFD3.0	3.0"	5 lbs.	¾" M. NGT	Type I	1 5/16" M. ACME and F. POL *CGA 791*	Slotted	375 PSIG	907-12 Included
907NFD4.0	4.0"	20 lbs.						
907NFD4.8	4.8"	30 lbs.						
907NFD6.5	6.5"	40 lbs.						

Heavy-Duty Cylinder Valves for Vapor Withdrawal

9103 Series

9103D



Application

This heavy duty cylinder valve is designed for vapor withdrawal of DOT cylinders up to 100 lbs. propane capacity. It is used in domestic hook-ups, and industrial commercial installations.

Materials

Body . . . . . Forged Brass
Handwheel . . . . . Aluminum
Stem . . . . . Brass
O-Rings . . . . . Resilient Rubber
Seat Disc . . . . . Nylon
Relief Spring . . . . . Stainless Steel

Features

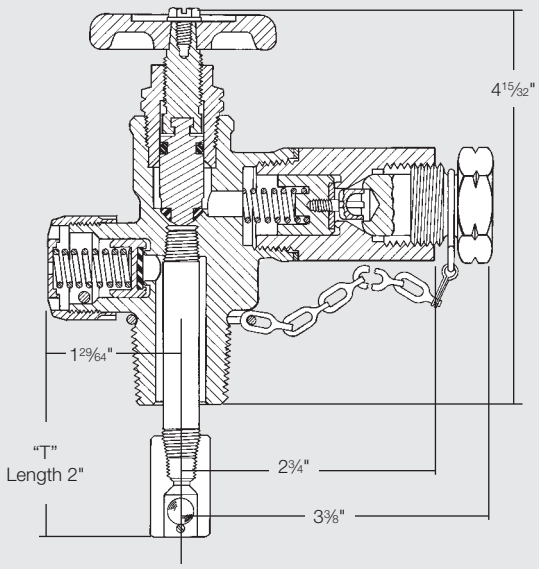
- Equipped with a fast filling throat and high lift, o-ring stem seal design.
- Utilizes a nylon tapered seat design for positive closing.
- Available with a fixed liquid level gauge.
- Self-tapping screw secures handwheel to stem and reduces possibility of handwheel vibrating loose while in transit.

Ordering Information

Part Number	Container Connection	Service Connection	Fixed Liquid Level Vent Valve Style	Dip Tube Length w/ Deflector	Pressure Relief Valve Setting	For use in Cylinders w/ Propane Capacity	Approximate Filling Rate Liquid Flow, GPM				Accessories	
							Pressure Drop Across Valves				POL Plug	Relief Valve Cover
							10 PSIG	25 PSIG	50PSIG	100 PSIG		
9103COA	3/4" M NGT	F. POL (CGA 510)	None	None	375 PSIG	100 lbs.	12.7	20.3	29.0	41.3	N970P	9103-54
9103D04.2			Knurled	4.2"								
9103D10.6				10.6"								
9103D11.6				11.6"								

Tamper-Resistant Cylinder Valve with Outlet Check for Vapor Withdrawal

9103T9F



Application

This valve is designed for vapor withdrawal from and protection of DOT cylinders up to 100 lbs. propane capacity. Ideal for cylinders used in the field by construction crews, utility repair men and plumbers.

Materials

Body	Forged Brass
Handwheel	Aluminum Die Cast
Stem	Brass
O-Rings	Resilient Rubber
Seat Disc	Nylon
Relief Spring	Stainless Steel
Plug	Brass

Features

- Minimizes the risk of unauthorized persons withdrawing propane from cylinders not in service. It is necessary to install a male POL connection to open the outlet check to withdraw vapor from the valve.
- Ball type excess flow located in the valve inlet protects against excessive discharge if the cylinder is tipped or the hose ruptures. Closing flow is 200 SCFH at 100 PSIG.
- Removable POL outlet and check mechanism make field replacement of worn connections an easy process without removing the valve from the cylinder.
- Outlet seal plug on a heavy duty chain prevents dirt from entering POL when not in use.
- Nylon tapered seat design provides positive closure.

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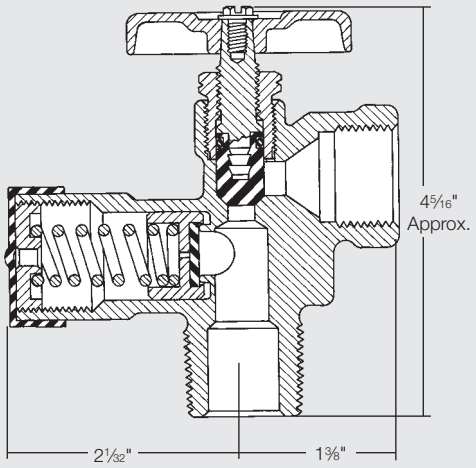
Ordering Information

Part Number	Container Connection	Service Connection	Fixed Liquid Level Vent Valve Style	Pressure Relief Valve Setting	For Use In Cylinders w/Propane Capacity Up To:	Approximate Filling Rate Liquid Flow, GPM			
						Pressure Drop Across Valves			
						10 PSIG	25 PSIG	50 PSIG	100 PSIG
9103T9F	¾" M. NGT	F. POL (CGA 510)	None	375 PSIG	100 lbs.	5.0	7.6	10.7	14.9

NOTE: These valves incorporate an excess flow valve. Refer to L-500/Section F, for complete information regarding selection, operation and testing of excess flow valves.

Cylinder Valve for RV and Small ASME System Vapor Withdrawal

9106CO



Application

Designed especially for vapor withdrawal service in small ASME containers with surface area up to 23.8 square feet. UL flow capacity is 645 CFM/air.

Features

- O-ring stem seal design provides positive seal.
- One-piece relief valve is shielded from tampering and damage.
- Relief is forged as part of the body for extra strength.
- 312 PSIG Relief Valve setting.

Materials

Body . . . . . Forged Brass
Handwheel . . . . . Aluminum Die Cast
Stem . . . . . Brass
O-Rings . . . . . Resilient Synthetic Rubber
Seat Disc . . . . . Nylon
Relief Spring . . . . . Stainless Steel

Ordering Information

Part Number	Container Connection	Service Connection	Fixed Liquid Level Vent Valve Style	Pressure Relief Valve Setting	For Use In Cylinders w/Propane Capacity Up To:	Flow Capacity SCFM/Air
9106CO	¾" M. NGT	F. POL (CGA 510)	None	312 PSIG	ASME Tanks*	645

* Surface area up to 23.8 square feet.

9107K8A

Application

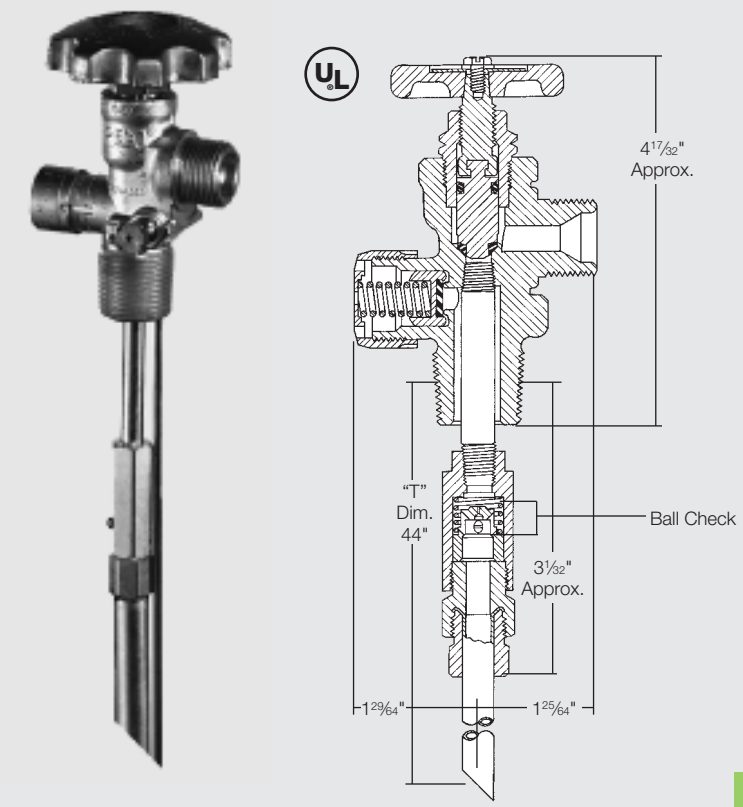
Equipped with excess flow valves and liquid withdrawal tubes, they are designed for liquid withdrawal of DOT cylinders up to 100 lbs. propane capacity. They are most often used with heavy BTU loads found in industrial uses.

Features

- O-ring stem seal design.
- Nylon tapered seat disc for positive closure.
- Self-tapping screw secures handwheel to stem and reduces possibility of handwheel vibrating loose while in transit.
- Features ball check excess flow valve.
- Furnished with ⅜" O.D. stainless steel withdrawal tube with "T" dimension of 44".

Materials

Body ..... Forged Brass
Handwheel .....Aluminum Die Cast
Seat Disc..... Nylon
O-Rings.....Resilient Rubber
Relief Spring .....Stainless Steel
Stem ..... Brass



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Ordering Information

Part Number	Container Connection	Service Connection	Fixed Liquid Level Vent Valve Style	Dip Tube Length w/Deflector	Liquid Withdrawal Tube Length
9107K8A	¾" M. NGT	CGA 555	Knurled	11.6"	44"

Pressure Relief Valve Setting	For Use In Cylinders w/Propane Capacity Up To:	Approximate Filling Rate Liquid Flow, GPM				Closing Flow (LP-Gas)*		
		Pressure Drop Across Valve				Vapor		
		10 PSIG	25 PSIG	50 PSIG	100 PSIG	25 PSIG Inlet	100 PSIG Inlet	Liquid
375 PSIG	100 lbs.	3.3	5.4	7.7	11.1	525 SCFH	1,000 SCFH	1.7 GPM

*Closing flows based on ⅜" O.D. withdrawal tube 44" long or less attached.

IMPORTANT: ¼" O.D. pigtails or POL connections for ¼" O.D. pigtails should not be used with these valves.

NOTES: To ensure proper functioning and maximum protection from excess flow valves, the cylinder valve should be fully opened and backseated when in use. These valves incorporate an excess flow valve. Refer to L-500 / Section F, for complete information regarding selection, operation and testing of excess flow valves.

"Dual" Cylinder Valve for Simultaneous Liquid and Vapor Withdrawal

8556

Application

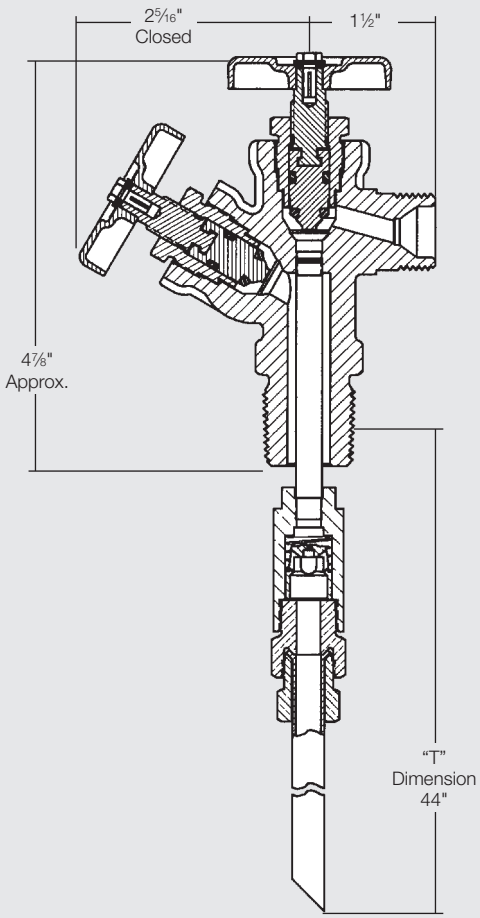
This dual cylinder valve was designed especially for industrial uses. It increases the cylinder's flexibility by permitting DOT cylinders up to 100 lbs. propane capacity to be used interchangeably or simultaneously for either liquid or vapor withdrawal.

Features

- Two separate flow channels in the body permit vapor and/or liquid withdrawal alternately, or simultaneously.
- Outlet connections have two different fittings.
- Handwheels are equipped with appropriate "liquid" or "vapor" identification labels.
- Furnished with a ⅜" O.D. stainless steel liquid withdrawal tube with a "T" dimension of 44".

Materials

Body ..... Forged Brass
Handwheels .....Aluminum Die Cast
Stem ..... Brass
Seat Discs ..... Nylon
O-Rings.....Resilient Rubber
Relief Spring .....Stainless Steel



Ordering Information

Part Number	Container Connection	Service Connection		Fixed Liquid Level Vent Valve Style	Liquid Withdrawal Tube Length
		Vapor	Liquid		
8556	¾" M. NGT	F. POL (CGA 510)	CGA 555	None	44"

Pressure Relief Valve Setting	For Use In Cylinders w/Propane Capacity Up To:	Approximate Filling Rate Liquid Flow, GPM Pressure Drop Across Valve				Liquid Closing Flow* (LP-Gas)
		10 PSIG	25 PSIG	50 PSIG	100 PSIG	
375 PSIG	**100 lbs.**	**6.6**	**10.0**	**14.5**	**21.0**	**2.3 GPM**

* To ensure proper functioning and maximum protection from integral excess flow valves, the cylinder valve should be fully opened and backseated when in use.

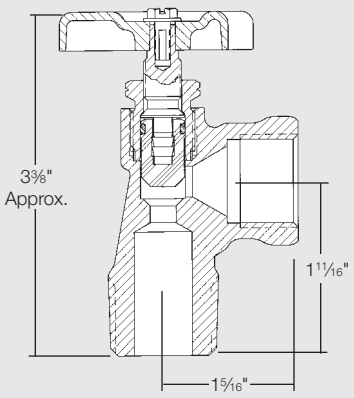
NOTE: These valves incorporate an excess flow valve. Refer to L-500/Section F, for complete information regarding selection, operation and testing of excess flow valves.

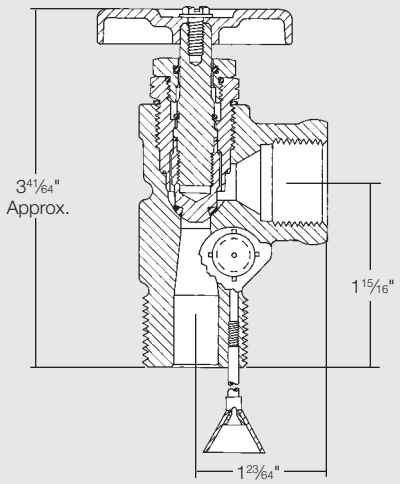
901C1, 9101C, 9101D, and 9101R Series

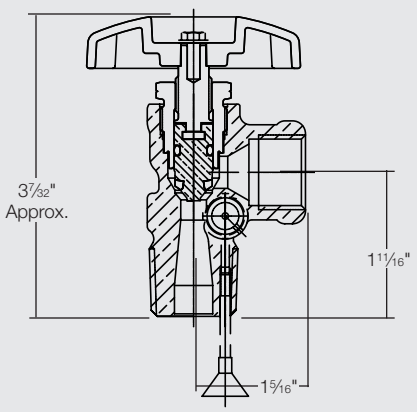
901C1

9101R1

9101D







Application

Designed especially for vapor or liquid withdrawal service on ASME and DOT containers or in fuel line applications. *Since none of these valves have an integral pressure relief valve, they may only be used as an accessory valve on containers that have an independent pressure relief valve sufficient for that container's capacity.*

Features

- O-Ring stem seal design provides positive seal.
- Metal-to-metal back seat provides added protection against leakage while the valve is open.
- Valves with fixed liquid level gauges permit operator to quickly determine when the maximum permitted filling level of the container is reached.
- 9101R Series with MultiBonnet allows quick and easy repair of bonnet.

Materials

Body ..... Forged Brass
Handwheel .....Aluminum Die Cast
Stem ..... Brass
O-Ring..... Resilient Synthetic Rubber
Seat Disc..... Nylon

B

Ordering Information

Part Number	Bonnet Style	Container Connection	Service Connection	Liquid Withdrawal Connection	Fixed Liquid Level Vent Valve	Approximate Filling Rate Liquid Flow, GPM			
						Pressure Drop Across Valve			
						10 PSIG	25 PSIG	50 PSIG	100 PSIG
901C1	Standard	¾" M. NGT	F. POL CGA 510	¼" NPT	No	5.3	8.2	10.8	14.2
9101C1						8.8	12.4	15.8	21.7
9101D11.1					Yes	8.6	12.7	16.3	22.3
9101D11.7									
9101R1	MultiBonnet				No	7.6	11.7	15.2	20.6
9101R11.1					Yes				
9101R11.7									

NOTE: Since these valves have no integral pressure relief valve, they can be used on any container with an independent relief device sufficient for that tank's capacity.

Service Valves for ASME Motor Fuel Containers

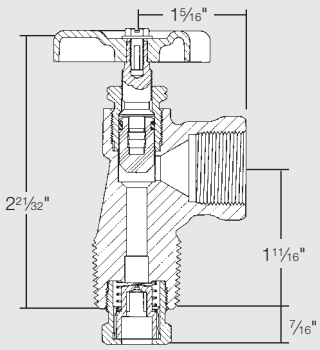
901C, 9101H, and 9101Y Series

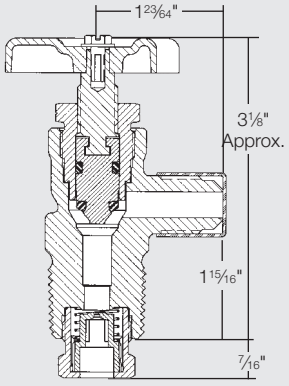

901C5

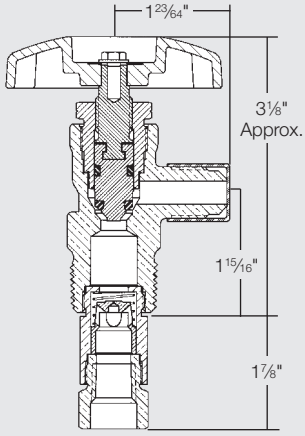

9101H5

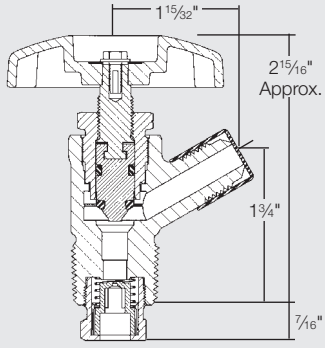

9101H6


9101Y5H









Application

Designed specifically for vapor or liquid withdrawal service on ASME motor fuel containers. *Since none of these valves have an integral pressure relief valve, they may only be used as an accessory valve on containers that have an independent pressure relief valve sufficient for that container's capacity.*

The integral excess flow valve found in all these service valves helps prevent excessive product loss in the event of fuel line rupture.

When installed for liquid withdrawal, the 9101H6 has provisions for attachment of a liquid withdrawal tube. All other valves must be installed in containers that have provisions for a separate liquid withdrawal.

To insure proper functioning and maximum protection from integral excess flow valves, these service valves should be fully opened and backseated when in use.

Features

- Incorporates integral excess flow valve and shut-off valve in one unit.
- Double lead thread provides faster opening and closing.
- O-Ring stem seal design provides positive seal.
- Tapered and confined seat disc provides positive shut off.
- Metal-to-metal back seat provides added protection against leakage while the valve is open.
- 9101H6 equipped with a ¼" NPT internal thread for the addition of a liquid withdrawal tube.
- 9101Y Series features a 60° angled outlet connection to facilitate easier and simpler fuel line make-up.

Materials

Body ..... Forged Brass
Handwheel ..... Aluminum Die Case
Stem ..... Brass
O-Ring..... Resilient Synthetic Rubber
Seat Disc..... Nylon

Ordering Information

Part Number	Container Connection	Service Connection	Liquid Withdrawl Connection	Closing Flow (LP-Gas)		
				Vapor		Liquid GPM
				25 PSIG Inlet (SCFH)	100 PSIG Inlet (SCFH)	
901C3	3/4" M. NGT	F. POL CGA 510	None	430***	900***	1.5***
901C5				550***	1050***	2.6***
9101H5*		3/8" SAE Flare		765**	1300**	3.6**
9101H6*			1/4" NPT	550****	1050****	2.6****
9101Y5H*		60° Angle 3/8" SAE Flare	None	550**	1050**	3.6**

* Heavy-duty models
** Based on ⅜" O.D. pigtail, 20" long or less, connected to valve outlet. For greater lengths, the pigtail must have a larger O.D.
*** Same as (**). In addition, ¼" O.D. pigtails or POL connections for ¼" O.D. should not be used with this valve.
**** Based on ⅜" O.D. pigtail; 20: long or less, connected to valve outlet. Also based on ¼" pipe size dip tube, 42" long or less, attached to special inlet connection. For longer pigtail lengths, the diameter of the pigtail must be increased.

NOTE: These valves incorporate an excess flow valve. Refer to L-500/Section F, for complete information regarding selection, operation and testing of excess flow valves.

Application

Designed specifically for vapor or liquid withdrawal service on DOT fork lift containers. Valves with 1.5 GPM closing flow are for use in small and medium size lift truck applications, while those with 2.6 GPM closing flow are for large lift trucks and gantry crane type vehicles. *Since none of these valves have an integral pressure relief valve, they may only be used as an accessory valve on containers that have an independent pressure relief valve sufficient for that cylinders capacity.*

The integral excess flow valve found in all these service valves helps prevent excessive product loss in the event of fuel line rupture.

When installed for liquid withdrawal, the 9101P6 Series has provisions for attachment of a liquid withdrawal tube. The 9101P5 Series must be installed in containers that have provisions for a separate liquid withdrawal.

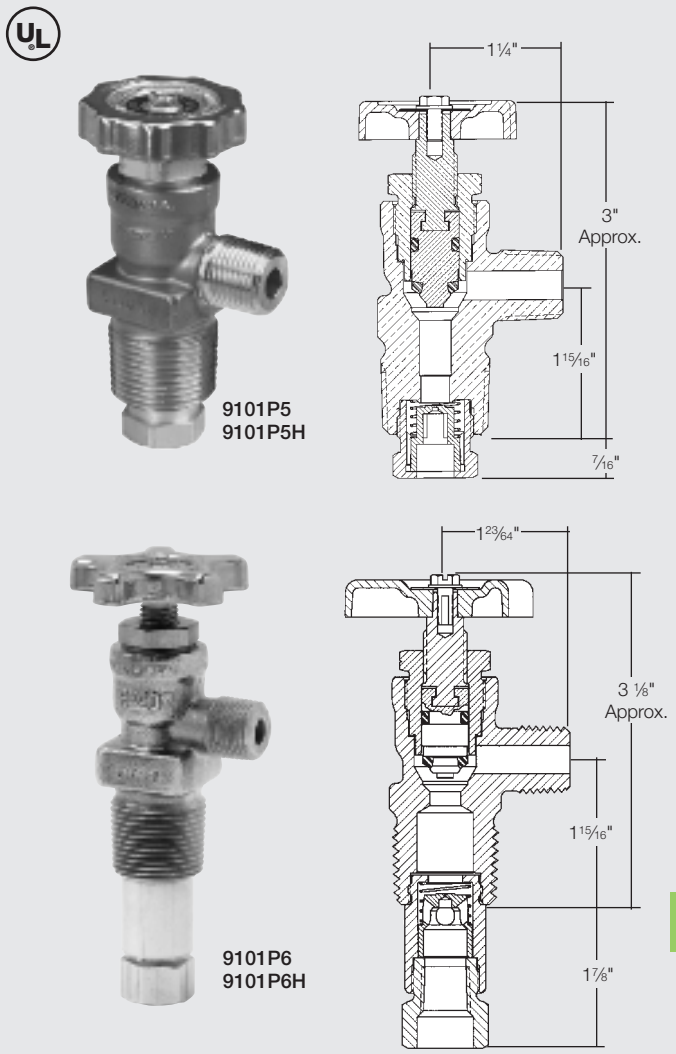
To insure proper functioning and maximum protection for integral excess flow valves, these service valves should be fully opened and backseated when in use.

Features

- Incorporates integral excess check valve and shut-off valve in one unit.
- Special 1.5 GPM closing flow on select valves provided especially for lift trucks and equipment with smaller engines.
- Double lead stem thread provides faster opening and closing.
- O-Ring stem seal design provides positive seal.
- Tapered and confined seat disc provides positive shut-off.
- Metal-to-metal back seat provides added protection against leakage while the valve is open.
- 9101P6 Series equipped with a ¼" NPT internal thread for the addition of a liquid withdrawal tube.

Materials

Body ..... Forged Brass
Handwheel .....Aluminum Die Cast
Stem ..... Brass
O-Ring..... Resilient Synthetic Rubber
Seat Disc..... Nylon



Ordering Information

Part Number	Container Connection	Service Connection	Liquid Withdrawal Connection	Closing Flow (LP-Gas)			Approximate Filling Rate Liquid Flow, GPM				Accessories		
				Vapor			Pressure Drop Across Valve				ACME Check Connectors		
				25 PSIG Inlet (SCFH)	100 PSIG Inlet (SCFH)	Liquid (GPM)	10 PSIG	25 PSIG	50 PSIG	100 PSIG	Male	Female	Cap
9101P5	¾" M. NGT	⅜" M. NPT	None	430	900	1.5	5.0	7.6	10.7	14.9	7141M	7141F	7141M-40 or 7141FP
9101P5H				550	1050	2.6							
9101P6			¼" NPT	430	900	1.5	4.5	7.2	10.3	14.8			
9101P6H				550	1050	2.6							

NOTE: These valves incorporate an excess flow valve. Refer to L-500/Section F, for complete information regarding selection, operation and testing of excess flow valves.

B

Adhesive Warning Labels

901-400 and 903-400

These adhesive warning labels are intended for application as close as possible to the cylinder valve and/or service valve.

The basic information contained on the label is intended for the benefit of the user of the valves and is not intended to be an “all-inclusive” product warning.

These labels are printed on a heavy duty material with pressure sensitive adhesive backing. The ultra-violet ink stands up well when exposed to the enviroment.

Ordering Information

Part Number	Description
901-400	Adhesive Label Primarily for Fork Lift Cylinders
903-400	Adhesive Label Primarily for Small DOT Cylinders

DANGER **LP GAS IS EXTREMELY FLAMMABLE AND EXPLOSIVE** **WARNING**

AVOID SERIOUS INJURY AND PROPERTY DAMAGE. IF YOU SEE, SMELL, OR HEAR ESCAPING GAS...*EVACUATE AREA IMMEDIATELY!* CALL YOUR LOCAL FIRE DEPARTMENT! DO NOT ATTEMPT TO REPAIR. DO NOT STORE IN BUILDING OR ENCLOSED AREA. DO NOT USE ON HOT AIR BALLOONS OR AIRCRAFT.

This container is filled with highly flammable LP-Gas under pressure. A serious fire or explosion can result from leaks and misuse or mishandling of the container and its valves. Do not move, hold or lift the container by any of its valves. Do not expose to fire or temperature above 120˚F (49˚C). Do not overfill.

This container incorporates a pressure relief valve. The pressure relief valve can expel a large jet of LP-Gas into the air if the container is (1) exposed to high temperatures—over 120˚F (49˚C) or (2) overfilled and exposed to a temperature higher than the temperatures at the time it was filled.

The pressure relief valve is equipped with a protective cover. **The protective cover must remain in place at all times except when inspecting the valve.** CAUTION...use eye protection. If dust, dirt, moisture or other foreign material collect in the valve, it may not function properly to prevent container rupture or minimize product loss after opening.

Each time the container is filled, the pressure relief valve must be checked to ensure that it is completely unobstructed and that it has no physical damage. If there is any doubt about the condition of the valve, the container must be removed from service and the pressure relief valve must be replaced.

Only trained personnel should be permitted to fill this container. Before the container is filled for the first time, it must be purged of air. **The total liquid volume of LP-Gas must never exceed the amount designated by applicable filling density regulations for this container.**

Make sure the protective cap is in place on the ACME threaded filler valve at all times. Never insert a screwdriver or other tools into the valve as it can damage the seal or guide and cause an uncontrolled leak.

Do not allow any overfill. If the fixed liquid level gauge is used during filling, filling should stop the moment a white LP-Gas cloud is emitted from its bleed hole. Keep the vent closed tightly at all other times. Each time the container is filled, it must be checked for leaks (with a high quality leak detection solution...leaks cause bubbles to grow).

Do not disconnect or connect this container without first reading the instructions accompanying the vehicle or appliance with which this container is intended to be used. **CAUTION...no smoking while connecting or disconnecting this container.**

Make sure the service valve is shut off tightly before beginning to assemble or disassemble the coupling. Liquid LP-Gas may flow or leak from the coupling. This liquid can cause skin burns, frost bite and other serious injury in addition to those caused by fire and explosion. CAUTION...Wear proper skin and eye protection. Any gasket or O-ring in the coupling must be routinely checked for wear and replaced as required.

After connecting the coupling, make sure the connection is leak tight. Check for leaks with a high quality leak detection solution (leaks cause bubbles to grow). If the connection leaks after tightening, close the service valve, disconnect the coupling and remove from service.

When not in use, keep the service shut-off valve closed.

When in use, keep the service valve fully open.

Keep this equipment out of the reach of children.

This container must be used only in compliance with all applicable laws and regulations, including National Fire Protection Association Publication No. 58, which is the law in many states. A copy of this Publication may be obtained by writing NFPA, Batterymarch Park, Quincy, MA 02269.

DO NOT REMOVE, DEFACE OR OBLITERATE THIS LABEL—DO NOT FILL THIS CONTAINER UNLESS THIS LABEL IS READABLE.

ADDITIONAL SAFETY INFORMATION IS AVAILABLE FROM: ECII *Engineered Controls International, Inc.*

Printed in U.S.A. 04-0994-1189 Part No. 901-400

100 RegO Drive PO Box 247 Elon College, NC 27244 USA Phone (336) 449-7707 Fax (336) 449-6594 www.regoproducts.com

DANGER! **LP-GAS IS EXTREMELY FLAMMABLE AND EXPLOSIVE** **KEEP CYLINDER OUT OF THE REACH OF CHILDREN** **WARNING!**

AVOID SERIOUS INJURY AND PROPERTY DAMAGE. IF YOU SEE, SMELL, OR HEAR THE HISS OF ESCAPING GAS...*IMMEDIATELY* GET AWAY FROM THIS CYLINDER! CALL YOUR LOCAL FIRE DEPARTMENT! DO NOT ATTEMPT TO REPAIR. DO NOT USE OR STORE IN BUILDING OR ENCLOSED AREA. *FOR OUTDOOR USE ONLY.*

This cylinder contains highly flammable LP-Gas under pressure. A serious fire or explosion can result from leaks and misuse or mishandling of the cylinder and its valve. **Do not carry, hold or lift the cylinder by its valve. Do not expose to fire or temperatures above 120˚F (49˚C).**

The cylinder valve incorporates a Shut-Off Valve and Pressure Relief Valve. The Pressure-Relief Valve can expel a large jet of LP-Gas into the air if the cylinder is (1) exposed to high temperatures —over 120˚F (49˚ C.), or (2) overfilled and exposed to a temperature higher than the temperature at the time it was filled.

Never attempt to fill this cylinder yourself. Do not tamper with it or attempt repairs.

Only trained LP-Gas Dealer personnel should be permitted to fill this cylinder and to repair or replace its valve. Each time the cylinder is filled, the entire cylinder valve must be checked for leaks (with a leak detection solution...leaks cause bubbles to grow). The shut-off valve and fixed liquid level gauge (if incorporated) must be checked for proper operation. The Pressure-Relief Valve must be checked to ensure that it is completely unobstructed and that it has no physical damage. **CAUTION...**eye protection must be worn when examining relief valve. This valve cannot be repaired. If it is obstructed, the entire cylinder valve must be replaced. The Shut-Off Valve may require periodic repair or replacement.

Before the cylinder is filled for the first time, it must be purged of air.

Total liquid volume must never exceed the amount designated by DOT for this cylinder.

If the cylinder has a fixed liquid level gauge, filling should stop the moment a white LP-Gas cloud is emitted from its bleed hole. Keep the vent valve closed tightly at all other times.

Keep this cylinder firmly secured in an upright position at all times. Do not lay it on its side during transport, storage or use. In other than an upright position, liquid LP-Gas may flow or leak. This liquid can cause skin burns, frostbite and other serious injuries in addition to those caused by fire or explosion.

When not in use: Close the Shut-Off Valve. Insert a protective plug (P.O.L. plug) into the cylinder valve outlet. (CAUTION...counterclockwise thread). The P.O.L. plug must be inserted whenever the cylinder is stored, manually moved, or transported by vehicle.

WHEN MAKING CONNECTIONS TO AN APPLIANCE—

1. Do not use this cylinder without first reading the instructions accompanying the appliance with which this cylinder is intended to be used.
2. Before connecting the Cylinder Valve outlet connection to an appliance, make sure the connection does not contain dirt or debris. These may cause the connection to leak or may impair the functioning of the regulator, creating a hazardous condition.
3. When connecting the Cylinder Valve outlet to an appliance (CAUTION...counterclockwise thread), make sure the connection is tight. Check for leaks with a high quality leak detection solution (leaks cause bubbles to grow). If the connection leaks after tightening, close cylinder valve, disconnect it from the appliance, insert the P.O.L. plug and immediately return the cylinder, with the Cylinder Valve attached, to your LP-Gas Dealer for examination.

This cylinder must be used only in compliance with all applicable laws and regulations, including National Fire Protection Association Publication No. 58, which is the law in many states. A copy of this Publication may be obtained by writing NFPA, Batterymarch Park, Quincy, MA 02269.

DO NOT REMOVE, DEFACE OR OBLITERATE THIS LABEL—DO NOT FILL THIS CYLINDER UNLESS THIS LABEL IS READABLE.

ADDITIONAL SAFETY INFORMATION IS AVAILABLE FROM: ECII *Engineered Controls International, Inc.* *100 RegO Drive PO Box 247 Elon College, NC 27244 USA Phone (336) 449-7707 Fax (336) 449-6594 www.regoproducts.com*

Printed in U.S.A. 05-0994-1086 Warning No. 903-400

The following warning information, Part Number 903-500, is included with each shipment of cylinder valves and service valves to the first purchaser of the product from the factory.

This information is intended to be forwarded throughout the product distribution chain. Additional copies are available from Engineered Controls International, Inc. and Authorized Product Distributors.

DANGER READ THIS FIRST WARNING

LP-GAS IS EXTREMELY FLAMMABLE AND EXPLOSIVE

AVOID SERIOUS INJURY AND PROPERTY DAMAGE. IF YOU SEE, SMELL, OR HEAR ESCAPING GAS...*EVACUATE AREA IMMEDIATELY!* CALL YOUR LOCAL FIRE DEPARTMENT! DO NOT ATTEMPT TO REPAIR. DO NOT STORE IN BUILDING OR ENCLOSED AREA. DO NOT USE ON HOT AIR BALLOONS OR AIRCRAFT.

Make sure you are thoroughly trained before you attempt any valve installation, maintenance, or repair. Improper conditions or procedures can cause accidents resulting in property damage and personal injury.

Become thoroughly familiar with NPGA Safety Pamphlet 306-79 "LP-Gas Regulator and Valve Inspection & Maintenance" and ECII® Safety Warnings WB-2 "LP-Gas Cylinder Valves", WB-3 "LP-Gas Excess Flow Valves", and WB-4 "LP-Gas Filler Valves and Hose End Filling Valves." Follow their recommendations.

Know and understand NFPA Pamphlet 58 "Storage and Handling Petroleum Gases," which is the law in many states. This publication is available from NFPA, Batterymarch Park, Quincy, MA 02269. Following its requirements is essential in the safe use of LP-Gas. Section 15 states that "In the interests of safety, all persons employed in handling LP-Gases shall be trained in proper handling and operating procedures."

Make sure this valve is the proper one for this installaion. Avoid misusing LP-Gas equipment.

Apply thread joint compound compatible with LP-Gas on valve external threads only. Make sure compound never comes into contact with other parts of the valve.

Install valves by applying force to wrenching flats only.

Tighten pipe threads approximately 1 to $1^{1}/_{2}$ turns beyond the hand-tight insertion point using a wrench which avoids damage to other valve parts.

Check for damage and proper operation after valve installation. Check that the valve is clean and free of foreign material.

Check container-valve connection with a non-corrosive leak detection solution before filling with LP-Gas.

Purge container before filling with LP-Gas (refer to the ECII® LP-Gas Serviceman's Manual for recommended procedure).

Test excess flow check valve for proper operation before placing into service. See NPGA Bulletin 113-78 for recommended procedure.

Check outlet connection make-up for leaks with a non-corrosive leak detection solution when placing into service.

If container is not being placed into service at the present time, insert a plug or cap onto the outlet connection.

In selecting a label for posting at the installation site, consider ECII® 903-400 or 901-400 along with your own, NPGA's and others.

Remember to instruct the owner/user/customer in safety matters concerning LP-Gas and this equipment.

Engineered Controls International, Inc., ECII® requests that this information be forwarded to your customers. Additional copies are available from ECII® and your Authorized Product Distributor.

ECII Engineered Controls International, Inc.

100 RegO Drive PO Box 247 Elon College, NC 27244 USA Phone (910) 449-7707 Fax (910) 449-6594 Telex 253204

Printed in U.S.A. 04-0994-0686
Warning 903-500

Cross Reference by Part Number

Catalog L-500

REGO® PRODUCTS

LP-GAS & ANHYDROUS AMMONIA EQUIPMENT

ECII® Engineered Controls International, Inc.

Section C

Multivalve Assemblies

Limited Warranty and Limitation of Liability

LIMITED WARRANTY
Engineered Controls International, Inc. warrants products and repair kits manufactured by it to be free from defects in materials and workmanship under normal use and service for a period of 12 months from the date of installation or operation or 18 months from the date of shipment from the factory, whichever is earlier. If within thirty days after buyer's discovery of what buyer believes is a defect, buyer notifies Engineered Controls International, Inc. thereof in writing, Engineered Controls International, Inc., at its option, and within forty-five days, will repair, replace F.O.B. point of manufacture, or refund the purchase price of that part or product found by it to be defective. Failure of buyer to give such written notice within thirty days shall be deemed an absolute and unconditional waiver of any and all claims of buyer arising out of such defect.

This warranty does not extend to any product or part that is not installed and used in accordance with Engineered Controls International, Inc.'s printed instructions, all applicable state and local regulations, and all applicable national standards, such as those promulgated by NFPA, DOT and ANSI. This warranty does not extend to any product or part that has been damaged by accident, misuse, abuse or neglect, nor does it extend to any product or part which has been modified, altered, or repaired in the field.

Except as expressly set forth above, and subject to the limitation of liability below, Engineered Controls International, Inc. makes NO OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, with respect to its products and parts, whether used alone or in combination with others. Engineered Controls International, Inc. disclaims all warranties not stated herein.

LIMITATION OF LIABILITY
Engineered Controls International, Inc.'s total liability for any and all losses and damages arising out of any cause whatsoever shall in no event exceed the purchase price of the products or parts in respect of which such cause arises, whether such cause be based on theories of contract, negligence, strict liability, tort or otherwise.

Engineered Controls International, Inc. shall not be liable for incidental, consequential or punitive damages or other losses. Engineered Controls International, Inc. shall not be liable for, and buyer assumes liability for, all personal injury and property damage connected with the handling, transportation, possession, further manufacture, other use or resale of products, whether used alone or in combination with any other products or material.

If Engineered Controls International, Inc. furnishes technical advice to buyer, whether or not at buyer's request, with respect to application, further manufacture or other use of the products and parts, Engineered Controls International, Inc. shall not be liable for such technical advice and buyer assumes all risks of such advice and the results thereof.

NOTE: Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. The warranty gives you specific legal rights, and you may have other rights that vary from State to State. The portions of this limited warranty and limitation of liability shall be considered severable and all portions which are not disallowed by applicable law shall remain in full force and effect.

WARNING
All Engineered Controls International, Inc. products are mechanical devices that will eventually become inoperative due to wear, corrosion and aging of components made of materials such as rubber, etc. The environment and conditions of use will determine the safe service life of these products. Periodic inspection and maintenance are essential to avoid serious injury and property damage.

Many Engineered Controls International, Inc. products are manufactured components which are incorporated by others on or in other products or systems used for storage, transport, transfer and otherwise for use of toxic, flammable and dangerous liquids and gases. Such substances must be handled by experienced and trained personnel only, using accepted governmental and industrial safety procedures.

NOTICE TO USERS OF PRODUCTS
The Limited Warranty stated above is a factory warranty to the first purchasers of Engineered Controls International, Inc. products. Since most users have purchased these products from Engineered Controls International, Inc. distributors, the user must within thirty (30) days after the user's discovery of what user believes is a defect, notify in writing the distributor from whom he purchased the product/parts. The distributor may or may not at the distributor's option choose to submit the product/parts to Engineered Controls International, Inc., pursuant to its Limited Warranty. Failure by buyer to give such written notice within thirty (30) days shall be deemed an absolute and unconditional waiver of buyer's claim for such defects. Acceptance of any alleged defective product/parts by Engineered Controls International, Inc.'s distributor for replacement or repairs under the terms of Engineered Controls International, Inc.'s Limited warranty in no way obligates Engineered Controls International, Inc. to the terms of the above warranty.

Because of a policy of continuous product improvement, Engineered Controls International, Inc. reserves the right to change designs, materials or specification without notice.

Foreword

This catalog describes a complete line of equipment available from Engineered Controls International, Inc. for use with LP-Gas and anhydrous ammonia (NH_3). The following points are important to know for proper use of the catalog:

1. *Illustrations and drawings of individual products are representative of "product groups" and all products within a product group are similar in construction.*
2. *Materials used for construction of products in this catalog are suitable for rated service pressure at temperatures of -40° F. to +165° F., unless otherwise specified.*
3. *Products in this catalog are only intended for use in LP-Gas and/or anhydrous ammonia service as follows.*
   - **a.** *"A" or "AA" prefix — Products with this prefix are suitable for NH_3 service (i.e., contain no brass parts).*
   - **b.** *"AA" prefix on relief valves — These valves are NOT suitable for use with LP-Gas service. These are of partial aluminum materials and are listed by Underwriters Laboratories (UL) for NH_3 service only.*
   - **c.** *All other products are suitable for use with LP-Gas service.*
   - **d.** *"SS" prefix—Hydrostatic relief valve with this prefix are suitable for NH_3 service (i.e., they have stainless steel materials).*

Caution

Do not use any product contained in this catalog with any service commodity other than LP-Gas or NH_3. If you have a need for use of another application, contact Engineered Controls International, Inc., 100 RegO Drive, Elon, NC 27244, (336) 449-7707 before proceeding.

Proper application, installation and maintenance of products in this catalog are essential. Users of these products should obtain further information if there are any doubts or questions.

Warning

All ECII® products are mechanical devices that will eventually become inoperative due to wear, corrosion and aging of components made of materials such as rubber. The environment and conditions of use will determine the safe service life of these products. Periodic inspection and maintenance are essential to avoid serious injury and property damage.

Many ECII® products are manufactured for storage, transport, transfer and use of toxic flammable and dangerous liquids and gases. Such substances should be handled by experienced and trained personnel only, using accepted governmental and industrial safety procedures. Never vent LP-Gas near any possible source of ignition.

Notice

Installation, usage, and maintenance of all ECII® products must be in compliance with all Engineered Controls International, Inc. instructions as well as requirements and provisions of NFPA #54, NFPA#58, DOT, ANSI, and all applicable federal, state, provincial and local standards, codes, regulations, and laws.

Inspection and maintenance on a periodic basis is essential. Installation and maintenance should be performed only by qualified personnel.

Be sure all instructions are read and understood before installation, operation and service.

Filters

ECII® LP-Gas equipment is designed to operate in a system free from contamination. A variety of in-line filters are commercially available to the LP-Gas industry for installation in domestic systems.
The use of an in-line filter should be considered when other system components may be unclean and the system contaminated by rust, scale, dirt, debris or other foreign material.

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Contents Page

RegO Multivalve® Assemblies

General Information

RegO Multivalves® were pioneered in the 1930's. By combining several valve functions in one unit, Multivalves® made possible new and more practical tank designs (fewer openings and smaller, less cumbersome protective hoods). They received immediate acceptance.

The Multivalve® design has kept pace with changing industry needs over the years. They are as popular as ever; still keeping fabricating costs down and reducing operating expenses for the LP-Gas dealer.

RegO Multivalves® Reduce the Cost of Fabrication by

- Combining several valve functions in one less expensive body.
- Reducing the number of threaded openings in ASME containers.
- Diminishing the size and cost of protective hoods.
- Providing generous sized wrenching bosses for quick, easy installation.

RegO Multivalves® Reduce LPG Dealer Expenses by

- Permitting on-site filling of 100 lb. to 420 lb. DOT cylinders, thus eliminating cylinder return and interrupted customer service.
- Providing well-placed hose connections for easy filling.
- Allowing ample space for secure attachment and easy removal of the regulator.
- Providing substantial savings of bonnet repairs on valves with the MultiBonnet.®

RegO Multivalves® Satisfy Customer Demands for Tough, Safe Equipment with These Features

Heavy-Duty Valve Stem Seals —

- Tapered nylon disc in a fully confined seat resist deterioration and provide hand-tight closings over a long service life.

Comprehensive Testing —

- Every Multivalve® must pass a stringent underwater leakage test prior to shipment.
- Multivalves® with pressure relief valves are individually tested and adjusted to assure proper pressure settings.
- Those equipped with excess flow checks are tested for compliance with published closing specifications and for leakage after closing.

Pressure Relief Valves and Other Devices —

- Multivalves® equipped with integral pressure relief devices employ full-capacity, "pop-action" reliefs with set pressures of 250 psig for ASME use and 375 psig for DOT cylinders.

Double Back-Check Filler Valves —

- Multivalves® with filling connections have double backcheck safety. If the upper check ceases to function, the lower stand-by check will continue to protect the filling connection from excessive leakage.

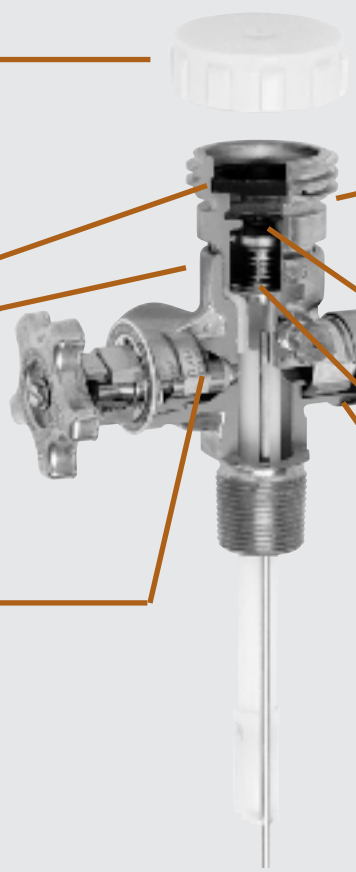
Ease of Maintenance —

- Standardization of parts makes it possible for one repair kit to maintain the bonnet assemblies of RegO® cylinder valves, service valves, motor fuel valves, and Multivalves®.

RegO Multivalves® fit every LP-Gas need.

- Wide selection of Multivalves® for domestic, commercial, and industrial needs are available.
- Multivalves® may be ordered with pressure relief, liquid level tube, filler valve, vapor equalizing valve, internal pipe connections, liquid filling and withdrawal connections, and ¼" NPT tapped opening for pressure gauge with or without steel plug.

Design Features of RegO Multivalves®



Seal Cap
Molded from tough, resilient plastic to protect threads and internal working parts. Designed to protect the filler opening against dirt and other foreign materials. Also acts as a secondary pressure seal.

Long Wearing Gasket
Permits leak-free, hand-tight connection of the hose coupling to the filler valve.

Forged Brass Body

MultiBonnet®
Designed to allow quick and easy repair of bonnet packings on Multivalves® on active propane systems.

UL Shear Point
Provides for a shear just below the ACME threads to protect the container in case of a pullaway while the hose is connected. The ACME connection should shear off on an angle pull, leaving the body and check assembly of the valve still in place.

Filler Seat Disc
Fabricated of special synthetic composition and made extra thick for longer life.

Valve Guide
A precision machined "stem" to assure positive alignment

"Pop Action" Pressure Relief
Provides quick release of excess pressure. Relief seat disc is special resilient composition rubber designed to resist bonding to the valve seat even after years of service.

RegO MultiBonnet® Assemblies

Design Features of the MultiBonnet®

Handwheel
Aluminum die cast handwheel.

Non-Rising Stem
Designed to allow easy backseating and long service life.

Upper Packing Assembly
Contains both internal and external o-rings. Provides leak resistant performance.

Internal O-ring

Lower Bonnet and Stem Assembly
Machined brass construction offers durability to bonnet design.

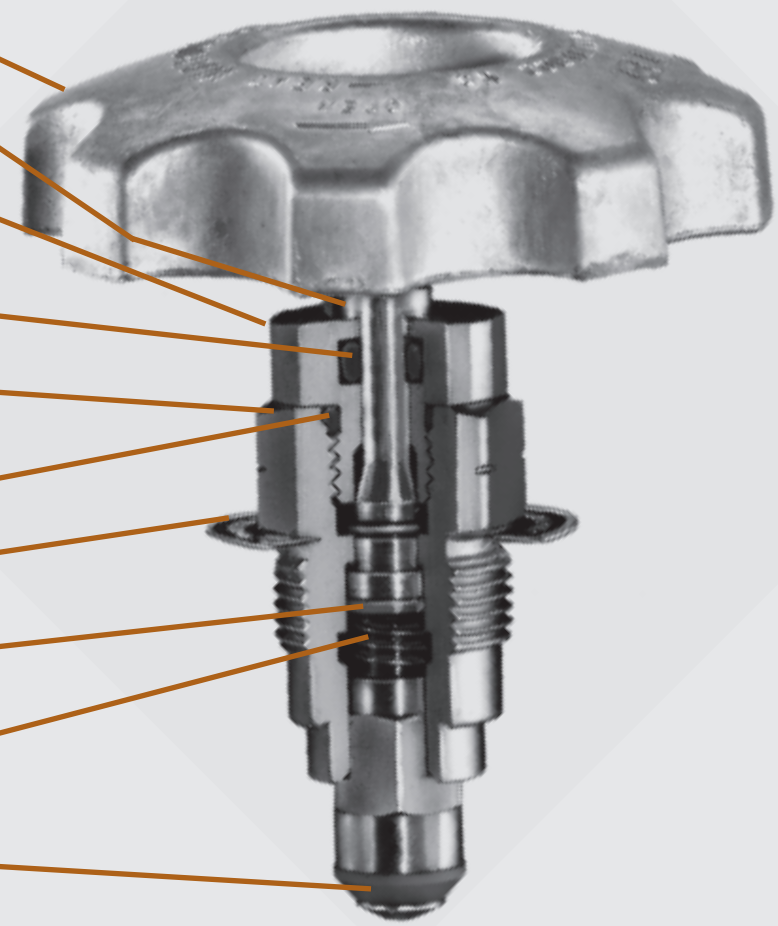
External O-ring

Nameplate
Provides easy identification of the RegO MultiBonnet®.

Teflon Backseat
Provides for upper packing isolation when valve is fully open.

Machined Double Lead Threads
Provides for quick opening and closing of the valve.

Shut-off Seat Disc
Tapered nylon disc is retained in a fully confined seat that helps ensure positive shut-offs.



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Application

The MultiBonnet® is designed to allow quick and easy repair of bonnet packings in certain Multivalves® and service valves on active propane systems. It allows you to repair valve bonnet stem o-ring leaks in minutes, without interrupting gas service to your customers.

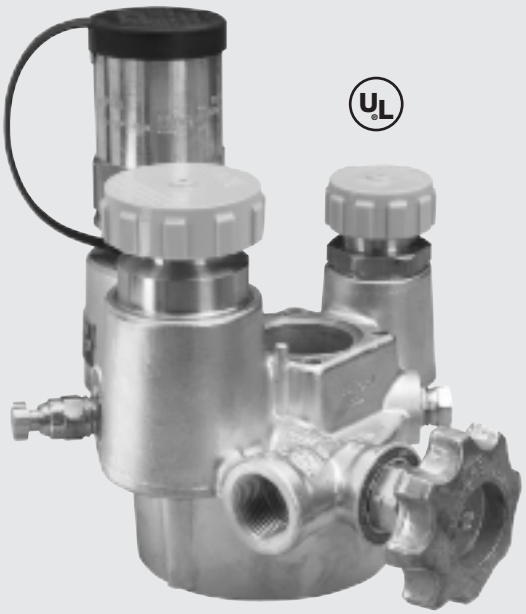
- Eliminates the need to evacuate tanks or cylinders to repair the MultiBonnet® packing.
- Two section design allows repair of MultiBonnet® assemblies on active propane systems without interruption in gas service or shutting off appliances downstream. This helps to prevent time consuming relighting of pilots, special appointments, and call backs.
- Cost of replacing the MultiBonnet® packing is only 1/3 as much as replacing a complete bonnet assembly—not including time cost savings, which can be substantial.
- Available on certain new Multivalves® and service valves as well as repair assemblies for many existing RegO® valves.
- UL listed as a component of valve assembly.

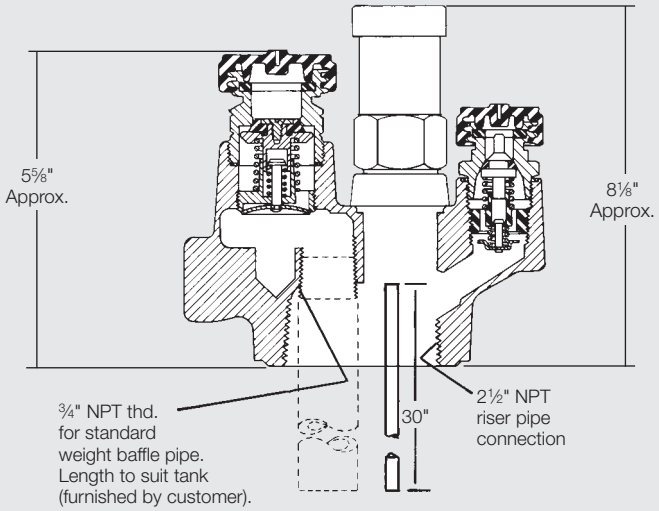
Here's How The MultiBonnet® Works

- When the valve is fully open, only the lower stem will rise and backseat against the teflon washer which isolates the upper packing.
- This allows you to remove the upper packing nut, which contains the o-rings, and replace it while the valve is fully open and gas service not interrupted.

ASME Multivalves® for Vapor Withdrawal

G8475R Series





Application

These Multivalves® are designed for use in single opening ASME containers equipped with a 2½" M. NPT riser. They can be used with underground ASME containers up to 639 sq. ft. surface area, and above ground ASME containers up to 192 sq. ft. surface area. A separate opening is required for liquid withdrawal. The MultiBonnet® is standard on this valve.

Materials

Body ..... Forged Brass
Handwheel ..... Aluminum Die Cast
Valve Stems ..... Brass
O-Rings ..... Resilient Rubber
Seat Disc (shut-off valve) ..... Nylon
Seat Discs (other) ..... Resilient Rubber
Relief Spring ..... Stainless Steel

Features

- The most complete Multivalve® assembly in the LP-Gas industry.
- Combines double back check filler valve, vapor equalizing valve with excess flow, pressure relief valve with protective cap and chain, service line shut-off valve, fixed liquid level gauge, "junior" size float gauge flange opening and plugged pressure gauge opening in one unit.
- Includes plugged, ¼" F. NPT gauge boss.
- Double back check filler valve has filling capacities matched to the high capacity pumps and meters on modern delivery trucks.
- Vapor equalizing valve with excess flow has increased capacity matched to the filler valve.
- Internal threads accommodate 2½" M. NPT riser pipe connection and a ¾" F. NPT connection for a customer furnished liquid baffle tube.
- MultiBonnet® allows quick and easy repair of bonnet.

Liquid Filling Rates

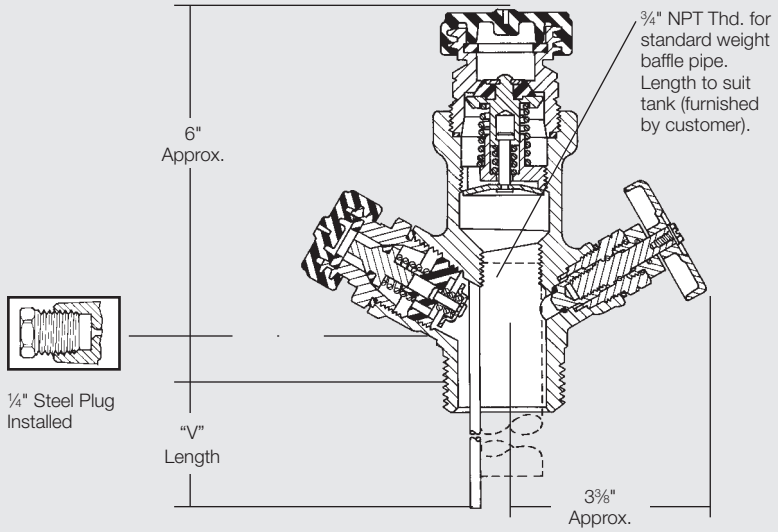
Part Number	Approximate Filling Rate Liquid Flow, GPM			
	Pressure Drop Across Valve			
	10 PSIG	25 PSIG	50 PSIG	100 PSIG
G8475RV	42	72	98	125
G8475RW				

Ordering Information

Part Number	Container Connection	Service Connection	Filling Connection	Vapor Equalizing Connection		Float Gauge Flange Opening	Fixed Liquid Level Vent Valve Style	Dip Tube Length	Pressure Relief Valve				For use in containers w/ surface area up to:
				Connection Size	UL Listed Closing Flow				Setting	Part Number	Flow Capacity		
											UL	ASME	
G8475RV	2 1/2" F. NPT	F. POL (CGA 510)	1 3/4" M. ACME	1 1/4" M. ACME	4200 CFH @ 100 PSIG	Fits "JUNIOR" size	knurled	30"*	250 PSIG	M31316	2020 SCFM, air	1939 SCFM, air	83 sq. ft. above ground 276 sq. ft underground
G8475RW										MV31326	3995 SCFM, air	n/a	192 sq. ft. above ground 639 sq. ft. underground

* Dip tube not installed, may be cut by customer to desired length.

8593AR



Application

These Multivalves® provide vapor withdrawal and filling of ASME containers. A separate pressure relief valve is required in addition to this valve. The MultiBonnet® is standard on this valve.

Materials

Body ..... Forged Brass
Handwheel ..... Aluminum Die Casting
Valve Stem ..... Brass
O-Ring ..... Resilient Rubber
Seat Disc (shut-off valve) ..... Nylon
Seat Discs (other) ..... Resilient Rubber

Features

- Combines double back check filler valve, service valve, vapor equalizing valve with excess flow, fixed liquid level gauge and plugged pressure gauge opening in one unit.
- Includes plugged, ¼" F. NPT gauge boss.
- "Y" shape configuration allows for ease of operation with all valves and gauges easily accessible at all times.
- Large 2 1/16" hex wrenching boss on center column provides ease of installation in tank coupling.
- MultiBonnet® allows quick and easy repair of bonnet.

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Liquid Filling Rates

Part Number	Approximate Filling Rate Liquid Flow, GPM			
	Pressure Drop Across Valve			
	10 PSIG	25 PSIG	50 PSIG	100 PSIG
8593AR16.0	42	72	98	125

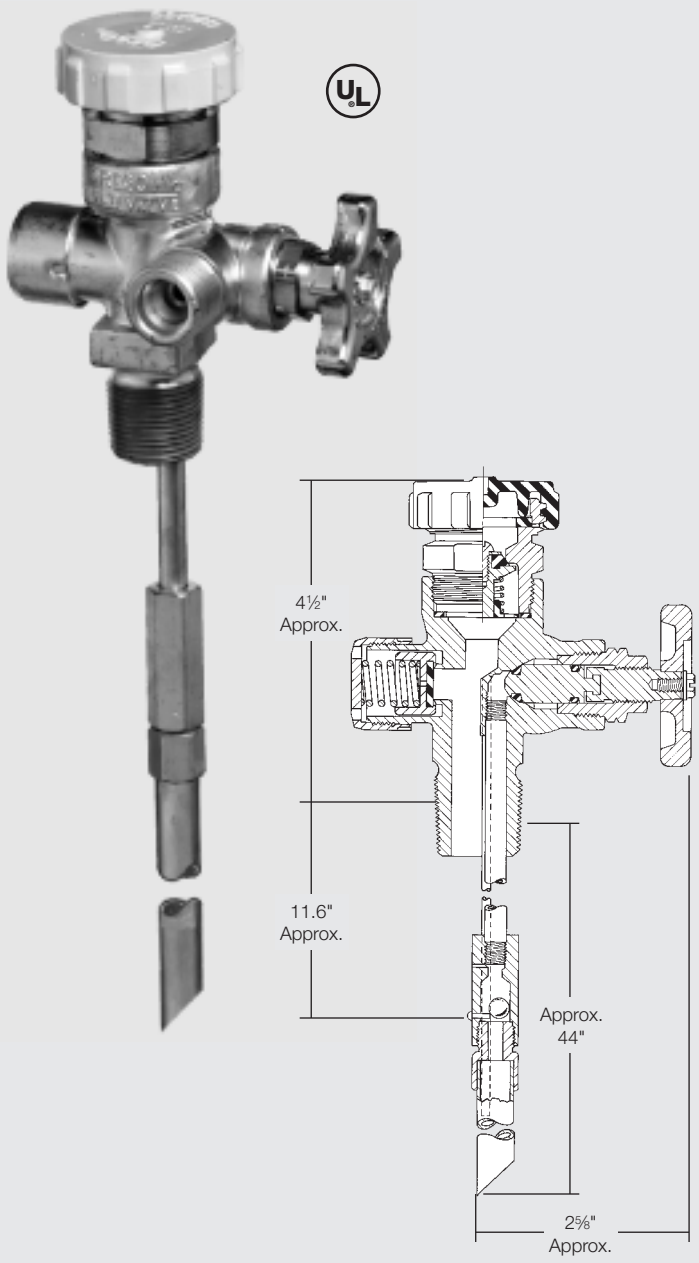
Ordering Information

Part Number	Container Connection	Service Connection	Filling Connection	Vapor Equalizing Connection		Fixed Liquid Level Vent Valve Style	Dip Tube Length	For Use In Containers w/Surface Area Up To:
				Connection Size	UL Listed Closing Flow			
8593AR16.0	1½" M. NPT	F. POL (CGA 510)	1¾" M. ACME	1¼" M. ACME	4200 CFH at 100 PSIG	Knurled	16"*	**

* Dip tube not installed, may be cut by customer to desired length.
** Since these Multivalves® have no integral pressure relief valves, they can be used on any ASME container with an independent relief device sufficient for that tank's capacity.

DOT Multivalve® for Liquid Withdrawal

8555DL



Application

These Multivalves® permit liquid withdrawal from DOT cylinders with up to 100 lbs. propane capacity. They eliminate unnecessary cylinder handling when servicing high volume loads and allow on-site filling into the vapor space without interrupting gas service.

Features

- Incorporates service valve, high capacity filler valve with integral back-check, fixed liquid level gauge, liquid withdrawal with excess flow check and pressure relief valve in one single unit.
- CGA 555 service connection minimizes accidental connection to vapor service systems.
- Furnished with 44" long, ½" O.D. brass liquid withdrawal tube.
- Liquid withdrawal tube incorporates a ball check excess flow valve that opens by allowing vapor, not liquid, to equalize pressure.
- 1⅛" wrenching flats.

Materials

Body ..... Forged Brass
Handwheel ..... Aluminum Die Cast
Valve Stems ..... Brass
O-Rings ..... Resilient Rubber
Seat Disc (shut-off valve) ..... Nylon
Seat Disc (others) ..... Resilient Rubber
Relief Spring ..... Stainless Steel

Liquid Filling Rates

Part Number	Approximate Filling Rate Liquid Flow, GPM			
	Pressure Drop Across Valve			
	10 PSIG	25 PSIG	50 PSIG	100 PSIG
8555DL11.6	8	23	34	42

Ordering Information

Part Number	Container Connection	Service Connection	Filling Connection	Fixed Liquid Level Vent Valve Style	Dip Tube Length w/Deflector	Liquid Withdrawal Tube Length	Pressure Relief Valve Setting	For Use In Cylinders w/Propane Capacity Up To:	Liquid Closing Flow (LP-Gas)***
8555DL11.6	¾" M. NGT	CGA 555*	1¾" M. ACME	Knurled	11.6"	44"	375 PSIG	100 lbs.**	1.7 GPM

* Use adapter 12982 to connect to pipe threads.
** Per CGA Pamphlet S-1.1.
*** To ensure proper functioning and maximum protection from integral excess flow valves, the cylinder valve should be fully opened and backseated when in use.

Application

These Multivalves® permit vapor withdrawal. They allow for container filling without interrupting gas service.

The 6555R Series is designed for ASME containers with up to 25 ft² surface area or 60 gallons water capacity.

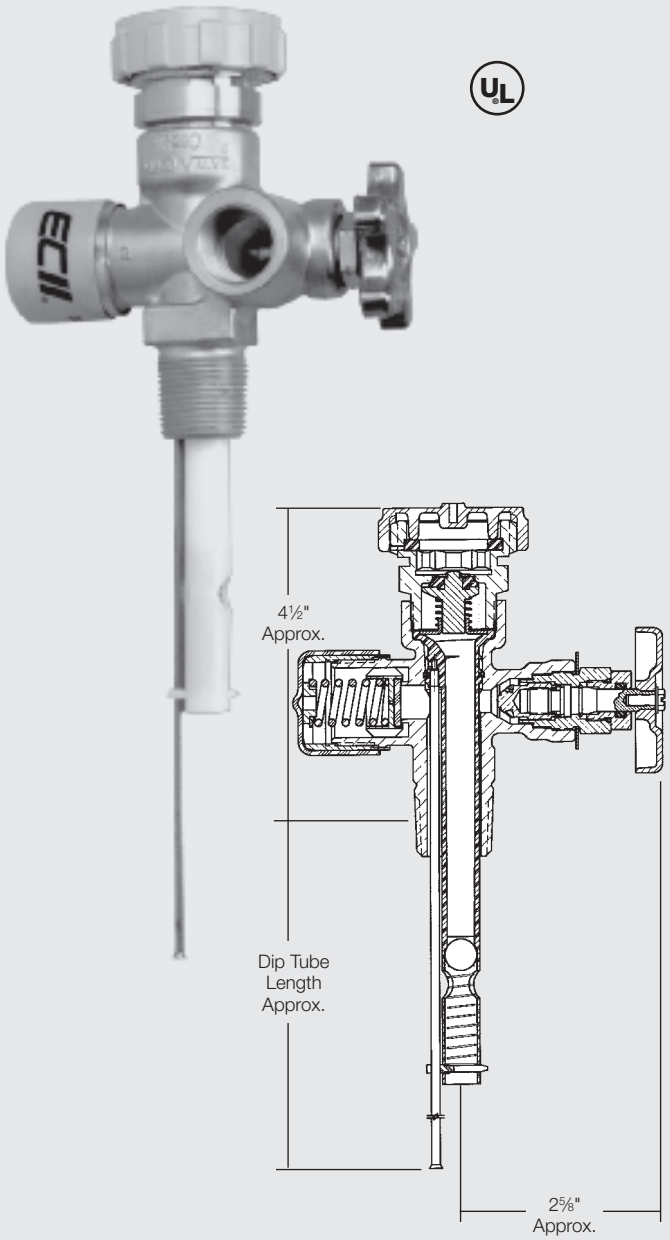
The 8555D and 8555R Series are designed for DOT cylinders with up to 200 lbs. propane capacity.

Features

- Incorporates service valve, high capacity filler valve with integral back-check, fixed liquid level gauge and pressure relief valve in one single unit.
- Filler Valve is high capacity with integral back check.
- Heavy duty O-ring stem seal provides positive leak proof seal.
- Tapered nylon shut-off seat disc in fully confined seat ensures easy, leak-free, positive shut-off.
- 1⅛" wrenching flats.
- The MultiBonnet® option allows quick and easy repair of bonnet.

Materials

Body ..... Forged Brass
Handwheel ..... Aluminum Die Cast
Valve Stems ..... Brass
O-Rings ..... Resilient Rubber
Seat Disc (shut-off valve) ..... Nylon
Seat Disc (other) ..... Resilient Rubber
Relief Spring ..... Stainless Steel



Liquid Filling Rates

Part Number	Approximate Filling Rate Liquid Flow, GPM — Pressure Drop Across Valve			
	10 PSIG	25 PSIG	50 PSIG	100 PSIG
6555R Series	8	23	34	42
8555D Series				
8555R Series				

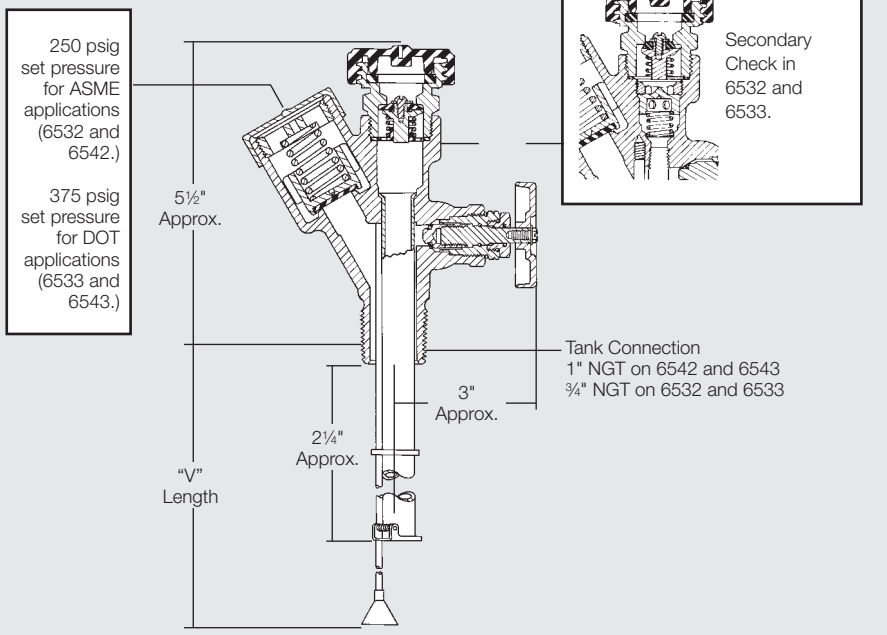
Ordering Information

Part Number	Bonnet Style	Application	For Use In Containers with size Up To:	Dip Tube Length w/Deflector	Container Connection	Service Connection	Filling Connection	Fixed Liquid Level Vent Valve Style	Pressure Relief Valve		
									Setting	Flow Capacity* UL Listing	Flow Capacity* ASME
6555R10.6	MultiBonnet®	ASME Containers	25 ft² surface area or 60 gallons water capacity	10.6"	¾" M. NGT	F. POL (CGA 510)	1¾" M. ACME	Knurled	250 PSIG	793 SCFM, air	700 SCFM, air
6555R11.6	MultiBonnet®			11.6"							
6555R12.0	MultiBonnet®			12.0"							
8555D10.6	Standard	DOT Cylinders	200 lbs. Propane **	10.6"					375 PSIG	n/a	n/a
8555R10.6	MultiBonnet®										
8555D11.6	Standard			11.6"							
8555R11.6	MultiBonnet®										

* At 120% of Set Pressure.
** Per CGA Pamphlet S-1.1.

DOT and ASME Multivalves® for Vapor Withdrawal

6532, 6533, 6542 and 6543 Series



Application

These Multivalves® permit vapor withdrawal from ASME containers up to 50 sq. ft. surface area and DOT containers up to 420 lbs. propane capacity. They allow on-site cylinder filling without interrupting gas service.

Features

6542 and 6543

- Incorporates high capacity filler valve with double back checks, service valve, fixed liquid level gauge, pressure relief valve and built-in baffle tube into one compact unit.
- Higher filling capacity is combined with back check protection by placing the secondary back check at the bottom of the baffle tube, creating a larger flow area through the body.
- Pre-drilled hole in 1¼" wrenching flat accepts a drive screw for attaching relief cap and chain.

6532 and 6533

- Similar but smaller than the 6542 and 6543, these are generally used for replacement on existing containers with ¾" NGT openings.
- Secondary back check placed in the body of the valve to help minimize reverse flow in the event the upper back check shears off or requires replacement.
- The MultiBonnet® option allows quick and easy repair of bonnet.

Materials

Body ..... Forged Brass
Handwheel ..... Aluminum Die Casting
Valve Stem ..... Brass
O-Ring..... Resilient Rubber
Seat Disc (shut-off valve) ..... Nylon
Seat Disc (other) ..... Resilient Rubber
Relief Spring ..... Stainless Steel

Liquid Filling Rates

Part Number	Approximate Filling Rate -- Liquid Flow, GPM Pressure Drop Across Valve			
	10 PSIG	25 PSIG	50 PSIG	100 PSIG
6532A12.0 / 6532R12.0	11	16	23	28
6542A12.0 / 6542R12.0	23	32	46	57
6533A10.5 / 6533R10.5	11	16	23	28
6533A11.7 / 6533R11.7				
6543A11.1 / 6543R11.1	23	32	46	57
6543A11.7 / 6543R11.7				

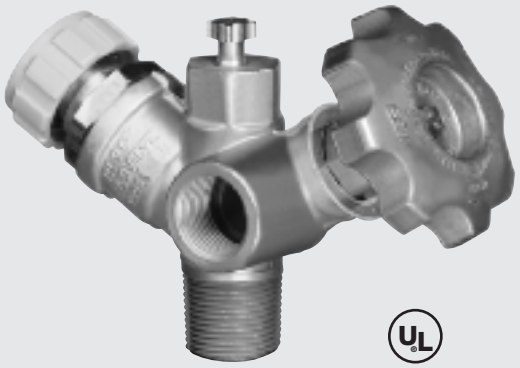
Ordering Information

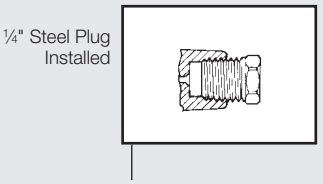
Part Number	Bonnet Style	Application	Container Connection	Service Connection	Filling Connection	Fixed Liquid Level Vent Valve Style	Dip Tube Length with Deflector	Pressure Relief Valve Setting	For Use In Cylinders w/Propane Capacity Up To:**	For Use In Containers w/Surface Area Up To:***
6532A12.0	Standard	ASME*	¾" M. NGT	F. POL (CGA 510)	1¾" M. ACME	Knurled	12.0"	250 PSIG	—	43 sq. ft.
6532R12.0	MultiBonnet®									
6542A12.0	Standard		1" M. NGT							53 sq. ft.
6542R12.0	MultiBonnet®									
6533A10.5	Standard	DOT	¾" M. NGT				10.5"	375 PSIG	420 lbs. Propane	—
6533R10.5	MultiBonnet®									
6533A11.7	Standard						11.7"			
6533R11.7	MultiBonnet®									
6543A11.1	Standard		1" M. NGT				11.1"			
6543R11.1	MultiBonnet®									
6543A11.7	Standard						11.7"			
6543R11.7	MultiBonnet®									

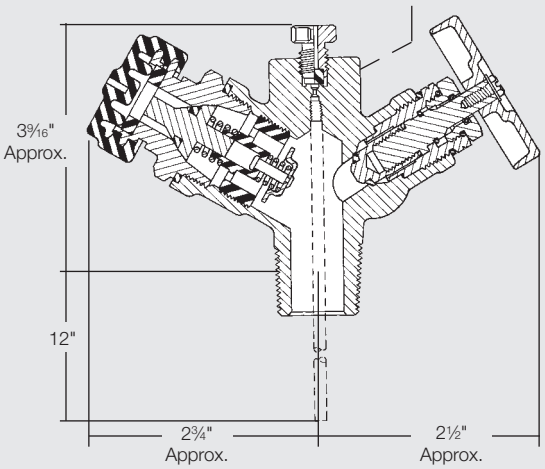
* UL rated flow capacities are: 6532A12.0-1180 SCFM/air, 6542A12.0-1530 SCFM/air.
** Per CGA Pamphlet S-1.1.
*** From NFPA, Appendix D.

ASME Multivalves® for Vapor Withdrawal

7556R







Application

These compact Multivalves® are especially suited for vapor withdrawal of ASME containers where compact groupings of components are necessary. Separate filler valves and pressure relief valves are required.

Features

- Combines service valve, vapor equalizing valve with excess flow, fixed liquid level gauge and plugged pressure gauge opening in one unit.
- Rugged, 1" wrenching boss on center column minimizes possible damage during installation.
- Low profile design extends only 3" above the container boss, allowing use of smaller domes.
- "Y" shape configuration allows for ease of operation with all valves and gauges easily accessible at all times.
- Includes ¼" F. NPT gauge boss, plugged.
- MultiBonnet® allows quick and easy repair of bonnet.

Materials

Body ..... Forged Brass
Handwheel ..... Aluminum Die Cast
Valve Stem ..... Brass
O-Ring ..... Resilient Rubber
Seat Disc (shut-off valve) ..... Nylon
Seat Discs (other) ..... Resilient Rubber

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Ordering Information

Part Number	Container Connection	Service Connection	Vapor Equalizing Connection		Fixed Liquid Level Vent Valve Style	Dip Tube Length	For Use In Containers w/Surface Area Up To:
			Connection Size	UL Listed Closing Flow			
7556R12.0	¾" M. NGT	F. POL (CGA 510)	1¼" M. ACME	4200 CFH @100 PSIG	Knurled	12"	*

* Since these Multivalves® have no integral pressure relief valves, they can be used on any ASME container with an independent relief device sufficient for that tank's capacity.

ECII® Warning Notice

The following warning information, Part Number 903-500, is included with each shipment of Multivalve® assemblies to the first purchaser of the product from the factory.

This information is intended to be forwarded throughout the product distribution chain. Additional copies are available from Engineered Controls International, Inc. and Authorized Product Distributors.

DANGER READ THIS FIRST **WARNING**

LP-GAS IS EXTREMELY FLAMMABLE AND EXPLOSIVE

AVOID SERIOUS INJURY AND PROPERTY DAMAGE. IF YOU SEE, SMELL, OR HEAR ESCAPING GAS . . . *EVACUATE AREA IMMEDIATELY!* CALL YOUR LOCAL FIRE DEPARTMENT! DO NOT ATTEMPT TO REPAIR. DO NOT STORE IN BUILDING OR ENCLOSED AREA. DO NOT USE ON HOT AIR BALLOONS OR AIRCRAFT.

Make sure you are thoroughly trained before you attempt any valve installation, maintenance, or repair. Improper conditions or procedures can cause accidents resulting in property damage and personal injury.

Become thoroughly familiar with NPGA Safety Pamphlet 306-79 "LP-Gas Regulator and Valve Inspection & Maintenance" and ECII® Safety Warnings WB-2 "LP-Gas Cylinder Valves", WB-3 "LP-Gas Excess Flow Valves", and WB-4 "LP-Gas Filler Valves and Hose End Filling Valves." Follow their recommendations.

Know and understand NFPA Pamphlet 58 "Storage and Handling Petroleum Gases," which is the law in many states. This publication is available from NFPA, Batterymarch Park, Quincy, MA 02269. Following its requirements is essential in the safe use of LP-Gas. Section 15 states that "In the interests of safety, all persons employed in handling LP-Gases shall be trained in proper handling and operating procedures."

Make sure this valve is the proper one for this installation. Avoid misusing LP-Gas equipment.

Apply thread joint compound compatible with LP-Gas on valve external threads only. Make sure compound never comes into contact with other parts of the valve.

Install valves by applying force to wrenching flats only.

Tighten pipe threads approximately 1 to 1½ turns beyond the hand-tight insertion point using a wrench which avoids damage to other valve parts.

Check for damage and proper operation after valve installation. Check that the valve is clean and free of foreign material.

Check container-valve connection with a non-corrosive leak detection solution before filling with LP-Gas.

Purge container before filling with LP-Gas (refer to the ECII® LP-Gas Serviceman's Manual for recommended procedure).

Test excess flow check valve for proper operation before placing into service. See NPGA Bulletin 113-78 for recommended procedure.

Check outlet connection make-up for leaks with a non-corrosive leak detection solution when placing into service.

If container is not being placed into service at the present time, insert a plug or cap onto the outlet connection.

In selecting a label for posting at the installation site, consider ECII® 903-400 or 901-400 along with your own, NPGA's and others.

Remember to instruct the owner/user/customer in safety matters concerning LP-Gas and this equipment.

Engineered Controls International, Inc., ECII® requests that this information be forwarded to your customers. Additional copies are available from ECII® and your Authorized Product Distributor.

ECII Engineered Controls International, Inc.

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Warning 903-500

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Cross Reference by Part Number

Catalog L-500

REGO® PRODUCTS

LP-GAS & ANHYDROUS AMMONIA EQUIPMENT

ECII® Engineered Controls International, Inc.

Section D

Pressure Relief Valves and Relief Valve Manifolds

Limited Warranty and Limitation of Liability

LIMITED WARRANTY
Engineered Controls International, Inc. warrants products and repair kits manufactured by it to be free from defects in materials and workmanship under normal use and service for a period of 12 months from the date of installation or operation or 18 months from the date of shipment from the factory, whichever is earlier. If within thirty days after buyer's discovery of what buyer believes is a defect, buyer notifies Engineered Controls International, Inc. thereof in writing, Engineered Controls International, Inc., at its option, and within forty-five days, will repair, replace F.O.B. point of manufacture, or refund the purchase price of that part or product found by it to be defective. Failure of buyer to give such written notice within thirty days shall be deemed an absolute and unconditional waiver of any and all claims of buyer arising out of such defect.

This warranty does not extend to any product or part that is not installed and used in accordance with Engineered Controls International, Inc.'s printed instructions, all applicable state and local regulations, and all applicable national standards, such as those promulgated by NFPA, DOT and ANSI. This warranty does not extend to any product or part that has been damaged by accident, misuse, abuse or neglect, nor does it extend to any product or part which has been modified, altered, or repaired in the field.

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WARNING
All Engineered Controls International, Inc. products are mechanical devices that will eventually become inoperative due to wear, corrosion and aging of components made of materials such as rubber, etc. The environment and conditions of use will determine the safe service life of these products. Periodic inspection and maintenance are essential to avoid serious injury and property damage.

Many Engineered Controls International, Inc. products are manufactured components which are incorporated by others on or in other products or systems used for storage, transport, transfer and otherwise for use of toxic, flammable and dangerous liquids and gases. Such substances must be handled by experienced and trained personnel only, using accepted governmental and industrial safety procedures.

NOTICE TO USERS OF PRODUCTS
The Limited Warranty stated above is a factory warranty to the first purchasers of Engineered Controls International, Inc. products. Since most users have purchased these products from Engineered Controls International, Inc. distributors, the user must within thirty (30) days after the user's discovery of what user believes is a defect, notify in writing the distributor from whom he purchased the product/parts. The distributor may or may not at the distributor's option choose to submit the product/parts to Engineered Controls International, Inc., pursuant to its Limited Warranty. Failure by buyer to give such written notice within thirty (30) days shall be deemed an absolute and unconditional waiver of buyer's claim for such defects. Acceptance of any alleged defective product/parts by Engineered Controls International, Inc.'s distributor for replacement or repairs under the terms of Engineered Controls International, Inc.'s Limited Warranty in no way obligates Engineered Controls International, Inc. to the terms of the above warranty.

Because of a policy of continuous product improvement, Engineered Controls International, Inc. reserves the right to change designs, materials or specification without notice.

Foreword

This catalog describes a complete line of equipment available from Engineered Controls International, Inc. for use with LP-Gas and anhydrous ammonia (NH_3). The following points are important to know for proper use of the catalog:

1. *Illustrations and drawings of individual products are representative of "product groups" and all products within a product group are similar in construction.*
2. *Materials used for construction of products in this catalog are suitable for rated service pressure at temperatures of -40° F. to +165° F., unless otherwise specified.*
3. *Products in this catalog are only intended for use in LP-Gas and/or anhydrous ammonia service as follows.*
   - **a.** *"A" or "AA" prefix — Products with this prefix are suitable for NH_3 service (i.e., contain no brass parts).*
   - **b.** *"AA" prefix on relief valves — These valves are NOT suitable for use with LP-Gas service. These are of partial aluminum materials and are listed by Underwriters Laboratories (UL) for NH_3 service only.*
   - **c.** *All other products are suitable for use with LP-Gas service.*
   - **d.** *"SS" prefix—Hydrostatic relief valve with this prefix are suitable for NH_3 service (i.e., they have stainless steel materials).*

Caution

Do not use any product contained in this catalog with any service commodity other than LP-Gas or NH_3. If you have a need for use of another application, contact Engineered Controls International, Inc., 100 RegO Drive, Elon College, NC 27244, (336) 449-7707 before proceeding.

Proper application, installation and maintenance of products in this catalog are essential. Users of these products should obtain further information if there are any doubts or questions.

Warning

All ECII® products are mechanical devices that will eventually become inoperative due to wear, corrosion and aging of components made of materials such as rubber. The environment and conditions of use will determine the safe service life of these products. Periodic inspection and maintenance are essential to avoid serious injury and property damage.

Many ECII® products are manufactured for storage, transport, transfer and use of toxic flammable and dangerous liquids and gases. Such substances should be handled by experienced and trained personnel only, using accepted governmental and industrial safety procedures. Never vent LP-Gas near any possible source of ignition.

Notice

Installation, usage, and maintenance of all ECII® products must be in compliance with all Engineered Controls International, Inc. instructions as well as requirements and provisions of NFPA #54, NFPA#58, DOT, ANSI, and all applicable federal, state, provincial and local standards, codes, regulations, and laws.

Inspection and maintenance on a periodic basis is essential. Installation and maintenance should be performed only by qualified personnel.

Be sure all instructions are read and understood before installation, operation and service.

Filters

ECII® LP-Gas equipment is designed to operate in a system free from contamination. A variety of in-line filters are commercially available to the LP-Gas industry for installation in domestic systems.
The use of an in-line filter should be considered when other system components may be unclean and the system contaminated by rust, scale, dirt, debris or other foreign material.

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Safety Warning — LP-Gas Pressure Relief Valves

Purpose

In its continuing quest for safety, Engineered Controls International, Inc. is publishing safety warning bulletins explaining the hazards associated with the use, misuse and aging of *ECII®/ RegO® Products*. LP-Gas dealer managers and service personnel must realize that the failure to exercise the utmost care and attention in the installation, inspection and maintenance of these products can result in personal injury and property damage.

The National Fire Protection Association Pamphlet #58 "Storage and Handling of Liquefied Petroleum Gases" states: "In the interests of safety, all persons employed in handling LP-Gases shall be trained in proper handling and operating procedures." *ECII®* Warning Bulletins are useful in training new employees and reminding older employees of potential hazards.

This Warning Bulletin should be provided to all purchasers of ECII® / RegO® Products and all personnel using or servicing these products. Additional copies are available from Engineered Controls International, Inc. and your Authorized *ECII®/ RegO® Products* Distributor.

⚠WARNING

What You Must Do:

- **Read This Entire Warning**
- **Install Properly**
- **Inspect Regularly**
- **Replace In 10 Years or Less**

Scope

This bulletin applies to pressure relief valves installed on stationary, portable and cargo containers and piping systems utilized with these containers. This bulletin is not intended to be an exhaustive treatment of this subject and does not cover all safety practices that should be followed in the installation and maintenance of LP-Gas systems. Each LP-Gas employee should be provided with a copy of NPGA Safety Pamphlet 306 "LP-Gas Regulator and Valve Inspection and Maintenance" as well as the NPGA "LP-Gas Training Guidebooks" relating to this subject.

Warnings should be as brief as possible. If there is a simple warning, it is:

Inspect pressure relief valves regularly. Replace unsafe or suspect valves immediately. Use common sense.

Install Properly

Consult NFPA Pamphlet #58 and/or any applicable regulations governing the application and use of pressure relief valves. Make sure you are thoroughly trained before you attempt any valve installation, inspection or maintenance.

Proper installation is essential to the safe operation of pressure relief valves. When installing *ECII®/ RegO®* pressure relief valves, consult warning # 8545-500 which accompanies each valve. Check for damage and proper operation after valve installation. Check that the valve is clean and free of foreign material.

Pipeaways and deflectors may be required by local codes, laws and regulations depending on the installation. Use only *ECII®/ RegO®* adapters on *ECII®/ RegO®* relief valves. Adapters not designed specifically for piping away *ECII®/ RegO®* relief valves, such as those with 90° turns or reduced internal diameters, will decrease flow dramatically. These should never be used as they can cause the relief valve to chatter and eventually destroy itself.

The addition of deflectors, pipeaway adapters and piping will restrict the flow. To properly protect any container, the total system flow must be sufficient to relieve pressure at the pressure setting of the relief valve in accordance with all applicable codes.

Inspect Regularly

A pressure relief valve discharges when some extraordinary circumstance causes an over pressure condition in the container. If a pressure relief valve is known to have discharged, the relief valve, as well as the entire system, should be immediately and thoroughly inspected to determine the reason for the discharge. In the case of discharge due to fire, the valve should be removed from service and replaced.

Relief valves should be inspected each time the container is filled but no less than once a year. If there is any doubt about the condition of the valve, it must be replaced.

Eye protection must be worn when performing inspection on relief valves under pressure. Never look directly into a relief valve under pressure or place any part of your body where the relief valve discharge could impact it. In some cases a flashlight and a small mirror are suggested to assist when making visual inspections.

To Properly Inspect A Pressure Relief Valve, Check For:

1. **A rain cap.** Check protective cap located in valve or at end of pipeaway for a secure fit. Protective caps help protect the relief valve against possible malfunction caused by rain, sleet, snow, ice, sand, dirt , pebbles, insects, other debris and contamination. **REPLACE DAMAGED OR MISSING CAPS AT ONCE AND KEEP A CAP IN PLACE AT ALL TIMES.**
2. **Open weep holes.** Dirt, ice, paint and other foreign particles can prevent proper drainage from the valve body. **IF THE WEEP HOLES CANNOT BE CLEARED, REPLACE THE VALVE.**
3. **Deterioration and corrosion on relief valve spring.** Exposure to high concentrations of water, salt, industrial pollutants, chemicals and roadway contaminants could cause metal parts to fail. **IF THE COATING ON THE RELIEF VALVE SPRING IS CRACKED OR CHIPPED, REPLACE THE VALVE.**
4. **Physical damage.** Ice accumulations and improper installation could cause mechanical damage. **IF THERE ARE ANY INDICATIONS OF DAMAGE, REPLACE THE VALVE.**
5. **Tampering or readjustment.** Pressure relief valves are factory set to discharge at specified pressures. **IF THERE ARE ANY INDICATIONS OF TAMPERING OR READJUSTMENT, REPLACE THE VALVE.**
6. **Seat leakage.** Check for leaks in the seating area using a non-corrosive leak detection solution. **REPLACE THE VALVE IF THERE IS ANY INDICATION OF LEAKAGE.** Never force a relief valve closed and continue to leave it in service. This could result in damage to the valve and possible rupture of the container or piping on which the valve is installed.
7. **Corrosion and contamination. REPLACE THE VALVE IF THERE ARE ANY SIGNS OF CORROSION OR CONTAMINATION ON THE VALVE.**
8. **Moisture, foreign particles or contaminants in the valve.** Foreign material such as paint, tar or ice in relief valve parts can impair the proper functioning of the valves. Grease placed in the valve body may harden over time or collect contaminants, thereby impairing the proper operation of the relief valve. **DO NOT PLACE GREASE IN THE VALVE BODY, REPLACE THE VALVE IF THERE ARE ANY INDICATIONS OF MOISTURE OR FOREIGN MATTER IN THE VALVE.**
9. **Corrosion or leakage at container connection.** Check container to valve connection with a non-corrosive leak detection solution. **REPLACE THE VALVE IF THERE IS ANY INDICATION OF CORROSION OR LEAKAGE AT THE CONNECTION BETWEEN THE VALVE AND CONTAINER.**

CAUTION: Never plug the outlet of a pressure relief valve. Any device used to stop the flow of a properly operating pressure relief valve that is venting an overfilled or overpressurized container - raises serious safety concerns!

Replace Pressure Relief Valves In 10 Years Or Less

The safe useful life of pressure relief valves can vary greatly depending on the environment in which they live.

Relief valves are required to function under widely varying conditions. Corrosion, aging of the resilient seat disc and friction all proceed at different rates depending upon the nature of the specific environment and application. Gas impurities, product misuse and improper installations can shorten the safe life of a relief valve.

Predicting the safe useful life of a relief valve obviously is not an exact science. The conditions to which the valve is subjected will vary widely and will determine its useful life. In matters of this kind, only basic guidelines can be suggested. For example, the Compressed Gas Association Pamphlet S-1.1 Pressure Relief Device Standards — Cylinders, section 9.1.1 requires all cylinders used in industrial motor fuel service to have the cylinder's pressure relief valves replaced by new or unused relief valves within twelve years of the date of manufacture of cylinder and within each ten years thereafter. *The LP-Gas dealer must observe and determine the safe useful life of relief valves in his territory.* The valve manufacturer can only make recommendations for the continuing safety of the industry.

WARNING: Under normal conditions, the useful safe service life of a pressure relief valve is 10 years from the original date of manufacture. However, the safe useful life of the valve may be shortened and replacement required in less than 10 years depending on the environment in which the valve lives. Inspection and maintenance of pressure relief valves is very important. Failure to properly inspect and maintain pressure relief valves could result in personal injuries or property damage.

For Additional Information Read:

1. CGA Pamphlet S-1.1 Pressure Relief Standards — Cylinders, Section 9.1.1.
2. *ECII*® Catalog L-500.
3. *ECII*® Warning # 8545-500.
4. NPGA Safety Pamphlet 306 "LP-Gas Regulator and Valve Inspection and Maintenance" and "LP-Gas Training Guidebooks".
5. NFPA # 58, "Storage and Handling of Liquefied Petroleum Gases".
6. NFPA # 59, "LP-Gases at Utility Gas Plants".
7. ANSI K61.1 Safety Requirements for Storage and Handling of Anhydrous Ammonia.

Requirements for Pressure Relief Valves

Every container used for storing or hauling LP-Gas and anhydrous ammonia must be protected by a pressure relief valve. These valves must guard against the development of hazardous conditions which might be created by any of the following:

- Hydrostatic pressures due to overfilling or the trapping of liquid between two points.
- High pressures resulting from exposure of the container to excessive external heat.
- High pressures due to the use of incorrect fuel.
- High pressures due to improper purging of the container.

Consult NFPA Pamphlet #58 for LP-Gas and ANSI #K61.1 for anhydrous ammonia, and/or any applicable regulations governing the application and use of pressure relief valves.

Operation of Pressure Relief Valves

Pressure relief valves are set and sealed by the manufacturer to function at a specific "start-to-discharge" pressure in accordance with regulations. This set pressure, marked on the relief valve, depends on the design requirement of the container to be protected by the relief valve. If the container pressure reaches the start-to-discharge pressure, the relief valve will open a slight amount as the seat disc begins to move slightly away from the seat. If the pressure continues to rise despite the initial discharge through the relief valve, the seat disc will move to a full open position with a sudden "pop". This sharp popping sound is from which the term "pop-action" is derived.

Whether the relief valve opens a slight amount or pops wide open, it will start to close if the pressure in the container diminishes. After the pressure has decreased sufficiently, the relief valve spring will force the seat disc against the seat tightly enough to prevent any further escape of product. The pressure at which the valve closes tightly is referred to as the "re-seal" or "blow-down" pressure. Generally, the re-seal pressure will be lower than the start-to-discharge pressure.The re-seal pressure can be, and in most cases is, adversely affected by the presence of dirt, rust, scale or other foreign particles lodging between the seat and disc. They interfere with the proper mating of the seat and disc and the pressure in the container will usually have to decrease to a lower pressure before the spring force embeds foreign particles into the resilient seat disc material and seals leak-tight. The degree by which the presence of dirt decreases the re-seal pressure, is, of course, dependent on the size of the interfering particles.

Once particles have been trapped between the disc and seat, the start-to-discharge pressure is also affected. For example, the pressure relief valve will start-to-discharge at some pressure lower than its original start-to-discharge pressure. Again, the pressure at which the valve will start to discharge is dependent on the size of the foreign particles.

In the case of a pressure relief valve that has opened very slightly due to a pressure beyond its start-to-discharge setting, the chances of foreign material lodging between the seat and disc is negligible although the possibility is always present. If the relief valve continues to leak at pressures below its start-to-discharge setting it must be replaced.

Relief valves which have "popped" wide open must also be checked for foreign material lodged between the seat and disc, as well as for proper reseating of the seat and disc. Continued leakage at pressures below the start-to-discharge setting indicate the relief valve must be replaced.

The pressure at which a pressure relief valve will start to discharge should never be judged by the reading of the pressure gauge normally furnished on the container.

The reasons for this are two-fold:

- If the relief valve is called upon to open, the resulting discharge produces an increased vaporization of the product in the container with the result that the liquid cools to a certain extent and the vapor pressure drops. A reading taken at this time would obviously not indicate what the pressure was when the relief valve opened.
- The pressure gauges usually on most containers provide somewhat approximate readings and are not intended to provide an indication of pressure sufficiently accurate to judge the setting of the relief valve.

Repair and Testing

RegO® Pressure Relief Valves are tested and listed by Underwriters Laboratories, Inc., in accordance with NFPA Pamphlet #58. Construction and performance of RegO® Pressure Relief Valves are constantly checked at the factory by U.L. inspectors. Therefore, testing of RegO® Pressure Relief Valves in the field is not necessary.

Never attempt to repair or change the setting of RegO® Pressure Relief Valves. Any changes in settings or repairs in the field will void the UL® listing and may create a serious hazard.

While the functioning of a pressure relief valve appears to be relatively simple, the assembly and test procedure used to manufacture these RegO® products is rather complex. Highly specialized test fixtures and specially trained personnel are necessary to attain proper relief valve settings. These fixtures and personnel are available only at the factory.

Any pressure relief valve which shows evidence of leakage, other improper operation or is suspect as to its performance must be replaced immediately using approved procedures.

Pipe-Away Adapters

Pipe-away adapters are available for most RegO® Pressure Relief Valves, where it is required or desirable to pipe the discharge above or away from the container. Each adapter is designed to sever if excessive stress is applied to the vent piping – thus leaving the relief valve fully operative.

Weep hole deflectors are available on larger relief valves. These deflectors provide protection against flame impinging on adjacent containers which could occur from ignition of LP-Gas escaping through the relief valve drain hole when the valve is discharging.

Selection of RegO® Pressure Relief Valves For ASME Containers

The rate of discharge required for a given container is determined by the calculation of the surface area of the container as shown in "Chart A" for LP-Gas and "Chart B" for anhydrous ammonia. See page D9.

Setting - The set pressure of a pressure relief valve depends upon the design pressure of the container. Refer to NFPA Pamphlet #58 for more information.

Selection of RegO® Pressure Relief Valves for DOT Containers

To determine the proper relief valve required for a given DOT con-

tainer, refer to the information shown with each pressure relief valve in the catalog. This information will give the maximum size (pounds water capacity) DOT container for which the relief valve has been approved.

Setting - The standard relief valve setting for use on DOT cylinders is 375 PSIG.

Ordering RegO® Pressure Relief Valves

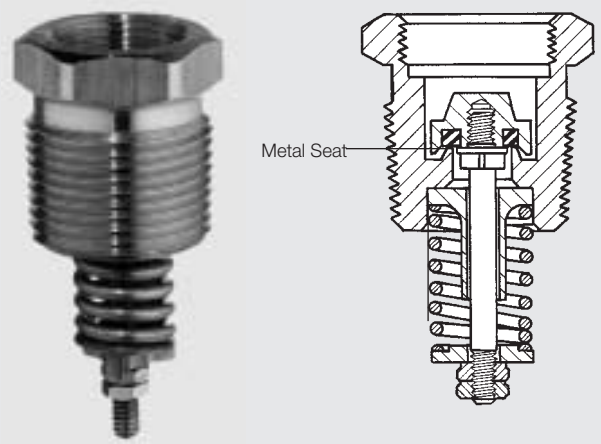
When ordering RegO® Pressure Relief Valves, be sure you are certain that it will sufficiently protect the container as specified in the forewording information, NFPA Pamphlet #58 and any other applicable standards or specifications.

All adapters, protective caps and deflectors must be ordered separately, unless specified otherwise.

Part Number Explanation

Products carrying an “A” or “AA” prefix contain no brass parts and are suitable for NH_3. Hydrostatic relief valves carrying an “SS” prefix are of stainless steel construction and are suitable for use with NH_3. The products are also suitable for use with LP-Gas service except relief valves carrying an “AA” prefix. These are of partial aluminum construction and are listed by U.L. for NH_3 service only.

Safety Information — Relief Valves Don’t Last Forever



RegO® Relief Valve for lift truck containers

The internal spring is protected from external contamination but the other external parts must be protected with a cap. Circular rubber seat disc ring seats on brass shoulder approximately 3⁄64" wide.

This article was prepared by the engineers of RegO® products, after technical consultation with valve manufacturers and other industry sources. Its purpose is to alert and remind the LP-Gas industry of the importance of proper maintenance of pressure relief valves. It applies most particularly to separate relief valves with emphasis on lift truck and motor fuel containers where the hazards of contamination are greatest.

Since the beginning of our industry, manufacturers of equipment and distributors of LP-Gas have worked diligently to provide a safe environment for employees and consumers. The history of the industry testifies to the success of their efforts.

But the industry is now entering its sixth decade and equipment installed years ago is failing because of age. Every year, additional equipment will fail unless it is replaced. Pressure relief valves are no exception. The valve manufacturers and LP-Gas dealers are naturally concerned about this situation.

Causes of Relief Valve Failure

A relief valve is designed to have a safe useful life of many years, but that life will vary greatly depending on the environment in which it “lives.” To attempt to estimate the safe useful life of a relief valve and the effect of environment on its performance, a brief discussion of the materials used and the nature of its performance should be helpful.

Relief valve bodies are generally made of brass or steel. Springs are made from various spring wires which are plated or painted, or made of stainless steel. Valve seat discs are made of synthetic rubber compounds which will remain serviceable in an atmosphere of LP-Gas. Relief valve stems, guides, etc. are generally made from brass or stainless steel.

Relief valves, over the years, may not function properly in several ways:

- They may leak at pressures below the set pressure.
- They may open and fail to properly reseat.
- They may open at higher than the set pressure.

These failures to function properly are due primarily to four “environmental” conditions:

1. Corrosion of metal parts (particularly springs) which result in the component parts failing to perform.
2. Deterioration of the synthetic rubber seat disc material.
3. Clogging or “cementing” of the movable relief valve components so that their movement is restricted.
4. Debris on the valve seat after the relief valve opens, effectively preventing the valve from reseating.

Corrosion is caused by water, corrosive atmospheres of salt and industrial pollutants, chemicals, and roadway contaminants. High concentrations can attack the metal parts vigorously. No suitable metals are totally resistant to such corrosion.

Synthetic rubber and seat disc materials can also be attacked by impurities in the gas and corrosive atmospheres, particularly those with sulphur dioxide. There are no suitable rubber materials which resist all contaminants.

“Cementing” of relief valve parts has been caused by normal industrial atmospheres containing particles of dirt, iron oxide, metal chips, etc. combined with water, oil, or grease. Ice collecting in recessed valves could cause relief valves to fail to open. Paint and tar in relief valves also cause failure to function properly.

Debris on valve seats which prevents reseating can occur whenever the valve collects material in the relief valve opening which is not blown out when the relief valve opens.

Inspection of Relief Valves

Unfortunately many of the above problems may not be easily observed because of the compact nature of some relief valve designs.

A casual visual inspection of a relief valve may not necessarily disclose a potential hazard. On the other hand, a visual inspection will often disclose leakage, corrosion, damage, plugging and contamination.

If additional light is required, a flashlight should be used.

If there is any doubt about the condition of the valve, or if there is a suspicion that the valve has not been protected by a cap for some time, it should be replaced before refilling the container.

Eye protection must be used when examining relief valves under pressure.

Smaller Relief Valves

The industry's requirement for a small full-flow safety relief valve challenged design engineers some years ago:

- The valve must be leakproof before operating and must reseat leakproof each time after each operation. The only known satisfactory seat disc materials to accomplish this have been special synthetic rubber compounds.
- Valve discharge settings are relatively high and require high spring loads to keep the valve closed.
- Because of the small interior diameter of the valve, the round metal seating area is small.

All of these parameters may result in the development of a significant indentation in the rubber seat disc after some years. The seat disc may have a tendency to cling to the metal seat. This may result in the relief valve not opening at the set pressure as the seat disc ages.

Test have been conducted on small LP-Gas relief valves of all the U.S. valve manufacturers. Valves over 10 years old were removed from service and tested to determine at what pressure the valves discharged. In many of the valves, the pressure required to open the valve exceeded the set pressure.

Because of the critical importance of proper functioning of relief valves, common sense and basic safety practice dictate that small relief valves should be replaced in about 10 years.

Some larger relief valves on bulk storage tanks can be replaced with rebuilt valves obtained from the manufacturers. Small relief valves cannot be rebuilt economically, thus, new valves are required. Most LP-Gas dealers find it impractical and costly to test relief valves and field repairing of relief valves is not sanctioned by the manufacturers, Underwriter's Laboratories, or ASME.

Use of Protective Caps

Many of the problems that cause inoperative relief valves could be prevented if proper protective caps were kept in place *at all times.*

Collection of debris would be prevented. Contamination caused by corrosive atmospheres would be reduced. Water collection in the valves would be eliminated. Relief valves protected with caps from the time of installation in the container would obviously have a much longer safe useful life, but they still should be replaced at some time because of the gradual deterioration of the rubber seat disc due to age alone.

NFPA 58 requires that protective caps must be kept in place as a protective cover on some relief valves. This is a mandatory requirement on several types of relief valves. The fact that use of caps may make inspection more time consuming should not be viewed as a reason for either not using the caps, or not making required periodic inspections.

In the event a relief valve has been used without the required cap, the relief valve should be thoroughly inspected and the required cap placed on the relief valve. If damage is noted to the relief valve, it should be replaced and the replacement valve should be capped.

Relief valves with pipe-away adapters or deflectors used on lift truck containers have been found choked with debris. Inspection of relief valves with deflectors can only be accomplished by removing the deflector.

Similarly, larger relief valves with vent stacks have been found choked with debris and water. Valves have failed because springs rusted through. The weep hole was plugged. It was obvious that the relief valves had not been inspected in many years. These conditions must be alleviated by periodic inspections and replacement of relief valves as needed.

Summary Recommendations

Predicting the safe useful life of a relief valve is obviously not an exact science. The conditions to which the valve is subjected will vary widely and will largely control its life. In matters of this kind, only basic guidelines can be suggested. The LP-Gas dealer must observe and determine the safe useful life of relief valves in his territory. The valve manufacturers can only make recommendations for the continuing safety of the industry:

1. Make sure proper protective caps are in place at all times. Do not release a container for service or fill a container unless it has a protective cap in place.
2. Replace relief valves periodically, at least every 10 years. Every relief valve has the month and year of manufacture stamped on the valve. This is most particularly true of small *separate* relief valves.
3. Carefully inspect valves each time before the container is filled. Replace valves showing any signs of contamination, corrosion, damage, plugging, leakage, or any other problem. Eye protection must be used when examining relief valves under pressure.

Chart A — Minimum Required Rate of Discharge for LP-Gas Pressure Relief Valves Used on ASME Containers

From NFPA Pamphlet #58, Appendix D (1986).

Minimum required rate of discharge in cubic feet per minute of air at 120% of the maximum permitted start-to-discharge pressure for pressure relief valves to be used on containers other than those constructed in accordance with Interstate Commerce Commission specification.

Surface Area Sq. Ft.	Flow Rate CFM Air	Surface Area Sq. Ft.	Flow Rate CFM Air	Surface Area Sq. Ft.	Flow Rate CFM Air	Surface Area Sq. Ft.	Flow Rate CFM Air	Surface Area Sq. Ft.	Flow Rate CFM Air	Surface Area Sq. Ft.	Flow Rate CFM Air	Surface Area Sq. Ft.	Flow Rate CFM Air
20 or less	626	85	2050	150	3260	230	4630	360	6690	850	13540	1500	21570
25	751	90	2150	155	3350	240	4800	370	6840	900	14190	1550	22160
30	872	95	2240	160	3440	250	4960	380	7000	950	14830	1600	22740
35	990	100	2340	165	3530	260	5130	390	7150	1000	15470	1650	23320
40	1100	105	2440	170	3620	270	5290	400	7300	1050	16100	1700	23900
45	1220	110	2530	175	3700	280	5450	450	8040	1100	16720	1750	24470
50	1330	115	2630	180	3790	290	5610	500	8760	1150	17350	1800	25050
55	1430	120	2720	185	3880	300	5760	550	9470	1200	17960	1850	25620
60	1540	125	2810	190	3960	310	5920	600	10170	1250	18570	1900	26180
65	1640	130	2900	195	4050	320	6080	650	10860	1300	19180	1950	26750
70	1750	135	2990	200	4130	330	6230	700	11550	1350	19780	2000	27310
75	1850	140	3080	210	4300	340	6390	750	12220	1400	20380		
80	1950	145	3170	220	4470	350	6540	800	12880	1450	20980		

Surface area =Total outside surface area of container in square feet.

When the surface area is not stamped on the name plate or when the marking is not legible, the area can be calculated by using one of the following formulas:

1. Cylindrical container with hemispherical heads. Area (in sq. ft.) = overall length (ft.) x outside diameter (ft.) x 3.1416.
2. Cylindrical container with semi-ellipsoidal heads. Area (in sq. ft.) = [overall length (ft.) + .3 outside diameter (ft.)] x outside diameter (ft.) x 3.1416.
3. Spherical container. Area (in sq. ft.) = outside diameter (ft.) squared x 3.1416.

Flow Rate CFM Air = Required flow capacity in cubic feet per minute of air at standard conditions, 60ºF. and atmospheric pressure (14.7 psia).

The rate of discharge may be interpolated for intermediate values of surface area. For containers with total outside surface area greater than 2000 square feet, the required flow rate can be calculated using the formula, Flow Rate in CFM Air = 53.632 $A^{0.82}$. Where A = total outside surface area of the container in square feet.

Valves not marked "Air" have flow rate marking in cubic feet per minute of liquefied petroleum gas. These can be converted to ratings in cubic feet per minute of air by multiplying the liquefied petroleum gas ratings by the factors listed below. Air flow ratings can be converted to ratings in cubic feet per minute of liquefied petroleum gas by dividing the air ratings by the factors listed below.

Air Conversion Factors

Container Type	100	125	150	175	200
Air Conversion Factor	1.162	1.142	1.113	1.078	1.010

Chart B — Minimum Required Rate of Discharge for Anhydrous Ammonia Pressure Relief Valves Used on ASME Containers

From ANSI K61.1-1981, Appendix A (1981).

Minimum required rate of discharge in cubic feet per minute of air at 120% of the maximum permitted start-to-discharge pressure for pressure relief valves to be used on containers other than those constructed in accordance with United States Department of Transportation cylinder specifications.

Surface Area Sq. Ft.	Flow Rate CFM Air	Surface Area Sq. Ft.	Flow Rate CFM Air	Surface Area Sq. Ft.	Flow Rate CFM Air	Surface Area Sq. Ft.	Flow Rate CFM Air	Surface Area Sq. Ft.	Flow Rate CFM Air	Surface Area Sq. Ft.	Flow Rate CFM Air	Surface Area Sq. Ft.	Flow Rate CFM Air
20	258	95	925	170	1500	290	2320	600	4200	1350	8160	2100	11720
25	310	100	965	175	1530	300	2380	650	4480	1400	8410	2150	11950
30	360	105	1010	180	1570	310	2450	700	4760	1450	8650	2200	12180
35	408	110	1050	185	1600	320	2510	750	5040	1500	8900	2250	12400
40	455	115	1090	190	1640	330	2570	800	5300	1550	9140	2300	12630
45	501	120	1120	195	1670	340	2640	850	5590	1600	9380	2350	12850
50	547	125	1160	200	1710	350	2700	900	5850	1650	9620	2400	13080
55	591	130	1200	210	1780	360	2760	950	6120	1700	9860	2450	13300
60	635	135	1240	220	1850	370	2830	1000	6380	1750	10090	2500	13520
65	678	140	1280	230	1920	380	2890	1050	6640	1800	10330		
70	720	145	1310	240	1980	390	2950	1100	6900	1850	10560		
75	762	150	1350	250	2050	400	3010	1150	7160	1900	10800		
80	804	155	1390	260	2120	450	3320	1200	7410	1950	11030		
85	845	160	1420	270	2180	500	3620	1250	7660	2000	11260		
90	885	165	1460	280	2250	550	3910	1300	7910	2050	11490		

Surface area = Total outside surface area of container in square feet.

When the surface area is not stamped on the name plate or when the marking is not legible, the area can be calculated by using one of the following formulas:

1. Cylindrical container with hemispherical heads. Area (in sq. ft.) = overall length (ft.) x outside diameter (ft.) x 3.146.
2. Cylindrical container with other than hemispherical heads. Area (in sq. ft.) = [overall length (ft.) + .3 outside diameter (ft.)] x outside diameter (ft.) x 3.1416.
3. Spherical container. Area (in sq. ft.) = outside diameter (ft.) squared x 3.1416.

Flow Rate CFM Air = Required flow capacity in cubic feet per minute of air at standard conditions, 60°F. and atmospheric pressure (14.7 psia).

The rate of discharge may be interpolated for intermediate values of surface area. For containers with total outside surface area greater than 2,500 square feet, the required flow rate can be calculated using the formula, Flow Rate in CFM Air = 22.11 $A^{0.82}$ where A = outside surface area of the container in square feet.

Conversion Factor

ft² x 0.092 903 = m²
CFM x 0.028 317 = m³/min
ft x 0.304 8 = m

"Pop-Action" Pressure Relief Valves

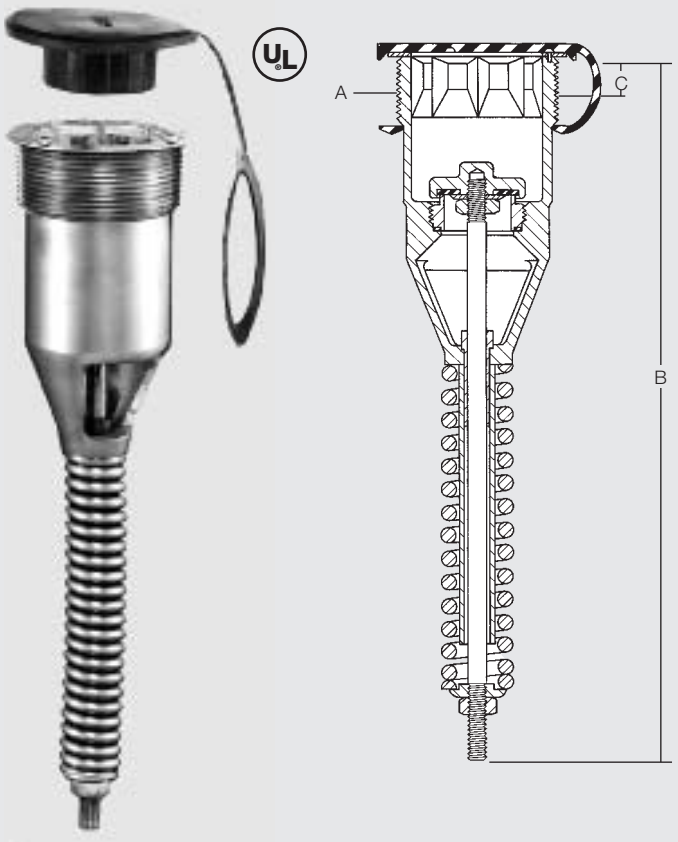
General Information

The "Pop-Action" design permits the RegO® Pressure Relief Valve to open slightly to relieve moderately excessive pressure in the container. When pressure increases beyond a predetermined point, the valve is designed to "pop" open to its full discharge capacity, reducing excess pressure quickly. This is a distinct advantage over ordinary valves which open gradually over their entire range, allowing excessive pressure to develop before the relief valve is fully open. All RegO® internal, semi-internal, and external relief valves incorporate this "Pop-Action" design.

Relief valves in this catalog are only intended for use in LP-Gas or anhydrous ammonia service. Do not use any relief valve contained in this catalog with any other service commodity. If you have an application other than conventional LP-Gas or anhydrous ammonia service, contact Engineered Controls International, Inc. before proceeding.

Fully Internal "Pop-Action" Pressure Relief Valves for Transports and Delivery Trucks

A8434 and A8436 Series



Application

Designed specifically for use as a primary relief valve in ASME transports and delivery trucks with 2" and 3" NPT couplings.

Features

- Low profile design assures maximum protection against sheering or distortion.
- All functioning parts are located below the level of the container connection to reduce the possibility of damage or tampering.
- Longer spring size designed to minimize stress cracking in service.
- Use of two different materials for stem and guide minimizes the possibility of stem seizure which may occur when similar materials are used.
- Internal octagonal wrenching broach assures easy installation and removal.
- ASME approved for use with LP-Gas and anhydrous ammonia.

Materials

Body ..... Stainless Steel
Spring ..... Stainless Steel
Stem ..... Stainless Steel
Stem Bushing ..... 17-4PH Stainless Steel
Seat Disc ..... Resilient Synthetic Rubber

Ordering Information

Part Number	Start To Discharge Setting PSIG	A Container Connection	B Overall Height (Approx.)	C Height Above Coupling (Approx.)	Flow Capacity SCFM/Air		Suitable for Tanks with Surface Area Up To:*	Protective Cap (Included)
					UL (At 120% of Set Pressure)	ASME (At 120% of Set Pressure)		
A8434N	265	2" M. NPT	9 1/16"	1/2"	3700	3659	175 Sq. Ft.	A8434-11B
A8434G	250					3456		
A8436N	265	3" M. NPT	17 7/8"	3/4"	10210	9839	602 Sq. Ft.	A8436-11B
A8436G	250					9598		

* Per NFPA Pamphlet #58, Appendix D. Area shown is for UL or ASME flow rating—whichever is larger.

Application

8543 Series relief valves are designed for use as a primary relief valve in larger ASME motor fuel containers such as on buses, trucks and construction equipment.

8544 Series relief valves are designed for use as a primary relief valve in smaller ASME and DOT motor fuel containers such as on tractors, lift trucks, cars and taxicabs.

Features

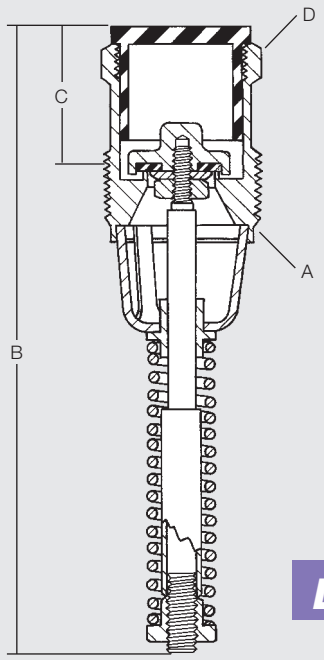
- Assure minimum product loss due to "pop-action" design.
- Recessed design minimizes possibility of damage and tampering.
- All are threaded to accept RegO® Pipeaway Adapters that permit the addition of a discharge hose or piping.
- ASME rated for use with LP-Gas (except 8544K which meets DOT requirements).
- Specify RegO® Relief Valves on all your original equipment motor fuel container purchases for reliable performance.

Materials

Body ..... Brass
Spring (8543) .....Stainless Steel
Spring (8544) ..... Coated Steel
Seat Disc ..... Resilient Rubber

7543-10

7544-11A



D

Ordering Information

Part Number	Container Type	Start To Discharge Setting PSIG	A Container Connection M. NPT	B Overall Height (Approx.)	C Height Above Coupling (Approx.)	D Hex Wrenching Section	Flow Capacity SCFM/Air****		Protective Cap (Included)	Accessories
							UL (At 120% of Set Pressure)	ASME (At 120% of Set Pressure)		Pipeaway Adapter
8544G	ASME	250	1"	$5\frac{7}{16}$"	$\frac{7}{8}$"	$1\frac{5}{16}$"	1020	936	7544-41	7544-11A*
8543G			$1\frac{1}{4}$"			$1\frac{11}{16}$"	1465	1400	7543-40C	7543-10**
8544T		312	1"			$1\frac{5}{16}$"	1938	1158	7544-41	7544-11A*
8543T			$1\frac{1}{4}$"			$1\frac{11}{16}$"	1990	1731	7543-40C	7543-10**
8544K	DOT	375	1"			$1\frac{5}{16}$"	1547***	—	7544-41	7544-11A*

* 1" M. NPT outlet connection.
** $1\frac{1}{4}$" M. NPT outlet connection.
*** Rating determined per RegO® specifications at 480 PSIG.
**** Flow rates shown are for bare relief valves. Adapters and pipeaway will reduce flow as discussed in forewording information.

Fully Internal "Pop-Action" Pressure Relief Valve for DOT Fork Lift Cylinders

8545AK

Application

Designed specifically for use as a primary relief valve on forklift cylinders, the 8545AK reduces the possibility of improper functioning of the relief mechanism due to foreign material build up. All guides, springs, stem and adjusting components are located inside the cylinder - removed from the direct exposure of foreign materials and debris from the atmosphere.

NFPA Pamphlet #58 requires that:

"All containers used in industrial truck (including forklift truck cylinders) service shall have the container pressure relief valve replaced by a new or unused valve within 12 years of the date of manufacture of the container and each 10 years thereafter."

Features

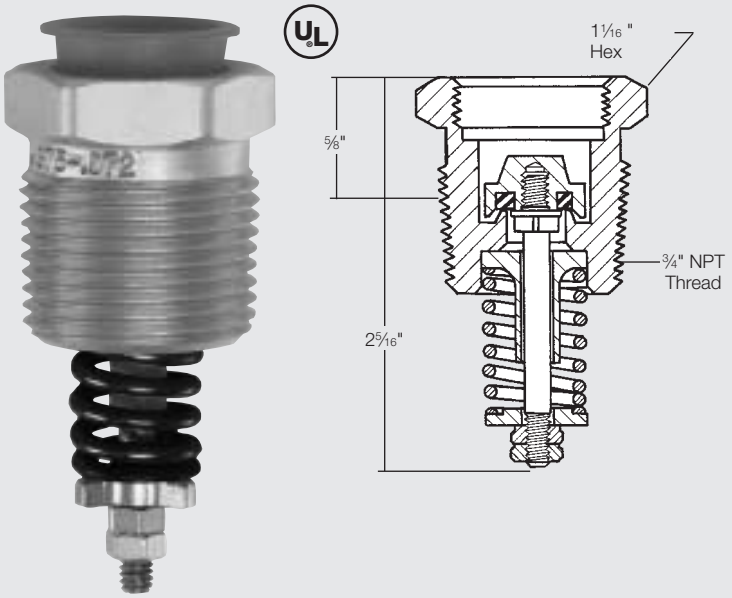
- Positive stop in the upper body protects against improper insertion of a pipeaway adapter that might interfere with proper operation of the relief valve.
- Internal stem guide eliminates the need for a close fit between the body and poppet, which lessens the chance of clogging due to foreign material.
- Single piece cold-headed stem provides more accurate positioning of working parts for more consistent operation and precise adjustment.
- Two different deflector adapters and a protective cap are available as accessories to provide complete protection.
- "Pop-action" design keeps product loss at a minimum.
- Request RegO® Relief Valves on all your original equipment forklift cylinders for reliable performance.

Materials

Body ..... Brass
Stem ..... Stainless Steel
Spring ..... Stainless Steel
Poppet ..... Brass
Guide ..... Brass
Seat Disc ..... Resilient Rubber

7545-12 90° Adapter

7545-14 45° Adapter



Ordering Information

Part Number	Container Type	Start To Discharge Setting PSIG	Container Connection M. NPT	Flow Capacity SCFM/Air** (ECII® Rated at 480 PSIG)	Accessories (Order Separately)		
					Protective Cap	Deflectors*** 45° Elbow	Deflectors*** 90° Elbow
8545AK	DOT	375	3/4"	350*	7545-40	7545-14	7545-12

* Classified by U.L. in accordance with Compressed Gas Association Pamphlet S-1.1 Pressure Device Standards for Cylinders. Meets requirements for use on DOT containers with 216 pounds or less weight of water or 90 pounds or less of LP-Gas.

** Flow rates are shown for bare relief valves. Adapters and pipeaways will reduce flow as discussed in forewording information.

*** Order protective cap #8545-41 or 7545-40.

Semi-Internal "Pop-Action" Pressure Relief Valves for ASME Containers

7583, 8684 and 8685 Series

Application

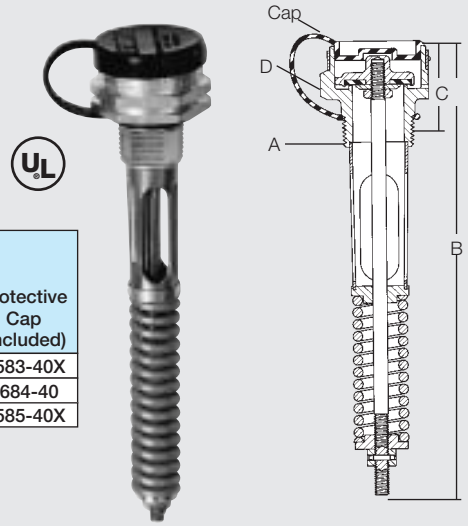
Designed for use as a primary relief valve on ASME containers such as 250, 500 and 1,000 gallon tanks. Underwriters' Laboratories lists containers systems on which these types of valves are mounted outside the hood without additional protection, if mounted near the hood and fitted with a protective cap.

Features

- Huddling chamber design allows quick opening and resists chattering for long dependable service life.
- Constructed of non-corrosive materials.
- "Pop-action" design keeps product loss at a minimum.
- ASME rated for use with LP-Gas.
- Request RegO® Relief Valves on all your original equipment ASME containers for reliable performance.

Materials

Body ..... Brass
Spring ..... Steel
Stem ..... Stainless Steel
Seat Disc ..... Resilient Rubber



Ordering Information

Part Number	Start To Discharge Setting PSIG	A Container Connection M. NPT	B Overall Height (Approx.)	C Height Above Coupling (Approx.)	D Wrench Hex Section	Flow Capacity SCFM/Air		Suitable for Tanks w/Surface Area Up To:*	Protective Cap (Included)
						UL (At 120% of Set Pressure)	ASME (At 120% of Set Pressure)		
7583G	250	3/4"	8 3/16"	1 7/16"	1 3/4"	1980	1806	80 Sq. Ft.	7583-40X
8684G		1"	9 3/8"	1 9/16"	1 7/8"	2620	2565	113 Sq. Ft.	8684-40
8685G		1 1/4"	11 1/16"	1 11/16"	2 3/8"	4385	4035	212 Sq. Ft.	7585-40X

* Per NFPA Pamphlet #58, Appendix D. Area shown is for UL or ASME flow rating—whichever is larger.

Semi-Internal "Pop-Action" Pressure Relief Valves for Large Storage Containers

7534 Series

Application

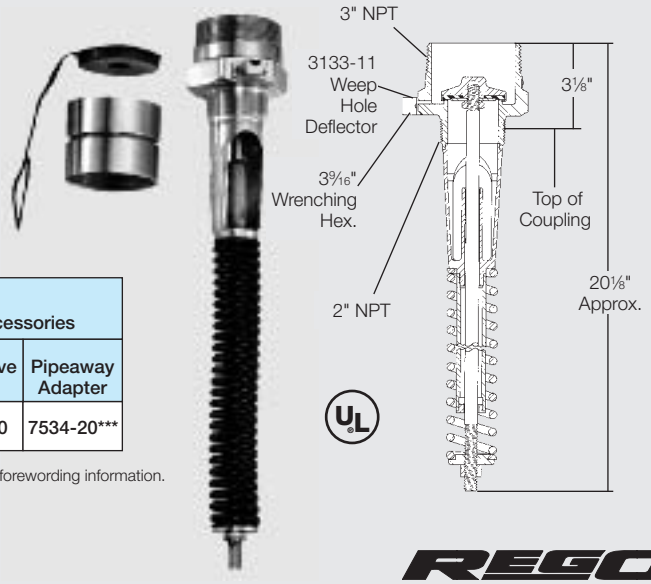
Designed especially for use as a primary relief valve on large stationary storage containers, these low profile relief valves are generally mounted in half couplings. However, they are designed so that the inlet ports clear the bottom of a full 2" coupling. This assures that the relief valve should always be capable of maximum flow under emergency conditions.

Features

- Large huddling chamber design allows quick opening and resists chattering for long dependable service life.
- High capacity, low turbulence design has a maximum guiding area providing for dependable shut-off after opening.
- Built-in spring stop limits the rise of the seat in full open position and prevents the spring from going "solid".
- External 3" NPT threaded body allows easy attachment of vent stacks. Optional pipeaway adapter has break-off groove to prevent damage to the relief valve should piping be stressed by damaging winds.
- "Pop-Action" design keeps product loss at a minimum.
- No guiding projections around the seat disc retainer to bind and hinder opening of valve if body is damaged.
- Weep hole deflector is furnished, installed, to guard against flame impingement on adjacent containers.
- ASME rated for use with LP-Gas.

Materials

Upper Body ..... Brass Forging
Lower Body ..... Brass Casting
Stem ..... Stainless Steel
Spring ..... Coated Steel
Seat Disc ..... Resilient Rubber



Ordering Information

Part Number	Start To Discharge Setting PSIG	Container Connection M. NPT	Flow Capacity SCFM/Air*		Suitable for Tanks w/Surface Area Up To:**	Accessories	
			UL (At 120% of Set Pressure)	ASME (At 120% of Set Pressure)		Protective Cap	Pipeaway Adapter
7534B	125	2"	6,025	—	319 Sq. Ft.	7534-40	7534-20***
7534G	250		11,675	10,422	708 Sq. Ft.		

* Flow rates shown are for bare relief valves. Adapters and pipeaways will reduce flow as discussed in the forewording information.

** Per NFPA Pamphlet #58, Appendix D. Area shown is for UL or ASME—whichever is larger.

*** 3" F. NPT outlet connection.

External "Pop-Action" Pressure Relief Valves for ASME Containers and Bulk Plant Installations

AA3126, AA3130, 3131, 3132, 3133, 3135, AA3135, and A3149 Series

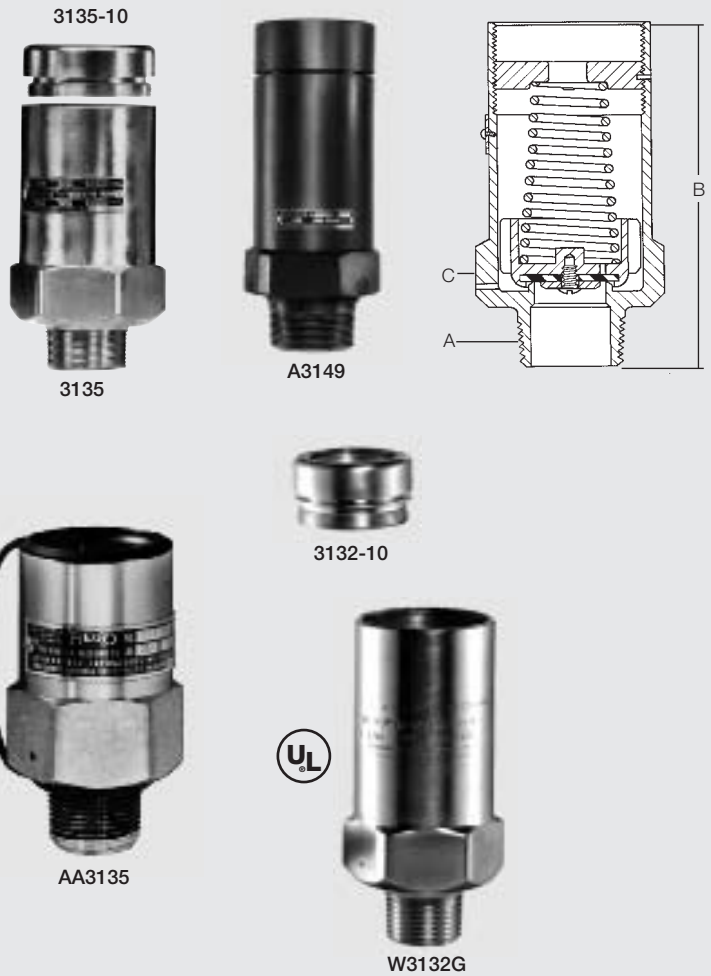
Application

Designed for use as a primary relief valve on ASME above ground and underground containers, bulk plant installations and skid tanks. The 3131 Series may also be used as a primary or secondary relief valve on DOT cylinders, or as a hydrostatic relief valve.

All working components of these relief valves are outside the container connection, so the valves must be protected from physical damage.

Features

- "Pop-action" design keeps product loss at a minimum.
- Relief valve designed to automatically reseat firmly after discharge.
- Resilient seat disc provides "bubble-tight" seal.
- 3149 relief valves incorporate integral pipeaway adapter with break off groove that protects the valve from piping stress damage.
- Optional pipeaway adapters have grooves that will break off to protect the relief valve from damage should excess stress be applied to the piping.
- 3149 relief valves include weep hole deflectors, installed to guard against flame impingment on adjacent containers.
- Most are ASME rated for use with LP-Gas and anhydrous ammonia.



Materials

Description	3131, 3132 3133, 3135	AA3126 AA3130	AA3135	A3149
Body	Brass	Aluminum Rod*		Upper-Cold Rolled Steel Lower-Ductile Iron
Liner	None			Stainless Steel
Spring Guide	Brass	Aluminum		Stainless Steel
Spring	Corrosion Resistant Steel	Stainless Steel	Stainless Steel or Coated Steel	
Seat Disc	Resilient Synthetic Rubber			

* A special coating is applied to the inlet threads to minimize possibility of electrolytic action between the valve and steel coupling.

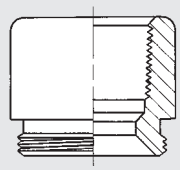
Ordering Information

Part Number	Start To Discharge Setting PSIG	A Container Connection M. NPT	B Overall Height (Approx.)	C Wrench Hex Section	Flow Capacity SCFM/Air (a) UL (At 120% of Set Pressure)	Flow Capacity SCFM/Air (a) ASME (At 120% of Set Pressure)	Suitable for Tanks with Surface Area Up To: (e)	Accessories: Protective Cap	Accessories: Pipeaway Adapter Part Number	Accessories: Pipeaway Adapter Outlet Size	Accessories: Weep Hole Delfector
AA3126L030	30	1/2"	2 3/8"	7/8"	(b)	—	—	7545-40	AA3126-10	1/2" M. NPT	—
A3149L050	50	2 1/2"	10 1/2"	4 1/8"	2600(c)	—	113 Sq. Ft.	3149-40	(h)		Included( )
A3149L200	200				8770 (c)	—	500 Sq. Ft.				
AA3126L250	250	1/2"	2 3/8"	7/8"	277 (c)	—	23 Sq. Ft. (f)	7545-40	AA3126-10	1/2" M. NPT	—
3131G		3/4"	3 7/16"	1 3/4"	2060	1939	85 Sq. Ft.	3131-40 (g)	—		
AA3130UA250					2045	1838	249 Sq. Ft. (f)	AA3130-40P	AA3131-10	1" F. NPT	
W3132G		1"	6 1/32"	2 3/8"	3340	—	154 Sq. Ft.	3132-54 (g)	3132-10	1 1/4" F. NPT	3133-11B
3132G		1 1/4"			4130	—	200 Sq. Ft.		—		
T3132G					3790	—	180 Sq. Ft.		3132-10	1 1/4" F. NPT	
MV3132G					3995	—	190 Sq. Ft.		—		
3135G			5 21/32"	2 11/16"	5770	—	300 Sq. Ft.	3135-54 (g)	3135-10	2" F. NPT	
AA3135UA250			6 13/32"		6430	5080 (d)	1010 Sq. Ft. (f)	AA3135-40PR	AA3135-10		
3133G		1 1/2"	5 15/16"	3 1/8"	6080	—	320 Sq. Ft.	3133-40 (g)	3133-10		
A3149G	265	2 1/2"	10 1/2"	4 1/8"	10390	9153	613 Sq. Ft.	3149-40	(h)		Included(j)
AA3130UA265		3/4"	3 7/16"	1 3/4"	2125	1912	261 Sq. Ft. (f)	AA3130-40P	AA3131-10	1" F. NPT	—
AA3135UA265		1 1/4"	6 11/16"	2 11/16"	6615	5370 (d)	1045 Sq. Ft. (f)	AA3135-40PR	AA3135-10	2" F. NPT	3133-11B
AA3126L312	312	1/2"	2 3/8"	7/8"	330 (c)	—	27 Sq. Ft. (f)	7545-40	AA3126-10	1/2" M. NPT	—

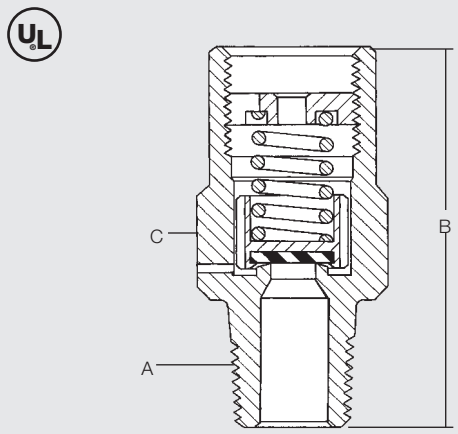
(a) Flow rates shown are for bare relief valves. Adapters and pipeaways will reduce flow as discussed in forewording information.
(b) Not UL or ASME rated. .059 square inch effective area.
(c) Not UL or ASME rated. ECII® rated at 120% of set pressure.
(d) Rated at 110% of set pressure.
(e) Per NFPA Pamphlet #58, Appendix D. Area shown is for UL or ASME flow rating—whichever is larger.
(f)Per ANSI K61.1-1972, Appendix A.
(g) Cap supplied with chain.
(h) Outlet 3½-8N (F) thread, will accept 3" M. NPT pipe thread.
(j)Weep hole deflector is Part No. A3134-11B.

External "Pop-Action" Supplementary Pressure Relief Valves for Small ASME Containers and DOT Cylinders

3127 and 3129 Series



3129-10
Pipe Away Adapter



Application

Designed for use as a supplementary relief valve on small ASME above ground and underground containers. They may also be used as a primary or secondary relief device on DOT cylinders, or as hydrostatic relief valves.

All working components of these relief valves are outside the container connection, so the valves must be protected from physical damage.

Materials

Body ..... Brass
Spring ..... Stainless Steel
Seat Disc ..... Resilient Rubber

Features

- "Pop-action" design keeps product loss at a minimum.
- Relief valve designed to automatically reseat firmly after discharge.
- Resilient seat disc provides a "bubble-tight" seal.

Ordering Information

Part Number	Container Type	Start To Discharge Setting PSIG	A Container Connection M. NPT	B Overall Height (Approx.)	C Wrench Hex Section	Flow Capacity SCFM/Air*		Suitable for Tanks with Surface Area Up to: ***	Accessories		
						UL (At 120% of Set Pressure)	ECII® Rated at 480 PSIG**		Protective Cap	Pipeaway Adapter	
										Part Number	Outlet Size
3127G	ASME	250	1/4"	1 31/32"	7/8"	295	—	—	7545-40	—	
3129G			1/2"	2 19/32"	1 1/8"	465				3129-10	1/2" F. NPT
3127K	DOT	375	1/4"	1 31/32"	7/8"	—	450	100 lbs./Propane		—	
3129K			1/2"	2 19/32"	1 1/8"		780	200 lbs./Propane		3129-10	1/2" F. NPT

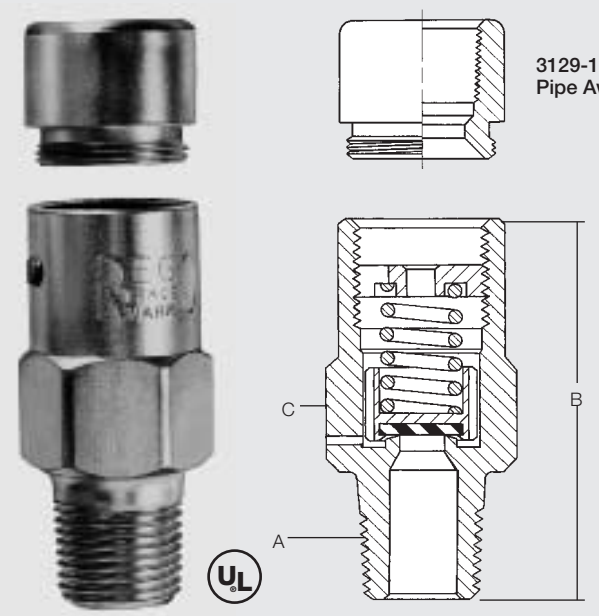
* Flow rates shown are for bare relief valves. Adapters and pipeaways will reduce flow as discussed in forewording information.

** Not UL or ASME rated. ECII® rated at 480 PSIG.

*** Meets DOT requirements.

External Hydrostatic Relief Valves

3125, 3127, 3129, SS8001, SS8002, SS8021 and SS8022 Series



3125, 3127, 3129 Series

3129-10
Pipe Away Adapter

Application

Designed especially for the protection of piping and shut-off valves where there is a possibility of trapping liquid LP-Gas or anhydrous ammonia. They may be installed in pipelines and hoses located between shut-off valves or in the side boss of RegO® shut-off valves.

Features

- Relief valve designed to automatically reseat firmly after discharge.
- Resilient seat disc provides a "bubble-tight" seal.
- Available in both brass and stainless steel.
- Available in configurations that permit direct attachment of vent piping when required.

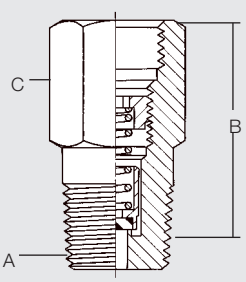
Materials

Body (3125, 3127, 3129) ..... Brass
Body (SS8001, SS8002, SS8021, SS8022)..... Stainless Steel
Spring ..... Stainless Steel
Seat Disc ..... Resilient Rubber

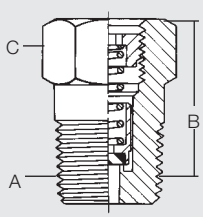
Ordering Information

Part Number	Start To Discharge Setting PSIG	Valve Body Material	A Container Connection M. NPT	B Height (Approx.)	C Wrench Hex Section	Accessories	
						Protective Cap	Pipeaway Adapter or Threads
SS8001G	250	Stainless Steel	1/4"	7/8"	11/16"	8001-54*	—
SS8002G			1/2"		7/8"	8022-54*	
SS8021G			1/4"	1 3/8"	11/16"	8001-54	1/4" NPSM Thrds
SS8022G			1/2"		7/8"	8002-54*	3/8" NPT Thrds
3127G		Brass	1/4"	1 31/32"		9103-54*	—
3129G			1/2"	2 19/32"	1 1/8"	3129-40P*	3129-10**
3127H	275		1/4"	1 31/32"	7/8"	9103-54*	—
3129H			1/2"	2 19/32"	1 1/8"	3129-40P*	3129-10**
3127P	300		1/4"	1 31/32"	7/8"	9103-54*	—
3129P			1/2"	2 19/32"	1 1/8"	3129-40P*	3129-10**
3127J	350		1/4"	1 31/32"	7/8"	9103-54*	—
3129J			1/2"	2 19/32"	1 1/8"	3129-40P*	3129-10**
SS8001J		Stainless Steel	1/4"	7/8"	11/16"	8001-54*	—
SS8002J			1/2"		7/8"	8002-54*	
SS8021J			1/4"	1 3/8"	11/16"	8001-54	1/4" NPSM Thrds
SS8022J			1/2"		7/8"	8002-54*	3/8" NPT Thrds
3127K	375	Brass	1/4"	1 31/32"		9103-54*	—
3129K			1/2"	2 19/32"	1 1/8"	3129-40P*	3129-10**
3125L	400		1/4"	1 9/16"	5/8"	3125-40P*	—
3127L				1 31/32"	7/8"	9103-54*	
3129L			1/2"	2 19/32"	1 1/8"	3129-40P*	3129-10**
SS8001L		Stainless Steel	1/4"	7/8"	11/16"	8001-54*	—
SS8002L			1/2"		7/8"	8002-54*	
SS8021L			1/4"	1 3/8"	11/16"	8001-54	1/4" NPSM Thrds
SS8022L			1/2"		7/8"	8002-54*	3/8" NPT Thrds
3127U	450	Brass	1/4"	1 31/32"		9103-54*	—
3129U			1/2"	2 19/32"	1 1/8"	3129-40P*	3129-10**
SS8001U		Stainless Steel	1/4"	7/8"	11/16"	8001-54*	—
SS8002U			1/2"		7/8"	8002-54*	
SS8021U			1/4"	1 3/8"	11/16"	8001-54	1/4" NPSM Thrds
SS8022U			1/2"		7/8"	8002-54*	3/8" NPT Thrds

* Included
** ½" F. NPT outlet connection.



SS8021, SS8022 Series



SS8001, SS8002 Series

DuoPort® Pressure Relief Valve Manifolds for Small Storage Containers

8542 Series

Application

Designed especially for use as a primary relief device on smaller stationary storage containers, with 2" NPT threaded couplings. These manifolds allow servicing or replacement of either of the two relief valves without evacuating the container or loss of service. The operating lever selectively closes off the entrance port to the relief valve being removed while the remaining valve provides protection for the container and its contents. The rating of each manifold is based on actual flow through the manifold and a single pressure relief valve, taking friction loss into account. It is not merely the rating of the relief valve alone.

Features

- Allows for relief valve removal and replacement on a periodic basis without shutting down and evacuating the container.
- Unique seat ring assemblies provide a smooth tubular section to preclude turbulence and assure more efficient flow capacity.
- Operating lever is only locked in the mid-position or in a position to seal either relief valve. Placement of the clapper disc in an intermediate position could restrict flow through one of the relief valves, causing it to chatter and destroy the resilient seat disc.
- A rubber plug with chain is provided to protect manifold outlet threads where the relief valve has been removed.
- "Pop-action" design insures maximum protection with only minimal product loss at moderately excessive pressures.
- Resilient relief valve seat disc provides "bubble-tight" seal.
- Relief valves are ASME rated for use with LP-Gas and anhydrous ammonia.

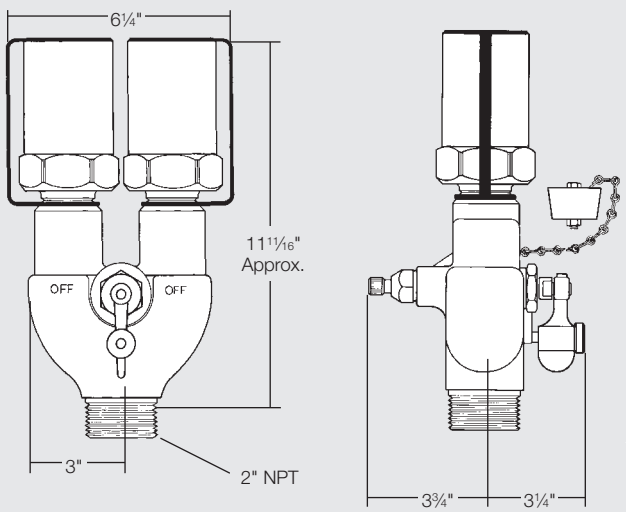
Manifold Materials

Body ..... Ductile Iron
Clapper Disc ..... Stainless Steel
Bleeder Valve ..... Stainless Steel
Seat Disc ..... Teflon
Packing ..... Polyethylene

Relief Valve Materials

Body ..... Forged Aluminum*
Spring Guide ..... Aluminum
Spring ..... Coated Steel
Seat Disc ..... Resilient Synthetic Rubber

*A special coating is applied to the inlet threads to minimize the possibility of electrolytic action.



Ordering Information

Part Number	Start To Discharge Setting PSIG	Application		Container Connection M. NPT	Relief Valve Included				Flow Capacity SCFM/Air**
		LP-Gas	NH_3		Quantity	Part Number	Inlet Connection M. NPT	Accessory Pipeaway Adapters	UL (At 120% of Set Pressure)
8542G	250	Yes	No	2"	2	3135MG	1¼"	3135-10*	5250 (1)
AA8542UA250		No	Yes			AA3135MUA250		AA3135-10*	5865 (1)
AA8542UA265	265					AA3135MUA265			5975 (1)

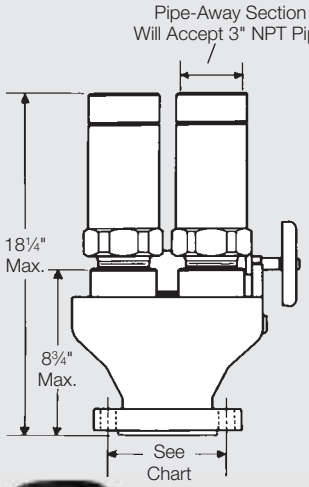
* 2" F. NPT outlet connection.

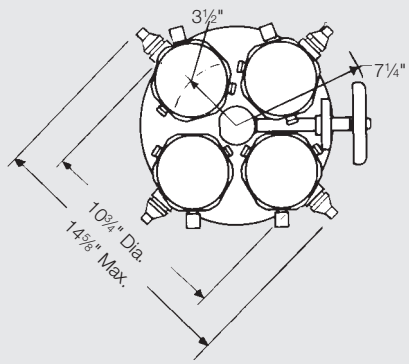
** Flow rating based on number of relief valves indicated in parenthesis ( ). Flow rates shown are for bare relief valves. Adapters and pipeaways will reduce flow rates as discussed in forewording information.

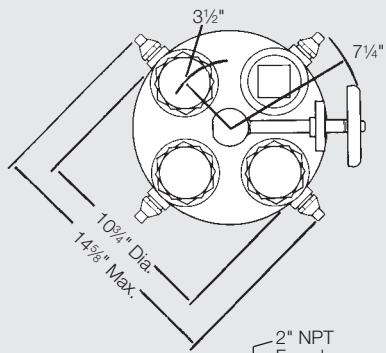
Multiport™ Pressure Relief Valve Manifold Assemblies for Large Storage Containers

A8560, A8570 and AA8570 Series

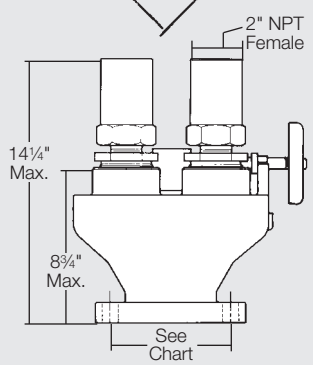
A8560
A8570







AA8570



Application

Designed especially for use as a primary relief device on large stationary pressurized storage containers with flanged openings. These manifolds incorporate an additional relief valve, not included in the flow rating, allowing for servicing or replacement of any one of the relief valves without evacuating the container. The handwheel on the manifold selectively closes off the entrance port to the relief valve being removed while the remaining relief valves provide protection for the container and its contents. All manifold flow ratings are based on flow through the relief valves after one has been removed for service or replacement.

Features

- Allows for relief valve removal and replacement on a periodic basis without shutting down and evacuating the container.
- "Pop-action" design of relief valves insures maximum protection with only minimal product loss at moderately excessive pressures.
- A rubber plug with chain is provided to protect manifold outlet threads where the relief valve has been removed.
- May be mounted directly to a welding neck flange or manhole cover plate. Requires no inlet piping.
- Relief valves designed to automatically reseat firmly after discharge.
- Resilient relief valve seat disc provides "bubble-tight" seal.
- Relief valves are ASME rated for use with LP-Gas and anhydrous ammonia.

Manifold Materials

Body ..... Ductile Iron
Resilient Parts ..... Teflon
Clapper Disc ..... Stainless Steel
Bleeder Valve ..... Stainless Steel

Relief Valve Materials

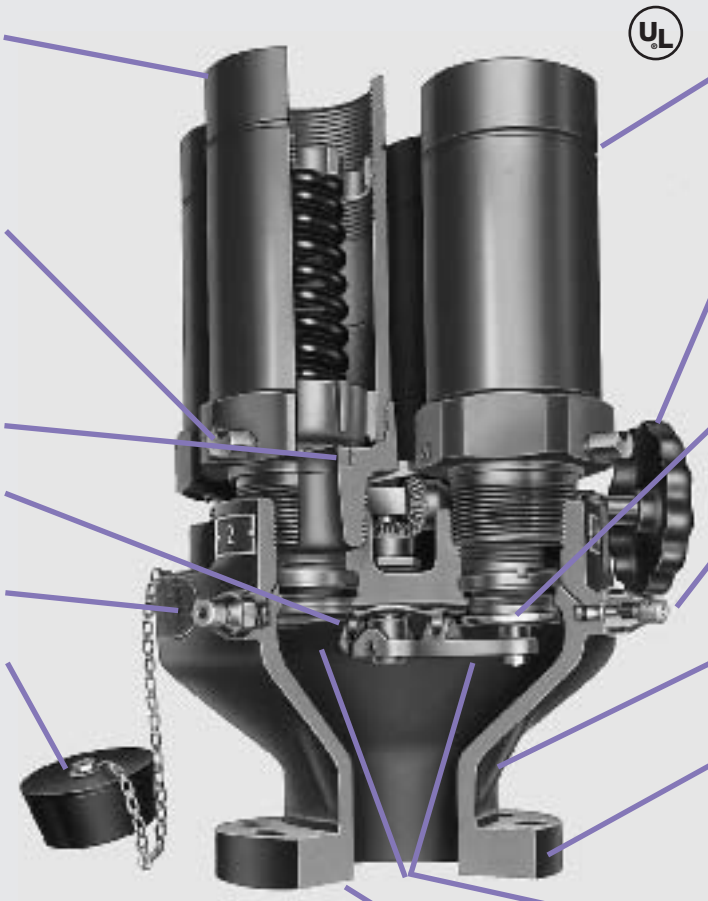
Description	A8563, A8564, A8573, A8574	AA8573
Body	Upper Cold Rolled Steel Lower Ductile Iron	Forged Aluminum*
Liner	Stainless Steel	None
Spring Guide	Stainless Steel	Aluminum
Spring	Coated Steel	
Seat Disc	Resilient Synthetic Rubber	

*A special coating is applied to the inlet threads to minimize possibility of electrolytic action.

Bolt Stud and Nut Assemblies

Part Number	Consists of	For Use With:	For Connection To:	Number Required
7560-55	1-Bolt Stud and Nut	All RegO Multiports	Modified 3"-300# and 4"-ASA 300# Welding Neck Flange	8
7560-56			Manhole Cover Plate	

Typical RegO Multiport™ Pressure Relief Valve Manifold



RegO® Pressure Relief Valve "Pop-action" insures maximum protection with only minimum fluid loss at moderately excessive pressures.

Weep Hole Deflector Port design of deflector prevents any ignited fluid ejected from the weep hole, while the relief valve is functioning, from impinging on the storage container or adjacent piping and equipment.

Resilient Seat Disc Assures positive shut-off.

Manifold Seat Ring Has integral teflon seat ring for positive shut-off of valve port by clapper disc.

Instruction Plate For relief valve replacement.

Plug Assembly Protects manifold outlet threads and keeps foreign material out of manifold when relief valve is removed for retest.

Safety Groove Excessive stress on vent piping attached to relief valve will break valve body at this point, leaving valve fully operative.

Handwheel Large, heavy duty hand-wheel has raised port numbers for selective positioning of clapper disc. Raised "arrow" below handwheel indicates exact position of clapper disc at all times.

Clapper Disc Shown in position to remove relief valve. Normally, clapper disc is positioned between any two relief valves.

Bleeder Valve Shown in "closed" position to bleed off pressure trapped between relief valve and clapper disc prior to removal of relief valve.

Ductile Iron Body Rugged. Has corrosion resistant lacquered finish.

Flanged Tank Connection Available with either a modified ASA 3" (4" port opening) or a 4" ASA 300# flanged connection. Mates respectively with modified ASA 3". 300 lb. flat face steel flange and ASA 4" 300 lb. 1/16" raised face steel flange.

Spacious Manifold Port Passages Large unobstructed throat assures minimum capacity loss. Manifold is bolted directly to storage container opening, eliminating any restrictions.

Gasket Johns-Manville Spirotallic flange gasket furnished with each manifold assembly.

Flange Dimensions

Manifold Series	Flange Size	Flange Drilling	Port Diameter	Flange Gasket
A8560	Modified 3" 300# (4" Port Dia.)	 (8) 7/8" Bolt Holes on a 6 5/8" Bolt Circle Diameter Flat Faced.	4"	3" 7564-48
A8570 AA8570	4" ASA 300#	 (8) 7/8" Bolt Holes on a 7 7/8" Bolt Circle Diameter 1/16" Raised Face.	4"	4" 7565-48

Ordering Information

Part Number	Start To Discharge Setting PSIG	Application		Container Flange Connection	Relief Valve				Flow Capacity SCFM/Air** At 120% of Set Pressure	
					Quantity	Part Number	Inlet Connection M. NPT	Accessories Pipeaway Adapters	UL Rating	ASME Rating
		LP-Gas	NH_3							
A8563G	250	Yes	Yes	3"-300#*	3	A3149MG	2 1/2"	****	18,500 (2)	Not Applicable
A8564G					4				27,750 (3)	
AA8573G		No		4"-300#	3	AA3135MUA250	1 1/4"	AA3135-10***	11,400 (2)	
A8573G		Yes				A3149MG	2 1/2"	****	18,500 (2)	
A8574G					4				27,750 (3)	
A8563AG	250	Yes	Yes	3"-300#*	3	A3149G	2 1/2"	****	Not Applicable	18,300 (2)
A8564AG					4					27,400 (3)
A8573AG				4"-300#	3					18,300 (2)
A8574AG					4					27,400 (3)

* For use with modified 300# ANSI flange with 4" port.

** Flow rating based on number of relief valves indicated in parenthesis ( ). Flow rates shown are for bare relief valves. Adapters and pipeaways will reduce flow rates as discussed in forewording information.

*** 2" F. NPT outlet connection.

**** Outlet 3 1/2-8N (F) thread, will accept 3" M. NPT pipe thread.

D

ECII® Warning Notice

The following warning information, Part Number 8545-500, is included with each shipment of pressure relief valves and relief valve manifolds to the first purchaser of the product from the factory.

This information is intended to be forwarded throughout the product distribution chain. Additional copies are available from Engineered Controls International, Inc. and Authorized Product Distributors.

DANGER **READ THIS FIRST** **WARNING**

LP-GAS IS EXTREMELY FLAMMABLE AND EXPLOSIVE

AVOID SERIOUS INJURY AND PROPERTY DAMAGE. IF YOU SEE, SMELL, OR HEAR ESCAPING GAS...*EVACUATE AREA IMMEDIATELY!* CALL YOUR LOCAL FIRE DEPARTMENT! DO NOT ATTEMPT TO REPAIR. DO NOT STORE IN BUILDING OR ENCLOSED AREA. DO NOT USE ON HOT AIR BALLOONS OR AIRCRAFT.

Make sure you are thoroughly trained before you attempt any pressure relief valve installation. Improper conditions or procedures can cause accidents resulting in property damage and personal injury.

Become thoroughly familiar with NPGA Safety Pamphlet 306-79 "LP-Gas Regulator and Valve Inspection & Maintenance" and ECII® Safety Warning WB-6 "Pressure Relief Valves." Follow their recommendations.

Know and understand NFPA Pamphlet 58 "Storage and Handling Liquified Petroleum Gases," which is the law in many states. This publication is available from NFPA, Batterymarch Park, Quincy, MA 02269. Following its requirements is essential in the safe use of LP-Gas. Section 15 states that "In the interest of safety, all persons employed in handling LP-Gases shall be trained in proper handling and operating procedures."

Make sure this valve is the proper one for this installation. Avoid misusing LP-Gas equipment. Flow rates in the charts are for bare relief valves. The addition of deflectors, pipeaway adapters and piping will restrict the flow. To properly protect any container, the total system flow must be sufficient to relieve pressure at the pressure setting of the relief valve in accordance with all applicable codes.

Use only ECII®/RegO® adapters on ECII®/RegO® relief valves. Adapters not designed specifically for piping away ECII®/RegO® relief valves, such as those with 90° turns or reduced internal diameters, will decrease flow dramatically. These should never be used as they can cause the relief valve to chatter and eventually destroy itself.

Apply thread joint compound compatible with LP-Gas on valve external threads only. Make sure compound never comes into contact with other parts of the valve.

Install valves by applying force to wrenching flats only.

Tighten pipe threads approximately 1 to 1½ turns beyond the hand-tight insertion point using a wrench which avoids damage to other valve parts.

Check for damage after valve installation. Check that the pressure relief valve is clean and free of foreign material. Make sure protective cap is properly in place.

Check that there are no leaks with a non-corrosive leak detection solution before filling with LP-Gas.

Purge container before filling with LP-Gas (refer to the ECII® LP-Gas Serviceman's Manual for recommended procedure).

In selecting a label for posting at the installation site, consider ECII® part number 901-400 along with your own, NPGA's and others.

Remember to instruct the owner/user/customer in safety matters concerning LP-Gas and this equipment.

Engineered Controls International, Inc., ECII® requests that this information be forwarded to your customers. Additional copies are available from ECII® and your Authorized Product Distrubutor.

ECII Engineered Controls International, Inc.

Printed in U.S.A. 04-0994-0686
Warning 8545-500

100 RegO Drive PO Box 247 Elon College, NC 27244 USA Phone (336) 449-7707 Fax (336) 449-6594 www.regoproducts.com

Cross Reference by Part Number

Catalog L-500

REGO® PRODUCTS

LP-GAS & ANHYDROUS AMMONIA EQUIPMENT

ECII® Engineered Controls International, Inc.

Section E

Globe and Angle Valves

Limited Warranty and Limitation of Liability

LIMITED WARRANTY
Engineered Controls International, Inc. warrants products and repair kits manufactured by it to be free from defects in materials and workmanship under normal use and service for a period of 12 months from the date of installation or operation or 18 months from the date of shipment from the factory, whichever is earlier. If within thirty days after buyer's discovery of what buyer believes is a defect, buyer notifies Engineered Controls International, Inc. thereof in writing, Engineered Controls International, Inc., at its option, and within forty-five days, will repair, replace F.O.B. point of manufacture, or refund the purchase price of that part or product found by it to be defective. Failure of buyer to give such written notice within thirty days shall be deemed an absolute and unconditional waiver of any and all claims of buyer arising out of such defect.

This warranty does not extend to any product or part that is not installed and used in accordance with Engineered Controls International, Inc.'s printed instructions, all applicable state and local regulations, and all applicable national standards, such as those promulgated by NFPA, DOT and ANSI. This warranty does not extend to any product or part that has been damaged by accident, misuse, abuse or neglect, nor does it extend to any product or part which has been modified, altered, or repaired in the field.

Except as expressly set forth above, and subject to the limitation of liability below, Engineered Controls International, Inc. makes NO OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, with respect to its products and parts, whether used alone or in combination with others. Engineered Controls International, Inc. disclaims all warranties not stated herein.

LIMITATION OF LIABILITY
Engineered Controls International, Inc.'s total liability for any and all losses and damages arising out of any cause whatsoever shall in no event exceed the purchase price of the products or parts in respect of which such cause arises, whether such cause be based on theories of contract, negligence, strict liability, tort or otherwise.

Engineered Controls International, Inc. shall not be liable for incidental, consequential or punitive damages or other losses. Engineered Controls International, Inc. shall not be liable for, and buyer assumes liability for, all personal injury and property damage connected with the handling, transportation, possession, further manufacture, other use or resale of products, whether used alone or in combination with any other products or material.

If Engineered Controls International, Inc. furnishes technical advice to buyer, whether or not at buyer's request, with respect to application, further manufacture or other use of the products and parts, Engineered Controls International, Inc. shall not be liable for such technical advice and buyer assumes all risks of such advice and the results thereof.

NOTE: Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. The warranty gives you specific legal rights, and you may have other rights that vary from State to State. The portions of this limited warranty and limitation of liability shall be considered severable and all portions which are not disallowed by applicable law shall remain in full force and effect.

WARNING
All Engineered Controls International, Inc. products are mechanical devices that will eventually become inoperative due to wear, corrosion and aging of components made of materials such as rubber, etc. The environment and conditions of use will determine the safe service life of these products. Periodic inspection and maintenance are essential to avoid serious injury and property damage.

Many Engineered Controls International, Inc. products are manufactured components which are incorporated by others on or in other products or systems used for storage, transport, transfer and otherwise for use of toxic, flammable and dangerous liquids and gases. Such substances must be handled by experienced and trained personnel only, using accepted governmental and industrial safety procedures.

NOTICE TO USERS OF PRODUCTS
The Limited Warranty stated above is a factory warranty to the first purchasers of Engineered Controls International, Inc. products. Since most users have purchased these products from Engineered Controls International, Inc. distributors, the user must within thirty (30) days after the user's discovery of what user believes is a defect, notify in writing the distributor from whom he purchased the product/parts. The distributor may or may not at the distributor's option choose to submit the product/parts to Engineered Controls International, Inc., pursuant to its Limited Warranty. Failure by buyer to give such written notice within thirty (30) days shall be deemed an absolute and unconditional waiver of buyer's claim for such defects. Acceptance of any alleged defective product/parts by Engineered Controls International, Inc.'s distributor for replacement or repairs under the terms of Engineered Controls International, Inc.'s Limited warranty in no way obligates Engineered Controls International, Inc. to the terms of the above warranty.

Because of a policy of continuous product improvement, Engineered Controls International, Inc. reserves the right to change designs, materials or specification without notice.

Foreword

This catalog describes a complete line of equipment available from Engineered Controls International, Inc. for use with LP-Gas and anhydrous ammonia (NH_3). The following points are important to know for proper use of the catalog:

1. *Illustrations and drawings of individual products are representative of "product groups" and all products within a product group are similar in construction.*
2. *Materials used for construction of products in this catalog are suitable for rated service pressure at temperatures of -40° F. to +165° F., unless otherwise specified.*
3. *Products in this catalog are only intended for use in LP-Gas and/or anhydrous ammonia service as follows.*
   - **a.** *"A" or "AA" prefix — Products with this prefix are suitable for NH_3 service (i.e., contain no brass parts).*
   - **b.** *"AA" prefix on relief valves — These valves are NOT suitable for use with LP-Gas service. These are of partial aluminum materials and are listed by Underwriters Laboratories (UL) for NH_3 service only.*
   - **c.** *All other products are suitable for use with LP-Gas service.*
   - **d.** *"SS" prefix—Hydrostatic relief valve with this prefix are suitable for NH_3 service (i.e., they have stainless steel materials).*

Caution

Do not use any product contained in this catalog with any service commodity other than LP-Gas or NH_3. If you have a need for use of another application, contact Engineered Controls International, Inc., 100 RegO Drive, Elon, NC 27244, (336) 449-7707 before proceeding.

Proper application, installation and maintenance of products in this catalog are essential. Users of these products should obtain further information if there are any doubts or questions.

Warning

All ECII® products are mechanical devices that will eventually become inoperative due to wear, corrosion and aging of components made of materials such as rubber. The environment and conditions of use will determine the safe service life of these products. Periodic inspection and maintenance are essential to avoid serious injury and property damage.

Many ECII® products are manufactured for storage, transport, transfer and use of toxic flammable and dangerous liquids and gases. Such substances should be handled by experienced and trained personnel only, using accepted governmental and industrial safety procedures. Never vent LP-Gas near any possible source of ignition.

Notice

Installation, usage, and maintenance of all ECII® products must be in compliance with all Engineered Controls International, Inc. instructions as well as requirements and provisions of NFPA #54, NFPA#58, DOT, ANSI, and all applicable federal, state, provincial and local standards, codes, regulations, and laws.

Inspection and maintenance on a periodic basis is essential. Installation and maintenance should be performed only by qualified personnel.

Be sure all instructions are read and understood before installation, operation and service.

Filters

ECII® LP-Gas equipment is designed to operate in a system free from contamination. A variety of in-line filters are commercially available to the LP-Gas industry for installation in domestic systems.
The use of an in-line filter should be considered when other system components may be unclean and the system contaminated by rust, scale, dirt, debris or other foreign material.

Contents

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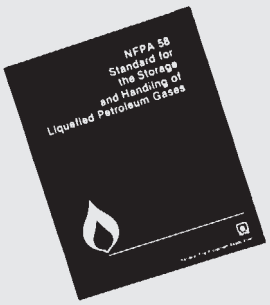
Safety Warning



Purpose

In its continuing quest for safety, Engineered Controls International, Inc. publishes a series of bulletins explaining the hazards associated with the use, misuse, and aging of LP-Gas valves and regulators. It is hoped that these factual bulletins will make clear to LP-Gas dealer managers and service personnel, that the utmost care and attention must be used in the installation, inspection, and maintenance of these products, or problems could occur which would result in injuries and property damage.

The National Fire Protection Association Pamphlet #58, "Storage and Handling Of Liquified Petroleum Gases" states in Section 1-6 that "In the interest of safety, all persons employed in handling LP-Gases shall be trained in proper handling and operating procedures." These "ECII® Safety Warnings" may be useful in training new employees and reminding older employees of hazards that can occur.

It is recommended that all employees be furnished with a copy of NPGA Safety Pamphlet 306-88 "LP-Gas Regulator and Valve Inspection and Maintenance."

Nature of Warnings

It is recognized that warnings should be as brief as possible, but factors involved in filler valve and filling valves failure are not simple. They need to be fully understood so that proper procedures and maintenance can be used to prevent accidents. If there is a simple warning, it would be:

Loosen filling valve from filler valve very slowly. If there is a leak, know procedure to follow.

This bulletin is not intended to be an exhaustive treatment of the subject of filler valves and certainly does not cover all safety practices that should be followed in the installation, operation and maintenance of LP-Gas systems, which include filler and filling valves.

Hose-End Filling Valves With ACME Connectors

Hose-end valves must never be dragged over the ground or dropped or banged into the truck when the hose is reeled in.

They could open accidentally or they could be damaged. Dragging will cause abnormal wear and eventual valve failure. Foreign material will lodge in the connector which can cause failure of the filler valve.

To prevent hazardous conditions, operators should follow this procedure on every filling application:

- Always wear gloves and eye protection.
- Check for foreign material in hose-end valve and the filler valve, and if present, remove with extreme care. If material cannot be safely removed, do not proceed with filling and replace valve.
- Make sure the ACME connector spins on easily by hand.
- If leak is noticed when filling is started, stop the operation and correct the leaking condition.
- After filling, bleed the gas trapped between the filler valve and hose-end valve by using the vent on the hose-end valve or by slightly loosening coupling nut to vent the gas before disconnecting.
  If gas does not stop venting, then filler valve or hose-end valve is leaking. Do not disconnect filling connector. This is a hazardous situation and your company procedure for handling this problem must be carefully followed.

Make sure your company has such a procedure.

Inspection of Filling Valves with Handwheel

- Valves should be inspected at least once a month to be sure the valve handle is tight and not damaged, that the stem is not bent and that there is no "play" in the threads in the bonnet. "Play" will normally not be noticed if the valve is under pressure.
- The ACME threads should be examined for wear, dents or nicks and the seating area should be clean and smooth.

Inspection of Quick Acting Filling Valves

- Valves should be inspected daily to make sure locking mechanism functions properly.
- The ACME threads should be examined for wear, dents or nicks and the seating area should be clean and smooth.
- The retaining ring on the filler connection should be examined to make sure it is properly holding the female ACME rotating nut or handle so as to keep the surface that seats on the filler valve gasket protected.
- If any problems are evident, valves should be immediately replaced or repaired.

Loosen slowly. If gas continues to vent, retighten ACME connector and follow company emergency procedures.

Larger Filler and Filling Valves

For 2¼" and 3¼" valves with ACME connections, use only the special wrenches designed for the purpose.

Do not use pipe wrenches or hammers to tighten the connections. All of the previous warnings about the smaller valves also apply here.

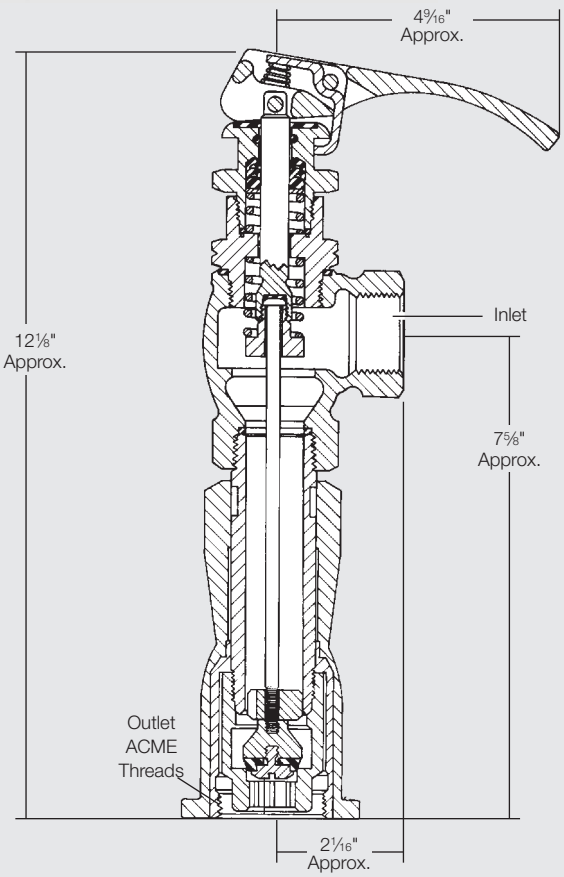
General Warning

All ECII® products are mechanical devices that will eventually become inoperative due to wear, contaminants, corrosion and aging components made of materials such as rubber and metal. The environment and conditions of use will determine the safe service life of these products. Periodic inspection and maintenance are essential. Because ECII® products have a long and proven record of quality and service, LP-Gas dealers may forget the hazards that can occur because a filler valve or a filling valve is used beyond its safe service life. Life of these valves is determined by the environment in which they "live." The LP-Gas dealer knows better than anyone what this environment is.

Note: There is a developing trend in state legislation and in proposed national legislation to make the owner of products responsible for replacing products before they reach the end of their safe useful life. LP-Gas dealers should be aware of the legislation which could affect them.

Quick-Acting Minimum Loss Hose-End Valves for Bobtail Delivery Trucks and Dispensing Stations

A7793 and A7797



Application

Designed to vastly reduce the amount of product vented when disconnecting bobtail delivery trucks, dispensing systems and anhydrous ammonia nurse tanks.

These valves provide instant, full-on flow at the flip of a handle. Shut-off is instant and the handle locks for added protection.

This "top of the line" hose-end valve is a fully contained unit that does not require additional filling adapters or connectors.

Features

- Minimizes product venting loss, when disconnecting, instantly by housing the seat disc at the bottom of the built-in ACME filling connector.
- Vents less than 1/500th of a gallon when disconnected.
- "V"-ring spring-loaded pressure seal design provides for dependable, leak-free operation. No packing to retighten or replace.
- Operator friendly. Contoured handle rotates a full 360° and large, easy to grip filling connector make the valve easy to handle.
- Self locking handle is operator opened and closed to prevent against accidental opening of the valve.

Materials

Body . . . . . Ductile Iron
"V"-Ring . . . . . Teflon
Stem . . . . . Stainless Steel
Seat Disc . . . . . Synthetic Elastomer
ACME Connector . . . . . Aluminum w/Steel Insert
Seal Housing . . . . . Stainless Steel
Lever . . . . . Stainless Steel
Bonnet . . . . . Cadmium Plated Steel

Ordering Information

Part Number	Inlet Connection (F. NPT)	Outlet Connection (F. ACME)	Locking Handle	Flow At 1 PSIG (Cv) Pressure Drop* (GPM/Propane)
A7793	3/4"	1 3/4"	Yes	16.0
A7797	1"			

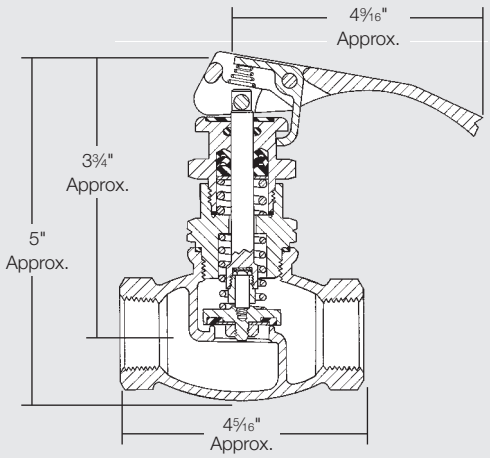
* To obtain approximate flow at other than 1 PSIG pressure drop, multiply flow in table by square root of pressure drop. Example: A7797 @ 9 PSIG = 16.0 x $\sqrt{9}$ = 48.0 GPM/propane. For NH_3 flow, multiply propane flow by .90.

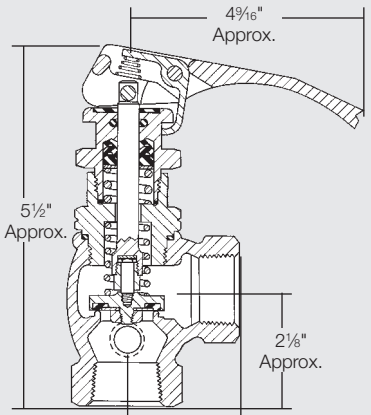
E

Quick-Acting Hose-End Valves for Bobtail Delivery Trucks and Dispensing Stations

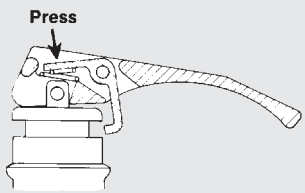
A7707L and A7708L

A7707L

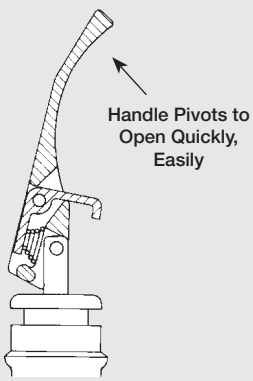




A7708L



Spring-Loaded Thumb-Button Opens Latch



Application

Designed especially for safe operator handling of LP-Gas in bobtail delivery truck, dispensing systems and anhydrous ammonia nurse tank service.

These valves provide instant, full-on flow at the flip of the handle and provide instant positive shut-off with a handle lock for added protection.

Features

- "V"-ring spring-loaded pressure stem seal provides for leak-proof operation. No packing to retighten or replace.
- Self locking handle is operator opened and closed to prevent against accidental opening of the valve.
- Large, contoured handle provides firm, comfortable grip.
- Full swivel handle rotates 360° so the valve can be operated from any angle.
- Built-in vent valve on the downstream side of the valve permits bleeding of trapped product to assure safe uncoupling.
- Can be used with a variety of RegO® filling adapter connectors.
- Swivel seat disc minimizes grinding on the body seat and assures longer service life.

Materials

Body ..... Ductile Iron
"V"-Rings ..... Teflon
Stem ..... Stainless Steel
Seat Disc ..... Synthetic Elastomer
Valve Lever ..... Stainless Steel
Seal Housing ..... Stainless Steel
Bonnet ..... Cadmium Plated Steel

Ordering Information

Part Number	Body Design	Inlet & Outlet Connection (F.NPT)	Locking Handle	Flow At 1 PSIG (Cv) Pressure Drop* (GPM/Propane)	Accessories		
					Filling Connectors*		
					Extended	Compact	
					Steel	Brass	Steel
A7707L	Globe	1"	Yes	18.0	A7575L4	3175A	A3175A
A7708L	Angle			22.0			

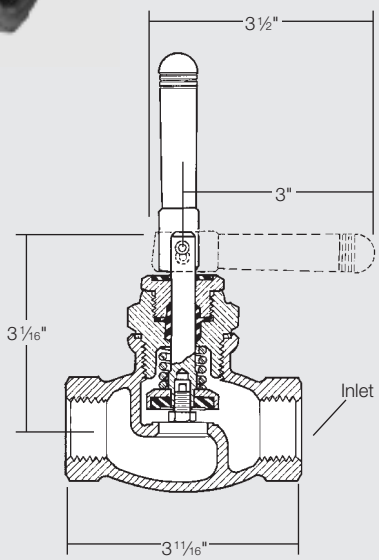
* To obtain approximate flow at other than 1 PSIG pressure drop, multiply flow in table by square root of pressure drop. Example: A7708L @ 9 PSIG = 22.0 x $\sqrt{9}$ = 66.0 GPM/propane. For NH_3 flow, multiply propane flow by .90.

* * See appropriate catalog section for additional information.

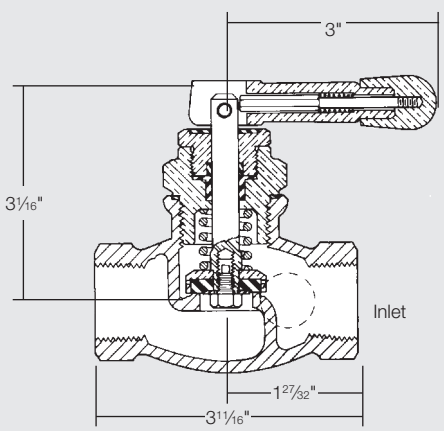
Quick-Acting Valves for Crop Driers and Charging Manifold Hoses

7554 Series

7554S



7554LV



Application

7554S Series valves provide instant shut-off and fast opening control on LP-Gas crop driers. They are also ideal for charging manifold hoses, stationary fuel transfer hoses and other applications requiring quick, positive shut-off. They are not for use with delivery truck hoses because the handle could snag on the ground and open the valve as the hose is reeled back to the truck.

7554L Series valves feature a locking handle device to help prevent accidental opening of the valve. It is ideal for all the same applications as the 7554S Series and may be used on delivery trucks as it incorporates the locking handle design.

Both valve series must be installed so that flow through the valve is opposite to that of a conventional globe valve. This allows the inlet flow to assist in closing the valve and prevents the valve from being opened by high pump pressures.

Features

- Quick-acting design speeds transfer operations, permitting rapid, one-handed opening and closing.
- Resilient seat disc provides positive shut-off.
- Flange seal stem design provides for leak-proof operation. No packing to retighten or replace.
- 7554L Series incorporates locking handle to prevent accidental opening of the valve.
- Vent valve installed on the downstream side of the valve permits bleeding of trapped product to assure safe uncoupling.
- Swivel seat disc minimizes grinding on the body seat and assures longer service life.

Materials

Body	Ductile Iron
Bonnet	Brass
Handle	Brass
Springs	Stainless Steel
Stem	Stainless Steel
Seat Disc	Resilient Synthetic Rubber
Flange Ring	Resilient Synthetic Rubber

Ordering Information

Part Number	Inlet & Outlet Connection (F.NPT)	Locking Handle	Flow At 1 PSIG (Cv) Pressure Drop* (GPM/Propane)
7554SAV	½"	No	7.3
7554LAV		Yes	
7554SV	¾"	No	11.5
7554LV		Yes	

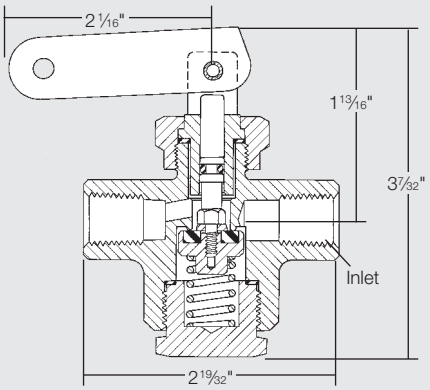
* To obtain approximate flow at other than 1 PSIG pressure drop, multiply flow in table by square root of pressure drop. Example: 7554LV @ 9 PSIG = 11.5 X $\sqrt{9}$ = 34.5 GPM/propane.

E

Quick-Acting Valves for Cylinder Charging Hoses

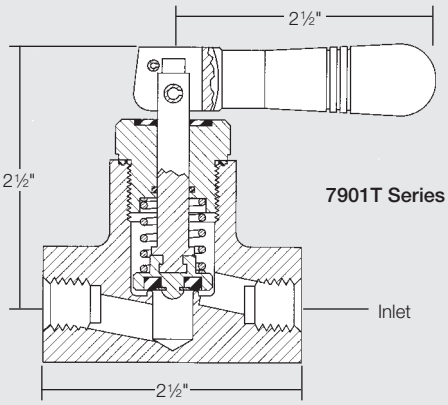
7053T, A7553A, and 7901T Series

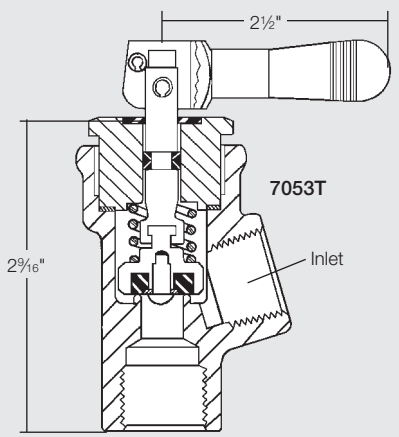
A7553A



7901TA

UL





Application

Designed primarily for use on cylinder charging hoses to provide fast, convenient shut-off and fast opening.

These valves must be installed so that flow through the valve is in the opposite direction to that of a conventional globe valve. This allows the inlet flow to assist in closing the valve, and even more important, helps prevent the valve from being forced open by high pump pressure.

Features

- Quick-acting design speeds transfer operations.
- Permits easy, one-handed opening and closing of the valve.
- O-ring stem seal design.
- Provides quick, positive shut-off.

Materials

Body (7053T, 7901)..... Forged Brass
Body (A7553)..... Ductile Iron
O-Ring..... Resilient Synthetic Rubber
Bonnet Assembly (7053T, 7901)..... Brass
Bonnet Assembly (A7553)..... Steel
Seat Disc..... Resilient Synthetic Rubber
Handle (7053T, 7901)..... Brass
Handle (A7553)..... Steel
Springs..... Stainless Steel

Ordering Information

Part Number	Inlet Connection (F.NPT)	Outlet Connection (F.NPT)	Body Material	Flow At 1 PSIG (CV) Pressure Drop* (GPM/Propane)
7901T	1/4"	1/4"	Brass	1.95
A7553A			Ductile Iron	
7901TA	3/8"	3/8"	Brass	
7901TB	1/2"	1/4"		
7901TC		1/2"		
7053T				

* To obtain approximate flow at other than 1 PSIG pressure drop, multiply flow in table by square root of pressure drop. Example: 7901T @ 9 PSIG = 1.95 x $\sqrt{9}$ = 5.85 GPM/propane. For NH3 flow, multiply propane flow by .90.

"V"-Ring Seal Globe and Angle Valves

General Information

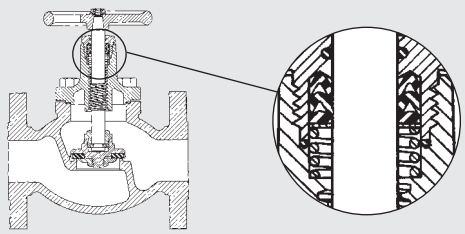
RegO® Globe and Angle Valves are designed and manufactured especially to meet the rigid requirements of the LP-Gas industry. The high quality construction and wide variety of sizes and styles also make them highly suited to many other industries such as anhydrous ammonia, chemical and petrochemical.

These ductile iron valves are available in both threaded and flanged connections. Threaded connections are available in ½" F. NPT to 3" F. NPT sizes. Flanged connections are available in 1½", 2" and 3" pipe sizes.

The ductile iron used in these valves has a 60,000 PSIG tensile strength which closely approaches that of steel castings. Its yield strength of 45,000 PSIG and elongation of 15% is also comparable to that of steel castings. These material features assure the ability of the valve body to withstand impact, wrenching stresses and thermal shock. This ductile iron conforms to ASTM specification A395.

RegO® globe and angle valves are designed for working pressures up to 400 PSIG WOG and for operating temperatures from -40° F. to +160° F.

"V"-Ring Stem Seal



The "V"-ring spring-loaded pressure seal used in these RegO® globe and angle valves is the most effective stem seal yet developed. It should not be confused with conventional valve stem packing where the seal is obtained by compressing the packing around the stem by means of a packing gland with resultant hard operation and frequent packing replacement.

The wax like surface of the teflon "V"-ring seal and consequent low friction assures leak-tight performance for an indefinite period where periodic retightening of the packing is not required and the seal provides extra long service life.

In the RegO® "V"-ring design, the seal is effected by the pressure expanding the "V"-shape of the seal, forcing it against the stem and bonnet surfaces to prevent leakage. The higher the pressure within the valve, the more effective the seal becomes. A spring loaded washer under the "V"-rings keeps them in an expanded position to assure an effective seal under low pressure conditions. A wiper ring, located above the seal, keeps the seal free from grit, and/or other foreign material that may hamper operation.

Installation and Operation Note

Containers and pipe lines should be thoroughly cleaned before globe and angle valves are installed. Large particles of solid foreign matter can permanently damage the seating surface in the valve body, causing the valve to leak. Use a minimum amount of a suitable pipe dope on the male connecting threads as excess amounts may fall off and be carried into the valve, causing damage to the seat or other operating parts.

It is totally unnecessary to use excess force in opening or closing RegO® valves. The type of seat disc material used and the general design of these valves permits them to be opened and closed easily. Proper valve operation insures unusually long life.

Wrenches must never be used to operate valves equipped with handwheels and designed for hand operation.

Downstream Accessory Boss

These RegO® valves incorporate a plugged ¼" F. NPT boss on the downstream side of the body for attaching either a hydrostatic relief valve or vent valve. Boss size on the 2" and 3" valves has been increased to allow a ¾" drilling for accommodation of a standard by-pass valve or jumper lines.

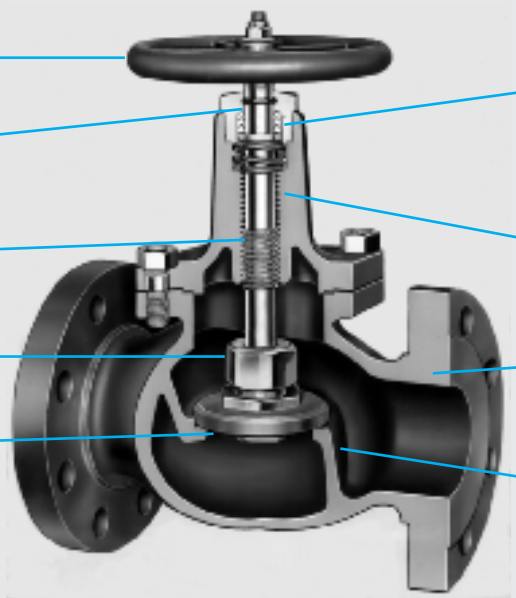
Hydrostatic Relief—When the design of the piping installation is such that liquid may be locked between two shut-off valves, a hydrostatic relief valve should be installed in the lines between the valves. The pressures which can develop due to temperature increase in a liquid-full line are tremendous and can easily damage the valves or piping unless a hydrostatic relief valve is installed.

Vent Valve—If the globe or angle valve is used as a shut-off valve on a loading hose, a vent valve should be installed in the downstream boss to allow liquid trapped beyond the shut-off valve to be vented before disconnecting the hose coupling.

Replace Gate Valves with Flanged Valves

Except for standard flange sizes, RegO® Flanged Globe and Angle Valves are smaller and lighter than contemporary valves, thus reducing price and shipping costs and making them far easier to install. RegO® face to face flange dimensions conform to gate valve dimensions, making replacement of most gate or plug valves with RegO® valves simple and easy.

General Features



Heavy Duty Handwheel provides easy operation.

O-Ring Wiper keeps sand and grit away from pressure seal and stem threads.

Heavy Duty ACME Threads for quick action and smooth operation.

Swivel Seat Holder promotes long life.

Synthetic Rubber Seat assures easy, positive shut-off.

Teflon "V"-Ring Spring-Loaded Pressure Seal for leak-proof operation. No packing to adjust or replace.

Stainless Steel Stem is centerless ground to provide a smooth sealing surface.

Rugged Ductile Iron Body won't crack or fracture from wrenching, dropping or hammer blows.

Circular Bridge is contoured to provide extra high capacity and low pressure drop.

E

"V"-Ring Seal Globe and Angle Valves for Bulk Storage Containers, Transports, Bobtails and Plant Piping

A7500 Series and TA7500 Series

Application

Specifically designed to assure positive shut-off and long, maintenance-free service life in liquid or vapor service on bulk storage containers, transports, bobtails, cylinder filling plants and plant piping.

The high quality construction and wide variety of sizes make them highly suited for use with LP-Gas, anhydrous ammonia and in the chemical and petrochemical industries.

Features

- "V"-ring spring-loaded pressure stem seal provides for leak-proof operation. No packing to retighten or replace.
- Circular bridge in the globe design and a dropped seat in the angle design achieve greater flow with less pressure drop.
- Swivel seat disc assembly minimizes the seat disc from grinding on the body seat. The seat disc stops rotating as soon as it touches the body seat. This feature provides for good seat alignment and assures long seat life.
- ¼" F. NPT plugged boss on the downstream side of the valve body allows attachment of a hydrostatic relief valve or vent valve.
- "V"-ring stem seal virtually eliminates hard to turn handles frequently encountered with packed type seals.
- Heavy duty rolled ACME stem threads provide quick action and long service life.

Materials

Body ..... Ductile Iron
Bonnet (7034, 7505-7508) ..... Steel
Bonnet (7509-7518) ..... Ductile Iron
Valve Stem ..... Stainless Steel
Wiper Ring ..... Synthetic Rubber
Seat Disc ..... See Ordering Chart
"V"-Rings ..... Teflon
Handwheel ..... Ductile Iron
Spring ..... Stainless Steel

A7517FP

A7518FP

A7514AP

A7517AP

TA7034

A7505AP

A7513AP

Ordering Information

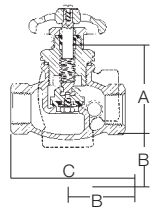
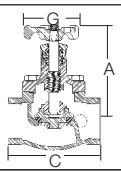
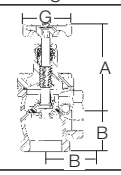
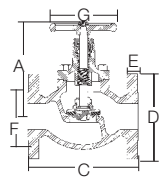
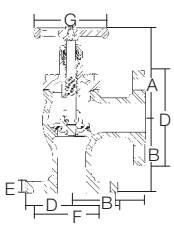
Part Number				Inlet and Outlet Connection	Port Diameter	Flow at 1 PSIG Pressure Drop (Cv) (GPM/Propane)***		Accessories	
Buna N Seat Discs		Teflon Seat Discs*						Hydrostatic Relief Valve	Vent Valve
Globe	Angle	Globe	Angle			Globe	Angle		
—	—	TA7034P	TA7034LP	½" F. NPT	¾"	10.0	14.8	SS8001U	TSS3169
A7505AP	A7506AP	TA7505AP	TA7506AP	¾" F. NPT		12.0	17.7		
A7507AP	A7508AP	TA7507AP	—	1" F. NPT	1"	17.8	22.0		
A7509BP	A7510BP	TA7509BP	TA7510BP	1¼" F. NPT	1¼"	36.5	54.0		
A7511AP	A7512AP	TA7511AP	TA7512AP	1½" F. NPT	1½"	43.0	55.5		
A7511FP	—	—		1½" Flange*		46.0	—		
A7513AP	A7514AP	TA7513AP		2" F. NPT	2"	75.0	88.5		
A7513FP	A7514FP	TA7513FP	TA7514FP	2" Flange*		78.0	133.0		
A7517AP	A7518AP	TA7517AP	TA7518AP	3" F. NPT	3⅛"	197.0	303.0		
A7517FP	A7518FP	TA7517FP	—	3" Flange*					

* Teflon seat discs on valves built to order.

* * 300# ANSI R.F. Flange.

* * * To obtain approximate flow at other than 1 PSIG pressure drop, multiply flow in chart by square root of pressure drop. Example: 7514FP @ 9 PSIG = 133 x $\sqrt{9}$ = 399 GPM/propane. For NH_3 flow, multiple propane flow by .90.

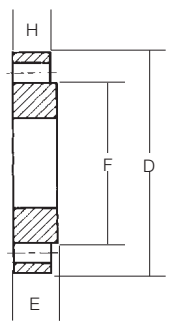
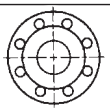
Globe and Angle Valve Dimensions

Drawing	Valve Number (A or TA Prefix)	Inlet & Outlet	Port Diameter	Dimensions						
				A	B	C	Flanges D	Flanges E	Flanges F	G
	**7034P**	½" F. NPT	¾"	4¾"	—	3 1⁄16"	—	—	—	—
	7505AP	¾" F. NPT								
	7507AP	1" F. NPT	1"			4 5⁄16"				
	7034LP	½" F. NPT	¾"		1¾"	—				
	7506AP	¾" F. NPT								
	7508AP	1" F. NPT	1"		2"					
	**7509BP**	1¼" F. NPT	1¼"	6¾"	—	4 7⁄8"	—	—	—	5¼"
	7511AP	1½" F. NPT	1½"	6 13⁄16"		5 3⁄16"				
	7513AP	2" F. NPT	2"	7 3⁄16"		5 7⁄8"				
	7517AP	3" F. NPT	3⅛"	13¼"		9"				9"
	**7510BP**	1¼" F. NPT	1¼"	6¾"	2¼"	—	—	—	—	5¼"
	7512AP	1½" F. NPT	1½"	6 13⁄16"	2 7⁄16"					
	7514AP	2" F. NPT	2"	7 3⁄16"	2 1⁄16"					
	7518AP	3" F. NPT	3⅛"	11¾"	4"					9"
	**7511FP**	1½" Flange	1½"	7 9⁄16"	—	7½"	6⅛"	¾"	2 7⁄8"	5¼"
	7513FP	2" Flange	2"	8 7⁄16"		8½"	6½"	13⁄16"	3 5⁄8"	
	7517FP	3" Flange	3⅛"	13¼"		11⅛"	8¼"	1⅛"	5"	9"
	**7514FP**	2" Flange	2"	7½"	5¼"	—	6½"	13⁄16"	3 5⁄8"	5¼"
	7518FP	3" Flange	3⅛"	11¾"	6¼"		8¼"	1⅛"	5"	9"

NOTE: Regarding 7505AP through 7510BP — the thread used for assembling the bonnet to the body of the valve is a left hand thread. We advise our customers to be cognizant of this assembly design in attempting to remove the bonnets of these valves in order to avoid serious damage to the valves.

Flange Dimensions

Dimensions and drilling conform to ANSI B16.5—1981: Class 300

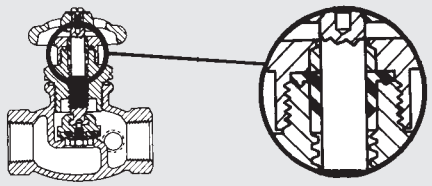
	Valve Number (A or TA Prefix)	Size	Flange Drilling	D	E	F	H
	**7511FP**	1½"*	 ⅞" Bolt Holes on a 4½" Bolt Circle Diameter	6⅛"	13⁄16"	2 7⁄8"	¾"
	7513FP	2"	 ¾" Bolt Holes on a 5" Bolt Circle Diameter	6½"	⅞"	3 5⁄8"	13⁄16"
	7514FP						
	7517FP	3"*	 ⅞" Bolt Holes on a 6⅝" Bolt Circle Diameter	8¼"	1⅛"	5"	1 1⁄16"
	7518FP						

* Reducing screwed flanges are available for reducing 1½" flange to 1 or 1¼" pipe thread and 3" flange to 2½" pipe thread. Order from your local piping supplier.

Flange Seal Globe and Angle Valves

General Information

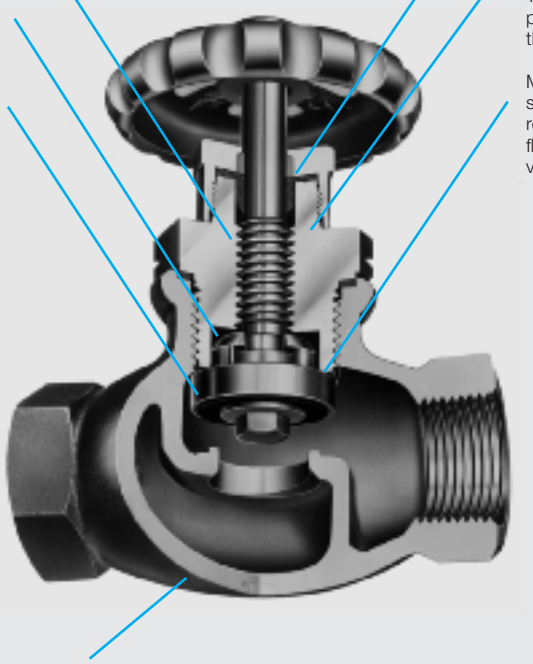
Globe and Angle Valves, incorporating the synthetic rubber flange seal design, operate on the same principle as the "V"-ring valves. Gas pressure in the valve is exerted against the synthetic rubber flange, forcing it tightly against the stem.



Leak-tight performance is assured and periodic adjustment is not required. The synthetic rubber construction provides smooth operating performance with long service life.
These valves all incorporate a plugged ¼" NPT side boss on the downstream side of the valve that can be equipped with a hydrostatic relief valve or vent valve.

> Please be familiar with the "Installation and Operation Note" and "Downstream Accessory Boss" section of the "V"-ring valve design general information before ordering these valves.

General Features



Application

Designed to assure positive shut-off and long maintenance-free service life in liquid or vapor service. Ideally suited for use on cylinder charging manifolds, truck filling hoses, bulk storage containers and plant piping.

The high quality construction and wide variety of sizes make them highly suited for use with LP-Gas, anhydrous ammonia and in the chemical and petrochemical industries.

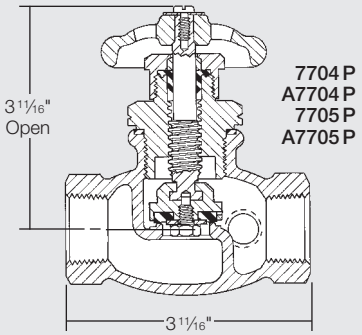
Features

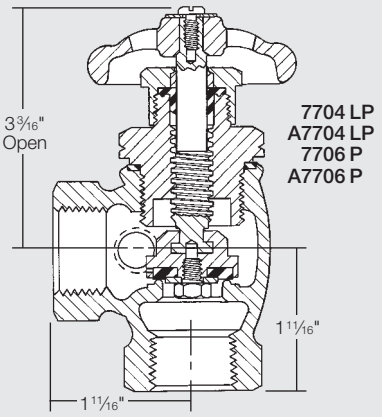
- Available with either a brass bonnet and bronze stem for LP-Gas service or a steel bonnet and stainless steel stem for combined LP-Gas and anhydrous ammonia service.
- Flange seal stem provides for leak-proof operation. No packing to retighten or replace.
- Metal-to-metal back seat permits replacement of the flange ring with the valve in service.
- Plugged ¼" NPT boss on downstream side of valve accommodates hydrostatic relief valve or vent valve.
- Swivel seat disc minimizes grinding on the body seat and assures longer service life.
- "Dropped seat" body design of the angle valve provides high flow capacity.

Materials

Body ..... Ductile Iron
Bonnet (7704, 05, 06)..... Brass
Bonnet (A7704, 05, 06) ..... Steel
Stem (7704, 05, 06)..... Bronze
Stem (A7704, 05, 06) ..... Stainless Steel
Flange Ring ..... Synthetic Rubber
Seat Disc..... Synthetic Rubber

A7704P





A7706 P

Ordering Information

Part Number		Inlet Connection (F.NPT)	Outlet Connection F. NPT	Flow At 1 PSIG Pressure Drop (Cv) (GPM/Propane)*		Accessories	
Globe	Angle			Globe	Angle	Hydrostatic Relief Valve	Vent Valve
7704P	7704LP	½"	½"	7.3	12.3	SS8001J or SS8001L	TSS3169
A7704P	A7704LP						
7705P	7706P	¾"	¾"	11.5	17.7		
A7705P	A7706P						

* To obtain approximate flow at other than 1 PSIG pressure drop, multiply flow in table by square root of pressure drop. Example: A7704LP @ 9 PSIG =12.3 x $\sqrt{9}$ = 36.9 GPM/propane. For NH_3 flow, multiply propane flow by .90.

E

Flange Seal Liquid Transfer Angle Valves for Bulk Storage Containers

7550 and 7551 Series

Application

Designed especially for liquid transfer of LP-Gas from consumer bulk storage containers when used with a Chek-Lok® or equipped with an integral excess flow valve. May also be used for vapor LP-Gas service.

In NH_3 applicator tanks they may be used as a vapor bleeder valve or as a liquid withdrawal valve when installed in a coupling with a dip pipe.

These liquid transfer valves are equipped with an integral excess flow valve for liquid transfer directly from the tank fitting, or without an integral excess flow for LP-Gas transfer through a Check-Lok®.

When equipped with an integral excess flow valve (7550PX), the valve should be mounted in a forged steel 3000 lb. half coupling. When mounted in a 1¼" x ¾" NPT reducing coupling, the ¾" female thread in this coupling must be full length — equivalent to a forged steel 3000 lb. half coupling.

The excess flow valve will not function properly if these specifications are not met. Refer to the Warning Bulletin in the Excess Flow Valve Section of this catalog.

7550P

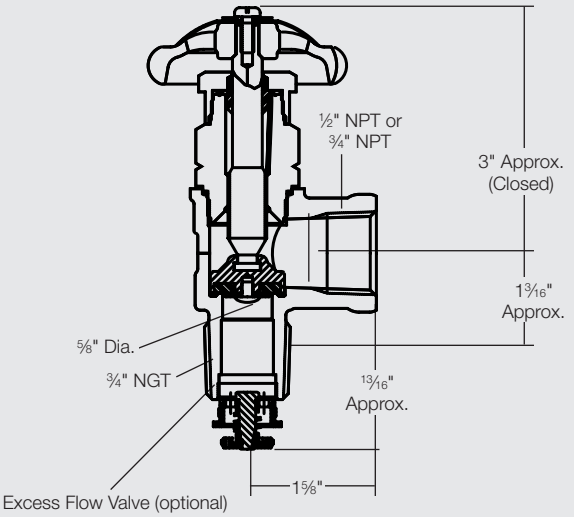
A7550PX

Features

- Flange seal stem design provides for leak-proof operation. No packing to retighten or replace.
- Large, unrestricted interior ports reduce pressure drop through the valve, increasing capacity and preventing cavitation.
- Resilient swivel seat disc assures longer seat life and easy, positive shut-off.
- Plugged ¼" NPT outlet boss accommodates hydrostatic relief valve or vent valve.
- Specifically designed for liquid transfer of LP-Gas with the Chek-Lok®.

Materials

Body	(7550, 51)	Brass
	(A7550, 51)	Cadmium Plated Ductile Iron
Bonnet	(7550, 51)	Brass
	(A7550, 51)	Steel
Stem	(7550, 51)	Bronze
	(A7550, 51)	Stainless Steel
Flange Ring		Synthetic Rubber
Seat Disc		Synthetic Rubber



Ordering Information

Part Number	Inlet Connection (M.NPT)	Outlet Connection (F.NPT)	Integral Excess Flow	Flow At 1PSIG (Cv) Pressure Drop* (GPM/Propane)	Excess Flow Approximate Closing Flow (GPM/Propane)**	Accessories***	
						Hydrostatic Relief Valve	Vent Valve
7550P	¾"	¾"	No	13.3	—	3127U	3165
A7550P						SS8001J	TSS3169
7550PX			Yes	—	16.0	3127U	3165
A7550PX						SS8001J	TSS3169
7551P		½"	No	8.9	—	3127U	3165
A7551P						SS8001J	TSS3169

* To obtain approximate flow at other than 1 PSIG pressure drop, multiply flow in table by square root of pressure drop. Example: 7550P @ 9 PSIG = 13.3 x $\sqrt{9}$ = 39.9 GPM/propane. For NH_3 flow, multiple propane flow by .90.

* * For NH_3 flow, multiply propane flow by .90.

* * * For complete information, refer to appropriate sections of this catalog.

Chek-Lok® Accessories***		
Chek-Lok® Number	Adapter Number	For use with:
7572FC	7572C-14	7550P, A7550P, 7551P, A7551P
7580FC		
7590U	7590U-10	7550P, A7550P, 7551P, A7551P
7591U		

TA7894P

Application

Designed especially for transfer of LP-Gas and anhydrous ammonia in railroad tank car service.

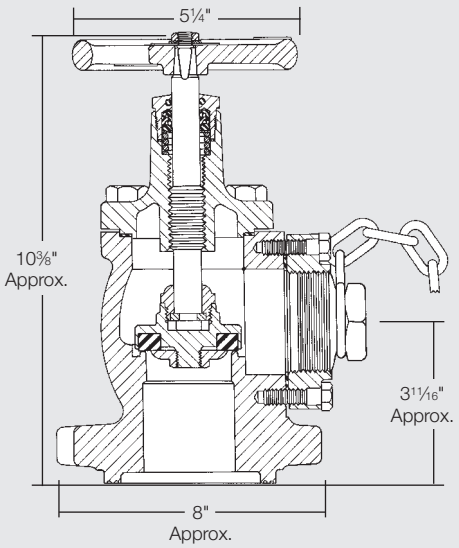
The combined heavyweight ductile iron castings and precision machining provide ruggedness and superior performance in working pressures up to 400 PSIG.

Features

- "V"-ring spring-loaded pressure seal design provides dependable, leak-free operation. No packing to retighten or replace.
- Wiper o-ring eliminates entrance of dirt and grit into stem area that can prohibit smooth operation.
- Heavy duty ACME stem threads give quick action and are hardened for long service life.
- Swivel seat reduces scoring of seat disc and provides positive shut-off.
- Full diameter seat provides greater flow capacity and low pressure drop.
- Plugged ¼" NPT boss on downstream side of valve accommodates vent valve or hydrostatic relief valve.
- Equipped with a malleable iron plug and chain installed in the valve outlet.

Materials

Body	Ductile Iron
"V"-Rings	Teflon
O-Ring	Synthetic Rubber
Stem	Stainless Steel
Bonnet	Ductile Iron
Seat Disc	Teflon
Handwheel	Cadmium Plated Ductile Iron



Ordering Information

Part Number	Inlet Connection	Outlet Connection (F.NPT)	Flow At 1 PSIG (Cv) Pressure Drop (GPM/Propane)	Accessories	
				Hydrostatic Relief Valve	Vent Valve
TA7894P	Tank Car Flange	2"	112	SS8001U	TSS3169

* To obtain approximate flow at other than 1 PSIG pressure drop, multiply flow in table by square root of pressure drop. Example: TA7894P @ 9 PSIG = 112 x $\sqrt{9}$ = 336 GPM/propane. For NH_3 flow, multiply propane flow by .90.

Multipurpose Valve for Filling of NH_3 Containers

A8016DBC

Application

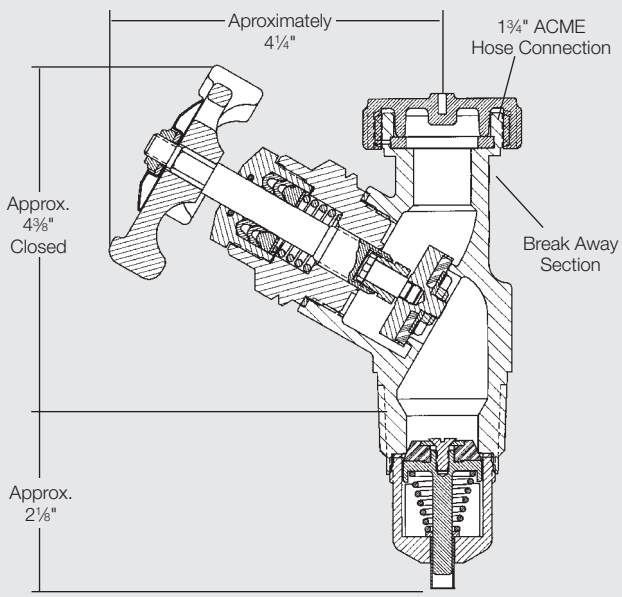
Designed specifically for use as a manual filler valve on anhydrous ammonia applicator tanks. This valve incorporates an integral back check valve.

Features

- Positive seating back check valve opens for maximum flow at minimum pressure drop when filling — regardless of the type of coupling in which the valve is installed.
- Back Check seat is fully contained in the tank coupling for maximum protection in the event of external damage to the valve.
- Resilient seat disc assembly is fully contained on three sides for bubble-tight shut-off and long service life.
- "V"-ring spring-loaded stem seal design requires no repacking or field adjustment.
- Specially machined break-away groove beneath ACME threads will shear-off with excessive pull on the hose and leave the valve body intact.
- Plugged ¼" NPT boss accommodates vent valve or hydrostatic relief valve.

Materials

Body . . . . . Ductile Iron
Bonnet . . . . . Steel
"V"-Rings . . . . . Teflon
Stem . . . . . Stainless Steel
Seat Disc . . . . . Resilient Synthetic Rubber
Back Check Valve . . . . . Stainless Steel, Steel, and Resilient Synthetic Rubber
Springs . . . . . Stainless Steel



Ordering Information

Part Number	Inlet Connection (M.NPT)	Filling Connection (M.ACME)	Filling Capacity At 20 PSIG Pressure Drop GPM/NH_3	Accessories	
				Hydrostatic Relief Valve	Vent Valve
A8016DBC	1¼"	1¾"	95	SS8001J	TSS3169

* Determined at 9.5 to 12 PSIG differential.
* * Determined at 100 PSIG inlet.

A8016DP

Application

Designed specifically for use as a manual valve or vapor equalizing valve on anhydrous ammonia applicator and nurse tanks.

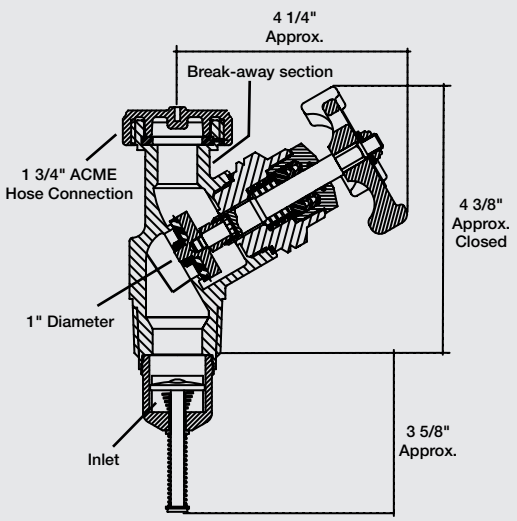
This valve incorporates an integral excess flow valve. When product is required, the valve must completely open and backseated to allow the excess flow valve to function properly as explained in the excess flow section of this catalog.

Features

- Positive-acting excess flow valve opens for maximum flow at minimum pressure drop when filling -- regardless of the type of coupling in which the valve is installed.
- Excess flow seat is fully contained in the tank coupling for maximum protection in the event of external damage to the valve.
- Resilient seat disc assembly is fully contained on three sides for bubble-tight shut-off and long service life.
- "V"-ring spring-loaded stem seal design requires no repacking or field adjustment.
- Specially machined break-away groove beneath ACME threads will shear-off with excessive pull on the hose and leave the valve body intact.
- Plugged ¼" NPT boss accommodates vent valve or hydrostatic relief valve.

Materials

Body	Ductile Iron
Bonnet	Steel
"V"-Rings	Teflon
Stem	Stainless Steel
Seat Disc	Resilient Synthetic Rubber
Excess Flow Valve	Stainless Steel--Steel Body
Springs	Stainless Steel



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Ordering Information

Part Number	Inlet Connection M. NPT	Filling Connection M. ACME	Filling Capacity at 20 PSIG Pressure Drop GPM/NH3	Approximate Excess Flow Closing Flows		Accessories	
				Liquid * GPM/NH3	Vapor ** CFH/NH3	Hydrostatic Relief Valve	Vent Valve
A8016DP	1 1/4"	1 3/4"	95	44	24,000	SS8001J	TSS3169

* Determined at 9.5 to 12 PSIG differential.

* * Determined at 100 PSIG inlet.

Multipurpose Valves for Liquid Withdrawal of LP-Gas and NH_3 Containers

A8017D & A8020D

Application

Designed especially for use as a high capacity liquid withdrawal valve on LP-Gas and anhydrous ammonia containers.

These valves incorporate an integral excess flow valve. When product is required, the valve must be completely open and backseated to allow the excess flow valve to function properly as explained in the excess flow valve section of this catalog.

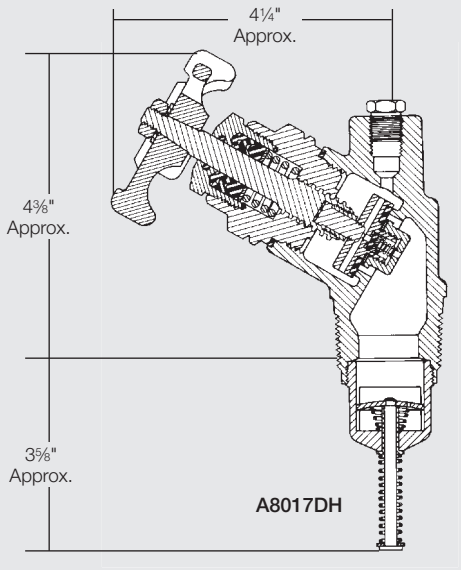
The A8017DH is equipped with a soft seated automatic differential back pressure check valve in the seat disc assembly. This allows any pressure build up in the liquid transfer line in excess of 10-15 psig above the container pressure to flow back into the container. The transfer hose is protected against excessive liquid or vapor pressure entrapment, which adds materially to the useful life of flexible hose. In addition to increasing hose service life, the equalizing valve adds substantially to the operating safety of liquid transfer systems.

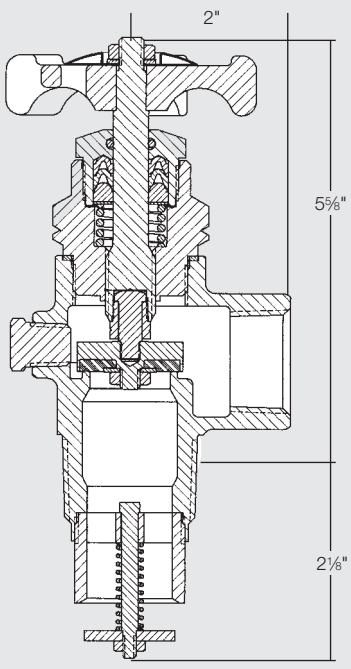
Features

- Positive-acting excess flow valve opens for maximum flow at minimum pressure drop when filling — regardless of the type of coupling in which the valve is installed.
- Excess flow seat is fully contained in the tank coupling for maximum protection in the event of external damage to the valve.
- Resilient seat disc assembly is fully contained on three sides for bubble-tight shut-off and long service life.
- "V"-ring spring loaded stem seal design requires no repacking or field adjustment.
- A8017DH has two plugged ¼" NPT ports, one on the top and the other on the side, accommodate either a vent valve or hydrostatic relief valve.
- A8020D has a alugged ¼" NPT port that accommodates vent valve, hydrostatic relief valve, or pressure gauge.
- A8017DH incorporates an automatic back check valve built into the shut-off valve, eliminating the need for a separate hydrostatic relief valve.

Materials

Body . . . . . Ductile Iron
Bonnet . . . . . Steel
Stem . . . . . Stainless Steel
Seat Disc . . . . . Synthetic Resilient Rubber
"V"-Rings . . . . . Teflon
Excess Flow Valve . . . . . Stainless Steel - Steel Body
Springs . . . . . Stainless Steel





Ordering Information

Part Number	Inlet Connection (M.NPT)	Outlet Connection (F.NPT)	Approximate Excess Flow Liquid Closing Flow** (GPM/Propane)	Accessories	
				Hydrostatic Relief Valve	Vent Valve
A8017DH*	1¼"	1"	49	Not Required	TSS3169
A8017DP			55	SS8001J	
A8017DLP		¾"	49		

* Built-in back pressure check valve incorporated into shut-off valve.
* * Determined at 11.5 to 13.5 PSIG differential for ¾" outlet and 9 to 12 PSIG differential for 1" outlet. For NH_3 flow, multiply by .90.

Part Number	Inlet Connection M. NPT	Outlet Connection F. NPT	Approximate Excess Flow Liquid Closing Flow*		Accessories	
			GPM/Propane	GPM/NH3	Hydrostatic Relief Valve	Vent Valve
A8020D	1¼"	1"	78	70	SS8001J	TSS3169

* Determined at 13 PSIG differential.

Multipurpose Valve for Filling and Liquid Transfer of NH_3 Containers

A8018DP

Application

Designed primarily for use as a combination filler and liquid withdrawal valve on three-opening applicator tanks or on nurse tanks.

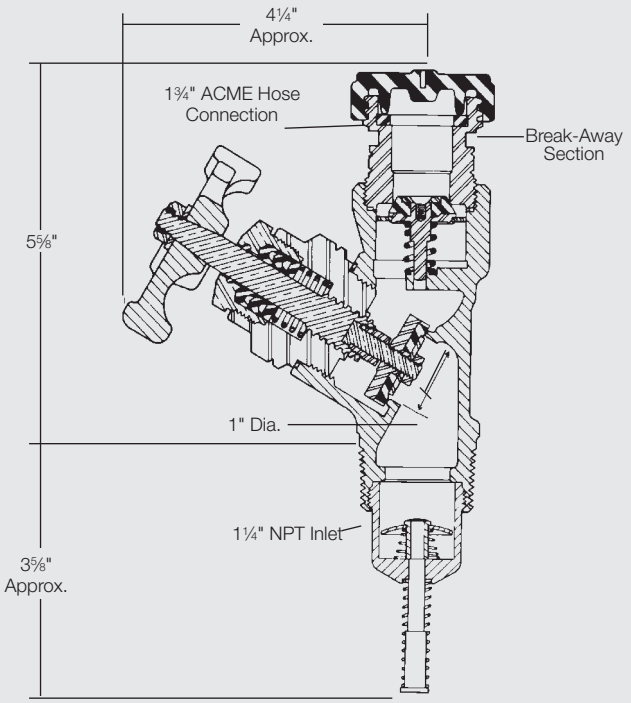
This valve incorporates an integral excess flow valve. When product is required, the valve must be completely open and backseated to allow the excess flow valve to function properly as explained in the excess flow valve section of this catalog.

Features

- Functions as both a filler valve and liquid transfer valve, in one unit.
- Positive acting excess flow valve opens for maximum flow at minimum pressure drop when filling — regardless of the type of coupling in which the valve is installed.
- Excess flow seat is fully contained in the tank coupling for maximum protection in the event of external damage to the valve.
- Specially machined break-away groove beneath ACME thread of filler valve will shear-off with excessive pull on the hose and leave the valve body intact.
- Triple guide filler valve check provides for dependable shut-off performance when filling ceases.
- Resilient seat disc assembly is fully contained on three sides for bubble-tight shut-off and long service life.
- "V"-ring spring loaded stem seal design requires no repacking or field adjustment.
- Plugged ¼" NPT boss accommodates vent valve or hydrostatic relief valve.

Materials

Body . . . . . Ductile Iron
Bonnet . . . . . Steel
Stem . . . . . Stainless Steel
Seat Discs . . . . . Synthetic Resilient Rubber
"V"-Rings . . . . . Teflon
Excess Flow Valve . . . . . Stainless Steel - Steel Body
Springs . . . . . Stainless Steel



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Ordering Information

Part Number	Inlet Connection (M.NPT)	Outlet Connection (F.NPT)	Filling Connection (M.ACME)	Filling Capacity At 20 PSIG Pressure Drop GPM/NH_3	Approximate Excess Flow Liquid Closing Flow GPM/NH_3*	Accessories	
						Hydrostatic Relief Valve	Vent Valve
A8018DP	1¼"	1"	1¾"	74	50	SS8001J	TSS3169

* Determined at 9 to 12 PSIG differential.

ECII® Warning Notice

The following warning information, Part Number 903-500, is included with each shipment of Quick-Acting and Tank Car Valves to the first purchaser of the product from the factory.

This information is intended to be forwarded throughout the product distribution chain. Additional copies are available from Engineered Controls International, Inc. and Authorized Product Distributors.

DANGER **READ THIS FIRST** **WARNING**

LP-GAS IS EXTREMELY FLAMMABLE AND EXPLOSIVE

AVOID SERIOUS INJURY AND PROPERTY DAMAGE. IF YOU SEE, SMELL, OR HEAR ESCAPING GAS . . . *EVACUATE AREA IMMEDIATELY!* CALL YOUR LOCAL FIRE DEPARTMENT! DO NOT ATTEMPT TO REPAIR. DO NOT STORE IN BUILDING OR ENCLOSED AREA. DO NOT USE ON HOT AIR BALLOONS OR AIRCRAFT.

Make sure you are thoroughly trained before you attempt any valve installation, maintenance, or repair. Improper conditions or procedures can cause accidents resulting in property damage and personal injury.

Become thoroughly familiar with NPGA Safety Pamphlet 306-79 "LP-Gas Regulator and Valve Inspection & Maintenance" and ECII® Safety Warnings WB-2 "LP-Gas Cylinder Valves", WB-3 "LP-Gas Excess Flow Valves", and WB-4 "LP-Gas Filler Valves and Hose End Filling Valves." Follow their recommendations.

Know and understand NFPA Pamphlet 58 "Storage and Handling Petroleum Gases," which is the law in many states. This publication is available from NFPA, Batterymarch Park, Quincy, MA 02269. Following its requirements is essential in the safe use of LP-Gas. Section 15 states that "In the interests of safety, all persons employed in handling LP-Gases shall be trained in proper handling and operating procedures."

Make sure this valve is the proper one for this installation. Avoid misusing LP-Gas equipment.

Apply thread joint compound compatible with LP-Gas on valve external threads only. Make sure compound never comes into contact with other parts of the valve.

Install valves by applying force to wrenching flats only.

Tighten pipe threads approximately 1 to 1½ turns beyond the hand-tight insertion point using a wrench which avoids damage to other valve parts.

Check for damage and proper operation after valve installation. Check that the valve is clean and free of foreign material.

Check container-valve connection with a non-corrosive leak detection solution before filling with LP-Gas.

Purge container before filling with LP-Gas (refer to the ECII® LP-Gas Serviceman's Manual for recommended procedure).

Test excess flow check valve for proper operation before placing into service. See NPGA Bulletin 113-78 for recommended procedure.

Check outlet connection make-up for leaks with a non-corrosive leak detection solution when placing into service.

If container is not being placed into service at the present time, insert a plug or cap onto the outlet connection.

In selecting a label for posting at the installation site, consider ECII® 903-400 or 901-400 along with your own, NPGA's and others.

Remember to instruct the owner/user/customer in safety matters concerning LP-Gas and this equipment.

Engineered Controls International, Inc., ECII® requests that this information be forwarded to your customers. Additional copies are available from ECII® and your Authorized Product Distributor.

ECII Engineered Controls International, Inc.

Printed in U.S.A. 05-0598-0686
Warning 903-500

100 RegO Drive PO Box 247 Elon College, NC 27244 USA Phone (336) 449-7707 Fax (336) 449-6594 www.regoproducts.com

Cross Reference by Part Number

Catalog L-500

REGO® PRODUCTS

LP-GAS & ANHYDROUS AMMONIA EQUIPMENT

ECII® Engineered Controls International, Inc.

Section F

Excess Flow, Check, Filler and Vapor Equalizing Valves

Limited Warranty and Limitation of Liability

LIMITED WARRANTY
Engineered Controls International, Inc. warrants products and repair kits manufactured by it to be free from defects in materials and workmanship under normal use and service for a period of 12 months from the date of installation or operation or 18 months from the date of shipment from the factory, whichever is earlier. If within thirty days after buyer's discovery of what buyer believes is a defect, buyer notifies Engineered Controls International, Inc. thereof in writing, Engineered Controls International, Inc., at its option, and within forty-five days, will repair, replace F.O.B. point of manufacture, or refund the purchase price of that part or product found by it to be defective. Failure of buyer to give such written notice within thirty days shall be deemed an absolute and unconditional waiver of any and all claims of buyer arising out of such defect.

This warranty does not extend to any product or part that is not installed and used in accordance with Engineered Controls International, Inc.'s printed instructions, all applicable state and local regulations, and all applicable national standards, such as those promulgated by NFPA, DOT and ANSI. This warranty does not extend to any product or part that has been damaged by accident, misuse, abuse or neglect, nor does it extend to any product or part which has been modified, altered, or repaired in the field.

Except as expressly set forth above, and subject to the limitation of liability below, Engineered Controls International, Inc. makes NO OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, with respect to its products and parts, whether used alone or in combination with others. Engineered Controls International, Inc. disclaims all warranties not stated herein.

LIMITATION OF LIABILITY
Engineered Controls International, Inc.'s total liability for any and all losses and damages arising out of any cause whatsoever shall in no event exceed the purchase price of the products or parts in respect of which such cause arises, whether such cause be based on theories of contract, negligence, strict liability, tort or otherwise.

Engineered Controls International, Inc. shall not be liable for incidental, consequential or punitive damages or other losses. Engineered Controls International, Inc. shall not be liable for, and buyer assumes liability for, all personal injury and property damage connected with the handling, transportation, possession, further manufacture, other use or resale of products, whether used alone or in combination with any other products or material.

If Engineered Controls International, Inc. furnishes technical advice to buyer, whether or not at buyer's request, with respect to application, further manufacture or other use of the products and parts, Engineered Controls International, Inc. shall not be liable for such technical advice and buyer assumes all risks of such advice and the results thereof.

NOTE: Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. The warranty gives you specific legal rights, and you may have other rights that vary from State to State. The portions of this limited warranty and limitation of liability shall be considered severable and all portions which are not disallowed by applicable law shall remain in full force and effect.

WARNING
All Engineered Controls International, Inc. products are mechanical devices that will eventually become inoperative due to wear, corrosion and aging of components made of materials such as rubber, etc. The environment and conditions of use will determine the safe service life of these products. Periodic inspection and maintenance are essential to avoid serious injury and property damage.

Many Engineered Controls International, Inc. products are manufactured components which are incorporated by others on or in other products or systems used for storage, transport, transfer and otherwise for use of toxic, flammable and dangerous liquids and gases. Such substances must be handled by experienced and trained personnel only, using accepted governmental and industrial safety procedures.

NOTICE TO USERS OF PRODUCTS
The Limited Warranty stated above is a factory warranty to the first purchasers of Engineered Controls International, Inc. products. Since most users have purchased these products from Engineered Controls International, Inc. distributors, the user must within thirty (30) days after the user's discovery of what user believes is a defect, notify in writing the distributor from whom he purchased the product/parts. The distributor may or may not at the distributor's option choose to submit the product/parts to Engineered Controls International, Inc., pursuant to its Limited Warranty. Failure by buyer to give such written notice within thirty (30) days shall be deemed an absolute and unconditional waiver of buyer's claim for such defects. Acceptance of any alleged defective product/parts by Engineered Controls International, Inc.'s distributor for replacement or repairs under the terms of Engineered Controls International, Inc.'s Limited warranty in no way obligates Engineered Controls International, Inc. to the terms of the above warranty.

Because of a policy of continuous product improvement, Engineered Controls International, Inc. reserves the right to change designs, materials or specification without notice.

Foreword

This catalog describes a complete line of equipment available from Engineered Controls International, Inc. for use with LP-Gas and anhydrous ammonia (NH_3). The following points are important to know for proper use of the catalog:

1. *Illustrations and drawings of individual products are representative of "product groups" and all products within a product group are similar in construction.*
2. *Materials used for construction of products in this catalog are suitable for rated service pressure at temperatures of -40° F. to +165° F., unless otherwise specified.*
3. *Products in this catalog are only intended for use in LP-Gas and/or anhydrous ammonia service as follows.*
   - **a.** *"A" or "AA" prefix — Products with this prefix are suitable for NH_3 service (i.e., contain no brass parts).*
   - **b.** *"AA" prefix on relief valves — These valves are NOT suitable for use with LP-Gas service. These are of partial aluminum materials and are listed by Underwriters Laboratories (UL) for NH_3 service only.*
   - **c.** *All other products are suitable for use with LP-Gas service.*
   - **d.** *"SS" prefix—Hydrostatic relief valve with this prefix are suitable for NH_3 service (i.e., they have stainless steel materials).*

Caution

Do not use any product contained in this catalog with any service commodity other than LP-Gas or NH_3. If you have a need for use of another application, contact Engineered Controls International, Inc., 100 RegO Drive, Elon, NC 27244, (336) 449-7707 before proceeding.

Proper application, installation and maintenance of products in this catalog are essential. Users of these products should obtain further information if there are any doubts or questions.

Warning

All ECII® products are mechanical devices that will eventually become inoperative due to wear, corrosion and aging of components made of materials such as rubber. The environment and conditions of use will determine the safe service life of these products. Periodic inspection and maintenance are essential to avoid serious injury and property damage.

Many ECII® products are manufactured for storage, transport, transfer and use of toxic flammable and dangerous liquids and gases. Such substances should be handled by experienced and trained personnel only, using accepted governmental and industrial safety procedures. Never vent LP-Gas near any possible source of ignition.

Notice

Installation, usage, and maintenance of all ECII® products must be in compliance with all Engineered Controls International, Inc. instructions as well as requirements and provisions of NFPA #54, NFPA#58, DOT, ANSI, and all applicable federal, state, provincial and local standards, codes, regulations, and laws.

Inspection and maintenance on a periodic basis is essential. Installation and maintenance should be performed only by qualified personnel.

Be sure all instructions are read and understood before installation, operation and service.

Filters

ECII® LP-Gas equipment is designed to operate in a system free from contamination. A variety of in-line filters are commercially available to the LP-Gas industry for installation in domestic systems.
The use of an in-line filter should be considered when other system components may be unclean and the system contaminated by rust, scale, dirt, debris or other foreign material.

Contents

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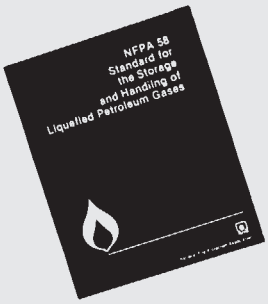
LP-Gas Excess Flow Valves

Safety Warning



Purpose

In its continuing quest for safety, Engineered Controls International, Inc. publishes a series of bulletins explaining the hazards associated with the use, misuse, and aging of LP-Gas valves and regulators. It is hoped that these factual bulletins will make clear to LP-Gas dealer managers and service personnel, that the utmost care and attention must be used in the installation, inspection, and maintenance of these products, or problems could occur which would result in injuries and property damage.

The National Fire Protection Association Pamphlet #58, "Storage and Handling Of Liquefied Petroleum Gases" states in Section 1-6 that "In the interest of safety, all persons employed in handling LP-Gases shall be trained in proper handling and operating procedures." These "ECII® Safety Warnings" may be useful in training new employees and reminding older employees of hazards that can occur.

It is recommended that all employees be furnished with a copy of NPGA Safety Pamphlet 306-88 "LP-Gas Regulator and Valve Inspection and Maintenance."

Nature of Warnings

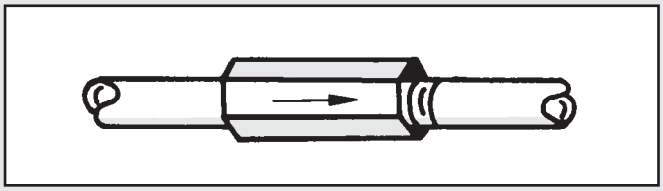
It is recognized that warnings should be as brief as possible, but the factors involved in excess flow valve failures to perform are not simple. They need to be fully understood. If there is a simple warning, it would be:

Make sure that the excess flow valve really closes when the flow exceeds normal transfer flow.

This bulletin is not intended to be an exhaustive treatment of excess flow valves, and certainly does not cover all safety practices that should be followed in installation, operation and maintenance of LP-Gas systems which include excess flow valves.

Selection and Installation

The selection of a given closing rating of an excess flow valve involves an analysis of the complete piping system and is beyond the scope of this bulletin.



It is sufficient to say that an excess flow valve must be installed in the correct direction and will close only if the flow of liquid or vapor exceeds its designed closing rating. Many valves have been installed with closing ratings considerably higher than any flow that could be obtained by a downstream rupture in piping or hoses and thus give none of the protection for which they are intended.

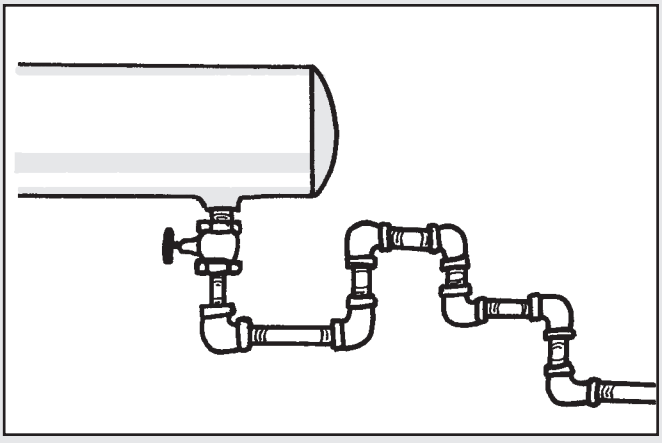
Engineered Controls International, Inc. provides excess flow valves with a number of closing ratings. Engineered Controls International, Inc. obviously can take no responsibility for the proper selection or correct installation of any valve.

Excess flow valves do not provide complete shut-off because there is a bleed at the check to permit pressure equalization.

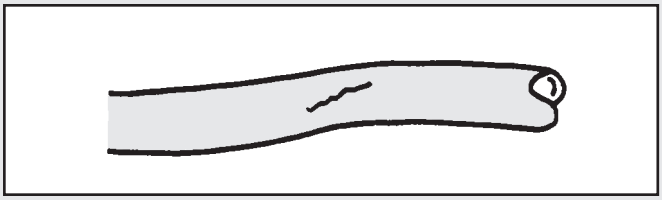
Causes of Failure to Close

Installers, LP-Gas plant managers and service personnel should be aware that the excess flow valves may not close if these conditions are present.

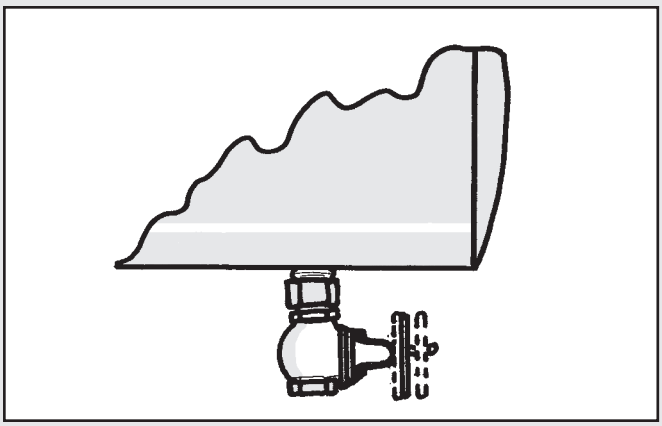
1. **The piping system restrictions (due to pipe length, branches, reduction in pipe size or number of other valves) decrease the flow rate to less than the valve's closing flow.**



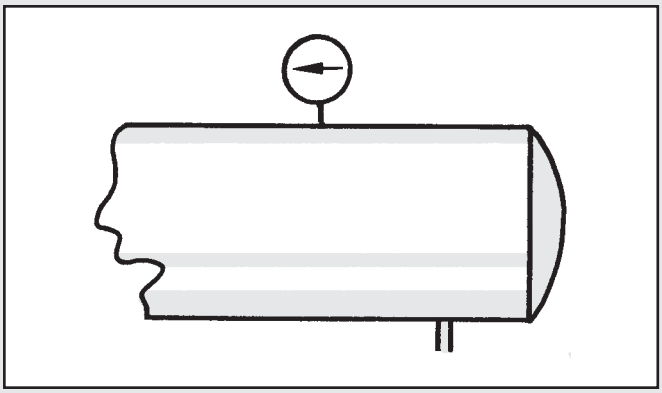
2. **The break or damage to the downstream line is not large enough to allow enough flow to close the valve.**



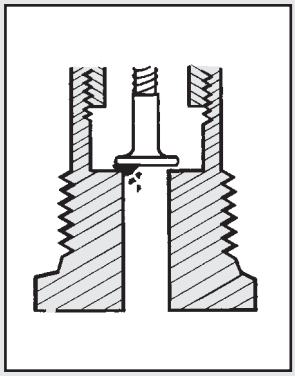
3. **A shut-off valve in the line is only partially open and will not allow enough flow to close the excess flow valve.**



4. **LP-Gas pressure upstream of the excess flow valve, particularly due to low temperature, is not high enough to produce a closing flow rate.**



5. **Foreign matter (such as welding slag, scale or sludge) is lodged in the valve and prevents closing.**



Because of these limitations, it is good industry practice to NOT rely entirely on excess flow valves for protection. Installation of emergency shut-off valves with remote controls is recommended in addition to excess flow valves.

Testing

The National Propane Gas Association Safety Bulletin #113-78 states:

> "In order to test an excess flow valve in a piping system, the flow through the valve must be made to exceed the valve's closing rating. This testing should only be attempted by trained personnel familiar with the process. If no one at the facility has experience in proper testing, outside expert help should be obtained. The exact procedure used may vary with the installation, advisability of gas discharge and availability of equipment.

In general, most testing makes use of the fact that excess flow valves are "surge sensitive" and will close quicker under a sudden flow surge than under steady flow. A sufficient surge can often be created by using a quick open/close valve to control sudden, momentary flow into a tank or piping section containing very low pressure. An audible click from the excess flow valve (and corresponding stoppage of flow) indicates its closure.

> A test involving venting gas to the atmosphere is hazardous and may be impractical, or illegal.

Any test of any excess flow valve will not prove that the valve will close in an emergency situation, due to reasons cited before. This test will only check the valve's condition, and the flow rate sizing for those test conditions."

General Warning

All ECII® products are mechanical devices that will eventually become inoperative due to wear, contaminants, corrosion and aging of components made of materials such as metal and rubber.

The environment and conditions of use will determine the safe service life of these products. Periodic testing at least once a year when tank pressures are low and maintenance, as required, are essential.

Because ECII® products have a long and proven record of quality and service, LP-Gas dealers may forget the hazards that can occur because an excess flow valve is used beyond its safe service life. Life of an excess flow valve is determined by the environment in which it "lives". The LP-Gas dealer knows better than anyone what this environment is.

NOTE: There is a developing trend in state legislation and in proposed national legislation to make the owners of products responsible for replacing products before they reach the end of their safe useful life. LP-Gas dealers should be aware of legislation which could effect them.

Troubleshooting Excess Flow Valve Installations

Periodical Inspections for Excess Flow Valves

> Excess flow valves should be tested and proven at the time of installation and at periodic intervals not to exceed one year. CAUTION: Testing an excess flow valve in the summer when tank pressures are high will not prove that the same valve will also function under low pressure conditions in the winter. Once a year testing should be conducted during the winter.

The test should include a simulated break in the line by the quick opening of a shut-off valve at the farthest point in the piping that the excess flow valve is intended to protect. If the excess flow valve closes under these conditions, it is reasonable to assume that it will close in the event of accidental breakage (clean break) of the piping at any point closer to the excess flow valve.

The National Propane Gas Association Safety Bulletin Number 113-78 states:

> In order to test an excess flow valve in a piping system, the flow through the valve must be made to exceed the valve's closing rating. This testing should only be attempted by trained personnel familiar with the process. If no one at the facility has experience in proper testing, outside expert help should be obtained. The exact procedure used may vary with the installation, advisability of gas discharge and availability of equipment.

In general, most testing makes use of the fact that excess flow valves are "surge sensitive" and will close quicker under sudden flow surge than under steady flow. A sufficient surge can often be created by using a quick open/close valve to control sudden, momentary flow into a tank or piping section containing very low pressure. An audible click from the excess flow valve (and corresponding stoppage of flow) indicates its closure.

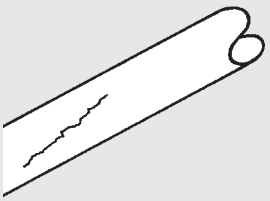
> A test involving venting gas to the atmosphere is hazardous and may be impractical or illegal.

Any test of any excess flow valve will not prove that the valve will close in an emergency situation, due to reasons cited before. This test will only check the valve's condition and the flow rate sizing for those test conditions.

What prevents excess flow valves from closing when the line breaks?

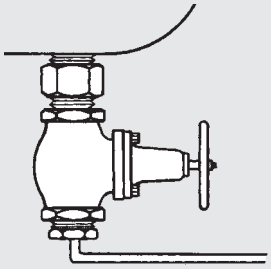
For one or a combination of the following reasons, excess flow valves have been prevented from closing in emergencies:

1. Not a Clean Break



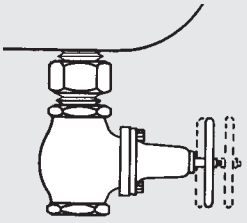
Hoses with a split or tear, and pipe lines not completely severed may be emitting LP-Gas in an amount insufficient to cause an "excess" flow. The amount of LP-Gas which can escape through such breaks may be even less than the flow during normal transfer service and under these conditions the excess flow valve could not be expected to close.

2. Line Restriction Too Great



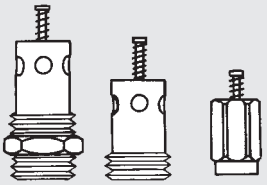
An excess flow valve installed in a tank outlet will not close if the line beyond it is reduced or if the flow is otherwise restricted by too many fittings or too long a run because the line is incapable of passing the amount of LP-Gas necessary to create an "excess" flow. This condition should be corrected when testing a system by simulating a break at the farthest possible point and replacing any restrictive hose, pipe or fittings.

3. Improper Operating Practice



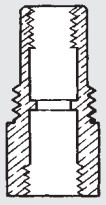
A restriction can also be imposed upon the excess flow valve by an improperly opened valve at the tank outlet. The shut-off valve should be either fully opened or fully closed. If "throttled," the valve could reduce the amount of LP-Gas passing through the excess flow valve in a sufficient amount to keep it from closing. Throttling operations should not be performed in the lines being protected by excess flow valves.

4. Improper Selection



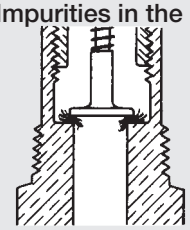
The many types of excess flow valves available are designed for specific jobs. The excess flow valve selected should remain open during normal flow but close at "excess" flow. An inspection which simulates a line break prior to start-up operations will determine if the proper valve has been selected.

5. Tampering with Excess Flow Valves



Sometimes an operator, annoyed with frequent closures of an excess flow valve with too low a rating, has mutilated the valve and forgotten to replace it with a properly rated excess flow valve. A pre-test of the system would reveal this and allow the excess flow valve to be replaced.

6. Impurities in the Line



Dirt, weld slag, broken drill taps, and various other foreign objects have been found jammed between the valve disc and valve seat to prevent excess flow valves from closing. A pre-test of the system would also discover this.

Excess flow check valves have been of help in limiting gas loss in many incidents involving breakage of hoses and transfer piping. Thus, they do provide a useful safety function in LP-Gas systems. However, there have also been transfer system accidents where excess flow valves have been ineffective in controlling gas loss due to a variety of conditions and to the inherent limitations of these valves. This bulletin explains what protection excess flow valves can offer, points out conditions which can interfere with that protection, and offers suggestions for effective excess flow valve installation.

An excess flow valve is a protective device to help control the discharge of product in the event of complete breakage of pipe lines or hose rupture. However, an excess flow valve can only offer limited protection from gas discharge, because it will only close under those conditions which cause the flow through the valve to exceed its rated closing flow, and even when closed it necessarily allows some "bleed" past the valve.

An excess flow valve is not designed to close and thus may not provide protection, if any of the following conditions are present:

1. The piping system restrictions (due to pipe length, branches, reduction in pipe size, or number of other valves) decrease the flow rate to less than the valve's closing flow. (Valve should be selected by closing flow rating — not just by pipe size).
2. The break or damage to the downstream line is not large enough to allow enough flow to close the valve.
3. A shut-off valve in the line is only partially open and will not allow enough flow to close the excess flow valve.
4. LP-Gas pressure upstream of the excess flow valve, particularly due to low temperature, is not high enough to produce a closing flow rate.
5. Foreign matter (such as welding slag) is lodged in the valve and prevents its closing.
6. A buildup of process material (sludge), which may be found in LP-Gas, may occur over a period of time and cause the valve to stick open.
7. The piping break or damage occurs upstream of an in-line excess flow valve, so the escaping product is not passing through the valve.
8. The flow through the valve is in the wrong direction. (Excess flow valves only respond to flow in one direction.)
9. The excess flow valve has been damaged, or is otherwise not in operating condition.

Because of these limitations of excess flow valves, they *should not* be relied upon as the only means of controlling the escape of product in the event of piping damage. When possible, shut-off protection by quick closing valves, with shut-off controls accessible in spite of likely line damage, should be provided in addition to, or instead of excess flow valves.

Where excess flow valves are installed, they should be checked to see that:

1. They are installed in the correct direction — the arrow on the valve indicates the shut-off direction.
2. The flow rating on the valve is proper for the installation. The rating must be above the normal system flow, but not higher than necessary to prevent "nuisance" closing in normal conditions. If the manufacturer's catalog information is not sufficient, the valve suppliers can provide sizing assistance.
3. In-line excess flow valves are installed so likely piping damage will occur downstream of the valve and will not separate the valve from the upstream piping.

When the excess flow valves can be examined separate from the line (before the installation or if removed for system maintenance), they should be checked to see that the parts are in good condition and that the poppet can be pushed fully closed.

Testing of Excess Flow Valves

In order to test an excess flow valve in a piping system, the flow through the valve must be made to exceed the valve's closing rating. This testing should only be attempted by trained personnel familiar with the process. If no one at the facility has experience in proper testing, outside expert help should be obtained. The exact procedure used may vary with the installation, advisability of gas discharge, and availability of equipment.

In general, most testing makes use of the fact that excess flow valves are "surge sensitive" and will close quicker under a sudden flow surge than under steady flow. A sufficient surge can often be created by using a quick-closing valve to control sudden, momentary flow into a tank or piping section containing very low pressure. An audible click from the excess flow valve (and corresponding stoppage of flow) indicates its closure.

A test involving venting gas to the atmosphere is hazardous and may be impractical, or illegal.

Any test of any excess flow valve will not prove that the valve will close in an emergency situation, due to reasons cited before. This test will only check the valve's condition, and the flow rate sizing for those test conditions.

For additional information on excess flow valves and other means of shut-off protection, contact Engineered Controls International, Inc. and refer to NFPA 58.

Prepared by
NATIONAL PROPANE GAS ASSOCIATION

Excess Flow Valves

General Information

RegO® Excess Flow Valves have been designed, developed, and manufactured for a wide variety of industry needs for more than three decades.

Throughout the years, those concerned with installing and operating bulk plant facilities have looked to RegO® products with confidence for reliable, long-lasting valves as required by the National Fire Protection Association (NFPA) Standards 58 and 59, as well as any state, provincial, and local regulations.

It is a responsibility we have not taken lightly. RegO® products continue to not only assess the most effective designs, but anticipate and meet the industry's changing requirements. Toward that goal, RegO® products include over fifty different types and sizes of excess flow valves (most of which are listed by Underwriters Laboratories) to meet the needs of the LP-Gas and anhydrous ammonia industries.

An Explanation and Warning

An excess flow valve is a spring-loaded check valve which will close only when the flow of fluid through the valve generates sufficient force to overcome the power of the spring holding it open. Each valve has a closing rating in gallons per minute and CFH/air.

The selection of a proper closing rating is critical. It requires a technical understanding of the flow characteristics of the piping system, including restrictions of the piping and other valves and fittings downstream of the excess flow valve.

System designers and operating people must understand why an excess flow valve, which remains open in normal operations, may fail to close when an accident occurs.

Warning: A downstream break in piping or hoses may not result in sufficient flow to close the valve.

How They Work

Excess flow valves permit the flow of liquid or vapor in either direction. This flow is controlled in only one direction (the direction of the arrow stamped on the valve). If the flow in that direction exceeds a predetermined rate (shown in this catalog for each valve), the valve automatically closes.

The valve disc is held in the open position by a spring. When the flow creates a pressure drop across the valve disc that overcomes the preset load on the spring, the valve disc moves to the closed position. It remains closed until the force on both sides of the valve disc are approximately equal (a small bleed hole in the disc of each valve permits equalization), then the spring automatically reopens the valve. When a line is completely broken, the pressure cannot equalize and the excess flow valve remains closed until the line is repaired. Because the bleed hole in each valve disc permits equalization of pressure, excess flow valves do not provide a 100 percent type shut-off.

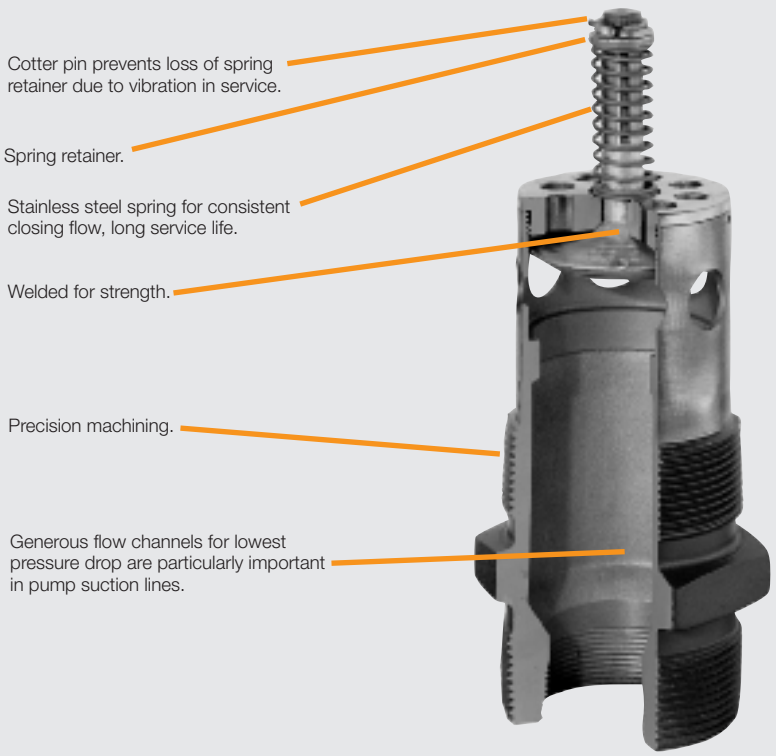
Proper Installation

Since excess flow valves depend on flow in order to close, the line downstream of the excess flow valve should be large enough not to excessively restrict the flow. If the piping is too small, unusually long or restricted by too many elbows, tees and other fittings, consideration should be given to the use of larger size pipe fittings.

An excess flow valve in a pump suction line cannot be expected to close in the case of a clean break in the line beyond the pump, as the pump constitutes too great a restriction, even if running.

Good piping practices dictate the selection of an excess flow valve with a rated closing flow of approximately 50 percent greater than the anticipated normal flow. This is important because valves which have a rated closing flow very close to the normal flow may chatter or slug closed when surges in the line occur during normal operation, or due to the rapid opening of a control valve.

All installations must be in accordance with NFPA Standards 58 and 59, as well as state, provincial and local regulations.



1519C Series

Application

Designed for top mounting in storage tank manhole covers for liquid or vapor applications. The tapped inlet allows for an optional 1" NPT dip pipe connection to withdraw liquid from the top of the tank.

The 1519C4 is designed for installation in long line or branch piping applications.

Features

- Precision machined
- Generous flow channels provide low pressure drop.
- Cotter pin prevents loss of spring retainer due to vibration in service.
- Stainless steel spring provides consistent closing flow and long service life.

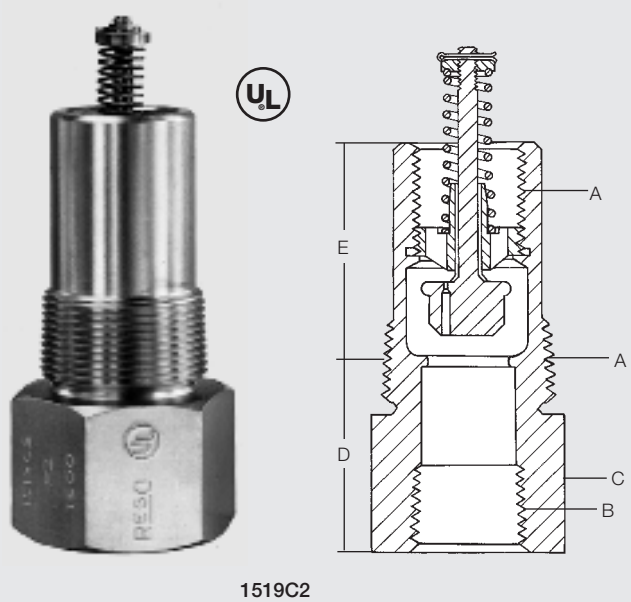
Materials

1519C2

Body	Brass
Valve Poppet w/Stem	Brass
Spring	Stainless Steel
Guide	Brass

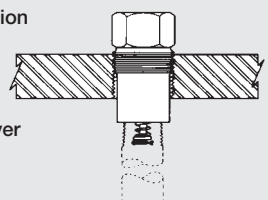
1519C4

Body	Brass
Valve Disc	Cadmium Plated Steel
Stem	Stainless Steel
Spring	Stainless Steel
Guide	Ductile Iron

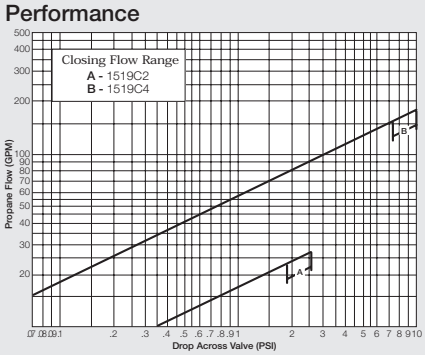


1519C2

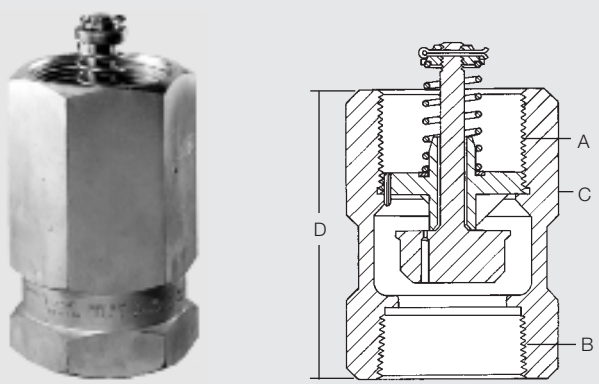
Typical Installation



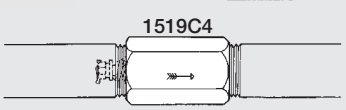
Performance



NOTE: Multiply flow rate by .94 to determine liquid butane flow.



1519C4



Typical Installation

F

Ordering Information

Part Number	A Inlet Connection NPT	B Outlet Connection F. NPT	C Wrench Hex Flats	D Effective Length (Approx.)	E Threaded End To Port	Approximate Closing Flows**		
						Liquid (GPM Propane)	Vapor SCFH (Propane)	
							25 PSIG Inlet	100 PSIG Inlet
1519C2	1 1/2" Male*	1"	2 1/4"	2 1/16"	2 11/16"	25	5,000	8,800
1519C4	2" Female	2"	3"	4 9/16"	—	170	28,590	48,600

* 1" Female Dip Pipe Connection

** Based on horizontal installation of excess flow valve.
Flows are slightly more when valves are installed with outlet up; slightly less when installed with outlet down.

NOTE: Multiply flow rate by .94 to determine liquid butane flow.

Excess Flow Valves for Liquid or Vapor Line Service

1519A Series, 1519B Series and A1519 Series

Application

Designed for top installation, in any position, in liquid or vapor service lines. They are intended for long lines or branch piping where tank mounted excess flow valves cannot suffice.

Features

- Precision machined.
- Generous flow channels provide low pressure drop.
- Cotter pin prevents loss of spring retainer due to vibration in service.
- Stainless steel spring provides consistent closing flow and long service life.

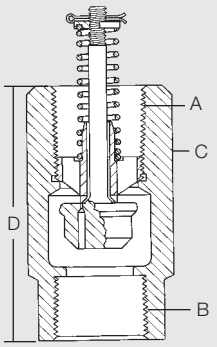
Materials

1519A Series and 1519B Series

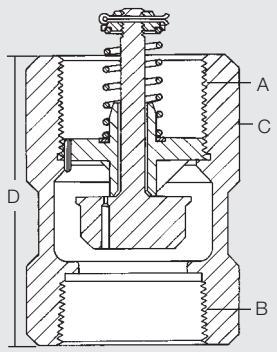
Body	Brass
Valve Poppet w/Stem	Brass
Spring	Stainless Steel
Guide	Brass

A1519 Series

Body	Cadmium Plated Steel
Valve Disc	Cadmium Plated Steel
Stem	Stainless Steel
Spring	Stainless Steel
Guide	Ductile Iron

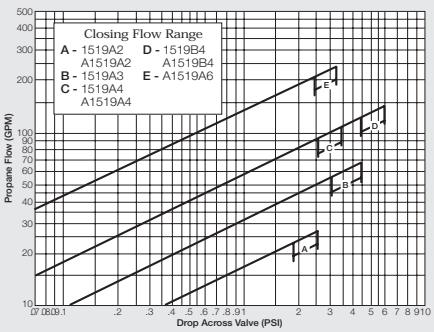


1519A2, 1519A3, 1519A4, 1519B4, A1519A2, A1519A4, A1519B4

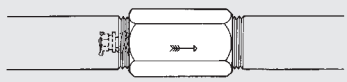


A1519A6

Performance



NOTE: Multiply flow rate by .94 to determine liquid butane flow and by .90 to determine liquid anhydrous ammonia flow.



Typical Installation

Ordering Information

Part Number	Brass or Steel	A Inlet Connection F. NPT	B Outlet Connection F. NPT	C Wrench Hex Flats	D Effective Length (Approx.)	Approximate Closing Flows*		
						Liquid (GPM Propane)	Vapor SCFH (Propane) 25 PSIG Inlet	Vapor SCFH (Propane) 100 PSIG Inlet
1519A2	Brass	1"	1"	1 3/4"	3 15/16"	25	5,000	8,800
A1519A2	Steel							
1519A3	Brass	1 1/2"	1 1/2"	2 1/4"	4"	60	11,500	20,200
1519A4		2"	2"	3"	4 9/16"	100	19,000	34,500
A1519A4	Steel							
1519B4	Brass					133	27,700	50,300
A1519B4	Steel							
A1519A6		3"	3"	4"	6 17/32"	225	45,000	82,000

* Based on horizontal installation of excess flow valve. Flows are slightly more when valves are installed with outlet up; slightly less when installed with outlet down.

NOTE: Multiply flow rate by .94 to determine liquid butane flow and by .90 to determine liquid anhydrous ammonia flow.

3272 Series, 3282 Series, 3292 Series, A3272 Series, A3282 Series, A3292 Series, 7574 and 12472

Application

Designed for liquid or vapor use for filling, withdrawal and vapor equalizing in container or line applications. They are intended for long lines or branch piping where tank-mounted excess flow valves are inadequate.

Features

- Precision machined.
- Generous flow channels provide low pressure drop.
- Stainless steel spring provides consistent closing flow and long service life.

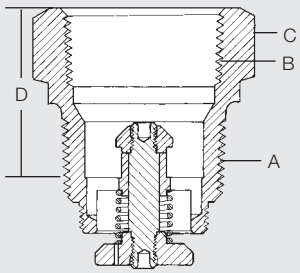
Materials

Series 3272, 3282, 3292, 7574, 12472

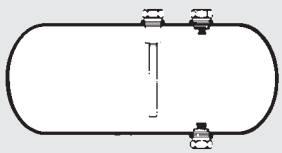
Body	Brass
Seat Disc	Brass
Stem	Brass
Spring	Stainless Steel
Guide (12472 ONLY)	Plastic

Series A3272, A3282, A3292

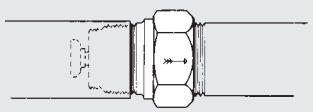
Body	Cadmium Plated Steel
Seat Disc	Cadmium Plated Steel
Stem	Cadmium Plated Steel
Spring	Stainless Steel



Typical Installation

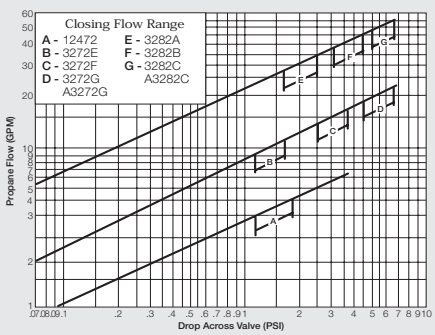


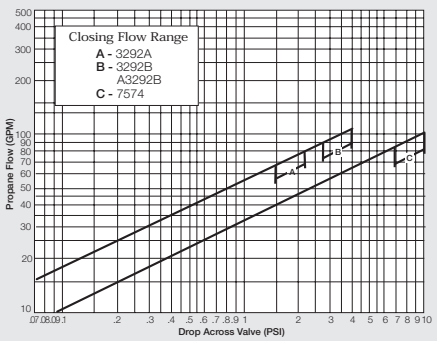
Container Service



Pipe Line Service

Performance





NOTE: Multiply flow rate by .94 to determine liquid butane flow and by .90 to determine liquid anhydrous ammonia flow.

Ordering Information

Part Number	Brass or Steel	A Inlet Connection M. NPT	B Outlet Connection F. NPT	C Wrench Hex Flats	D Effective Length (Approx.)	Approximate Closing Flows*		
						Liquid (GPM Propane)	Vapor SCFH (Propane) 25 PSIG Inlet	Vapor SCFH (Propane) 100 PSIG Inlet
12472	Brass	3/4"	3/4"	1 3/8"	1 3/8"	4	1,050	1,700
3272E						10	2,100	3,700
3272F						15	2,800	5,000
3272G						20	3,700	6,900
A3272G	Steel							
3282A	Brass	1 1/4"	1 1/4"	2"	1 5/16"	30	5,850	10,000
3282B						40	7,600	13,600
3282C						50	9,000	16,300
A3282C	Steel							
7574	Brass	1 1/2"	1 1/2"	2 1/4"	1 3/4"	90	15,200	28,100
7574L						70	14,000	25,000
3292A		2"	2"	2 7/8"	1 7/8"	75	14,200	24,800
A3292A	Steel							
3292B	Brass					100	18,100	32,700
A3292B	Steel							
A3292C						122	22,100	37,600

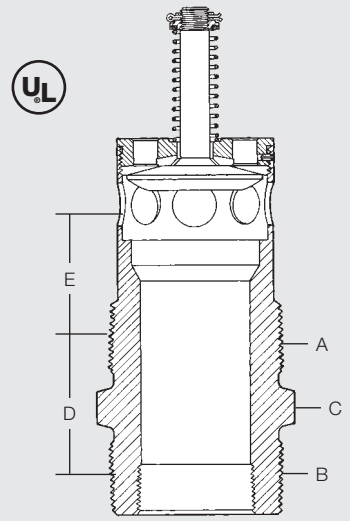
* Based on horizontal installation of excess flow valve. Flows are slightly more when valves are installed with outlet up; slightly less when installed with outlet down.

NOTE: Multiply flow rate by .94 to determine liquid butane flow and by .90 to determine liquid anhydrous ammonia flow.

F

Excess Flow Valves for Container Service

A7537 Series, A7539 Series, A8523 and A8525



Application

Designed for mounting in threaded full or half couplings in container installations. They may be used for filling, withdrawal or vapor equalizing applications. The exceptionally low pressure drop makes them ideal for pump suction lines. If a riser pipe to the vapor space is used with these valves, the minimum inside diameter of the riser pipe must be at least two times the valve thread size in order not to restrict flow to the side inlet ports.

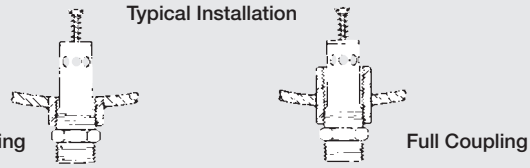
Features

- Precision machined.
- Generous flow channels provide low pressure drop minimizing cavitation in pump suction lines.
- Cotter pin prevents loss of spring retainer due to vibration in service.
- Stainless steel spring provides consistent closing flow and long service life.
- Separate models for installation in either half or full couplings.

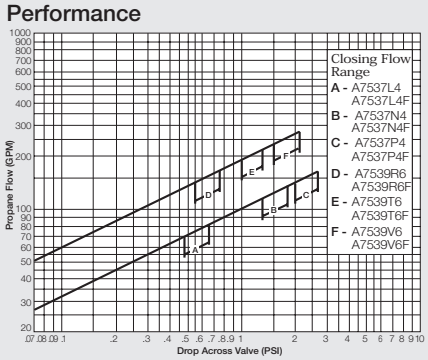
Materials

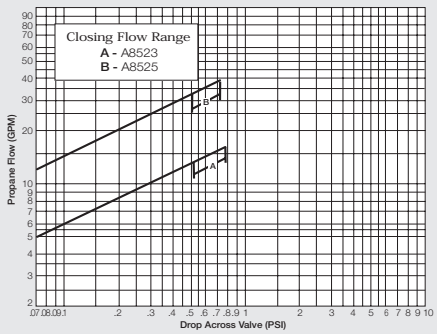
Body ..... Cadmium Plated Steel
Body (A7539 Series Only) ..... Ductile Iron
Seat Disc ..... Cadmium Plated Steel
Stem .....Stainless Steel
Spring ..... Stainless Steel
Guide ..... Cadmium Plated Steel

Typical Installation



Performance





NOTE: Multiply flow rate by .94 to determine liquid butane flow and by .90 to determine liquid anhydrous ammonia flow.

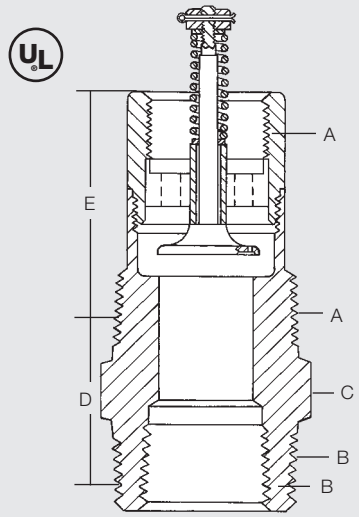
Ordering Information

Part Number	For Use With This Type Coupling	A Inlet Connection M. NPT	B Outlet Connection NPT	C Wrench Hex Flats	D Effective Length (Approx.)	E Threaded End To Port (Approx.)	Approximate Closing Flows*		
							Liquid (GPM Propane)	Vapor SCFH (Propane)	
								25 PSIG Inlet	100 PSIG Inlet
A8523	Half	3/4"	3/4" Male	1 1/8"	1 3/4"	1 3/16"	15	5,170	8,800
A8525	Half	1 1/4"	1 1/4" Male	1 3/4"	2 1/8"	1 9/16"	35	12,540	21,560
A7537L4	Half	2"	2" Male and 1 1/4" Female	2 5/8"	2 1/4"	2"	75	13,000	25,600
A7537L4F	Full					3 11/16"			
A7537N4	Half					2"	125	25,000	42,500
A7537N4F	Full					3 11/16"			
A7537P4	Half					2"	150	30,500	52,000
A7537P4F	Full					3 11/16"			
A7539R6	Half	3"	3" Male and 2" Female	3 3/4"	3 1/8"	2 1/2"	150	32,100	55,500
A7539R6F	Full					4 1/2"			
A7539T6	Half					2 1/2"	200	39,400	68,300
A7539T6F	Full					4 1/2"			
A7539V6	Half					2 1/2"	250	51,100	88,700
A7539V6F	Full					4 1/2"			

* Based on horizontal installation of excess flow valve. Flows are slightly more when valves are installed with outlet up; slightly less when installed with outlet down.

NOTE: Multiply flow rate by .94 to determine liquid butane flow and by .90 to determine liquid anhydrous ammonia flow.

A2137 Series and 2139 Series



Application

Designed especially for filling, withdrawing or vapor equalizing in half and full coupling installations. Ideal for container service where welded-in dip pipes are not provided. For vapor use, mount in the bottom opening with a threaded dip pipe. For liquid use, mount in the top opening with a threaded dip pipe. These may also be installed in pipe lines provided the connection is made to the male inlet thread and not the female dip pipe connection.

Features

- Precision machined.
- Cotter pin helps prevents loss of spring retainer due to vibration in service.
- Stainless steel spring provides consistent closing flow and long service life.
- Generous flow channels provide low pressure drop.

Materials

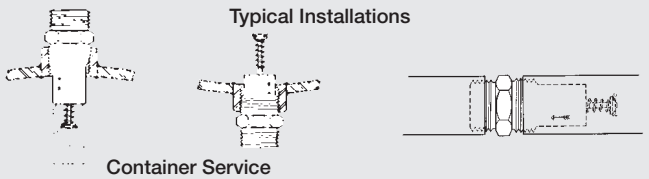
A2137 Series

Body ..... Cadmium Plated Steel
Disc ..... Cadmium Plated Steel
Stem ..... Stainless Steel
Spring ..... Stainless Steel
Guide ..... Cadmium Plated Steel with Stainless Steel Liner

2139 Series

Body ..... Brass
Disc ..... Brass
Stem ..... Stainless Steel
Spring ..... Stainless Steel
Guide ..... Brass

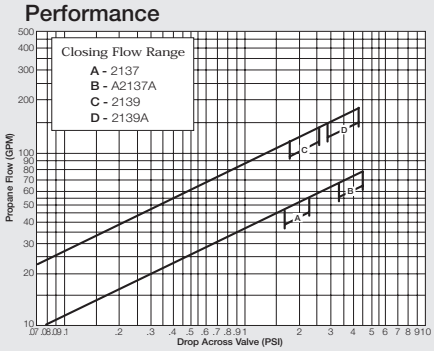
Typical Installations



Container Service

Pipe Line Service

Performance



NOTE: Multiply flow rate by .94 to determine liquid butane flow and by .90 to determine liquid anhydrous ammonia flow.

Ordering Information

Part Number	A Inlet Connection M. NPT	B Outlet Connection NPT	C Wrench Hex Flats	D Effective Length (Approx.)	E Threaded End To Port	Approximate Closing Flows***		
						Liquid (GPM Propane)	Vapor SCFH (Propane) 25 PSIG Inlet	Vapor SCFH (Propane) 100 PSIG Inlet
A2137	2"*	2" Male and $1\frac{1}{4}$" Female	$2\frac{7}{16}$"	$1\frac{9}{16}$"	$3\frac{1}{16}$"	50	10,000	17,000
A2137A						70	14,000	25,000
2139	3"**	3" Male and 2" Female	$3\frac{1}{2}$"	$2\frac{5}{16}$"	$4\frac{3}{8}$"	125	26,500	46,000
2139A						160	32,700	57,200

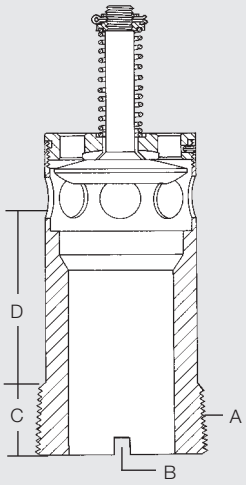
* 1¼" F. NPT Dip Pipe Connection
** 2" F. NPT Dip Pipe Connection
*** Based on horizontal installation of excess flow valve. Flows are slightly more when valves are installed with outlet up; slightly less when installed with outlet down.

NOTE: Multiply flow rate by .94 to determine liquid butane flow and by .90 to determine liquid anhydrous ammonia flow.

F

Excess Flow Valves for Flange Mounting in Container Service

A3500 Series and A4500 Series



Application

Designed for mounting in flanged tank connections with internal threads in the bottom of a container. They may be used in filling, withdrawal or vapor equalizing application. They provide high flow capacity with low pressure drop to minimize pump inlet line cavitation.

If a riser pipe to the vapor space is used with these excess flow valves, the minimum inside diameter of the riser pipe must be at least two times the valve thread size in order not to restrict flow to the side inlet ports.

Flange mounted excess flow valves are readily accessible for servicing and completely enclosed and protected in event of fire. Because there is no direct connection between external piping and the valve, stresses imposed on piping will not affect the excess flow valve.

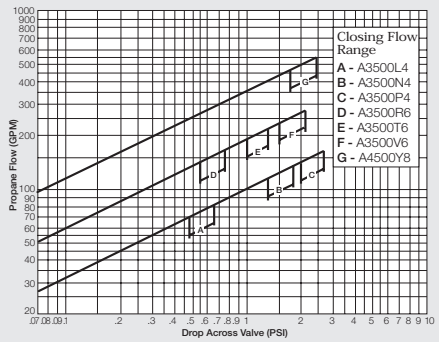
Features

- Precision machined.
- Generous flow channels provide low pressure drop minimizing cavitation in pump suction lines.
- Cotter pin prevents loss of spring retainer due to vibration in service.
- Stainless steel spring provides consistent closing flow and long service life.

Materials

Body ..... Cadmium Plated Steel
Seat Disc ..... Cadmium Plated Steel
Stem .....Stainless Steel
Spring ..... Stainless Steel
Guide ..... Cadmium Plated Steel

Performance



NOTE: Multiply flow rate by .94 to determine liquid butane flow and by .90 to determine liquid anhydrous ammonia flow.

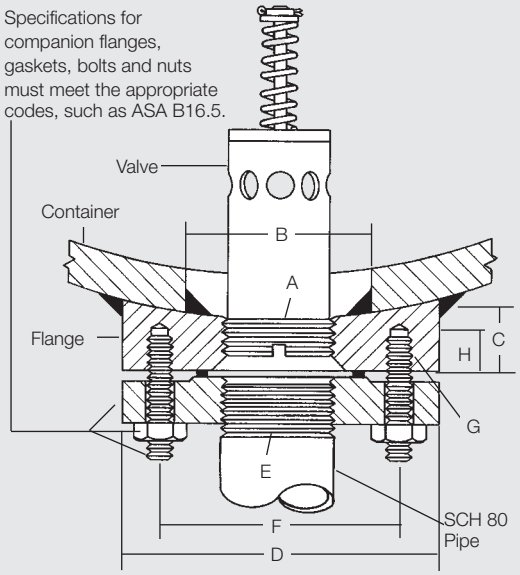
Ordering Information

Part Number	A Inlet Connection M. NPT	B For Installation	C Effective Thread (Approx.)	D Threaded End To Port	Approximate Closing Flows*		
					Liquid (GPM Propane)	Vapor SCFH (Propane) 25 PSIG Inlet	Vapor SCFH (Propane) 100 PSIG Inlet
A3500L4	2"	Slotted Body	3/4"	1 15/16"	75	13,000	22,500
A3500N4					125	25,000	42,500
A3500P4					150	30,500	52,000
A3500R6	3"		1"	1 9/16"	150	32,100	55,500
A3500T6					200	39,400	68,300
A3500V6					250	51,100	88,700
A4500Y8	4"		1 1/16"	1 15/16"	500	89,000	154,000

* Based on horizontal installation of excess flow valve. Flows are slightly more when valves are installed with outlet up; slightly less when installed with outlet down.

NOTE: Multiply flow rate by .94 to determine liquid butane flow and by .90 to determine liquid anhydrous ammonia flow.

Specifications for companion flanges, gaskets, bolts and nuts must meet the appropriate codes, such as ASA B16.5.



Flanged Installation In Container

NOTE: The opening in the tank flange should be machined with a ¼"-45° chamfer at the outer edge. The thread should be tapped one or two turns large as checked by a plug gauge. This and the undersize thread on the valve should permit the valve to be installed so that its outer face is at least flush with the outer edge of the flange.

The valve is screwed into this opening by fitting a ¼" flat metal piece into the slot and turning until *hand tight*. A lubricant may be used, but a luting compound is not necessary since this joint does not have to be gas tight.

If any difficulty is experienced in "making up" the valve to fit flush, as indicated, the thread in the tank flange can be tapped.

Design and construction of tank and flange must be in accordance with the appropriate section of the ASME Pressure Vessel Code.

Dimension Specifications

Key No.	Description	A3400L4, A3500L4 A3500N4, A3500P4	A3400L6, A3500R6 A3500T6, A3500V6	A4500Y8
A	Valve Size (NPT)	2"	3"	4"
B	Tank Opening	3 1/2"	4 1/2"	5 1/2"
C	Thickness(min.)	1"	1 1/4"	1 3/8"
D	Outside Diameter	6 1/2"	8 1/4"	10"
E	Pipe Thread (NPT)	2"	3"	4"
F	Bolt Circle Dia.	5"	6 5/8"	7 1/8"
	Number of Bolt Holes	8	8	8
G	Bolt Hole Thread	5/8" – 11NC – 2	3/4" – 10NC – 2	3/4" – 10NC – 2
H	Bolt Hole Depth (min. eff.)	3/4"	1"	1 1/8"

2723C and A8013D Series

Application

These valves are designed for bottom mounting in consumer storage tanks for liquid service. They may also be top mounted for vapor service. These valves are designed especially for use with RegO® globe and angle valves.

Features

- 2723C provides a ¾" dip pipe inlet connection for top-mounted liquid or bottom-mounted vapor requirements.
- A8013D Series features a 2-position floating valve disc for faster, more efficient container filing.
- Precision machined.
- Stainless steel spring provides consistent closing flow and long service life.
- Generous flow channels provide low pressure drop.

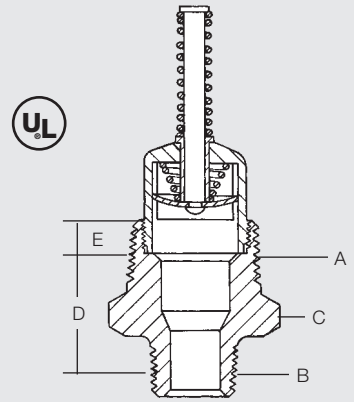
Materials

A8013D Series

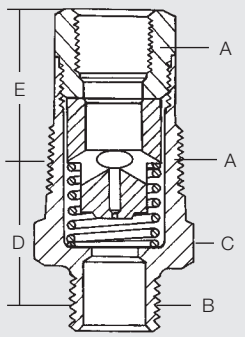
Body ..... Cadmium Plated Steel
Disc ..... Stainless Steel
Stem ..... Stainless Steel
Spring ..... Stainless Steel
Guide ..... Cadmium Plated Steel
Insert .....Stainless Steel

2723C

Body ..... Brass
Valve Poppet ..... Brass
Retainer ..... Brass
Spring ..... Stainless Steel

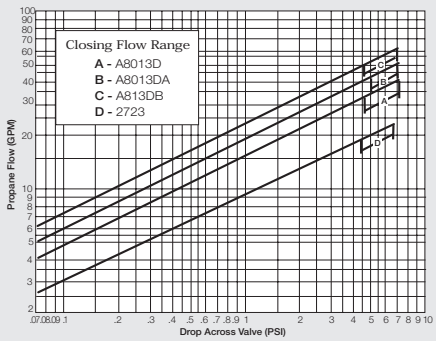


A8013D



2723C

Performance



NOTE: Multiply flow rate by .94 to determine liquid butane flow and by .90 to determine liquid anhydrous ammonia flow.

F

Ordering Information

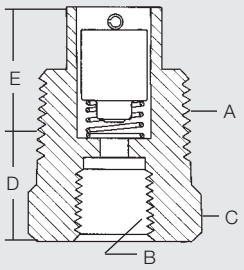
Part Number	A Inlet Connection M. NPT	B Outlet Connection M. NPT	C Wrench Hex Flats	D Effective Length (Approx.)	E Threaded End To Port	Approximate Closing Flows**		
						Liquid (GPM Propane)	Vapor SCFH (Propane) 25 PSIG Inlet	Vapor SCFH (Propane) 100 PSIG Inlet
A8013D	1¼"	¾"	1⅞"	9/16"	—	39	8,700	14,700
A8013DA		1"		21/32"		44		
A8013DB		1¼"		11/16"		55	10,900	19,300
2723C	1¼"*	¾"	1 11/16"	1¼"	3 3/16"	20	3,900	6,900

* ¾" F. NPT Dip Pipe Connection
** Based on horizontal installation of excess flow valve. Flows are slightly more when valves are installed with outlet up; slightly less when installed with outlet down.

NOTE: Multiply flow rate by .94 to determine liquid butane flow and by .90 to determine liquid anhydrous ammonia flow.

Excess Flow Valve for Pressure Gauges

2884D



Application

Designed for container use in pressure gauge installations to minimize excess gas discharge in the event the pressure gauge is sheared. A suitable shut-off valve should be installed between this valve and the pressure gauge to allow convenient gauge replacement.

Features

- Precision machined.
- Suitable for use with all ¼" M.NPT pressure gauges.

Materials

Body ..... Brass
Valve ..... Brass
Spring ..... Stainless Steel
Pin ..... Stainless Steel

Ordering Information

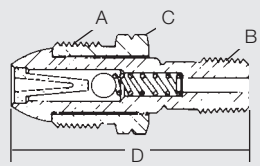
Part Number	A Inlet Connection M. NPT	B Outlet Connection F. NPT	C Wrench Hex Flats	D Effective Length (Approx.)	E Threaded End To Port	Approximate Closing Flows*		
						Liquid (GPM Propane)	Vapor SCFH (Propane)	
							25 PSIG Inlet	100 PSIG Inlet
2884D	¾"	¼"	1 1/16"	1¼"	11/16"	N/A	60	110

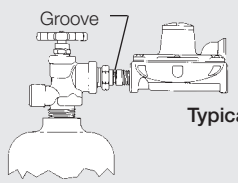
* Based on horizontal installation of excess flow valve. Flows are slightly more when valves are installed with outlet up; slightly less when installed with outlet down.

NOTE: Multiply flow rate by .94 to determine liquid butane flow.

Excess Flow Valve for DOT Cylinders

3199W





Typical Installation

Application

Designed for use on portable systems with vapor or liquid including torches, heaters, lead melting burners, tar and asphalt burners, wallpaper steamers and other applications involving portable DOT cylinders. The POL inlet attaches directly to the cylinder valve and the outlet mounts to the regulator.

Features

- Integral ball check design.
- Machined groove designed to break-off and allow excess flow valve ball to close.

NOTE:

No protection is afforded should break-off occur downstream of the groove. Also, restrictions introduced by the regulator may prevent closing of the valve due to limited flow capacity. The valve's purpose is to protect the cylinder valve outlet should the regulator be broken off of its connection (at the groove), in which case it will close. It must not be depended upon to protect against breaks downstream of the regulator.

Materials

Body ..... Brass
Nut ..... Brass
Ball ..... Stainless Steel
Spring ..... Stainless Steel
Retaining Ring ..... Stainless Steel
Retainer ..... Brass

Ordering Information

Part Number	A Inlet Connection	B Outlet Connection M. NPT	C Wrench Hex Flats	D Effective Length (Approx.)	Approximate Closing Flows*		
					Liquid (GPM Propane)	Vapor SCFH (Propane)	
						25 PSIG Inlet	100 PSIG Inlet
3199W	Male POL	¼"	7/8"	2 7/16"	.95	265	500

* Based on horizontal installation of excess flow valve. Flows are slightly more when valves are installed with outlet up; slightly less when installed with outlet down.

NOTE: Multiply flow rate by .94 to determine liquid butane flow.

Chek-Lok® Excess Flow Valves

Chek-Lok® Excess Flow Valves are designed to provide a convenient means of withdrawing liquid from stationary containers prior to moving the container.

NFPA Pamphlet 58 standards require: 1) containers with 125 gallons water capacity, or more, have a connection for liquid evacuation which is at least ¾" NPT, and 2) containers designed for stationary use, have no more propane than 5% of their water capacity in liquid form during transportation. These rules apply to containers manufactured after July 1, 1961.

The Chek-Lok® permits one transfer shut-off valve with an adapter to be used interchangeably on a number of tanks. With a Chek-Lok® on each tank and a high capacity RegO® 7550P Series transfer valve and adapter on all your service and delivery trucks – the need for individual transfer valves is eliminated. This provides a substantial savings without sacrificing safety.

Chek-Lok® Operation

Instructions to Open Chek-Lok®

1. Loosen cap to vent any accumulated LP-Gas from the Chek-Lok. After venting stops, remove the cap. If venting does not stop, retighten the cap and use other approved means to withdraw liquid from the container.

   NOTE: Use a suitable size wrench when removing the cap and adapter from the Chek-Lok. Do not allow the Chek-Lok to un-thread from the tank during removal. When necessary, use a second wrench to secure the Chek-Lok in position.

2. Before beginning withdrawal, securely connect an ECII® 7550P angle valve or suitable shut-off valve to the adapter. Fully open the shut-off valve – the valve's handwheel must be fully opened before connecting adapter to tank.

3. Completely thread the adapter and shut-off valve assembly onto the Chek-Lok by turning adapter's coupling nut clockwise until it is tight. Immediately close the shut-off valve. Listen for an audible click to signal that the Chek-Lok has opened and is actuated for liquid withdrawal. The flow can now be controlled by the transfer valve.

4. Check the coupling nut and adapter assembly for leaks using a suitable leak detection solution.

   If the Chek-Lok fails to open after following this procedure, the pressure downstream of the shut-off valve should be increased to equalize pressure in the Chek-Lok. It is simple to equalize pressures using vapor from either the vapor return valve or service valve, or from a hose end valve connected to the delivery truck.

Instructions to Close Chek-Lok®

1. To re-lock the Chek-Lok, container pressure must be in excess of 35 PSIG. Close shut-off valve and disconnect the hose or piping.

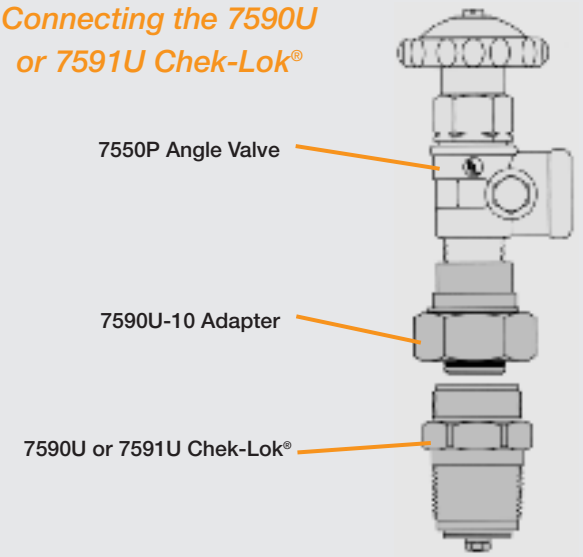
2. Open shut-off valve fully. Liquid discharging to the atmosphere should cause the excess flow feature of the Chek-Lok to close, provided tank pressure is 35 PSIG or more.

   If, for any reason, the excess flow valve does not close, the shut-off valve must be closed immediately and must not be removed until the system can be evacuated and the unit repaired.

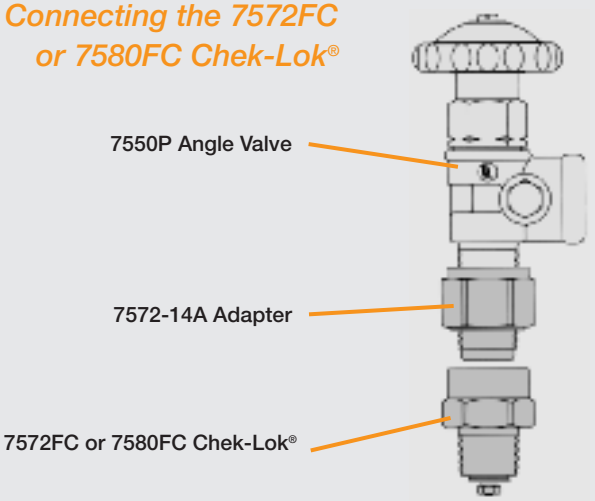
3. After the excess flow valve closes, remove the Adapter and Shut-Off Valve Assembly.

4. Clean face of Chek-Lok and install the Cap with a gasket. IMPORTANT: Only use the proper Chek-Lok Cap. Do not use a standard pipe cap.

Connecting the 7590U or 7591U Chek-Lok®



Connecting the 7572FC or 7580FC Chek-Lok®

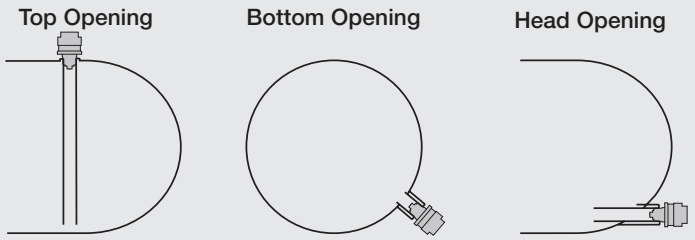


In the absence of a 7550P transfer valve, a ¾" A7505A Globe Valve or A7506AP Angle Valve may be used. Follow the above procedures using the 7572C-15A adapter instead of the 7572C-14A. Use an ECII 7550P without an adapter in an emergency only.

CAUTION: Always wear approved protective gloves when working with the Chek-Lok®. Do not vent LP-Gas near possible source of ignition.

Chek-Lok® Mounting

Chek-Lok® Valves may be either top mounted with a dip tube or bottom mounted. For bottom mounting, it is preferable to position the coupling in the head or slightly off of the bottom. This helps prevent the accumulation of sludge, etc. around the valve which could affect the proper operation of the excess flow valve.



F

Chek-Lok® Excess Flow Valves

7590U and 7591U Series

7590U with Cap

Application

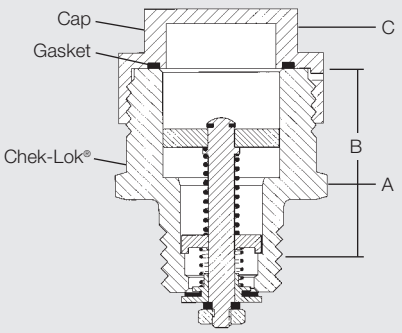
Chek-Lok® Excess Flow Valves are designed to provide a convenient means of withdrawing liquid from stationary containers prior to moving the container. The Chek-Lok® permits one transfer shut-off valve with an adapter to be used interchangeably on a number of tanks.

The 7590U and 7591U Chek-Loks® are also designed for use on permanent installations provided the excess flow valve is sized properly for the system and piping. NOTE: In some cases, it may be necessary to use an in-line excess flow valve to protect the downstream piping.

This valve is not recommended for use as a liquid source for pumps.

Features

- Extra strength connection between body and adapter provides increased strength.
- Weep hole in cap provides indicator to verify Chek-Lok® is closed before cap removal.
- Heavy duty brass cap requires at least 3½ full turns for removal.
- O-ring seal on adapter provides a gas tight seal before the adapter opens the equalizing stem.
- Eliminates need for individual transfer valves at each container.
- UL listed.



Materials

Body..... Brass
Stem..... Brass
Spring.....Stainless Steel
Seals..... Synthetic Rubber
Valve Poppet..... Brass
Gasket..... Nylon

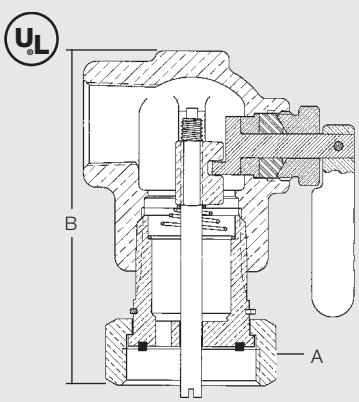
Ordering Information

Chek-Lok® Number	Inlet Connection	Outlet Connection	A Body Wrench Hex Flats	B Approximate Effective Length	C Cap Wrench Hex Flats	Approximate Closing Flow, Liquid GPM (Propane)*
7590U	¾" M. NPT	1⅝" UNF	1⅝"	1 7/16"	1 5/16"	20
7591U	1¼" M. NPT		1¾"	1 11/16"		35

* Based on horizontal installation of excess flow valve. Flows are slightly more when valves are installed with outlet up, and slightly less when installed with outlet down.
Note: Multiply flow rate by .94 to determine liquid butane flow.

Chek-Lok® Liquid Evacuation Adapter for 7590U and 7591U Valves

7590U-20



Application

Designed specifically for use with RegO® 7590U and 7591U Chek-Lok® Excess Flow Valves. Adapter's operating handle opens and closes equalizing stem in the Chek-Lok® valve. Eliminates gas flow through Chek-Lok® valve when installing or removing adapter. Use of RegO® adapter ensures proper connections and opening of the check mechanism.

Features

- Built in nylon gasket provides a gas tight seal.
- Adapter can be installed without depressing the equalizing stem of the Chek-Lok®.
- Design eliminates the need to slug excess flow feature of Chek-Lok® when removing the adapter.
- Built in bleeder valve allows controlled discharge of liquid before removing the adapter.

Ordering Information

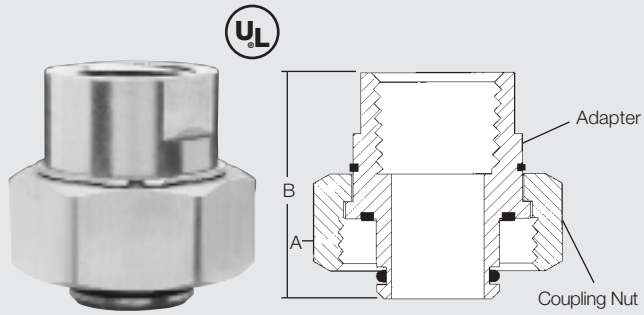
Adapter Number	Inlet Connection	Outlet Connection	A Wrench Hex Flats	B Approximate Length
7590U-20	1⅝" F. UNF	¾" F. NPT	1¾" F. NPT	4⅛" F. NPT

Union Style Adapters for 7590U and 7591U Valves

7590U-10

The 7590U-10 adapter must be used to connect to the 7590U and 7591U Chek-Lok. This insures a proper connection to open the check mechanism. A built in nylon gasket provides a gas tight seal.

Adapter Number	Inlet Connection	Outlet Connection	A Wrench Hex Flats	B Approximate Length
7590U-10	$1\frac{5}{8}$" UNF	$\frac{3}{4}$" F. NPT	$1\frac{3}{4}$"	$1\frac{13}{16}$"



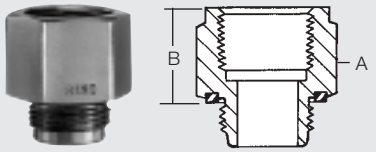
Adapters for 7572FC and 7580FC Valves

7572C-14A and 7572C-15A

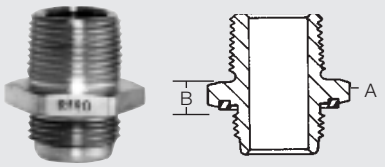
These adapters must be used to connect to the 7572FC and 7580FC Chek Loks to open the check mechanism properly. A built in nylon gasket provides a gas tight seal.

Adapter Number	Inlet Connection	Outlet Connection	A Wrench Hex Flats	B Approximate Effective Length
7572C-14A	$\frac{3}{4}$" M. NPT	$\frac{3}{4}$" F. NPT	$1\frac{3}{8}$"	1"
7572C-15A		$\frac{3}{4}$" M. NPT		$\frac{1}{4}$"

7572C-14A
For Transfer Valves



7572C-15A
For Globe and Angle Valves



F

Double-Check Filler Valves

General Information

RegO® Double-Check Filler Valves incorporate a resilient upper check valve, normally designated as a filler valve, and a lower check valve, commonly called a back pressure check valve. Available in a range of sizes to cover virtually all LP-Gas storage containers, these valves are UL listed and meet NFPA standards, as well as other safety requirements.

Flow of liquid into the storage container opens both check valves. When flow stops, they both are designed to close automatically to permit the operator to disconnect the hose coupling. The automatic closing action also helps prevent the discharge of container contents in the event of hose failure. The lower back pressure check affords extra protection by restricting the discharge if the upper check fails to function properly due to accidents or other causes.

The double back check construction allows emergency inspection, repair, or replacement of the upper fill assembly without removing product from the container. When the upper filler valve body is removed, the lower back check valve provides a seal, permitting only some leakage, allowing a new upper filler valve body to be installed.

Spare Gasket Ordering Information

ACME	Part Number
1¼"	A2797-20R
1¾"	A2697-20R
2¼"	A3184-8R
3¼"	A3194-8R

Seal cap made of tough, resilient molded plastic. Protects threads and internal working parts. Caps are designed to contain normal tank pressures, and must be kept on valves at all times.

Long-wearing gasket permits hand-tight connection of cap and hose coupling.

Safety groove is designed to shear below the ACME thread, leaving the valve seats closed and unaffected if the delivery truck pulls away with the hose connected.

Seat disc of special synthetic composition is extra thick for longer life.

Valve guide is precision machined to assure positive seal.

Exclusive swing-away lower back check valve for extra fast filling is provided on Models 6579 and 6587. Differs from conventional design by swiveling to a vertical position when opened.

Double-Check Filler Valves for Large Motor Fuel and ASME Tanks

6579 Series and 7579 Series

Application

Designed to provide fast filling of large motor fuel and ASME domestic tanks.

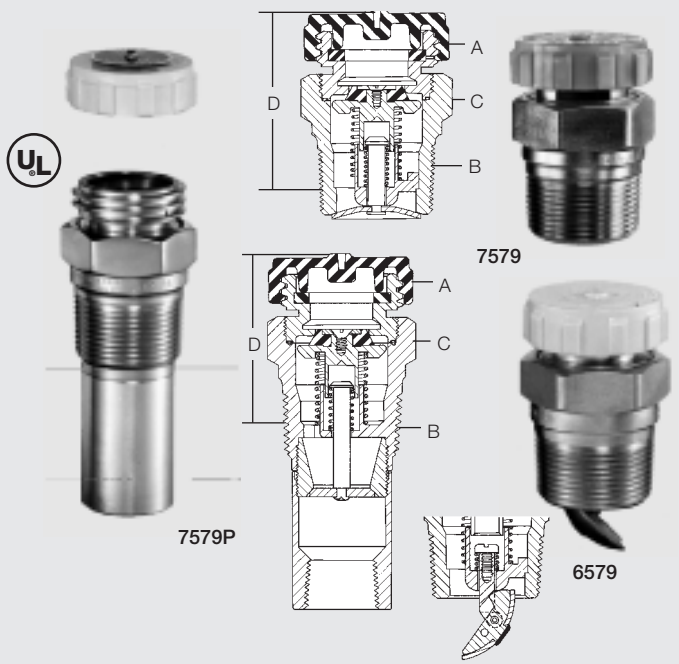
The 6579 Series incorporates a swing-away lower check which greatly reduces pressure drop across the valve. This lower pressure drop promotes faster filling rates and greater efficiency resulting in more profitable operations.

Features

- Double back check provides added system protection.
- Upper filler valve assembly can be easily replaced without evacuating the container.
- Both checks are spring actuated for quick, precise closure when flow into the valve stops or reverses.
- 6579 Series swing-away check promotes faster filling for more profitable operations.
- Specify RegO® Filler Valves on all your original tank purchases to insure quality and dependable performance.

Materials

Upper Body . . . . . Brass
Lower Body . . . . . Brass
Springs . . . . . Stainless Steel
Washer and Seat Disc . . . . . Synthetic Rubber
Cap . . . . . Plastic



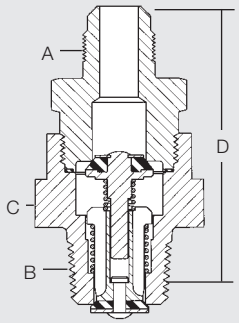
Ordering Information

Part Number		A ACME Hose Connection	B Tank Connection M. NPT	C Wrench Hex Flats	D Effective Length (Approx.)	Propane Liquid Capacity at Various Differential Pressures (GPM)				
Cap Only	Cap, Chain and Ring					5 PSIG	10 PSIG	25 PSIG	50 PSIG	75 PSIG
7579	7579C	1¾"	1¼"	1⅞"	2 11/16"	50	70	111	157	192
7579P	—		1¼"*			37	52	82	116	142
6579**	6579C**		1¼"			78	110	174	246	301

* Incorporates ¾" F. NPT dip pipe connection
** Swing-away lower back check valve design for higher filing rate.
NOTE: Multiply flow rate by .94 to determine liquid butane capacity.

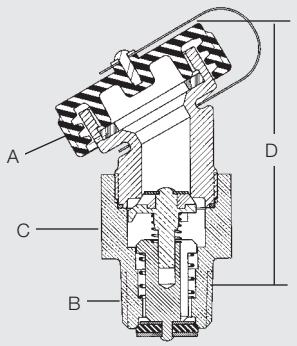
7647 Series

7647HF

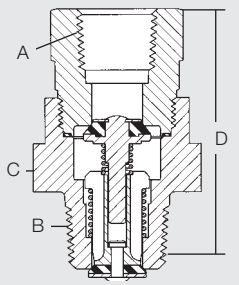


Lanyard and Cap

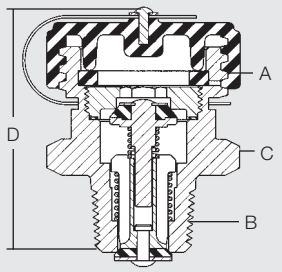
7647SA



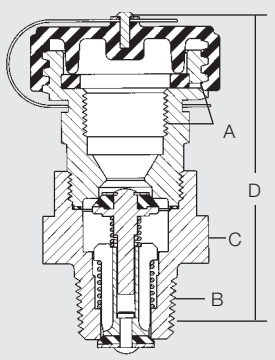
7647H



7647SC



7647DC



Application

Designed to provide fast filling of forklift, motor fuel, and recreational vehicle tanks.

Features

- Resilient seat disc in lower check designed to provide a gas tight seal without leakage.
- Double back check provides added system protection.
- 7647SA has 30° angle on hose connection. Makes connection and disconnection easier for certain engine fuel applications.
- Large 1¾" wrench flats on 7647SC allow use of socket wrench for easy installation.
- Specify RegO® Filler Valves on all your original tank purchases to insure quality and dependable performance.

Materials

Upper Body ..... Brass
Lower Body ..... Brass
Springs ..... Stainless Steel
Washer & Seat Discs ..... Resilient Synthetic Rubber
Cap ..... Plastic

F

Ordering Information

Part Number		A Hose Connection	B Tank Connection M. NPT	C Wrench Flats	D Effective Length (Approx.)	Propane Liquid Capacity at Various Differential Pressures (GPM)***				
Basic	w/Lanyard and Cap					10 PSIG	20 PSIG	30 PSIG	40 PSIG	50 PSIG
7647H	—	½" F. NPT	¾"	1½"	2 7/16"	14	20	24	27	50
7647HF	—	½" SAE Flare			2 5/8"					
—	7647DC	1¾" ACME & F. POL			3"					
—	7647SA**	1¾" ACME			3 1/16"					
—	7647SC*			1¾"*	2¼"*					

* Large 1¾" hex wrench flats.
** 30° angle on 1-1/4" ACME hose connection.
*** Multiply flow rate by .94 to determine liquid butane capacity.

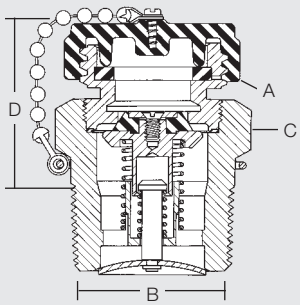
Double Check Filler Valves for Delivery Truck Tanks and Large Storage Containers

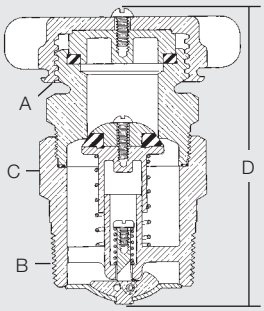
7579S, 6587EC and 3197C

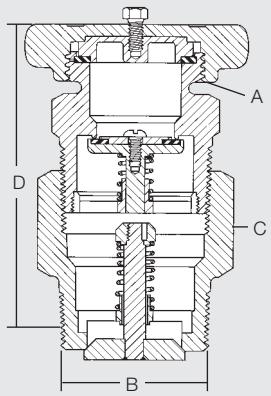
7579S

6587EC

3197C







Application

Designed to provide fast filling of bobtails, transports and large bulk storage tanks.

The 6587EC incorporates a swing-away lower check which greatly reduces pressure drop across the valve. This lower pressure drop promotes faster filling rates and greater efficiency resulting in more profitable operations.

Materials

Upper Body ..... Brass
Lower Body (7579S and 6587EC) ..... Brass
Lower Body (3197C) ..... Cadmium Plated Steel
Springs ..... Stainless Steel
Washer and Seat Disc ..... Synthetic Rubber
Cap (6587EC and 3197C) ..... Brass
Cap (7579S) ..... Plastic

Features

- Double back check provides added system protection.
- Upper filler valve assembly can be easily replaced without evacuating the container.
- Both checks are spring actuated for quick, precise closure when flow into the valve stops or reverses.
- 6587EC swing-away check promotes up to 65% faster filling rates for more profitable operations. Faster filling rates add longer pump life by reducing chances of cavitation.
- Specify RegO® Filler Valves on all your original tank purchases to insure quality and dependable performance.

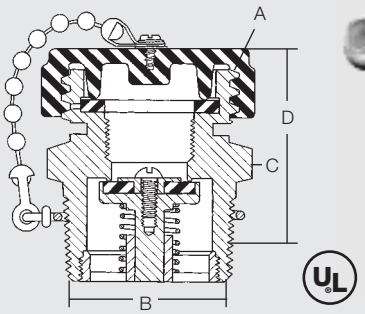
Ordering Information

Part Number	A ACME Hose Connection	B Tank Connection M. NPT	C Wrench Hex Flats	D Effective Length (Approx.)	Propane Liquid Capacity at Various Differential Pressures (GPM)				
					5 PSIG	10 PSIG	25 PSIG	50 PSIG	75 PSIG
7579S	1 3/4"	1 1/2"	2"	2 11/16"	44	62	98	139	170
6587EC*	2 1/4"	2"	2 7/8"	4 3/8"	92	130	206	291	356
3197C	3 1/4"	3"	4"	6 1/2"	148	210	332	470	575

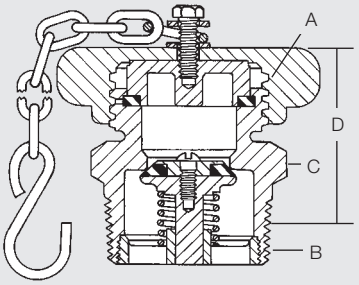
* Swing-away lower back check valve design for higher filling rates.
NOTE: Multiply flow rate by .94 to determine liquid butane capacity.

Single Check Filler Valves for Storage Tanks with Supplementary Back Check Valves

3174C, 3194C and 6584C



3174C



3194C, 6584C

Application

Designed for use with RegO® Back Check Valves to provide fast filling of bulk storage tanks. Also may be used as a spare or replacement part.

These single check filler valves must never be installed directly into container couplings. They must be used with the appropriate back check valve to comply with NFPA Pamphlet #58.

Features

- Specifically for use with RegO® Back Check Valves.
- 6584C stem assembly reduces turbulence during filling and promotes higher filling rates.
- Specify RegO® Filler Valves on all your original tank purchases to insure quality and dependable performance.

Materials

Upper Body ..... Brass
Lower Body ..... Brass
Spring ..... Stainless Steel
Seat Disc ..... Synthetic Rubber
Cap (3194C, 6584C) ..... Brass
Cap (3174C) ..... Plastic

Ordering Information

Part Number	A ACME Hose Connection	B Outlet Connection M. NPT	C Wrench Hex Flats	D Effective Length (Approx.)	Propane Liquid Capacity at Various Differential Pressures (GPM)				For Use With Back Check Valve:
					5 PSIG	10 PSIG	25 PSIG	50 PSIG	
3174C	1 3/4"	1 1/4"	1 3/4"	1 11/16"	23	33	52	74	3176
6584C*	2 1/4"	2"	2 3/8"	2 1/4"	156	220	348	492	A3186
3194C	3 1/4"	3"	3 1/2"	3 7/16"	147	208	329	465	A3196

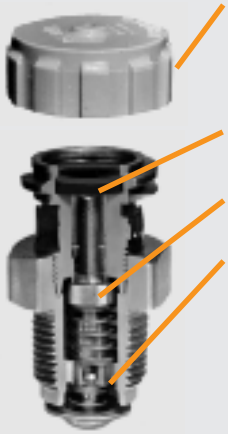
* Stem Assembly designed for higher filling rates.
NOTE: Multiply flow rate by .94 to determine liquid butane capacity.

Vapor Equalizing Valves

General Information

RegO® Vapor Equalizing Valves consist of an upper back check valve and lower excess flow valve. In the closed position, the attachment of a vapor hose coupling with its projecting nozzle, opens the back check valve to permit flow in either direction. The lower excess flow valve is designed to close automatically when flow out of the container being filled exceeds the rated capacity. The valve closes automatically when the coupling is removed. Like the double-check filler valves, the vapor equalizing valves utilize a two-piece body construction. The lower excess flow valve will permit some leakage when the upper back check valve is removed for emergency repairs or replacement.

RegO® Vapor Equalizing Valves are designed for use in both ASME and DOT containers.



Seal cap made of tough, resilient molded plastic. Protects threads and internal working parts. Caps are designed to contain normal tank pressures, and must be kept on valves at all times.

Long-wearing gasket permits hand-tight connection of cap and hose coupling.

Seat disc of special synthetic composition is extra thick for longer life.

Valve guide is precision machined to assure positive seal.

Spare Gasket Ordering Information

ACME	Part Number
1 1/4"	A2797-20R
1 3/4"	A2697-20R

F

Double Check Vapor Equalizing Valves for ASME and DOT Containers

7573 Series and 3183AC

Application

Designed to facilitate loading operations by providing equalization of pressures in the supply and storage containers. The supplementary excess flow valve closes when the flow from the container being filled exceeds a predetermined rate.

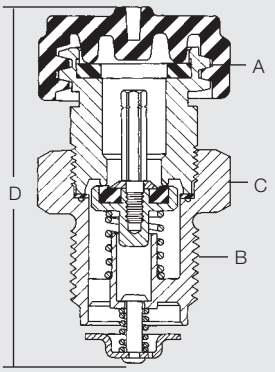
The 7573 Series is designed for use in bulk delivery systems and motor fuel containers. The 3183AC is designed for use in delivery trucks and other large containers.

Materials

Body ..... Brass
Spring ..... Stainless Steel
Upper Check Seat Disc ..... Synthetic Rubber
Seals ..... Synthetic Rubber
Cap ..... Plastic

Features

- Double check provides added system protection.
- Upper back check valve can be easily replaced without evacuating the container.



- Specify RegO® Vapor Equalizing Valves on all your original tank purchases to insure quality and dependable performance.

Ordering Information

Part Number		A ACME Hose Connection	B Tank Connection M. NPT	C Wrench Hex Flats	D Effective Length (Approx.)	Approximate Closing Flow at 100 PSIG Inlet Pressure (SCFH/Propane Vapor)
Basic	With Cap & Chain					
7573A	7573AC	1 1/4"	3/4"	1 1/4"	2 1/16"	4,100
—	3183AC	1 3/4"	1 1/4"	2"	3 1/16"	10,000

Single Check Vapor Equalizing Valves for ASME and DOT Containers with Supplementary Excess Flow Valves

3170 and 3180C

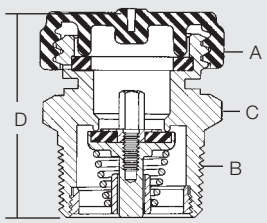
Application

Designed for use with RegO® Excess Flow Valves to facilitate loading operations by providing equalization of pressures in the supply and storage containers. Also may be used as a spare or replacement part.

These vapor equalizing valves must never be installed directly into container couplings. They must be used with the appropriate excess flow valve to comply with NFPA Pamphlet #58.

Materials

Body ..... Brass
Spring ..... Stainless Steel
Seat Disc ..... Synthetic Rubber
Seal ..... Synthetic Rubber
Cap ..... Plastic



Features

- Specifically for use with RegO® Excess Flow Valves.
- Specify RegO® Vapor Equalizing Valves on all your original tank purchases to insure quality and dependable performance.

Ordering Information

Part Number		A ACME Hose Connection	B Tank Connection M. NPT	C Wrench Hex Flats	D Effective Length (Approx.)	Approximate Closing Flow at 100 PSIG Inlet Pressure (SCFH/Propane Vapor)	For Use With Excess Flow Valve:
Basic	With Cap & Chain						
3170	—	1 1/4"	3/4"	1 1/4"	1 9/16"	7,600	3272E
—	3180C	1 3/4"	1 1/4"	1 3/4"	1 11/16"	10,000	3282A

General Information

RegO® Back Pressure Check Valves are designed to allow flow in one direction only. The check, normally held in the closed position by a spring, precludes the possibility of flow out of the container. When flow starts into the container, the pressure overcomes the force of the spring to open the check. When the flow stops or reverses, the check closes.

Metal-to-metal seats will allow slight leakage after closure. These valves will restrict the escape of container contents in the event of accidental breakage of the piping or fittings.

Back Pressure Valves for Container or Line Applications

3146 Series, 3176 Series, A3186, A3187S, A3196, and A3276BC

Application

Designed to provide protection of a container opening when desired flow is always into the vessel. May be used in line applications where flow must be limited to one direction.

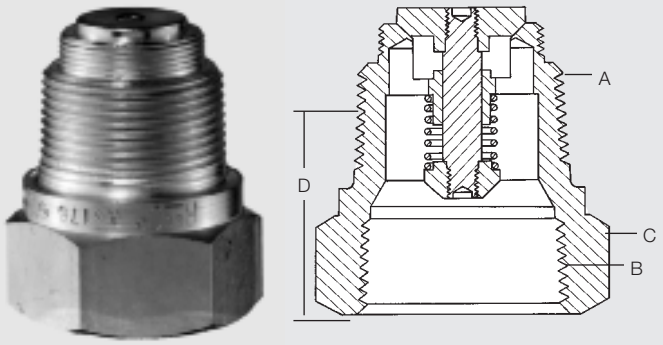
When used with the appropriate single check filler valve, the combination forms a double check filler valve suitable for use in filling of bulk storage tanks.

Features

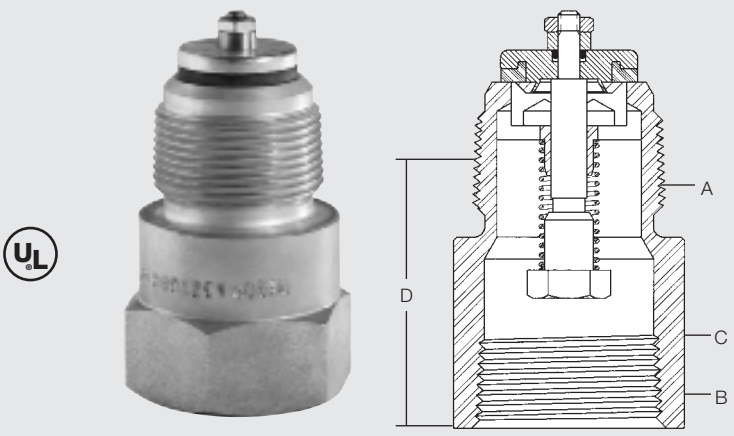
- Generous flow channels for low pressure drop.
- Heavy-duty construction for long service life.
- Soft seat valves have synthetic rubber seat disc for positive seals.

Materials

Body (3146, 3146S, 3176) ..... Brass
Body (all others) ..... Cadmium Plated Steel
Disc (3146, 3146S, 3176) ..... Brass
Disc (all others) ..... Cadmium Plated Steel
Stem (3146, 3146S, 3176) ..... Brass
Stem (A3146, A3196, A3276BC) ..... Stainless Steel
Stem (A3176, A3186) ..... Cadmium Plated Steel
Spring ..... Stainless Steel
Seat Disc (3146S, A3276BC) ..... Synthetic Rubber



3146 Series, 3176 Series, A3186, A3196



A3276BC

A3187S

Ordering Information

Part Number		A Inlet Connection F. NPT	B Outlet Connection M. NPT	C Wrench Hex Flats	D Effective Length (Approx.)	Propane Liquid Capacity at various differential pressures (GPM)			
Brass	Steel					5 PSIG	10 PSIG	25 PSIG	50 PSIG
3146	A3146	3/4"	3/4"	1 3/8"	1 15/16"	11	16	25	36
3146S*									
3176	A3176	1 1/4"	1 1/4"	2"	1 3/8"	28	40	63	89
	A3276BC*				2 1/2"	32	45	73	103
	A3186	2"	2"	2 7/8"	2 7/16"	124	175	276	391
	A3187S*	2" Male & 1 1/4" Female	2" Male & 1 1/4" Female	2 3/8"	4 3/8"	60	110	225	350
	A3196	3"	3"	4"	3 15/16"	297	420	664	939

* Soft Seat
NOTE: Multiply flow rate by .94 to determine liquid butane capacity and by .90 to determine liquid anhydrous ammonia capacity.

F

Swing-Away Back Pressure Check Valves for Container or Line Applications

6586D and A6586D

Application

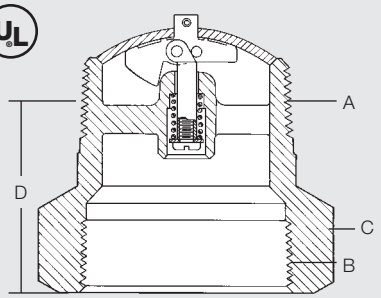
Designed to provide protection of a container opening when desired flow is always into the vessel. May also be used in the line applications where flow must be limited to one direction.

When used with the appropriate single check filler valve, the combination forms a double check filler valve suitable for use in filling of bulk storage tanks.

The swing-away check offers more efficient flow rates than conventional designs. It swivels open vertically to reduce pressure drop across the valve and improves flow rates.

Materials

Body (6586D) ..... Brass
(A6586D) ..... Steel
Disc (6586D)..... Brass
(A6586D) ..... Stainless Steel
Stem Assembly .....Stainless Steel
Spring ..... Stainless Steel
Screw .....Stainless Steel



Features

- Swing-away check design offers faster flow rates.
- Heavy-duty construction for long service life.

Ordering Information

Part Number		A Inlet Connection F. NPT	B Outlet Connection M. NPT	C Wrench Hex Flats	D Effective Length (Approx.)	Propane Liquid Capacity at Various Differential Pressures (GPM)			
Brass	Steel					5 PSIG	10 PSIG	25 PSIG	50 PSIG
6586D	A6586D	2"	2"	$2\frac{7}{8}$"	$2\frac{7}{16}$"	190	270	420	600

NOTE: Multiply flow rate by .94 to determine liquid butane capacity.

Back Pressure Check Valves for Flanged Installation

A3400L4 and A3400L6

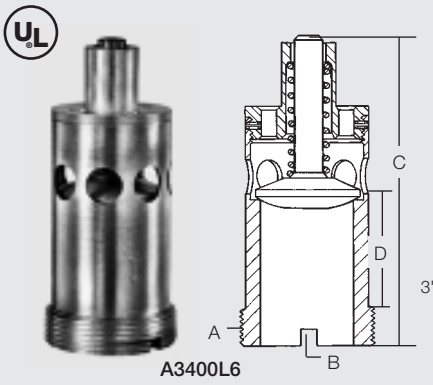
Application

Designed to provide high flow capacity and allow more efficient tank filling than conventional designs. The unobstructed throat area reduces flow turbulence through the valve, thereby reducing pressure drop. Large flow channels and spacious side ports assure ample capacity for the most demanding high capacity filling operations.

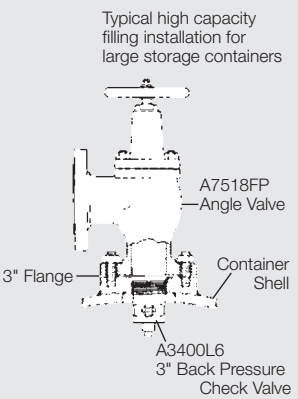
The valve is designed for installation in internally threaded flanges in container bottoms.

Materials

Body ..... Cadmium Plated Steel
Stem ..... Stainless Steel
Spring ..... Stainless Steel
Disc ..... Cadmium Plated Steel
Guide .....Stainless Steel
Roll Pin ..... Stainless Steel



A3400L6



Features

- Speeds up filling operations in bulk tanks.
- All steel and stainless steel construction assures long service life.

Ordering Information

Part Number	A Flange Connection M. NPT	B Wrench Hex Flats	C Overall Length	D Threaded End To Port	Propane Liquid Capacity at Various Differential Pressures (GPM)			
					5 PSIG	10 PSIG	25 PSIG	50 PSIG
A3400L4	2"	Slotted	$5\frac{1}{4}$"	$1\frac{5}{16}$"	223	316	500	707
A3400L6	3"		$5\frac{9}{32}$"	$1\frac{9}{16}$"	424	600	949	1342

NOTE: For installation in flange tank connections with internal threads, see the "Flanged Installation in Container" section under "Excess Flow Valves."
Multiply flow rate by .94 to determine liquid butane capacity and by .90 for liquid anhydrous ammonia capacity.

ECII® Warning Notice

The following warning information, Part Number 903-500, is included with each shipment of Excess Flow, Check, Filler and Vapor Equalizing Valves to the first purchaser of the product from the factory.

This information is intended to be forwarded throughout the product distribution chain. Additional copies are available from Engineered Controls International, Inc. and Authorized Product Distributors.

DANGER **READ THIS FIRST** **WARNING**

LP-GAS IS EXTREMELY FLAMMABLE AND EXPLOSIVE

AVOID SERIOUS INJURY AND PROPERTY DAMAGE. IF YOU SEE, SMELL, OR HEAR ESCAPING GAS . . . *EVACUATE AREA IMMEDIATELY!* CALL YOUR LOCAL FIRE DEPARTMENT! DO NOT ATTEMPT TO REPAIR. DO NOT STORE IN BUILDING OR ENCLOSED AREA. DO NOT USE ON HOT AIR BALLOONS OR AIRCRAFT.

Make sure you are thoroughly trained before you attempt any valve installation, maintenance, or repair. Improper conditions or procedures can cause accidents resulting in property damage and personal injury.

Become thoroughly familiar with NPGA Safety Pamphlet 306-79 "LP-Gas Regulator and Valve Inspection & Maintenance" and ECII® Safety Warnings WB-2 "LP-Gas Cylinder Valves", WB-3 "LP-Gas Excess Flow Valves", and WB-4 "LP-Gas Filler Valves and Hose End Filling Valves." Follow their recommendations.

Know and understand NFPA Pamphlet 58 "Storage and Handling Petroleum Gases," which is the law in many states. This publication is available from NFPA, Batterymarch Park, Quincy, MA 02269. Following its requirements is essential in the safe use of LP-Gas. Section 15 states that "In the interests of safety, all persons employed in handling LP-Gases shall be trained in proper handling and operating procedures."

Make sure this valve is the proper one for this installation. Avoid misusing LP-Gas equipment.

Apply thread joint compound compatible with LP-Gas on valve external threads only. Make sure compound never comes into contact with other parts of the valve.

Install valves by applying force to wrenching flats only.

Tighten pipe threads approximately 1 to 1½ turns beyond the hand-tight insertion point using a wrench which avoids damage to other valve parts.

Check for damage and proper operation after valve installation. Check that the valve is clean and free of foreign material.

Check container-valve connection with a non-corrosive leak detection solution before filling with LP-Gas.

Purge container before filling with LP-Gas (refer to the ECII® LP-Gas Serviceman's Manual for recommended procedure).

Test excess flow check valve for proper operation before placing into service. See NPGA Bulletin 113-78 for recommended procedure.

Check outlet connection make-up for leaks with a non-corrosive leak detection solution when placing into service.

If container is not being placed into service at the present time, insert a plug or cap onto the outlet connection.

In selecting a label for posting at the installation site, consider ECII® 903-400 or 901-400 along with your own, NPGA's and others.

Remember to instruct the owner/user/customer in safety matters concerning LP-Gas and this equipment.

Engineered Controls International, Inc., ECII® requests that this information be forwarded to your customers. Additional copies are available from ECII® and your Authorized Product Distributor.

ECII Engineered Controls International, Inc.

Printed in U.S.A. 05-0598-0686
Warning 903-500

100 RegO Drive PO Box 247 Elon College, NC 27244 USA Phone (336) 449-7707 Fax (336) 449-6594 www.regoproducts.com

ECII® Chek-Lok® Adhesive Warning Labels

These adhesive warning labels are intended for application as close as possible to the Chek-Lok® once the Chek-Lok® is installed.

The basic information contained on the label is intended for the benefit of the user of the Chek-Lok® and is not intended to be an "all-inclusive" product warning.

This label is printed on a heavy duty material with pressure sensitive adhesive backing. The ultra-violet ink stands up well when exposed to the environment.

Ordering Information

Part Number	Description
7572-400	Adhesive Warning Label

DANGER **WARNING**

LP-GAS IS EXTREMELY FLAMMABLE AND EXPLOSIVE

AVOID SERIOUS INJURY AND PROPERTY DAMAGE. IF YOU SEE, SMELL, OR HEAR ESCAPING GAS... *EVACUATE AREA IMMEDIATELY!* CALL YOUR LOCAL FIRE DEPARTMENT! DO NOT ATTEMPT TO REPAIR. DO NOT STORE IN BUILDING OR ENCLOSED AREA. DO NOT USE ON HOT AIR BALLOONS OR AIRCRAFT.

CAUTION!

Use this CHECK-LOK® connection *only* for liquid evacuation before moving tank in accordance with NFPA Pamphlet 58, which is the law in many states. This publication is available from NFPA, Batterymarch Park, Quincy, MA 02269. Read and follow ECII® product instruction number 7572FA-301.

DO NOT REMOVE, DEFACE OR OBLITERATE THIS LABEL.
DO NOT FILL THIS CONTAINER UNLESS THIS LABEL IS READABLE.

ADDITIONAL SAFETY INFORMATION IS AVAILABLE FROM

ECII Engineered Controls International, Inc.

Printed in U.S.A. 03-0994-1189
Part No. 7572-400

100 RegO Drive PO Box 247 Elon College, NC 27244 USA Phone (336) 449-7707 Fax (336) 449-6594 www.regoproducts.com

F

Cross Reference by Part Number

Catalog L-500

REGO® PRODUCTS

LP-GAS & ANHYDROUS AMMONIA EQUIPMENT

ECII® Engineered Controls International, Inc.

Section G

Internal Valves and Accessories

Limited Warranty and Limitation of Liability

LIMITED WARRANTY
Engineered Controls International, Inc. warrants products and repair kits manufactured by it to be free from defects in materials and workmanship under normal use and service for a period of 12 months from the date of installation or operation or 18 months from the date of shipment from the factory, whichever is earlier. If within thirty days after buyer's discovery of what buyer believes is a defect, buyer notifies Engineered Controls International, Inc. thereof in writing, Engineered Controls International, Inc., at its option, and within forty-five days, will repair, replace F.O.B. point of manufacture, or refund the purchase price of that part or product found by it to be defective. Failure of buyer to give such written notice within thirty days shall be deemed an absolute and unconditional waiver of any and all claims of buyer arising out of such defect.

This warranty does not extend to any product or part that is not installed and used in accordance with Engineered Controls International, Inc.'s printed instructions, all applicable state and local regulations, and all applicable national standards, such as those promulgated by NFPA, DOT and ANSI. This warranty does not extend to any product or part that has been damaged by accident, misuse, abuse or neglect, nor does it extend to any product or part which has been modified, altered, or repaired in the field.

Except as expressly set forth above, and subject to the limitation of liability below, Engineered Controls International, Inc. makes NO OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, with respect to its products and parts, whether used alone or in combination with others. Engineered Controls International, Inc. disclaims all warranties not stated herein.

LIMITATION OF LIABILITY
Engineered Controls International, Inc.'s total liability for any and all losses and damages arising out of any cause whatsoever shall in no event exceed the purchase price of the products or parts in respect of which such cause arises, whether such cause be based on theories of contract, negligence, strict liability, tort or otherwise.

Engineered Controls International, Inc. shall not be liable for incidental, consequential or punitive damages or other losses. Engineered Controls International, Inc. shall not be liable for, and buyer assumes liability for, all personal injury and property damage connected with the handling, transportation, possession, further manufacture, other use or resale of products, whether used alone or in combination with any other products or material.

If Engineered Controls International, Inc. furnishes technical advice to buyer, whether or not at buyer's request, with respect to application, further manufacture or other use of the products and parts, Engineered Controls International, Inc. shall not be liable for such technical advice and buyer assumes all risks of such advice and the results thereof.

NOTE: Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. The warranty gives you specific legal rights, and you may have other rights that vary from State to State. The portions of this limited warranty and limitation of liability shall be considered severable and all portions which are not disallowed by applicable law shall remain in full force and effect.

WARNING
All Engineered Controls International, Inc. products are mechanical devices that will eventually become inoperative due to wear, corrosion and aging of components made of materials such as rubber, etc. The environment and conditions of use will determine the safe service life of these products. Periodic inspection and maintenance are essential to avoid serious injury and property damage.

Many Engineered Controls International, Inc. products are manufactured components which are incorporated by others on or in other products or systems used for storage, transport, transfer and otherwise for use of toxic, flammable and dangerous liquids and gases. Such substances must be handled by experienced and trained personnel only, using accepted governmental and industrial safety procedures.

NOTICE TO USERS OF PRODUCTS
The Limited Warranty stated above is a factory warranty to the first purchasers of Engineered Controls International, Inc. products. Since most users have purchased these products from Engineered Controls International, Inc. distributors, the user must within thirty (30) days after the user's discovery of what user believes is a defect, notify in writing the distributor from whom he purchased the product/parts. The distributor may or may not at the distributor's option choose to submit the product/parts to Engineered Controls International, Inc., pursuant to its Limited Warranty. Failure by buyer to give such written notice within thirty (30) days shall be deemed an absolute and unconditional waiver of buyer's claim for such defects. Acceptance of any alleged defective product/parts by Engineered Controls International, Inc.'s distributor for replacement or repairs under the terms of Engineered Controls International, Inc.'s Limited warranty in no way obligates Engineered Controls International, Inc. to the terms of the above warranty.

Because of a policy of continuous product improvement, Engineered Controls International, Inc. reserves the right to change designs, materials or specification without notice.

Foreword

This catalog describes a complete line of equipment available from Engineered Controls International, Inc. for use with LP-Gas and anhydrous ammonia (NH_3). The following points are important to know for proper use of the catalog:

1. *Illustrations and drawings of individual products are representative of "product groups" and all products within a product group are similar in construction.*
2. *Materials used for construction of products in this catalog are suitable for rated service pressure at temperatures of -40° F. to +165° F., unless otherwise specified.*
3. *Products in this catalog are only intended for use in LP-Gas and/or anhydrous ammonia service as follows.*
   - **a.** *"A" or "AA" prefix — Products with this prefix are suitable for NH_3 service (i.e., contain no brass parts).*
   - **b.** *"AA" prefix on relief valves — These valves are NOT suitable for use with LP-Gas service. These are of partial aluminum materials and are listed by Underwriters Laboratories (UL) for NH_3 service only.*
   - **c.** *All other products are suitable for use with LP-Gas service.*
   - **d.** *"SS" prefix—Hydrostatic relief valve with this prefix are suitable for NH_3 service (i.e., they have stainless steel materi-*

Caution

Do not use any product contained in this catalog with any service commodity other than LP-Gas or NH_3. If you have a need for use of another application, contact Engineered Controls International, Inc., 100 RegO Drive, Elon, NC 27244, (336) 449-7707 before proceeding.

Proper application, installation and maintenance of products in this catalog are essential. Users of these products should obtain further information if there are any doubts or questions.

Warning

All ECII® products are mechanical devices that will eventually become inoperative due to wear, corrosion and aging of components made of materials such as rubber. The environment and conditions of use will determine the safe service life of these products. Periodic inspection and maintenance are essential to avoid serious injury and property damage.

Many ECII® products are manufactured for storage, transport, transfer and use of toxic flammable and dangerous liquids and gases. Such substances should be handled by experienced and trained personnel only, using accepted governmental and industrial safety procedures. Never vent LP-Gas near any possible source of ignition.

Notice

Installation, usage, and maintenance of all ECII® products must be in compliance with all Engineered Controls International, Inc. instructions as well as requirements and provisions of NFPA #54, NFPA#58, DOT, ANSI, and all applicable federal, state, provincial and local standards, codes, regulations, and laws.

Inspection and maintenance on a periodic basis is essential. Installation and maintenance should be performed only by qualified personnel.

Be sure all instructions are read and understood before installation, operation and service.

Filters

ECII® LP-Gas equipment is designed to operate in a system free from contamination. A variety of in-line filters are commercially available to the LP-Gas industry for installation in domestic systems.
The use of an in-line filter should be considered when other system components may be unclean and the system contaminated by rust, scale, dirt, debris or other foreign material.

Contents

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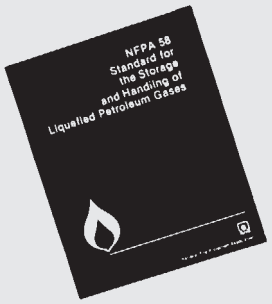
LP-Gas Internal Valves

Safety Warning



Purpose

In its continuing quest for safety, Engineered Controls International, Inc. publishes a series of bulletins explaining the hazards associated with the use, misuse, and aging of LP-Gas valves and regulators. It is hoped that these factual bulletins will make clear to LP-Gas dealer managers and service personnel, that the utmost care and attention must be used in the installation, inspection, and maintenance of these products, or problems could occur which would result in injuries and property damage.

The National Fire Protection Association Pamphlet #58, "Storage and Handling of Liquified Petroleum Gases" states in section 1-6 that "In the interest of safety, all persons employed in handling LP-Gases shall be trained in proper handling and operating procedures". These "ECII® Safety Warnings" may be useful in training new employees and reminding older employees of hazards that can occur.

It is recommended that all employees be furnished with a copy of NPGA Safety Pamphlet 306-88 "LP-Gas Regulator and Valve Inspection and Maintenance, 111-81 Limitations of Excess Flow Check Valves for LP-Gas, and 113-78 Safety Considerations in Bobtail Deliveries."

Nature of Warnings

It is recognized that warnings should be as brief as possible, but the factors involved in internal valve and excess flow valve failures to perform are not simple. They need to be fully understood. If there is a simple warning, it would be:

Make sure that the internal valve's excess flow feature really closes when the flow exceeds rated closing flow, and that the valve will shut-off.

This bulletin is not intended to be an exhaustive treatment of internal valves, and certainly does not cover all safety practices that should be followed in installation, operation and maintenance of LP-Gas systems, which include internal valves.

Internal valves must be closed on Cargo Vehicles when traveling on public roads and highways. The valve should only be open when pumping. Per MC 330 or 331, internal valves must also be equipped with remote closure system, when used on transports or bobtails.

There are two types of internal valves being used on storage tanks, transports and bobtails — spring loaded internal valves and differential pressure internal valves. They both provide positive shut-off when product is not being withdrawn and may include excess flow protection for the system during transfer operations.

Spring Loaded Internal Valves

Spring loaded internal valves are manually opened by levers, by means of fuse linked cable mechanisms or pneumatic or hydraulic actuators. They incorporate an excess flow feature that will close the valve when the flow through the valve exceeds its rate of flow. **These valves should never be locked open by means of wires, chains, pegs or other devices.**

Testing

Testing should be completed on a periodic basis.

1. To check operation of a spring loaded valve, activate the remote control to close the valve while unit is pumping. If the meter indicator flow continues, the valve should be repaired immediately.
2. Testing excess flow feature.
   The National Propane Gas Association Safety Bulletin #113-78 states: "In order to test an excess flow valve in a piping system, the flow through the valve must be made to exceed the valve's closing rating."

This testing should only be attempted by trained personnel familiar with the process. If no one at the facility has experience in proper testing, outside expert help should be obtained.

The exact procedure used may vary with the installation, advisability of gas discharge and availability of equipment.

In general, most testing makes use of the fact that the excess flow valves are "surge sensitive" and will close quicker under a sudden flow surge than under steady flow. A sufficient surge can often be created by using a quick open/close valve to control sudden, momentary flow into a tank or piping section containing very low pressure. An audible click from the excess flow valve (and corre-

sponding stoppage of flow) indicates its closure.

> A test involving venting gas to the atmosphere is hazardous and may be impractical, or illegal.

Any test of any excess flow valve will not prove that the valve will close in an emergency situation, due to reasons cited before. This test will only check the valves condition, and the flow rate sizing for those test conditions.

3. Tight Shut-Off — A test should be made to insure the internal valve will give a gas tight seal when the valve is in the closed position. This will require removal of all product downstream from the internal valve, to insure the valve will give 100% seal when in the closed position. If the internal valve does not give 100% seal the valve should be repaired immediately.

Pressure Differential Internal Valves (Flomatics)

Pressure differential valves (Flomatics) open by pump pressure and close when the pump stops.

These valves must never be locked open by means of wires, chains, pegs or other devices.

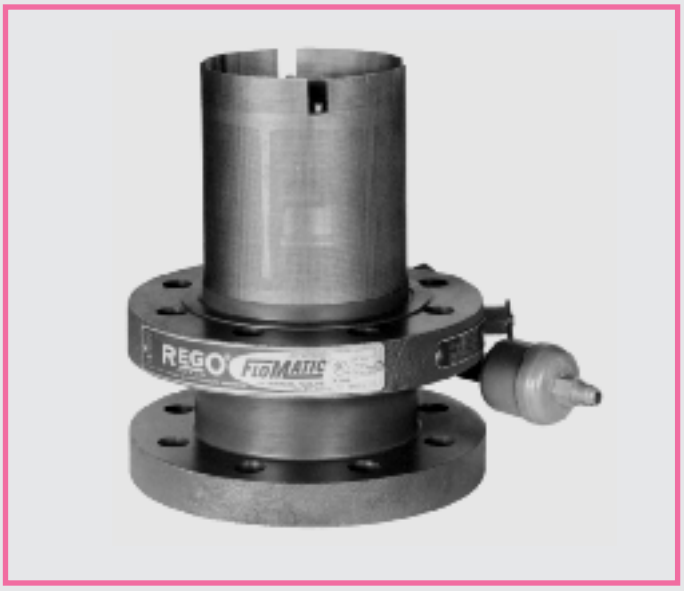
Testing

Testing should be completed on a periodic basis.

1. To check operation of a differential pressure internal valve activate the remote control shut-off valve while the unit is pumping. If the meter indicates that flow continues the valve should be repaired immediately.
2. Since the differential pressure internal valve requires at least 18 psi to open and 8 psi over container pressure to keep open, a test may be performed to check for closure. With the PTO disengaged, connect delivery hose to a container with very low pressure. Then with hose end valve open, engage PTO. The internal valve should remain closed, no flow should be detected through the meter. If flow continues through the meter the valve should be repaired immediately.
3. Tight Shut-Off — A test should be made to insure the internal valve will give a gas tight seal when the valve is in the closed position. First insure the pump prime valve is closed by turning clockwise until it seats. Then with the valve closed (PTO disengaged) the product downstream from the internal valve will have to be safely removed. If the internal valve does not give 100% seal, the valve should be repaired immediately.

General Warning

All ECII® Products are mechanical devices that will eventually become inoperative due to wear, contaminants, corrosion and aging of components made of materials such as metal and rubber.
The environment and conditions of use will determine the safe service life



of these products. Periodic testing at least once a year when tank pressures are low and maintenance, as required, are essential.

Because ECII® products have a long and proven record of quality and service, LP-Gas dealers may forget the hazards that can occur because an excess flow valve is used beyond its safe service life. Life of an excess flow valve is determined by the environment in which it “lives”. The LP-Gas dealer knows better than anyone what this environment is.

NOTE: There is a developing trend in state legislation and in proposed national legislation to make the owners of products responsible for replacing products before they reach the end of their safe useful life. LP-Gas dealers should be aware of legislation which could effect them.

Manual Internal Valves

A3200 Series

General Information

Manual Internal Valves are designed for a variety of uses in LP-Gas and anhydrous ammonia service. In addition, accessories allow most of them to be actuated manually, by cable or with air.

Installation, usage and maintenance of this product must be in compliance with all Engineered Controls International, Inc. instructions, as well as requirements and provisions of NFPA # 58, DOT, ANSI, and all applicable federal, state, provincial, and local standards, codes, regulations and laws.

These valves must remain in the closed position except during product transfer. A line break downstream of the pump may fail to actuate the excess flow valve as the pump may limit flow. If break occurs in the system, or the excess flow closes, immediately shut down the system.

Inspection and maintenance on a periodic basis is essential. Installation and maintenance must be performed only by qualified personnel.

Be sure all instructions are read and understood before installation and operation of these valves.

How The Valves Work

Refer to the drawings. View “A” shows the valve held closed without leakage by tank pressure and the valve’s closing spring. Actuation of the operating handle alone does not open the valve, it only allows pressure to equalize between the inlet and outlet of the valve by rapid bleeding of the product downstream. This equalized pressure then allows the valve to open via the internal spring.

The valve opens by moving the handle to mid-point, see view “B”. This position allows the actuator to put the equalizing portion of the valve stem in the pilot opening, allowing more product to bleed downstream than if the handle was fully open.

In a few seconds, the tank and downstream pressure will be nearly equal. The excess flow spring will push the main poppet to the open position, see view “C”, the handle should then be moved to the fully open position.

If at first, the handle is quickly moved to the fully opened position, the pilot valve allows a small amount of bleed downstream, but much less than during rapid bleed (view “B”). This results in a longer pressure equalizing time before the main valve can open.

NOTE:

The main poppet will not open until outlet pressure approximates tank pressure!

Once the main poppet is open, flow greater than the excess flow rating, or a sufficient surge in flow, forces the main poppet closed against the excess flow spring, as seen in view “D”. The pilot valve in this position is open and allows a small amount of bleed downstream, but much less than during rapid bleed (view “B”).

When the operating handle is moved to the closed position, the valve closes and a leak-tight seal is re-established as seen in view “A”.

NOTE:

To provide excess flow protection, the flow rating of the pump, piping, valves, fittings, and hose on the inlet and outlet sides of the valve must be greater than the flow rating of the valve. Any restrictions that reduce the flow to less than the excess flow valve rating will result in the excess flow valve not operating when required.

Valve Operation and Precautions

1. Valve must be opened before starting pump, and before opening valve on pump outlet.
2. Leave pumping system “wet” to avoid drying of seals and to reduce time involved in opening valve. Drain piping only when required by codes or safe operating practices.
3. When piping is dry or at lower pressure than the tank, open valve half-way for a few seconds to allow line pressure to equalize before fully opening the valve handle. The main poppet may not open immediately if the handle is placed in the open position too quickly.
4. Flow surges may close the built-in excess flow valve and should be avoided. If the valve slams shut, immediately stop the pump, close the nearest downstream valve, and move handle to midpoint position to equalize pressure until valve reopens with a click, then restart pump and open downstream valve slowly.
5. Always keep valve closed except during product transfer.
6. Completely open all valves during pumping. Partially closed or throttle type valves may prevent excess flow valve from closing when required, even in a properly designed piping system.
7. All personnel must be aware of remote closure locations and their operation in case of emergency. They must also be aware of the equalizing opening through which bleeding can occur after the excess flow valve closes. If this bleed is not stopped by closing a downstream valve, a hazard may occur.
8. Never, under any circumstances, permanently wire open the operating handle of the internal valve.

Cable Control System

The cable control system employed must meet the requirements and be in accordance with the provisions of NFPA #58, DOT, ANSI, and all applicable federal, state, provincial and local codes.

Troubleshooting

1. Internal Valve Will Not Open.

   Causes may be excess leakage downstream, pump engaged too quickly, excessive wear of valve, or ice freezing of poppet.

   When there is excessive volume downstream, a greater amount of time is required to equalize tank and downstream pressure.

   To determine if the pilot seat is opening, install a pressure gauge downstream of valve outlet, open any hand valves between valve and pressure gauge, and open valve. Pilot seat is not opening if pressure does not build up to tank pressure. Perform this test with pump off. A broken internal part may cause pilot seat not to open.

   If operating handle rotates past the full open position, there is internal malfunctioning, and the valve must be disassembled and repaired.

2. Premature Valve Closure.

   First, check to see that operating lever is properly connected and fully opens valve. Premature closure may also be a result of engaging pump too quickly, sudden line surges, an underrated excess flow spring or an obstructed inlet port.

3. Valve Will Not Close.

   Usually a result of faulty or sticking actuator. First, check the actuator to see that it works freely by disconnecting it from valve handle and cycling it several times. Also, operate valve handle manually. If it sticks in the open position, replace the packing and bushings. This should free the operating mechanism providing the valve has no internal damage.

4. Low Flow Capacity

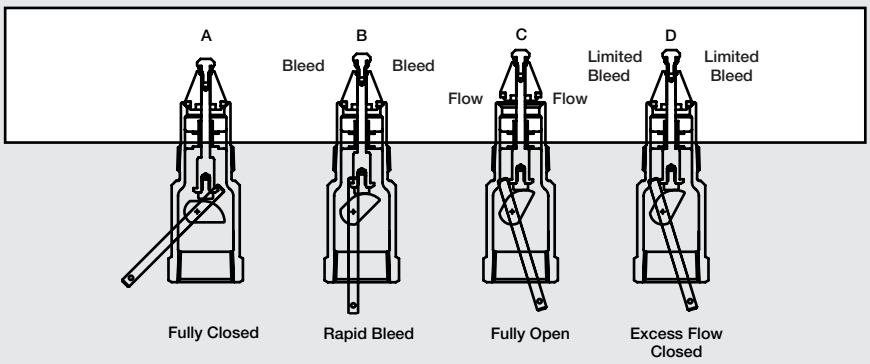
   Downstream piping may be too small and/or long, screen or strainer may be plugged, possible restriction downstream, or a bypass valve stuck in the open position are causes of low flow. Also, the bypass valve may be set too low and prematurely opening. Check for high differential pressure across the bypass valve. If bypass valve is open, the differential across the valve should not exceed 5 to 6 psig.

Maintenance

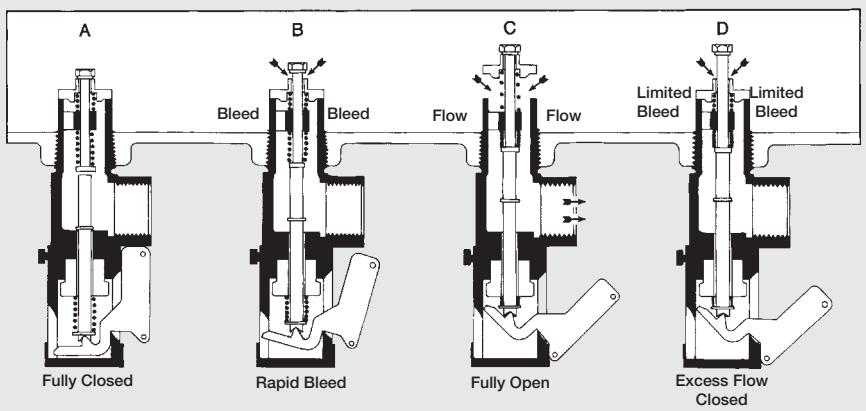
Potential problems may be eliminated with preventive internal valve maintenance. Perform the following steps once a month:

1. Check to see that the operating lever moves freely and smoothly. There should be no leakage around the lower stem or seal housing. Leakage requires replacement of the seal housing packing. A sticking lever indicates trapped foreign material or mechanism wear.
2. Check both seat discs for tight closure. Close valve and exhaust downstream pressure. Be sure piping is warmed to an ambient temperature. Close the first downstream valve and note pressure buildup between the closed valves with a pressure gauge. If leakage occurs, replace both seat discs.
3. Inspect, clean and oil all operating controls. Check controls to see that they open fully, but do not overtravel the valve operating lever. See that they work freely to close the valve. Worn parts should be replaced.
4. Remove valve if the tank is to be steam cleaned. Heat may damage the valve's seals.
5. Valve is not designed for water service. After tank is hydrostatically tested, immediately remove all water and allow tank to thoroughly dry out before installing valve.

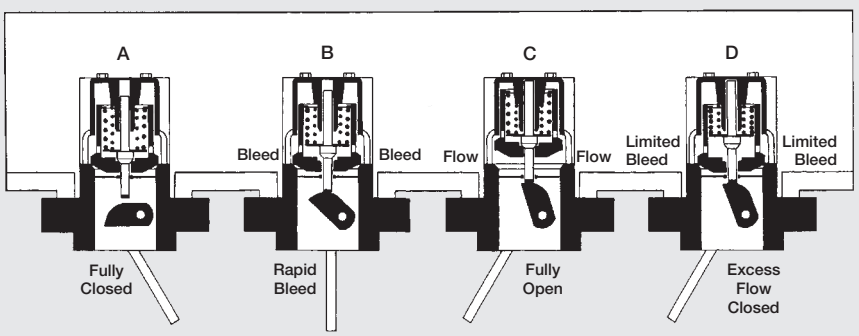
A3209R Series, 1¼" Straight
A3212R Series, 2" Straight
A3213A Series, 3" Straight
A3212RT Series 2" Tee Body
A3213T Series 3" Tee Body



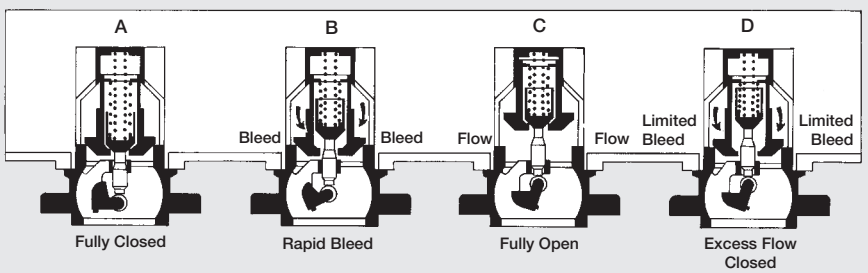
A3210A Series, 1¼" Angle



A3217F Series, 3" Flanged
A3217DF Series,
3" Double Flanged



A3219F Series, 4" Flanged



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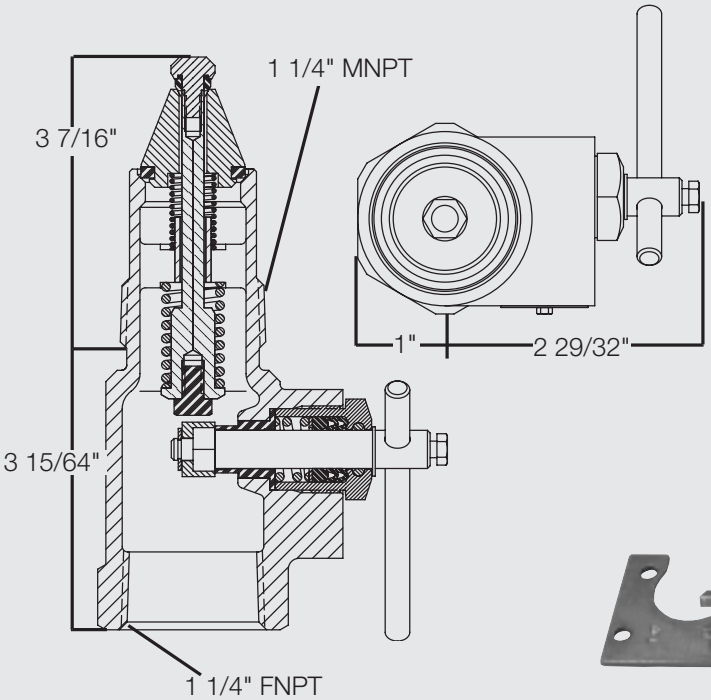
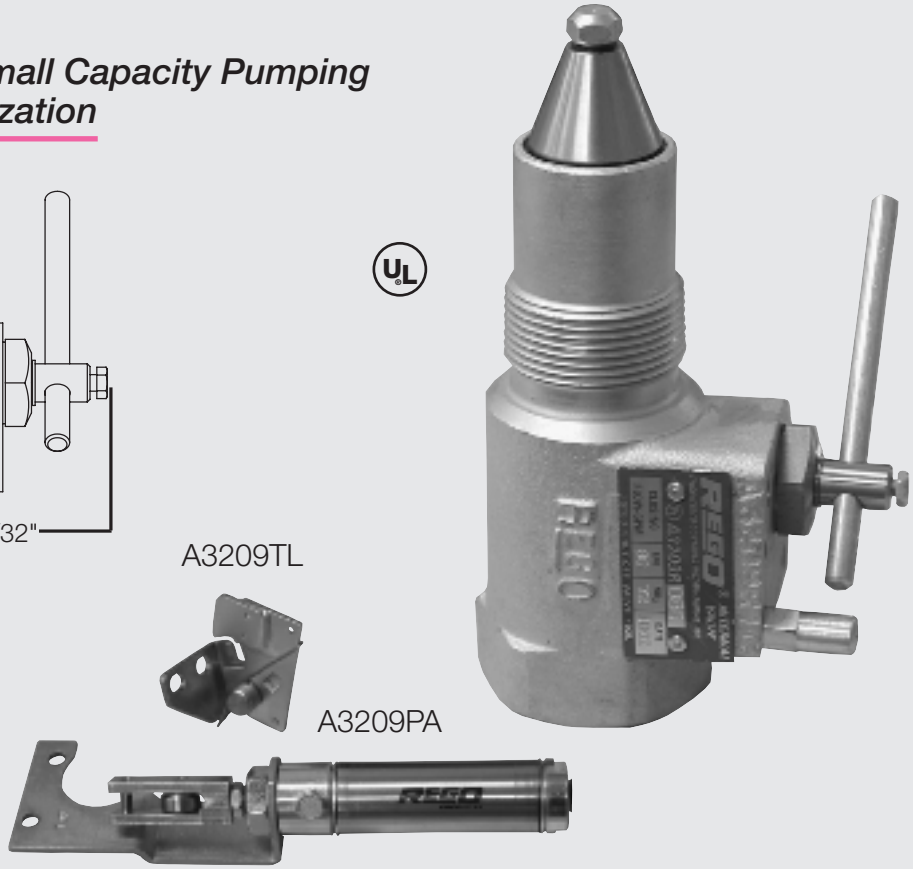
1¼" Threaded Internal Valve for Small Capacity Pumping Systems and Bobtail Vapor Equalization

A3209R Series





Application

Designed primarily for use with LP-Gas and anhydrous ammonia as a main valve on small capacity pumping systems, NH_3 nurse tanks and in-line installations. It may also be installed in the vapor equalizing opening on bobtail delivery trucks. Installation is quick and easy, and it fits in both full and half couplings, as well as, in-line applications. The valve may be actuated manually by hand or cable.

Features

- Valve is compact, with one piece body construction.
- Spring loaded V-packing with heavy duty wiper ring on operating shaft for dependable leak-free construction.
- Nylon bearing supported operating shaft provides smooth, easy operation.
- Simple operating lever allows for easy connection of cable controls.
- Built in excess flow valve
- Return spring forces the valve to the closed position when the lever is released.
- All critical operating components are located in the valve body and inside the container coupling for maximum protection against damage.
- Midway stem position allows for quick pressure equalization.
- Equipped with 212° F, UL listed fuse link for thermal protection.

Materials

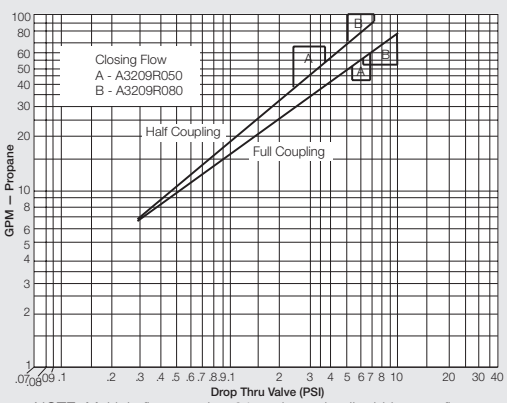
Body ..... Ductile Iron
Operating Lever ..... Cadmium Plated Carbon Steel
Stem ..... Stainless Steel
Springs .....Stainless Steel
Shaft Bearing ..... Nylon
Seat Disc ..... Synthetic Resilient Rubber

A3209TL Thermal Latch Accessory

Designed especially for use with the A3209A050 Internal Valve. When the valve's operating lever is moved to open position, a spring loaded latch automatically holds the lever open. If exposed to fire or extreme heat, the built-in 212°F fusible element is designed to melt and return the operating lever to the closed position. Latch is easily installed while valve is "in-line". Accommodates convenient and versatile release cable installations.

A3209PA Pneumatic Actuator

Designed especially for use with the A3209A050 Internal Valve. Provides a convenient means of opening and closing the valve from a remote location. Easily installed while valve is "in-line". Operates with pressures from 40 to 200 psig.



NOTE: Multiply flow rate by .94 to determine liquid butane flow and by .90 to determine liquid anhydrous ammonia flow.

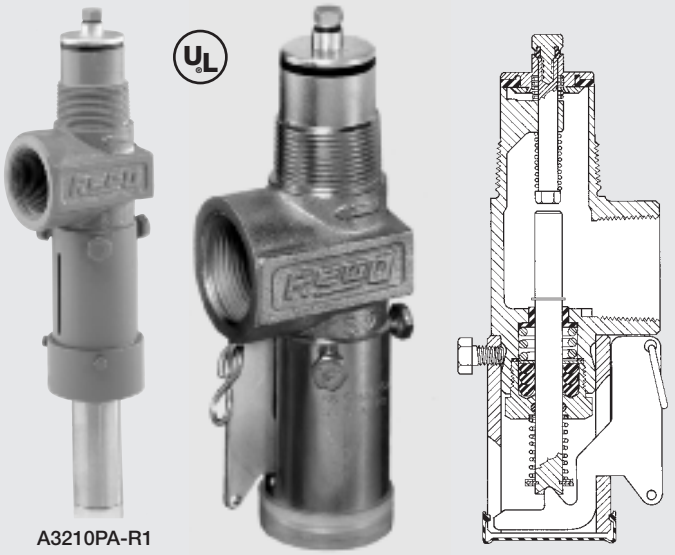
Ordering Information

Part Number	Inlet Connection M. NPT	Oulet Connection F. NPT	Closing Flow		LP-Gas Vapor Capacity** (SCFH/Propane)		Accessories	
			LP-Gas	NH3	25 PSIG Inlet	100 PSIG Inlet	Thermal Latch	Pneumatic Actuator
A3209R050	1 1/4"	1 1/4"	50	45	13.300	22,900	A3209TL	A3209PA
A3209R080	1 1/4"	1 1/4"	80	72	15,700	26,700	A3209TL	A3209PA

*Installs in full or half coupling.
**Data for flow in half coupling.

1¼" Threaded Angle Internal Valve for Motor Fuel Dispensers and Small Capacity Pumping Systems

A3210A Series



A3210PA-R1

Application

Designed primarily for use with LP-Gas and anhydrous ammonia as a main valve on pump systems with small capacity, such as motor fuel dispensers. It may also be installed in bottom liquid withdrawal openings in NH_3 nurse tanks or the vapor equalizing opening of bobtail delivery trucks. Installation is quick and easy, and must be installed in a modified half coupling or the equivalent. The valve may be actuated manually by cable or pneumatically.

Features

Right Angle Design/External Actuator

- Accommodates compact piping arrangements, especially in motor fuel dispensing units.
- Eliminates the need for extra fittings.
- Simple external cam actuator allows higher flow capacity and is fully maintained without evacuating the system or removal of the valve.

Large Unobstructed Flow Channel:

- Allows for higher flow capacity and higher pumping rates due to an extremely low pressure drop.
- Eliminates actuator and packing from the flow stream.
- High closing flow of 65 GPM/propane.

Unique Swivel Actuator

- Rotates to accommodate most mounting locations for cable control systems.
- Easily adjustable once valve is installed.
- Easily converted in-line to pneumatic actuation.

Quality Construction

- Cadmium plating helps resist corrosion during storage and use.
- Spring loaded chevron seals for more trouble-free operation and longer life.
- Teflon packing.
- Equipped with 212° F., UL listed fuse link for thermal protection.
- Built-in excess flow valve.
- Specify RegO® Internal Valves on your next new tank or when your tank is rebuilt.

Materials

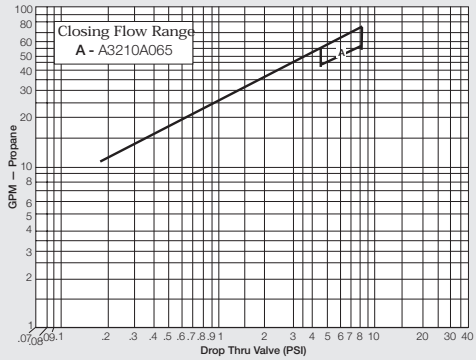
Body ..... Cadmium Plated Ductile Iron
Operating Lever ..... Cadmium Plated Carbon Steel
Stem ..... Stainless Steel
Springs .....Stainless Steel
Seat Disc ..... Resilient Synthetic Rubber

A3210PA-R1 Pneumatic Actuator

The A3210PA-R1 Pneumatic Actuator is designed especially for use with the A3210A 1¼" Right Angle Internal Valve. Provides a convenient means of opening and closing the valve from a remote location, especially in LP-Gas motor fuel dispenser applications.

Features

- Easily installed on internal valve "in-line."
- Rotates to accommodate most any piping configuration.
- Ideal for providing automatic actuation of the valve in "credit card" fuel dispenser systems.
- Operates with pressures of 40-200 psig.



NOTE: Multiply flow rate by .94 to determine liquid butane flow and by .90 to determine liquid anhydrous ammonia flow.

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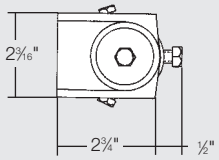
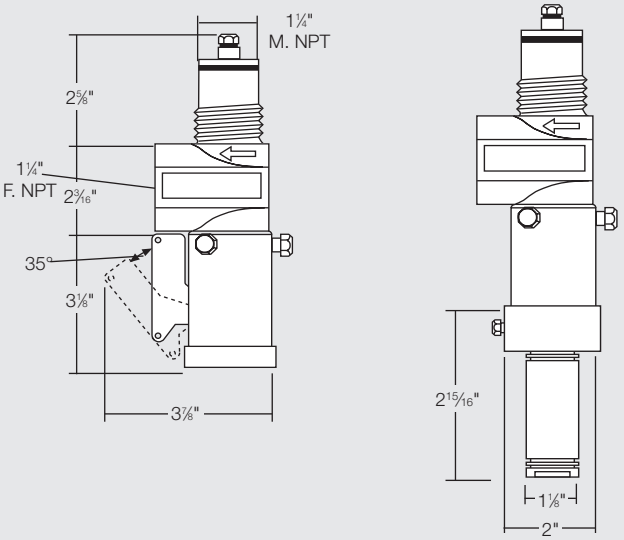
Ordering Information

Part Number	Inlet Connection M. NPT	Outlet Connection F. NPT	Closing Flow (GPM)		LP-Gas Vapor Capacity (SCFH/Propane)				Accessories
			LP-Gas	NH_3	25 PSIG Inlet	50 PSIG Inlet	75 PSIG Inlet	100 PSIG Inlet	Pneumatic Actuator
A3210A065	1¼"	1¼"	65	58.5	17,000	22,250	26,500	30,000	A3210PA-R1

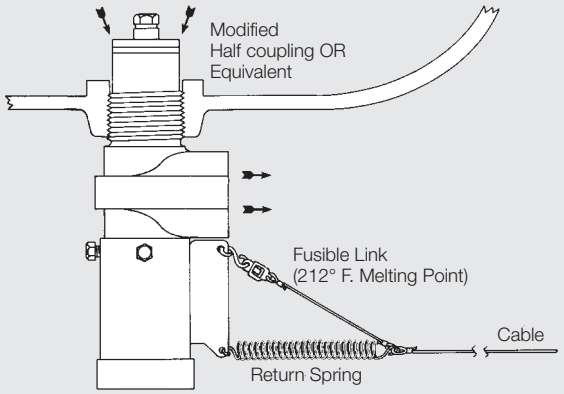
* For use in half coupling only, 1½" diameter minimum bore. If welded-in dip pipe is required, use of 1½" schedule 40 pipe is recommended –flow will be reduced by approximately 10%.

1¼" Threaded Angle Internal Valve for Motor Fuel Dispensers and Small Capacity Pumping Systems





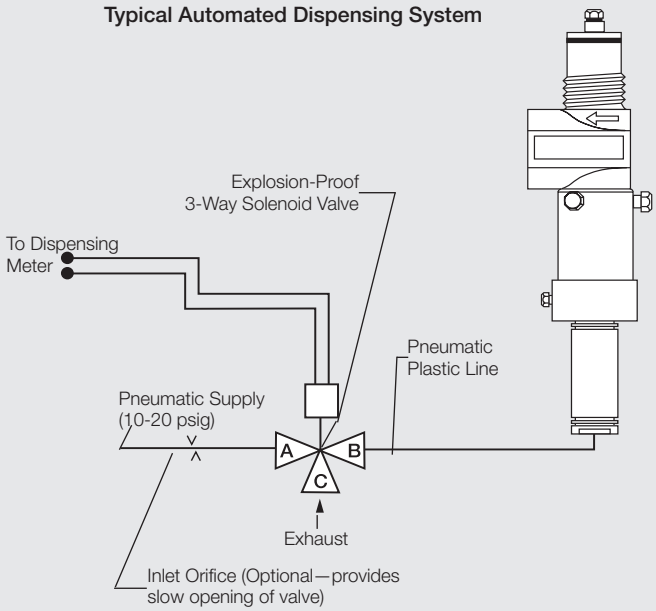
Typical Valve Installation



The cable control system selected must operate the valve without restricting free closing of the operating lever. One suggested method employs a simple return spring to overcome cable system friction.

The level housing may be rotated 360° to accommodate actuation by cable from any direction. This is done by loosening the retaining screws, rotating the housing to the desired position, and securely re-tightening the screws.

Typical Automated Dispensing System

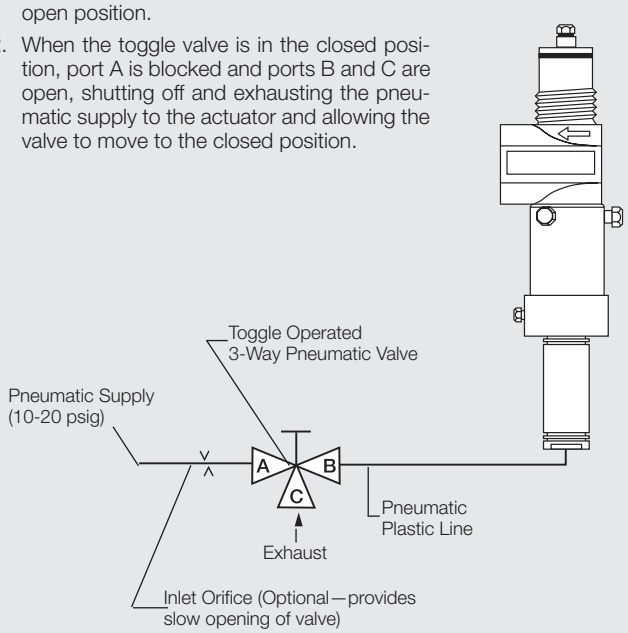


1. The explosion-proof 3-way solenoid valve is opened and closed by the meter. When the meter is actuated, by a key card for example, contacts in the meter opening valve initiate a time delay sequence that starts the pump and opens the solenoid valve. When the meter is stopped, the pump shuts off and the solenoid valve closes.
2. The system opens and closes the 3-way solenoid valve automatically and the remaining operation follows steps one and two in the standard system sequence.

NOTE: Plastic pneumatic line is recommended between the actuator and toggle valve to provide for thermal protection in case of a fire. The line should melt and exhaust the pneumatic supply to the actuator allowing the valve to go to the closed position.

Typical Standard Actuating System

1. When toggle valve is in the open position, ports A and B are open and port C is blocked, allowing the pneumatic supply to reach the actuator and push the valve to the open position.
2. When the toggle valve is in the closed position, port A is blocked and ports B and C are open, shutting off and exhausting the pneumatic supply to the actuator and allowing the valve to move to the closed position.

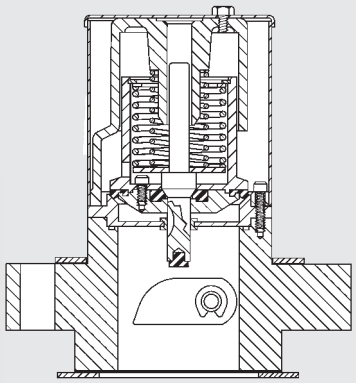


3" Flanged Internal Valve for Bobtail Delivery Trucks, Transports, and Large Stationary Storage Tanks

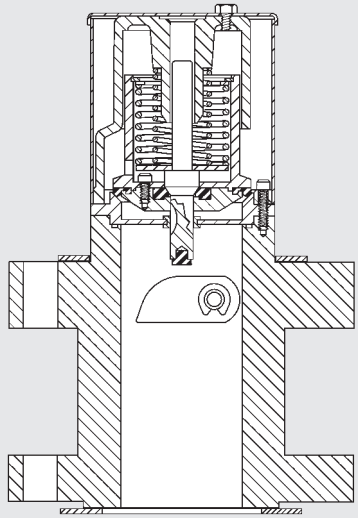
A3217 Series

A3217 FR Series

A3217FPA on A3217FR
Single Flange Valve



A3217FR & FL Series
Single Flange



A3217DFR & DFL Series
Double Flange

Application

Designed primarily for LP-Gas and anhydrous ammonia filling and/or withdrawal on MC331 bobtail delivery trucks, transports and stationary storage tanks with flanged pumps or piping. Installation is quick and easy, and the valve may be operated manually by cable or pneumatically.

Lever available on right or left side to allow for installation without the use of an extra pulley.

Features

Provides More Efficient Operation

- Flow passages designed to allow substantially higher pumping rates without cavitation or loss of efficiency--saving time and money.
- Simple operating lever facilitates easy adaptation of all cable controls.
- Lever available on right or left side to allow for installation without the use of an extra pulley.
- Nylon bearing supported operating shaft provides smooth, easy operation.

Less Frequent-Easier Maintenance

- Easily replaceable nickel chrome plated seat insert eliminates need for expensive remachining of valve body when overhauled.
- Stainless steel screws resist rusting and are easily removed during valve disassembly.
- Strainer sits on the top flange of the valve's seat insert, making removal of the valve easier. It completely covers the top of the valve to help keep out sediment and foreign material.
- Heavy duty rod wiper helps minimize dirt and foreign material from entering operating shaft and hampering operation.

Durable Construction

- Cadmium plating helps resist corrosion during storage and use.
- Main disc retaining screws are installed from the top down to help minimize the chance of loose screws entering and damaging the pump.
- All ferrous materials with a temperature range of -40° F. to +130° F. and a pressure rating of 400 psi w.o.g.
- Sturdy retaining ring secures operating cam to provide for more durable, slack-free operation.
- Built-in excess flow valve.
- Specify RegO® Internal Valves on your next new tank body or when your tank is rebuilt.

Ordering Information

Part Number		Operating Lever Position	Inlet Connection	Outlet Connection	Closing Flow GPM		Accessories
Single Flange Body	Double Flange Body				LP-Gas	NH_3	Pneumatic Actuator
A3217FR160	**A3217DFR160**	Right Side	3" 300# ANSI RF Modified Flange**	3" 300# ANSI RF Flange	160	145	**A3217FPA**
A3217FL160	**A3217DFL160**	Left Side					**A3217FLPA**
A3217FR210	**A3217DFR210**	Right Side			210	190	**A3217FPA**
A3217FL210	**A3217DFL210**	Left Side					**A3217FLPA**
A3217FR260	**A3217DFR260**	Right Side			260	236	**A3217FPA**
A3217FL260	**A3217DFL260**	Left Side					**A3217FLPA**
A3217FR410	**A3217DFR410**	Right Side			410	372	**A3217FPA**
A3217FL410	**A3217DFL410**	Left Side					**A3217FLPA**

* Valve supplied with nuts and studs for mounting.
** Modified bore = 4⅜" diameter with 5¾" diameter raised face.

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3" Flanged Internal Valves for Bobtail Delivery Trucks, Transports, and Large Stationary Storage Tanks

Materials

Body and Valve Cage	Cadmium Plated Ductile Iron
Seat	Nickel Chrome Plated Steel
Strainer	Stainless Steel
Shaft	Stainless Steel
Pilot Valve Stem	Stainless Steel
Springs	Stainless Steel
Actuator Cam	Stainless Steel
Lever	Cadmium Plated Carbon Steel
Seat Disc	Resilient Synthetic Rubber

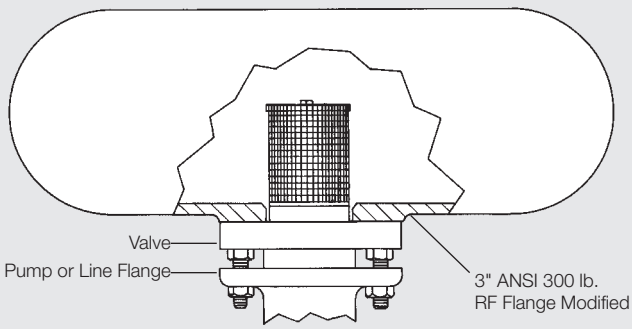
A3217FPA and A3217FLPA Pneumatic Actuators

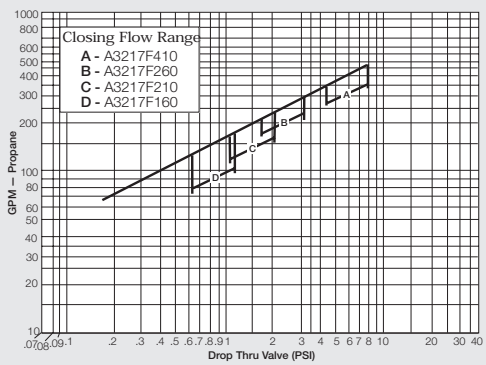
These Pneumatic Actuators are designed specifically for use with the A3217 Series 3" Internal Valves. The diaphragm design provides a convenient means of opening and closing the valve from a remote location, using either air or nitrogen.

Features

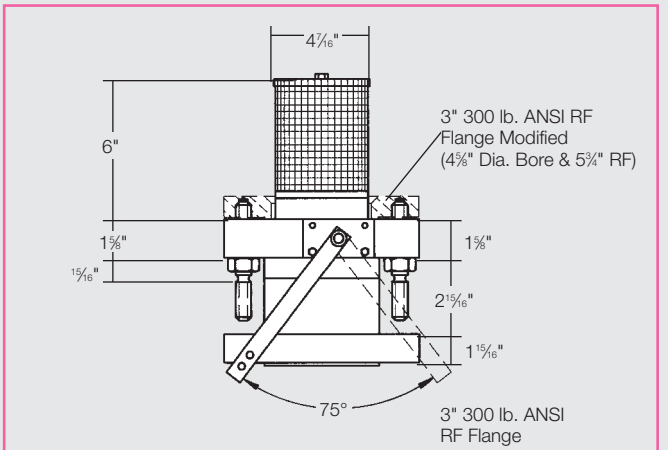
- Diaphragm type–no seals to leak.
- Easily installed on internal valve "in-line."
- Utilizes standard air brake chamber with proven performance over many years of heavy-duty truck/trailer applications.
- Compatible with existing air interlock systems.
- Operates with pressures of 50-150 psig.
- Thermal Fuse installed complies with DOT thermal protection requirements.

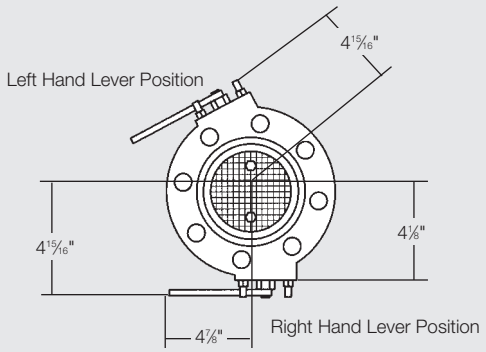
Typical Valve Installation

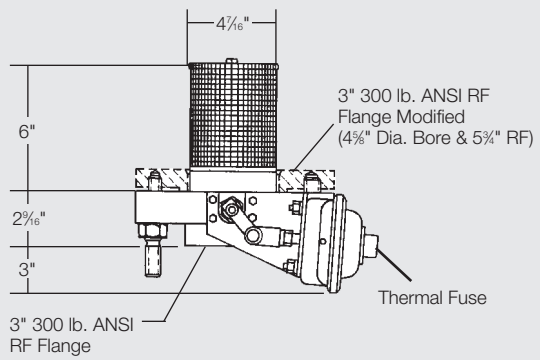


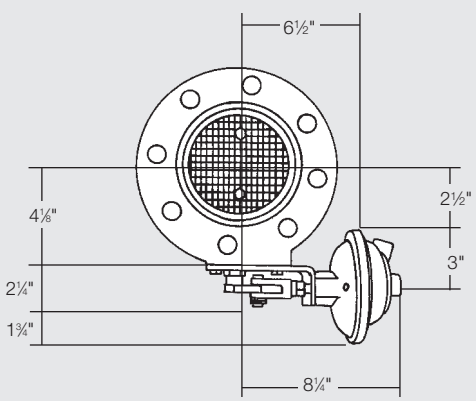


NOTE: Multiply flow rate by .94 to determine liquid butane flow and by .90 to determine liquid anhydrous ammonia flow.



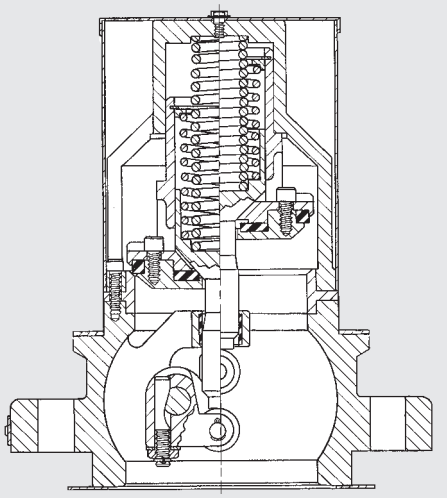






4" Flanged Internal Valve for Transports and Large Stationary Storage Tanks

A3219 Series



Application

Designed primarily for LP-Gas and anhydrous ammonia service on MC331 transport pressure vessels and large stationary storage tanks. Installation is quick and easy, and it fits in most existing tank flanges. The valve may be actuated manually or pneumatically.

Use of the A3219RT Remote Thermal Release with this valve is suggested to provide a remote means of mechanical closure along with thermal protection, as required by DOT MC331.

Features

Provides More Efficient Operation

- Flow passages designed to allow higher pumping rates without cavitation or loss of efficiency–-saves time and money.
- One piece, stainless steel pilot valve provides more accurate alignment for dependable operation.
- Remote release lever allows cables to run directly to opposite ends of vessel without pulleys or tubing.

Protects Your Pump

- Main disc retaining screws are installed from the top down to help minimize loose screws from entering and damaging the pump.
- Back-up cotter pin is designed to minimize the chance of a loosened actuator nut and washer from entering and damaging the pump.

Less Frequent-Easier Maintenance

- Easily replaceable chrome plated seat insert eliminates need for expensive remachining of valve body when overhauled.
- Stainless steel screws resist rusting and are easily removed during valve disassembly.
- Strainer completely covers the top of the valve to help keep out sediment and foreign material.
- Stainer seats at the top flange of the valve's seat insert, making removal of the valve easier.

Durable Construction

- Cadmium plating helps resist corrosion during storage and use.
- Taper pin lock secures the operating shaft to provide for more precise, trouble-free actuation.
- Built-in excess flow valve and thermal protection.
- Specify RegO® Internal Valves on your next new tank body or rebuild.

Materials

Body and Valve Cage ..... Cadmium Plated Ductile Iron
Handle ..... Cadmium Plated Ductile Iron
Seat ..... Nickel Chrome Plated Steel
Strainer ..... Stainless Steel
Stem ..... Stainless Steel
Pilot Valve Plug ..... Stainless Steel
Springs ..... Stainless Steel
Roller Actuator ..... Cadmium Plated Carbon Steel
Lever Assembly ..... Cadmium Plated Carbon Steel
Seat Disc ..... Resilient Synthetic Rubber

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Ordering Information

Part Number*	Inlet Connection	Outlet Connection	Closing Flow GPM		Accessories	
			LP-Gas	NH_3	Pneumatic Actuator	Remote Thermal Release
A3219F600L	4" 300# ANSI RF Modified Flange**	4" 300# ANSI RF Flange	600	544	A3219FPA	A3219RT (2)

* Valve supplied with 16 nuts and 8 studs for mounting.
** Modified bore = 5¼" diameter with 7" diameter raised face.

4" Flanged Internal Valves for Transports and Large Stationary Storage Tanks

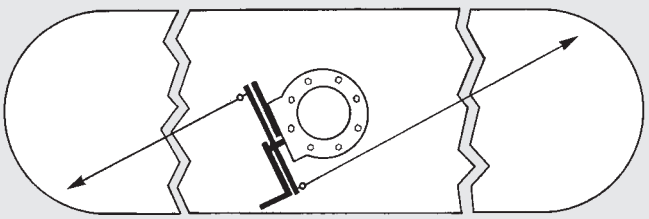
A3219FPA Pneumatic Actuator

The A3219FPA Pneumatic Actuator is designed especially for use with the A3219F600L 4" Flanged Internal Valves. The diaphragm type A3219FPA provides a convenient means of opening and closing the valve from a remote location, using either air or nitrogen, on LP-Gas and NH_3 transport trailers and stationary tanks.

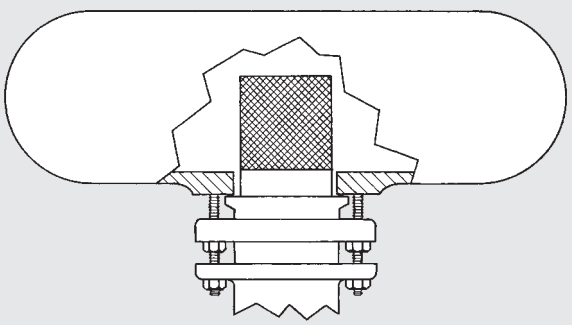
Features

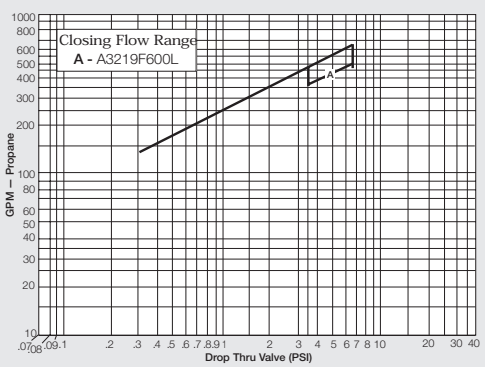
- Diaphragm type–no seals to leak.
- Easily installed on internal valve "in-line,"
- Utilizes standard brake actuator with time proven performance in heavy-duty truck/trailer applications.
- Compatible with existing air interlock systems.
- Operate with pressures of 50-150 psig.
- Thermal fuse installed in actuator complies with DOT thermal protection requirements.

Typical Valve Positioning

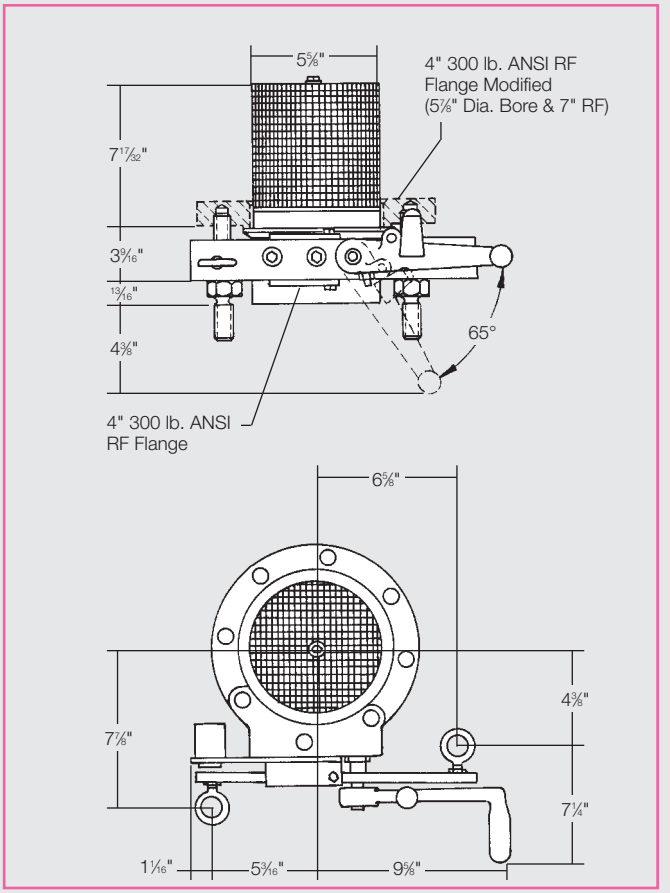


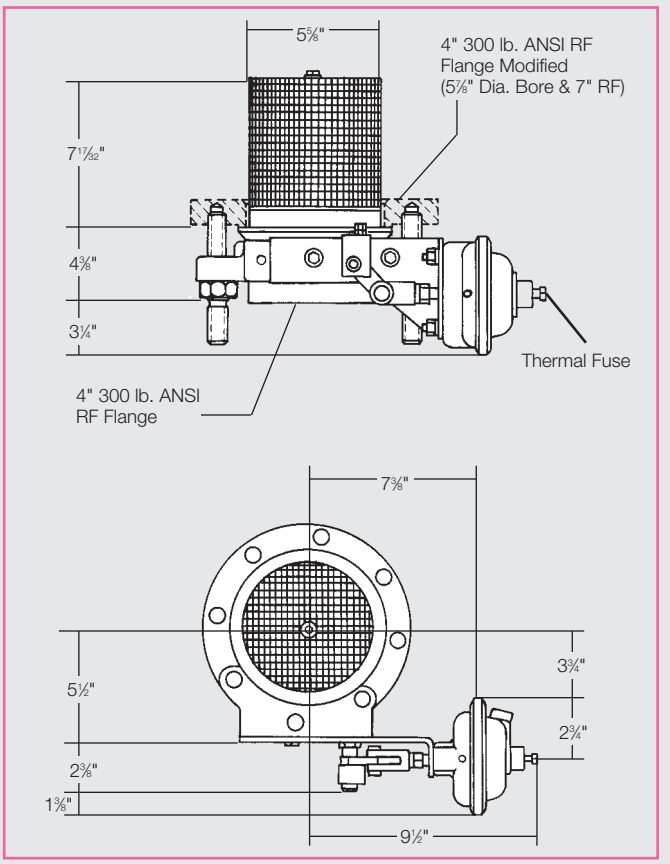
Typical Valve Installation





NOTE: Multiply flow rate by .94 to determine liquid butane flow and by .90 to determine liquid anhydrous ammonia flow.





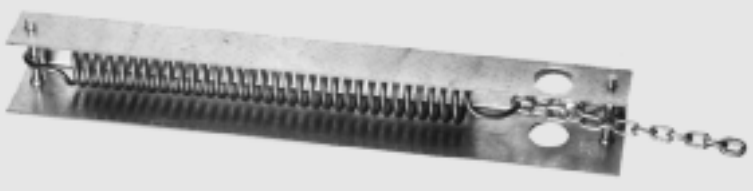
Remote Thermal Release for DOT MC331 Pressure Vessel

A3219RT

Application

Designed especially for use with Internal Valves installed in DOT MC331 pressure vessels. The A3219RT provides a remote means of mechanical closure along with thermal protection, as required by DOT MC331.

The A3219RT is connected by cable to the internal valve(s) on the vessel. In the event of extreme heat (over 212° F.), the fuse link will melt, causing the spring to contract and pull the cable. When properly installed the cable will trip the internal valve release lever(s) allowing the connected handle(s) to move to the closed position.



Features

- Meets DOT MC331 requirements.
- Easily installed, rugged formed steel bracket has open bottom to minimize dirt and water build-up.
- Heavy, shouldered pins lock into position.
- Stainless steel spring provides dependable performance with 100 lb. load.
- Heavy-duty chain adapts easily to standard cable and fittings.
- Fuse link has 212° F. release temperature.
- Adapts easily to standard cables and fittings.

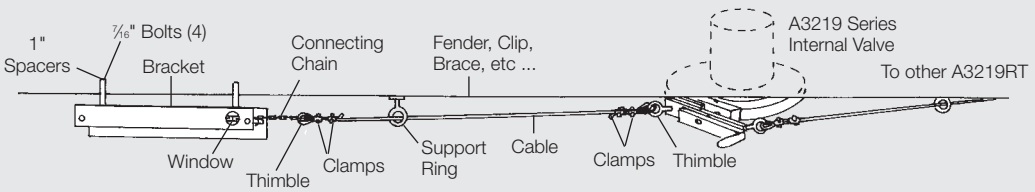
Materials

Body ..... Galvanized Steel
Spring ..... Stainless Steel

Ordering Information

Part Number	For Use With	Release Temperature	Spring Load		Minimum Number Required by MC331
			Fully Extended	After 4" Travel	
A3219RT	Internal Valves	212° F.	≈100 lbs.	≈50 lbs.	2

Typical Mounting Side View



Remote Cable Controls for Internal Valves

3200C and 3200L

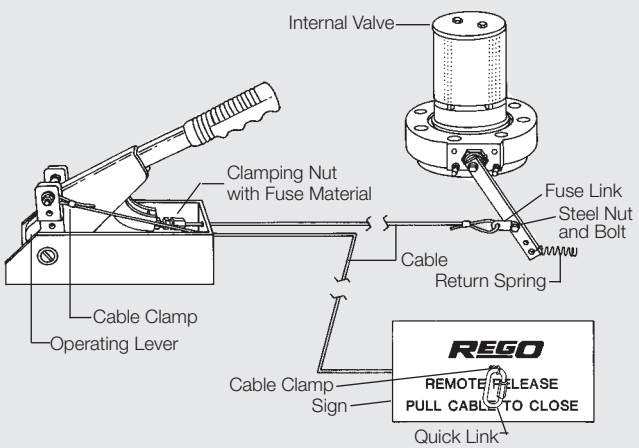
Application

The 3200C Remote Cable Kit is designed especially for use with the 3200L Remote Operating Lever to operate internal valves from a remote location.

The internal valve is opened by pulling back the remote operation lever and closed by returning the lever to its original position. A remote release is provided to close the internal valve from a different remote location.

Features

- Metal construction provide durability in heavy duty applications.
- Toggle action of operating lever allows for quick closure without extra springs and latches.
- The unique clamping nut and cable clamps provide easy installation.
- Fuse connections allow internal valves to close if connections are exposed to fire.
- Versatile design permits installation on bobtails and stationary tanks at bulk plants.
- Provides necessary remote closure system for bobtails required by DOT regulation on MC330/MC331 tanks and NFPA #58.



Ordering Information

Part Number	Description	Contents
3200C	Remote Cable Kit	100 Foot Cable, 6 Cable Clamps, Quick Link, Sign, Fuse Link, Steel Nut and Bolt.
3200L	Operating Lever	Lever Assembly

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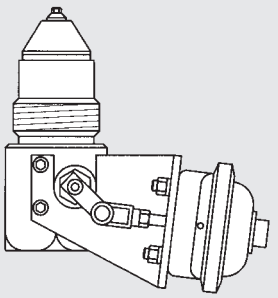
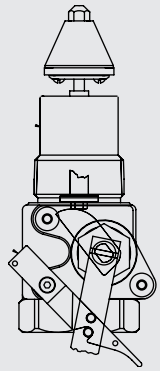
Threaded Internal Valves For Bobtail Delivery Trucks, Transports and Stationary Storage Tanks

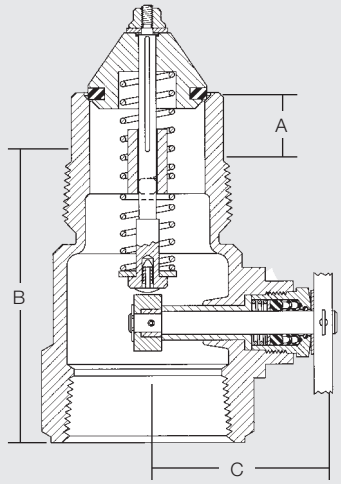
A3212R Series
A3213A Series



Internal Valve with Pneumatic Actuator



Internal Valve with Thermal Latch



Application

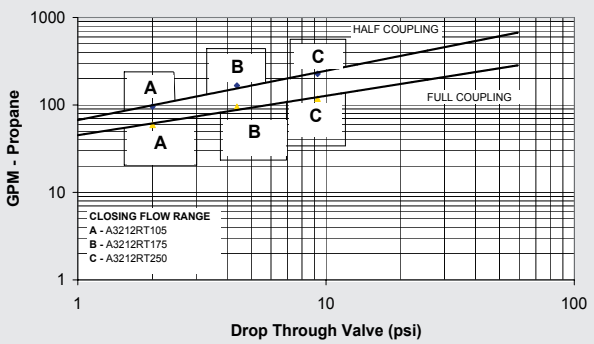
Designed primarily for use with LP-Gas and anhydrous ammonia for liquid withdrawal; vapor transfer or vapor equalization of bobtail delivery trucks, transports, stationary storage tanks, and in-line installations. The valve may be operated manually by cable or pneumatically.

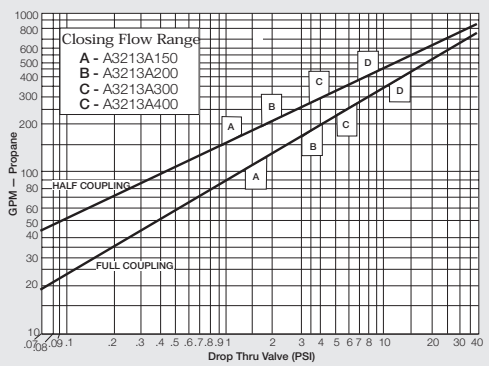
Features

- May be installed in full and half couplings.
- Nylon bearing supported operating shaft provides smooth, easy operation.
- Simple operating lever facilitates easy adaptation of all cable controls.
- Midway stem position allows for quicker pressure equalization.
- All critical operating components are located in the valve body inside the container coupling for maximum protection against physical damage.
- Built in excess flow valve.
- Return spring returns the valve to the closed position when the handle is released.
- Specify RegO® Internal Valves on your next new tank body or when your tank is rebuilt.
- A3213PA pneumatic actuator provides a convenient means of opening and closing the valve from a remote location, using either air or nitrogen for both the A3212R & A3213A service valves.

Materials

Body ..... Ductile Iron
Operating Lever ..... Cadmium Plated Steel
Stem ..... Stainless Steel
Springs ..... Stainless Steel
Seat Disc ..... Resilient Synthetic Rubber
Shaft Bearing ..... Nylon





NOTE: Multiply flow rate by .94 to determine liquid butane flow and by .90 to determine liquid anhydrous ammonia flow.

Ordering Information

Part #	Inlet Connection M. NPT	Inlet Connection M. NPT	Closing Flow (GPM) Half Coupling		Closing Flow (GPM) Full Coupling		A	B	C	Accessories	
			LP-Gas	NH3	LP-Gas	NH3				Pneumatic Actuator	Thermal Latch
A3212R105	2"	2"	105	95	65	59	1 9/16"	4 11/16"	4 1/8"	A3213PA	A3213TL
A3212R175			175	158	100	90					
A3212R250			250	225	130	117					
A3213A150	3"	3"	150	135	125	113	1 9/16"	5 15/16"	4 1/8"		
A3213A200			200	180	160	144					
A3213A300			300	270	250	225					
A3213A400			400	360	325	293					

Threaded Internal Valves For Bobtail Delivery Trucks, Transports and Stationary Storage Tanks

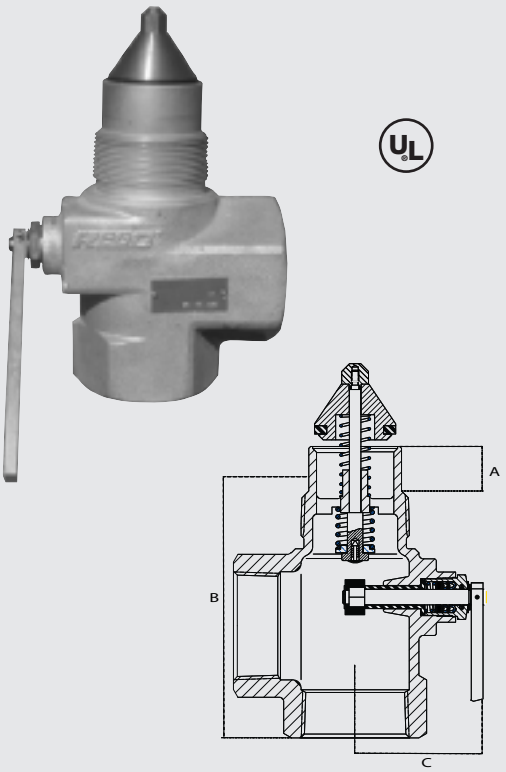
A3212RT Series
A3213T Series

Application

Designed primarily for use with LP-Gas and anhydrous ammonia for liquid withdrawal; vapor transfer or vapor equalization of bobtail delivery trucks, transports, stationary storage tanks, and in-line installations. The valve may be operated manually by cable or pneumatically.

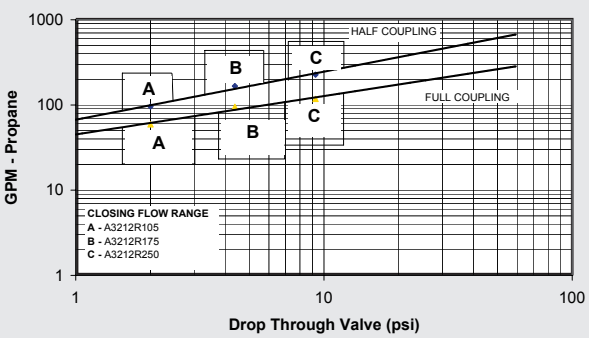
Features

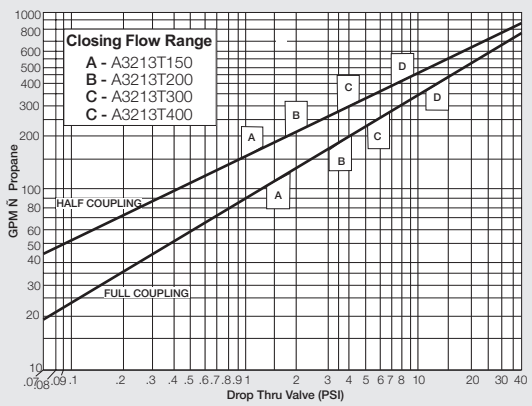
- May be installed in full and half couplings.
- Nylon bearing supported operating shaft provides smooth, easy operation.
- Simple operating lever facilitates easy adaptation of all cable controls.
- Midway stem position allows for quicker pressure equalization.
- All critical operating components are located in the valve body inside the container coupling for maximum protection against physical damage.
- Built in excess flow valve.
- Return spring returns the valve to the closed position when the handle is released.
- Specify RegO® Internal Valves on your next new tank body or when your tank is rebuilt.
- A3213PA pneumatic actuator provides a convenient means of opening and closing the valve from a remote location, using either air or nitrogen.
- Both valves utilize the same actuator, thermal latch & lever as the A3213A Series



Materials

Body..... Ductile Iron
Operating Lever ..... Cadmium Plated Steel
Stem ..... Stainless Steel
Springs .....Stainless Steel
Seat Disc ..... Resilient Synthetic Rubber
Shaft Bearing .....Nylon





Ordering Information

Part Number	Inlet Connection M. NPT	Outlet Connection F. NPT	Closing Flow (GPM) Half Coupling		Closing Flow (GPM) Full Coupling		A	B	C	Accessories	
			LP-Gas	NH3	LP-Gas	NH3				Pneumatic Actuator	Thermal Latch
A3212RT105	2"	2"	105	95	65	59	1 9/16"	4 11/16"	4 1/8"	A3213PA	A3213TL
A3212RT175			175	158	100	90					
A3212RT250			250	225	130	117					
A3213T150	3"	3"	150	135	125	113	1 9/16"	5 15/16"	4 1/8"		
A3213T200			200	180	160	144					
A3213T300			300	270	250	225					
A3213T400			400	360	325	293					

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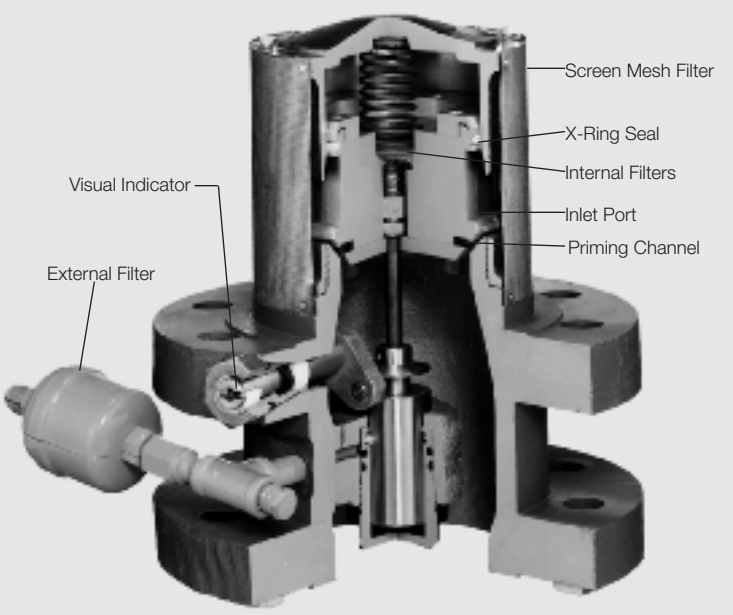
Flomatic® Internal Valve Operation

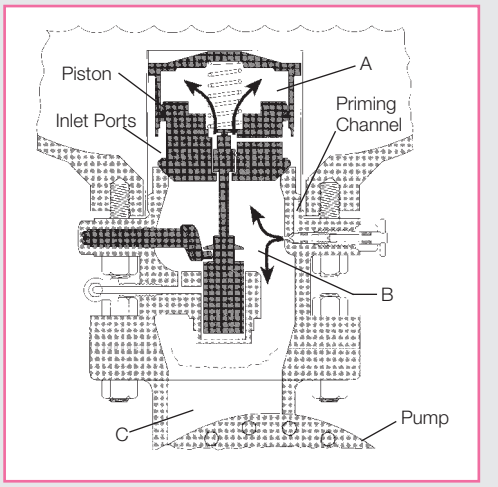


General Information

RegO® piston type Flomatic® Internal Valves are normally closed and use pressure differential to provide completely automatic service. Mounted directly between the tank body and pump, the Flomatic® uses the pressure differential developed by the pump to open the valve and it closes automatically when the differential no longer exists.

This means the RegO® Flomatic® opens when the pump is on and closes when the pump is shut off – fully automatic.

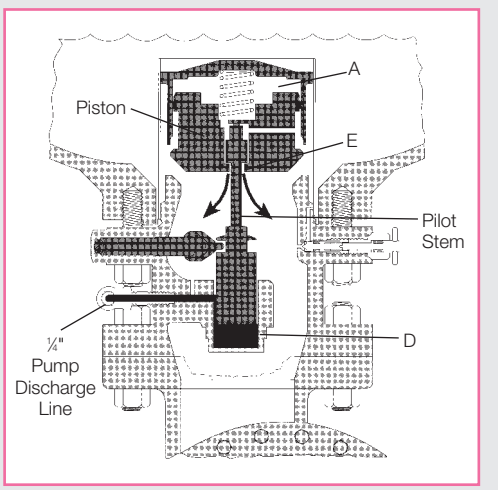
1



1. Normally Closed

When the valve is closed, liquid flows into the INLET PORTS, through a channel in the PISTON, and into area **A**. It also flows down through the PRIMING CHANNEL in the valve body, into area **B** beneath the valve seat, and into area **C** to prime the **PUMP**.

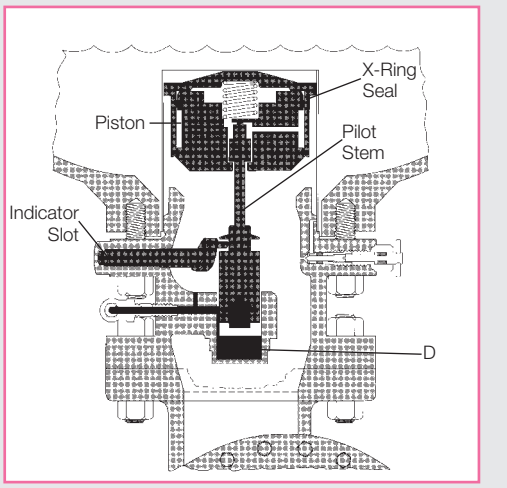
2



2. Pump On – Valve Opening

When the pump is started, differential pressure transmits through the ¼" piping into chamber **D**. lifting the PILOT STEM. This opens the seat between the stem and piston at **E**. Pump suction then evacuates the tank pressure in area **A**, which becomes equal to the pump suction pressure.

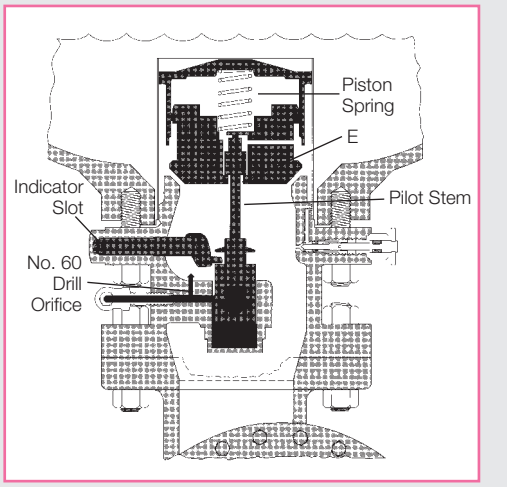
3



3. Pump On – Valve Open

The force below the pilot stem forces the piston up to open the valve; rotating the INDICATOR SLOT to **its** vertical (valve open) position. Pump differential pressure in area **D** holds the PILOT STEM and PISTON open. Approximately 20 psig pump differential pressure is required to open the valve; approximately 8 psig differential pressure will hold **the valve open.**

4

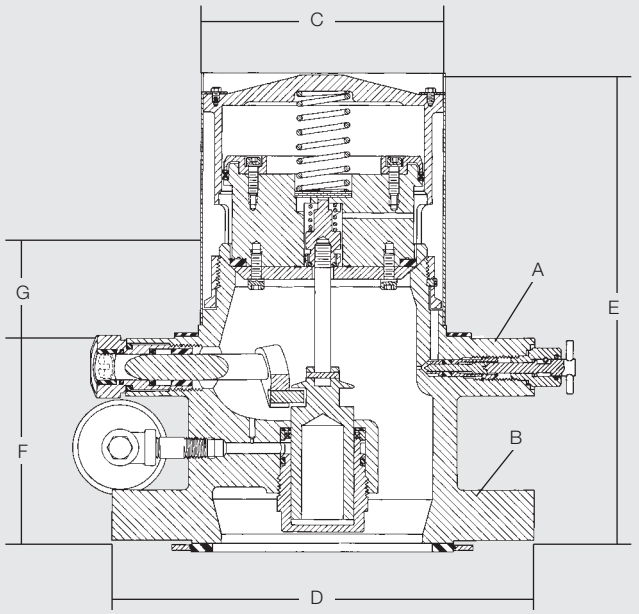


4. Pump Off – Valve Closes

With the pump shut off, the pressure in area **D** which holds the valve open, bleeds out through the #60 DRILL ORIFICE. This loss of pressure permits the SPRING to push the PILOT STEM down to reseat at point **E**. Since pressures are equal above and below the PISTON, with no sustaining pressure in area **D**, the SPRING forces the valve closed. The INDICATOR SLOT rotates to the horizontal (valve closed) position.

Flomatic® Internal Valves for Bobtail Delivery Trucks, Transports and Large Stationary Storage Tanks

A7883FK and A7884FK



Application

Designed primarily for LP-Gas and anhydrous ammonia liquid withdrawal on MC331 bobtail delivery trucks, transports and large stationary storage containers with flanged connections. The valve is fully automatic, opening and closing as the pump is turned on or off.

Features

Fully Automatic

- Operates on pressure differential from the pump to open and close.
- Automatically closes should downstream line rupture causing loss of pump differential pressure required to keep the valve open.
- Problems of improperly sized excess flow valves slugging shut during liquid transfer are eliminated.

Faster Unloading

- Straight through flow design provides minimum pressure drop and large flow capacity to the pump, resulting in higher flow rates and greater pump efficiency.
- Unloading is quicker and turn-around faster to provide more profitable operation.

Greater Protection

- Fully automatic operation virtually eliminates operator errors such as forgetting to close the valve after product transfer.
- Fully internal design reduces possibility of spillage that may result from a collision.
- Built-in visual indicator lets the operator know whether the valve seat is in the open or closed position.
- Never a cable problem. These valves must NEVER be held open by wire or any other means as the valve will not close as expected when the pump is shut-off.

Less Maintenance

- Easily replaceable, high efficiency external filter removes contaminant's as small as 20 microns. Filter virtually eliminates orifice clogging, excessive internal filter maintenance and service downtime.
- No need to check or replace air lines, cables or cable connections.

Economical

- Completely equipped with mounting bolts, flange gaskets, quick acting valve and filter - all in one purchase price.
- No need to purchase additional mounting equipment or actuating accessories.
- Specify RegO® Internal Valves on your next new tank body or when your tank is rebuilt.

Materials

Body ..... Cast Steel
Valve Stem ..... Stainless Steel
Operating Stem ..... Stainless Steel
Piston ..... Aluminum
Cylinder ..... Stainless Steel
Screen ..... Stainless Steel
Seats ..... Resilient Synthetic Rubber

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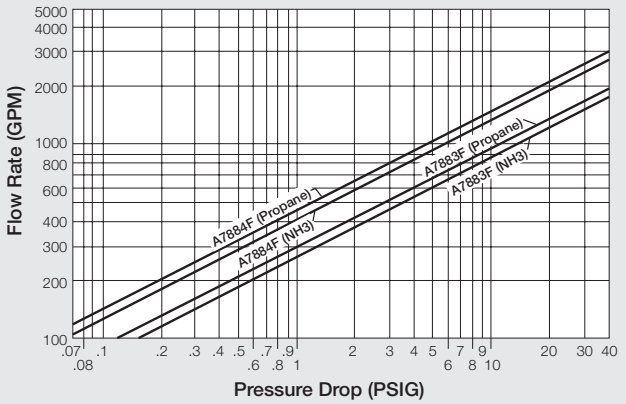
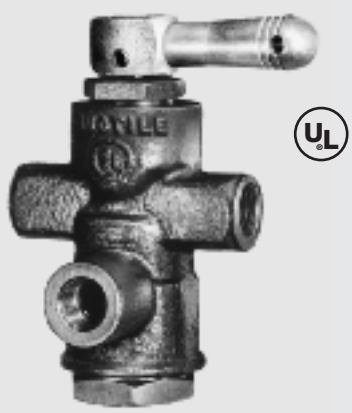
Ordering Information

Part Number	A Inlet Connection ANSI Flange	B Outlet Connection ANSI Flange	C	D	E	F	G	Accessories (Included with Flomatic®)	
								Filter	3-Way Valve
A7883FK	3"-300#**	3"-300#	4¾"	8¼"	10⅞"	4 13/16"	1 13/16"	A7884-201	A7853A
A7884FK	4"-300#***	4"-300#	5¾"	10"	11¼"	4 15/16"			

*Supplied with A7853A 3-way valve, A7884-201 filter, studs, nuts and gaskets.
** With 4 13/16" diameter bore.
*** With 5 13/16" diameter bore.

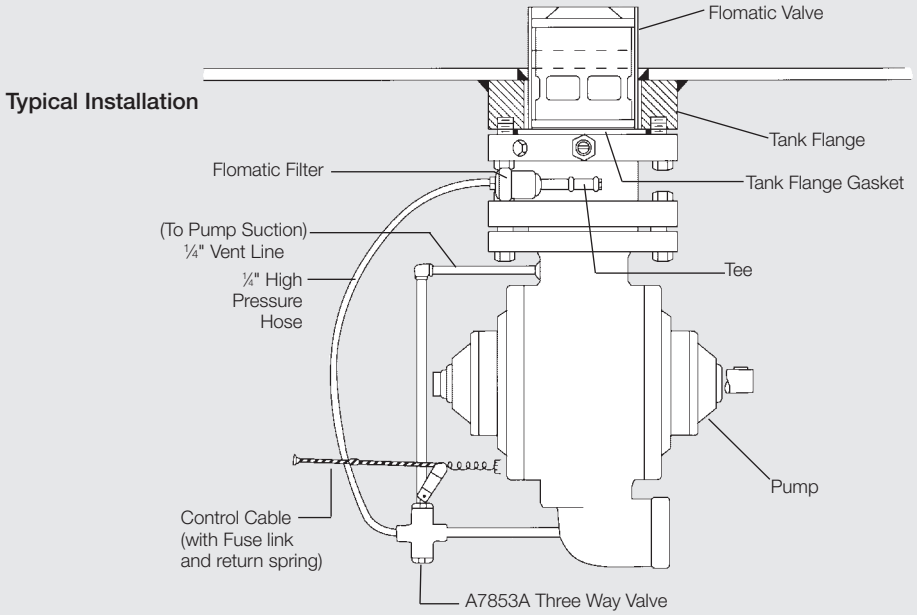
Flow Characteristics



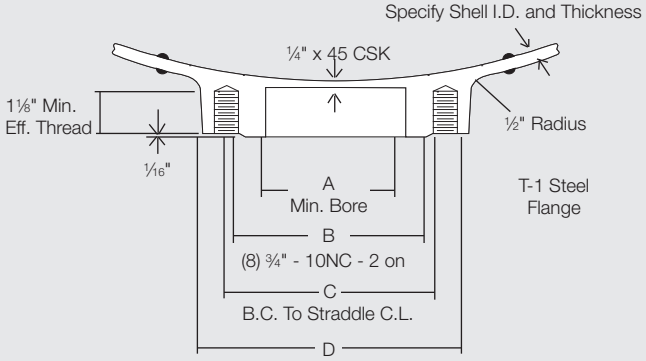


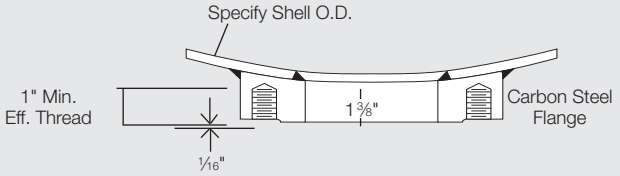
A7853A ¼" Three-Way Quick-Acting Valve

Typical Installation



Flange Dimensions





Ordering Information

Flomatic Model	Flange Type	A	B	C	D
A7883FK	T-1 Steel Carbon Steel	4 13/16"	5¾"	6⅝"	8¼"
A7884FK	T-1 Steel Carbon Steel	5⅞"	7"	7⅞"	10"

On The Job Service Guide for the Flomatic® Valve

Introduction

Efficient, profitable transport and delivery truck operations depend on keeping the equipment working safely and efficiently under changing conditions. It is important to know how to eliminate expensive delays by handling unloading problems as they arise.

The purpose of this technical guide is to provide basic information on the Flomatic® valve, along with simple, appropriate steps to follow in the event things go wrong.

The Flomatic® valve is mounted on the bottom of your transport or delivery truck tank, with the pump mounted immediately downstream. When the pump starts to push the liquid down the piping, the Flomatic® Valve opens automatically, allowing you to unload the tank, and closes when the pump stops pushing. It takes at least 20 pounds per square inch of "push" at the pump to open the valve.

Your flanged Flomatic® valve has an indicating shaft on it that shows whether it's open or closed (**Figure 1**). If the indicating shaft is horizontal, the valve is closed. If it's vertical, the valve is open.

A threaded type, diaphragm-operated Flomatic® valve has an indicating shaft on the bottom, covered by a clear plastic hood. The indicating shaft projects down when the valve is closed and is concealed when the valve is open (**Figure 2**).

Important Facts About Pressure

When handling propane or anhydrous ammonia, storage and transport tank pressures vary from about 20 pounds per square inch or less when it's cold to 200 pounds per square inch or more in hot weather (**Figure 3**). If you're hauling butane, tank pressures will be 50 pounds per square inch or less.

The transport or delivery truck tank pressure may be higher than the storage tank pressure when you are ready to unload (**Figure 4**). This is because your rig may have been freshly loaded at the terminal or bulk plant without a vapor equalizing line and hasn't had time to get back to normal. Also, the storage tank pressure tends to drop when a lot of LP-Gas is being used.

Troubleshooting on the Job

O.K. So you follow your procedures, hook up your hoses, open the required valves and start your pump. The indicating shaft on the Flomatic® valve moves to the open position and the liquid goes in to storage. Great! You're happy and so is the boss, and so are we.

But, let's say you do these things, start the pump and the liquid doesn't move. Now, how do you find out what is wrong?

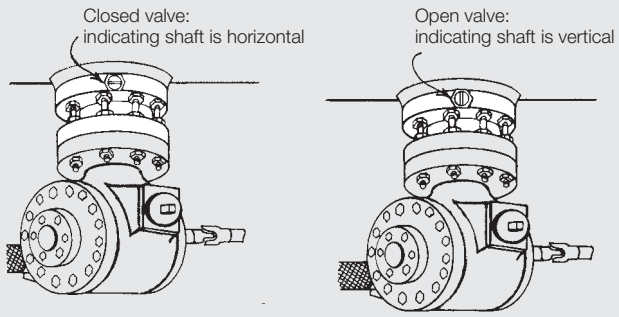


Figure 1. Flanged Flomatic Valve

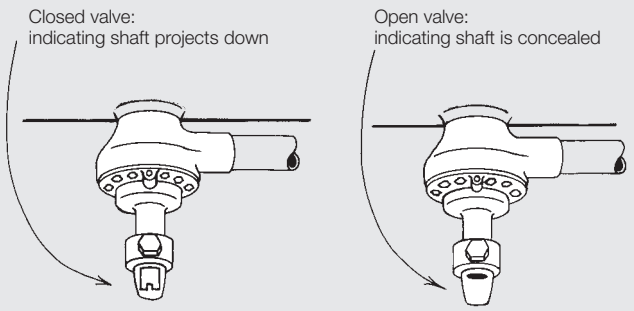


Figure 2. Threaded, Diaphragm-operated Flomatic Valve

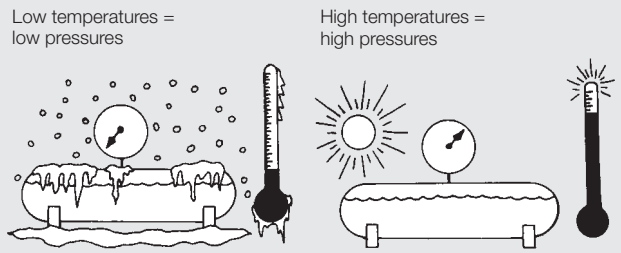


Figure 3. Weather Conditions Affect Pressure

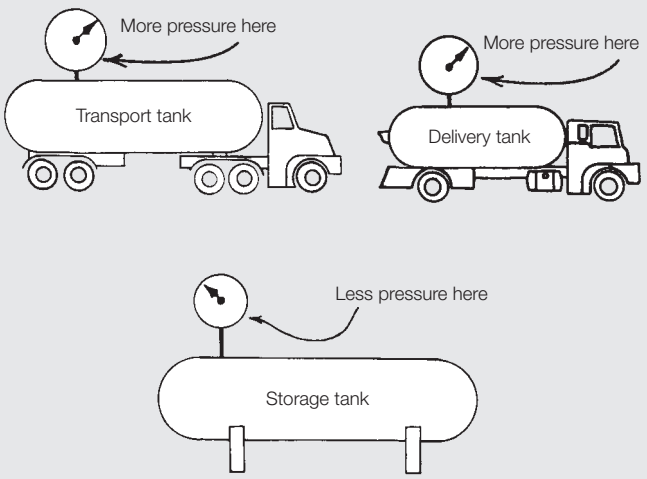


Figure 4. Unloading Conditions Affect Pressure

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Step 1

Immediately shut down the pump so you don't cause possible damage to the seals or valves. Next:

1. Check all manual valves in the system to make certain they are open or closed as required for proper operation.

2. Check the liquid level in the transport or delivery tank. If the level is low, it may slow the transfer rate.

3. Check to assure that the pump rotates normally when power is applied. If not, inspect and repair as needed the power takeoff, universal joints, drive shaft and clutch, etc.

4. Make sure the lever is straight out on the ¼" operating valve in the line between the pump discharge line and the Flomatic® valve (**Figure 5**).

   If is isn't, the Flomatic® valve will remain closed.

5. Make certain the priming valve on the side of the Flomatic® valve is open (**Figure 6**).

6. Ice in the system may prevent proper operation, as will a collapsed or kinked sensing line or a clogged sensing line filter.

If you found the trouble within STEP 1, just start the pump and continue unloading, If not, proceed accordingly.

a. New Models with T-handle: To adjust to the proper position, push in the end of the valve stem and tighten the needle valve clockwise until it seats. Then, turn counterclockwise 1½ turns.

b. Old Models with Plug: To adjust to the proper position, carefully remove the plug. A small amount of liquid LP-Gas may be discharged when plug is loosened. Insert a small screwdriver and tighten the needle valve clockwise until it seats. Then turn it counterclockwise 1 turn only. **CAUTION: Do not open needle valve more than 1 turn as it might blow out!**

c. Threaded Models with Internal Priming Channel. The internal priming channel normally self-actuates. To be sure the system is primed, remove the plastic hood and push the travel indicator up about ⅛" and hold for at least 15 seconds.

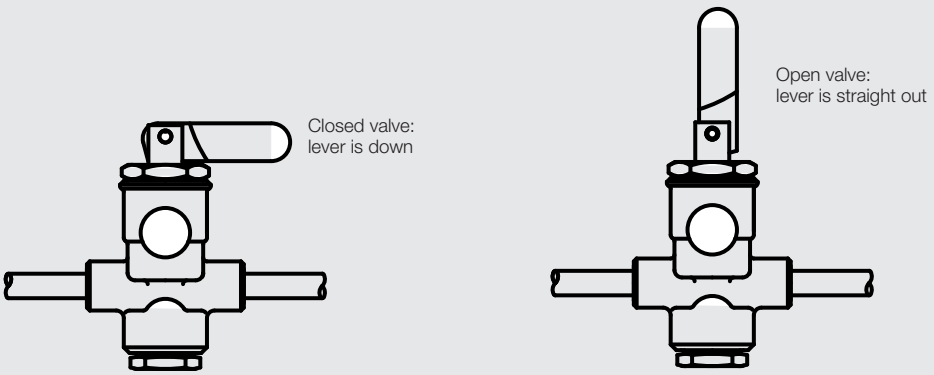


Figure 5. Operating Lever Positions

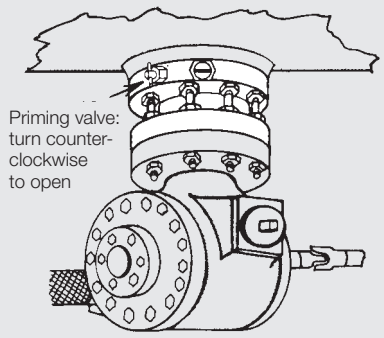


Figure 6. Priming Procedures

Step 2

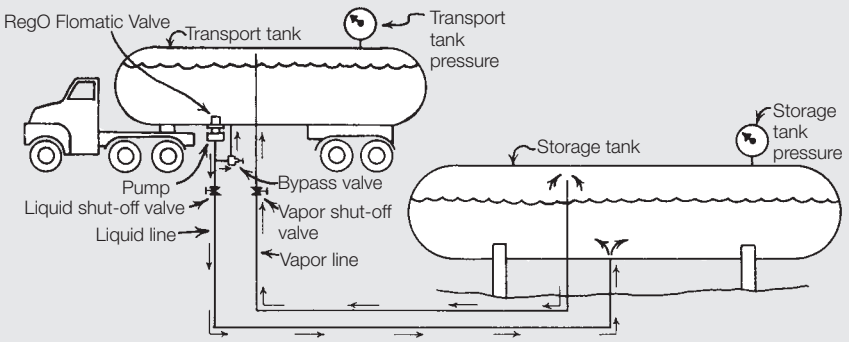


Figure 7a. Unloading Diagram of Transport Trailer Truck

The liquid flows out of the transport tank through the Flomatic® valve, into the pump and through the delivery hose to the storage tank. The vapor line allows vapor to flow from storage back to the transport so that the storage tank pressure won't build up too much and make the pump work harder than necessary.

For Transport Trailer Trucks Only (Figure 7a)

1. Check the difference between the pressure in your transport and the storage tank. If there's 15 or 20 pounds per square inch more pressure in the transport tank than in the storage tank, chances are the Flomatic® valve won't open. This is because the pump can't develop enough "push".

   If you have a good bypass valve on your rig to send the extra liquid back into the tank, you can merely close the liquid shut-off valve in the discharge line and restart your pump (**Figure 8a**). Now, the Flomatic® indicating shaft should move to the open position (**see Figures 1 and 2**).

2. Slowly open the liquid shut-off valve in the discharge line and the liquid will start to move out of the transport. If the Flomatic® valve indicating shaft starts to move toward the closed position once you've opened this liquid shut-off valve all the way, throttle the valve for a while until the transport tank pressure drops to where the Flomatic® valve indicating shaft will stay open. Then, open the liquid shut-off valve all the way until you finish unloading.

3. If your pump system doesn't have a bypass valve, the liquid shut-off valve in the discharge line should be left partially open when you restart the pump. Just be sure that the pump is pushing at least 20 pounds per square inch, so the Flomatic® valve can open.

   Don't worry about how much it may slow up your loading speed when you pinch down the liquid shut-off valve to get the Flomatic® valve open. Your pump is running at constant RPM and will move liquid at almost the same rate, even when pushing harder. (It's a lot like using engine braking on a downhill grade, except, in this case, the pump keeps the liquid moving at a constant flow rate.)

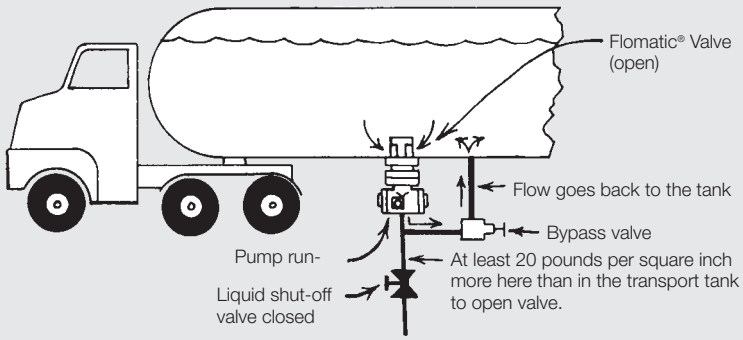


Figure 8a. Unloading Diagram of Transport Trailer Truck with Back-to-tank Bypass Valve

You must have a separate back-to-tank bypass valve if the pump is to be run with the liquid shut-off valve closed.

For Delivery Trucks Only (Figure 7b)

1. Check the pump bypass piping. If your truck is equipped with a manual bypass valve, close it and try the pump again. **(Figure 8b)**. If the Flomatic® valve indicating shaft moves to the open position, the problem is that the pump can't develop 20 pounds per square inch or more to "push" open the Flomatic® valve with the bypass valve open. You can prevent this in the future by not opening the manual bypass valve too wide.
2. If the delivery truck is not equipped with a manual bypass valve, merely start the pump. Slowly close the shut-off valve between the back-to-tank bypass valve and tank. If the Flomatic® valve indicating shaft moves to the open position as you close the valve, the back-to-tank bypass valve may be stuck open, adjusted too low, or the spring may be broken.

   CAUTION: Don't close the shut-off valve all the way, because excessive pressures and pump damage may occur.
3. If the Flomatic® valve indicating shaft remains in the closed position, the problem is either in the pump or the Flomatic® valve.

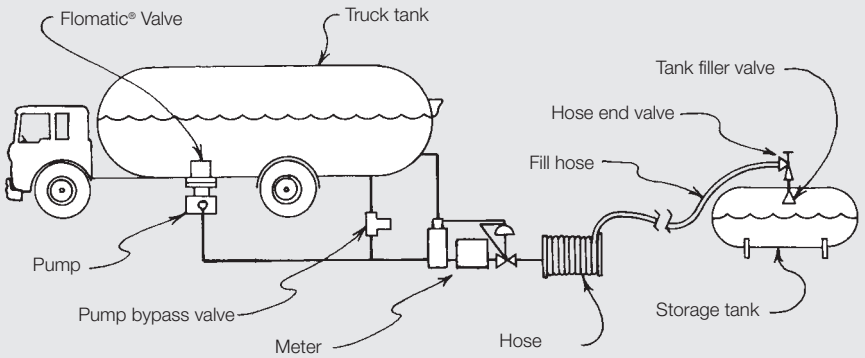


Figure 7b. Unloading Diagram of Delivery Truck

The liquid flows out of the truck tank, through the Flomatic® valve and into the pump, where it is then pushed through the meter and delivery hose into the storage tank. The liquid normally enters the vapor space of the storage tank to minimize pressure buildup, so a vapor equalizing line is usually not needed. The back-to-tank bypass valve opens to divert excess pump capacity back to the truck tank, preventing the pump from creating too much pressure.

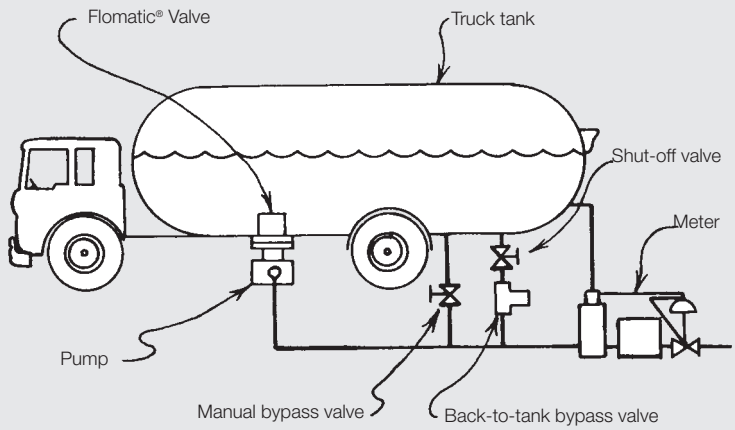


Figure 8b. Unloading Diagram of Delivery Truck with Manual Bypass Valve

Step 3

USE EXTREME CARE AT ALL TIMES WHEN WORKING AROUND YOUR VEHICLE! Watch out for drive shafts and moving parts. It is common knowledge that serious injury can result if any part of one's body or clothing is caught in moving machinery.

If you *manually* open the Flomatic® valve, *you* are responsible for safely unloading the liquid and closing the valve when you're through. If this procedure is being followed, under no circumstances must the valve be left unattended. The valve must *never* be permanently held in the open position.

If you are not able to cause the Flomatic® valve indicating shaft to move to the open position after completing the preceding steps, a complete detailed diagnosis will have to be made.

In the meantime, you can actuate the flanged Flomatic® valve by using a special wrench and attempt to unload manually (**Figure 9**).

If you still can't unload by following the preceding steps, it is suggested that you unload by an alternate method, such as through the valve normally used for liquid filling.

In any event, if you haven't solved the problem and the unit still doesn't operate properly, immediately take it out of service, have a complete analysis made and repair as needed.

Be sure to obtain and keep available for quick referral the Manufacturers' Operation and Service Manuals for the valves, pump, meter and all operating equipment in the system.

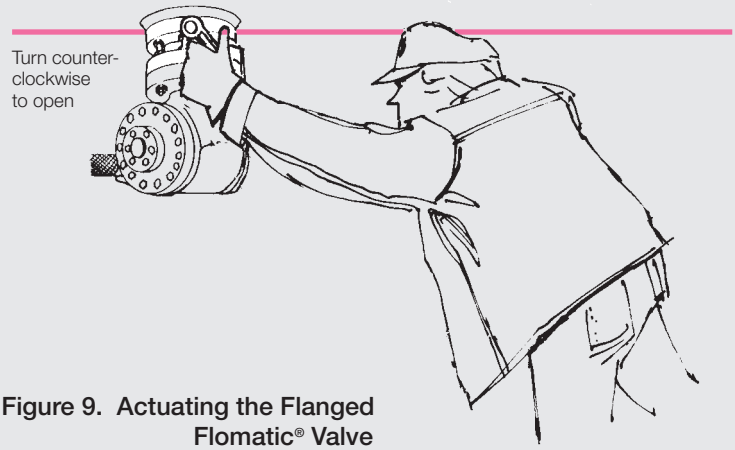


Figure 9. Actuating the Flanged Flomatic® Valve Manually

Pumping System Troubleshooting Guide

Introduction

Most LP-Gas and anhydrous ammonia systems use pumps to move liquid from one location to another. Unloading transport trailer tanks into plant storage, loading delivery trucks, filling bulk tanks, engine fuel tanks, portable cylinders, etc. and pressurizing LP-Gas vaporizers are only a few of many such applications. A well-designed and properly installed pumping system will perform well for some time, but eventually problems occur requiring attention.

Finding out what is wrong, and getting it working again, can be a time-consuming and confusing experience, unless one knows clearly how to proceed.

The purpose for this technical guide is to provide simple, step-by-step guidelines for correcting LP-Gas and anhydrous ammonia pumping difficulties.

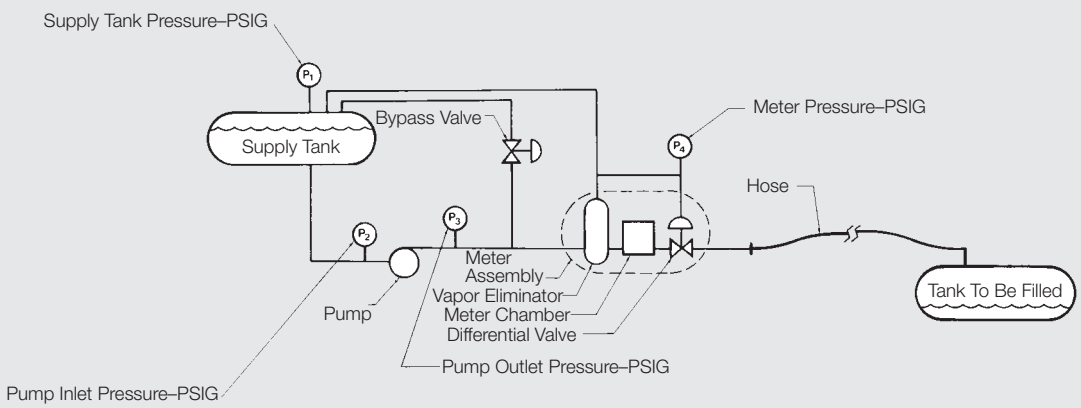
The procedure includes a preliminary checklist to help find out if the difficulty can be corrected without taking anything apart. Then, it shows how to zero in on more serious problems by using a few pressure gauges to pinpoint the cause.

It is recommended that the pumping system be equipped for easy pressure gauge installation before trouble occurs. Small manual shutoff valves can be installed at proper locations, with plugs inserted in the outlets. This would allow pressure gauges to be put in easily without removing the LP-Gas or anhydrous ammonia from the system at the time trouble occurs, saving a lot of time and unnecessary expense. Pressure gauges should be installed temporarily at the time the system is first installed, and pressure readings recorded while the system is working properly. Then, in many cases, merely comparing pressures with original readings may tell what the trouble is.

NOTE: The figure below shows where pressure gauges should be installed. Pressure gauge readings from the original tests should be recorded for each gauge.

It is recommended that the pressure gauges not be used continuously, because vibrations and the ravages of weather cause their damage or ruin. Therefore, as soon as the initial tests are complete, it is best to (1) close the shutoff valves, (2) remove the gauges, (3) plug the valves and (4) keep the gauges in a safe place, ready for troubleshooting when really needed. It is easier to diagnose a problem if the original test results are available, but don't panic if they aren't. You can still solve the problem without this information, but it requires more time and effort.

Pump System Schematic



A

Tank Pressure doesn't change

Pump Inlet Pressure decreases

Pump Outlet Pressure doesn't change

The trouble is most likely somewhere in the inlet line. It could be:

1. The pump may be running at a speed too low to develop proper differential pressure.
2. An inlet strainer is clogged.
3. A valve is partially closed somewhere in the inlet line.
4. Ice has formed either in the bottom of the supply tank or somewhere in the inlet line. This is common particularly when the tank has been hydrostatically tested or purged with steam, and not completely drained and dehydrated.
5. If a Flomatic® valve is used, it may not be opening for a number of reasons.
   a. Pressure in the tank to be filled may be considerably less than that in the supply tank, making it impossible for the pump to develop sufficient differential pressure to open the valve (Simply throttle a manual valve on the discharge line to cause the pump to develop enough differential pressure to open the Flomatic® valve. As the pressure in the tank to be filled goes up, it will be possible to re-open the valve in the discharge line.)
   b. The pump by-pass valve may be blocked open or have broken or damaged parts, preventing the pump from developing sufficient differential pressure to open the Flomatic® valve. (Pump outlet pressure must rise at least 21 PSI to open the Flomatic® Valve.)
   c. The Flomatic® strainer, filter, three-way valve or other element in the actuating line is clogged, or the activating line is kinked.
   d. The Flomatic® valve internal parts may be damaged or worn. (Refer to Installation Manual #A7884F-301 for flanged valves or #L-451 for diaphragm-type threaded valves for repair instructions.)
6. If an internal valve is used, the main valve may not be opening due to insufficient equalization time, broken or damaged valve parts, valve lever in closed position or insufficient excess flow sizing.

NOTE: Meter pressure is not needed for this condition.

B

Tank Pressure doesn't change

Pump Inlet Pressure doesn't change

Pump Outlet Pressure goes up a little

The trouble is most likely related to the pump or by-pass valve. It could be:

1. The pump may have excessively worn parts.
2. The internal by-pass valve in the pump may be blocked open by foreign material, or may have broken or damaged parts.
3. The back-to-tank by-pass valve may be blocked open by foreign material, or may have broken or damaged parts.
4. The manual by-pass valve, is so-equipped, may be open.

NOTE: Meter pressure is not needed for this condition.

G

Be sure to obtain and keep available for quick referral the Manufacturer's Operation and Service Manuals for the valves, pump, meter and all operating equipment in the system.

To avoid delays, maintain a complete stock of recommended spare parts on hand for quick repairs.

Follow the steps as shown. Don't assume the answer is known beforehand, or skip any applicable steps. Rather, be thorough and methodical and in most instances, you will solve the problem. On the other hand, if you have done all of this and still haven't worked out your problem. feel free to call your local distributor or Engineered Controls International, Inc. direct. We will do our best to help. Perhaps, between us, we will be able to solve your problem and add something new to the procedure which could help everyone in the future.

Pumping System Troubleshooting Chart

BASIC ASSUMPTION

The pumping system did work OK, but now the transfer rate is considerably less, or the system won't pump at all.

PRELIMINARY REVIEW

1. Check the supply tank liquid level. The transfer rate could be considerably reduced if the level is low, due to vapor bubbles in the line, because of insufficient liquid head, or a vortex effect in the tank. Remember, reduction in the pumping rate from these causes will be more extreme in cold weather when tank pressures are low.
2. Examine the pump drive to make sure the pump is rotating properly. Inspect for loose drive belts, damaged or broken flexible couplings or universal joints, broken drive keys and damaged or inoperative power take-off or pump clutch, etc.
3. If the system is equipped with the Flomatic® Valve:

   a Make sure the three-way valve handle is straight out, allowing the valve to open.

   b. Check the position indicator on the Flomatic Valve when the pump is running. If the indicator shows that the valve is open, the trouble **must** be downstream of the valve.

   c. Make sure the priming valve is open, allowing pressure to equalize between the tank and pump inlet.

4. If the system is equipped with internal valves, make sure the operating lever moves to a full open position. Repair if needed.
5. Make sure all valves in the system are either open or closed as required for normal operation. Check each valve in sequence, starting from the supply tank, making sure that no valve element is missed

If the cause of the problem has not been determined during preliminary review, it will be necessary to conduct diagnostic tests, using pressure gauges at key points in the system. (See Introduction, Page 1.)

DIAGNOSTIC TESTS

Open all valves as required for proper pumping operation. Gauges should show tank pressure, pump inlet pressure, pump outlet pressure and meter pressure to be equal.

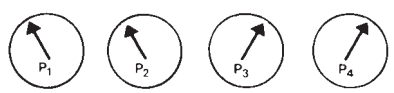
Start the pump and observe all pressure gauges. Match results with conditions A, B, C, or D. Follow the appropriate steps.

FINAL RESULTS

Make repairs or adjustments as needed, and test the system's operation. Record a new set of test pressures for future reference, and order replacements for all spare parts used.

The system is now ready to return to service.

C

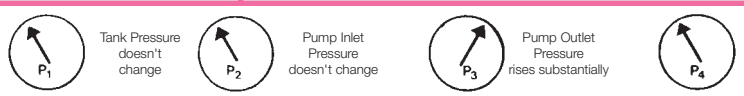


Tank Pressure doesn't | Pump Inlet Pressure doesn't change | Pump Outlet Pressure rises substantially | Meter Pressure rises substantially

The trouble is most likely in the meter vapor eliminator or meter differential valve. It could be:

1. The meter's vapor eliminator may be malfunctioning. If the valve at the outlet of the vapor eliminator does not seat when the vapors have been purged, the differential valve downstream of the meter will not open. Such failure could be caused by a damaged vapor eliminator valve seat, foreign material blocking the vapor eliminator valve, a leak in the ball float, or a jammed or binding linkage between the ball and valve.
2. The diaphragm could be ruptured, or other parts could be damaged or broken in the differential valve downstream of the meter.

D



Tank Pressure doesn't change | Pump Inlet Pressure doesn't change | Pump Outlet Pressure rises substantially | Meter Pressure doesn't change

The problem is most likely somewhere downstream of the pump. Look for a closed valve, or some type of blockage in the discharge line. It could be:

1. The meter strainer may be clogged.
2. A back check valve at the inlet of the meter may be blocked, closed, or jammed.
3. The meter rotor may be jammed by foreign material, preventing it from moving properly, which would prevent or retard flow.
4. The drive key on the meter gears may be sheared. (In this case, flow would actually be moving through the meter but not registering.)
5. The differential valve downstream of the meter may be closed due to damage, foreign material or ice.
6. If screw type hose fittings are used, it is extremely important that they be installed properly. If not, it is possible that a flap of rubber may be cut from the inside diameter of the hose, acting as a back check. It can flap across the discharge line, effectively stopping the flow.
7. Check the hose nozzle valve, if so equipped. In some brands, a bent handle or other defect may prevent the inner valve from opening sufficiently to allow a proper amount of flow.
8. The problem could be in the valve assemblies in the tank to be filled.

   If you are dealing with a delivery truck application, move to another tank and see whether the problem still exists. If not, it may be a problem with one specific tank, rather than the pumping system.

9. Some delivery trucks are equipped with a quick-acting valve immediately upstream, of the hose reel. **Make sure** that this valve is open.
10. Some delivery trucks are equipped with excess flow valves between the meter and hose reel. Improper sizing, a weak spring, or other valve damage can cause this valve to close prematurely, effectively stopping the flow.
11. If, with a delivery truck system, the flow reduced considerably while the tank is being filled, it is possible that the back-to-tank by-pass valve is not set high enough to compensate for vapor pressure buildup in the tank being filled. This can be solved merely by adjusting the by-pass valve as a slightly higher level. **Warning**: Do not raise the back-to-tank by-pass setting high enough to cause the internal relief valve in the pump to actuate. If this should happen, it could cause excessive cavitation, loss of capacity and premature pump wear.

FINAL RESULTS

Make repairs or adjustments as needed, and test the system's operation. Record a new set of test pressures for future reference, and order replacements for all spare parts used. The system now is ready to return to service.

Cross Reference by Part Number

Catalog L-500

REGO® PRODUCTS

LP-GAS & ANHYDROUS AMMONIA EQUIPMENT

ECII® Engineered Controls International, Inc.

Section H

Adapters, Connectors and Fittings

Limited Warranty and Limitation of Liability

LIMITED WARRANTY
Engineered Controls International, Inc. warrants products and repair kits manufactured by it to be free from defects in materials and workmanship under normal use and service for a period of 12 months from the date of installation or operation or 18 months from the date of shipment from the factory, whichever is earlier. If within thirty days after buyer's discovery of what buyer believes is a defect, buyer notifies Engineered Controls International, Inc. thereof in writing, Engineered Controls International, Inc., at its option, and within forty-five days, will repair, replace F.O.B. point of manufacture, or refund the purchase price of that part or product found by it to be defective. Failure of buyer to give such written notice within thirty days shall be deemed an absolute and unconditional waiver of any and all claims of buyer arising out of such defect.

This warranty does not extend to any product or part that is not installed and used in accordance with Engineered Controls International, Inc.'s printed instructions, all applicable state and local regulations, and all applicable national standards, such as those promulgated by NFPA, DOT and ANSI. This warranty does not extend to any product or part that has been damaged by accident, misuse, abuse or neglect, nor does it extend to any product or part which has been modified, altered, or repaired in the field.

Except as expressly set forth above, and subject to the limitation of liability below, Engineered Controls International, Inc. makes NO OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, with respect to its products and parts, whether used alone or in combination with others. Engineered Controls International, Inc. disclaims all warranties not stated herein.

LIMITATION OF LIABILITY
Engineered Controls International, Inc.'s total liability for any and all losses and damages arising out of any cause whatsoever shall in no event exceed the purchase price of the products or parts in respect of which such cause arises, whether such cause be based on theories of contract, negligence, strict liability, tort or otherwise.

Engineered Controls International, Inc. shall not be liable for incidental, consequential or punitive damages or other losses. Engineered Controls International, Inc. shall not be liable for, and buyer assumes liability for, all personal injury and property damage connected with the handling, transportation, possession, further manufacture, other use or resale of products, whether used alone or in combination with any other products or material.

If Engineered Controls International, Inc. furnishes technical advice to buyer, whether or not at buyer's request, with respect to application, further manufacture or other use of the products and parts, Engineered Controls International, Inc. shall not be liable for such technical advice and buyer assumes all risks of such advice and the results thereof.

NOTE: Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. The warranty gives you specific legal rights, and you may have other rights that vary from State to State. The portions of this limited warranty and limitation of liability shall be considered severable and all portions which are not disallowed by applicable law shall remain in full force and effect.

WARNING
All Engineered Controls International, Inc. products are mechanical devices that will eventually become inoperative due to wear, corrosion and aging of components made of materials such as rubber, etc. The environment and conditions of use will determine the safe service life of these products. Periodic inspection and maintenance are essential to avoid serious injury and property damage.

Many Engineered Controls International, Inc. products are manufactured components which are incorporated by others on or in other products or systems used for storage, transport, transfer and otherwise for use of toxic, flammable and dangerous liquids and gases. Such substances must be handled by experienced and trained personnel only, using accepted governmental and industrial safety procedures.

NOTICE TO USERS OF PRODUCTS
The Limited Warranty stated above is a factory warranty to the first purchasers of Engineered Controls International, Inc. products. Since most users have purchased these products from Engineered Controls International, Inc. distributors, the user must within thirty (30) days after the user's discovery of what user believes is a defect, notify in writing the distributor from whom he purchased the product/parts. The distributor may or may not at the distributor's option choose to submit the product/parts to Engineered Controls International, Inc., pursuant to its Limited Warranty. Failure by buyer to give such written notice within thirty (30) days shall be deemed an absolute and unconditional waiver of buyer's claim for such defects. Acceptance of any alleged defective product/parts by Engineered Controls International, Inc.'s distributor for replacement or repairs under the terms of Engineered Controls International, Inc.'s Limited warranty in no way obligates Engineered Controls International, Inc. to the terms of the above warranty.

Because of a policy of continuous product improvement, Engineered Controls International, Inc. reserves the right to change designs, materials or specification without notice.

Foreword

This catalog describes a complete line of equipment available from Engineered Controls International, Inc. for use with LP-Gas and anhydrous ammonia (NH_3). The following points are important to know for proper use of the catalog:

1. *Illustrations and drawings of individual products are representative of "product groups" and all products within a product group are similar in construction.*
2. *Materials used for construction of products in this catalog are suitable for rated service pressure at temperatures of -40° F. to +165° F., unless otherwise specified.*
3. *Products in this catalog are only intended for use in LP-Gas and/or anhydrous ammonia service as follows.*
   - **a.** *"A" or "AA" prefix — Products with this prefix are suitable for NH_3 service (i.e., contain no brass parts).*
   - **b.** *"AA" prefix on relief valves — These valves are NOT suitable for use with LP-Gas service. These are of partial aluminum materials and are listed by Underwriters Laboratories (UL) for NH_3 service only.*
   - **c.** *All other products are suitable for use with LP-Gas service.*
   - **d.** *"SS" prefix—Hydrostatic relief valve with this prefix are suitable for NH_3 service (i.e., they have stainless steel materials).*

Caution

Do not use any product contained in this catalog with any service commodity other than LP-Gas or NH_3. If you have a need for use of another application, contact Engineered Controls International, Inc., 100 RegO Drive, Elon, NC 27244, (336) 449-7707 before proceeding.

Proper application, installation and maintenance of products in this catalog are essential. Users of these products should obtain further information if there are any doubts or questions.

Warning

All ECII® products are mechanical devices that will eventually become inoperative due to wear, corrosion and aging of components made of materials such as rubber. The environment and conditions of use will determine the safe service life of these products. Periodic inspection and maintenance are essential to avoid serious injury and property damage.

Many ECII® products are manufactured for storage, transport, transfer and use of toxic flammable and dangerous liquids and gases. Such substances should be handled by experienced and trained personnel only, using accepted governmental and industrial safety procedures. Never vent LP-Gas near any possible source of ignition.

Notice

Installation, usage, and maintenance of all ECII® products must be in compliance with all Engineered Controls International, Inc. instructions as well as requirements and provisions of NFPA #54, NFPA#58, DOT, ANSI, and all applicable federal, state, provincial and local standards, codes, regulations, and laws.

Inspection and maintenance on a periodic basis is essential. Installation and maintenance should be performed only by qualified personnel.

Be sure all instructions are read and understood before installation, operation and service.

Filters

ECII® LP-Gas equipment is designed to operate in a system free from contamination. A variety of in-line filters are commercially available to the LP-Gas industry for installation in domestic systems.
The use of an in-line filter should be considered when other system components may be unclean and the system contaminated by rust, scale, dirt, debris or other foreign material.

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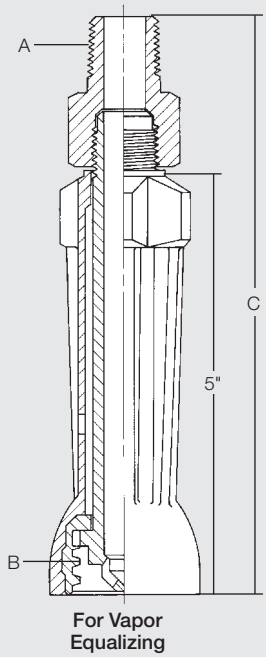
Extended Type Hose Couplings for Vapor and Liquid Service

A7571 and A7575 Series



For Vapor Equalizing

A7571 Series

Application

Designed especially for liquid filling and vapor equalization of LP-Gas and anhydrous ammonia. The limited travel of the handle on the tailpiece minimizes spin-off, encouraging cautious removal to properly bleed off trapped product to assure closure of the filler valve and hose end valve. The ACME threads are machined on a rugged steel insert which is permanently cast in the aluminum handle, providing for durability under repeated use.

Features

- Lightweight aluminum handle is contoured and ribbed for added comfort, easy handling allows for easy make-up.
- Free swivel action between tailpiece and handle allows for easy make-up.
- Simplified design eliminates an extra joint and provides smooth, uninterrupted flow.

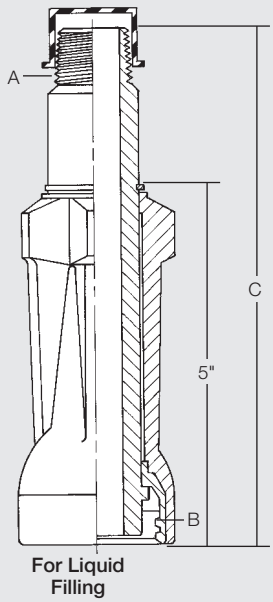
Materials

Handle.....Aluminum
ACME Threads.....Steel Insert
Retaining Ring.....Stainless Steel

Ordering Information

Part Number	Type of Service	A Hose Connection (M. NPT)	B Coupling Connection (F. ACME)	C Approx. Length
A7575L2*	Liquid	½"	1¾"	7"
A7575L3		¾"		
A7575L4		1"		
A7575L5**		1¼"		
A7571LA	Vapor	½"	1¼"	
A7571LB		¾"		

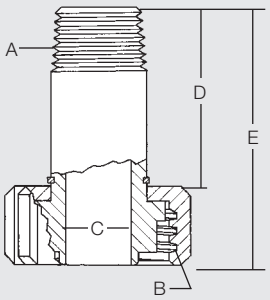
* Includes 7199-33 adapter, shipped loose.
** Includes A7575L5-1 adapter, shipped loose.



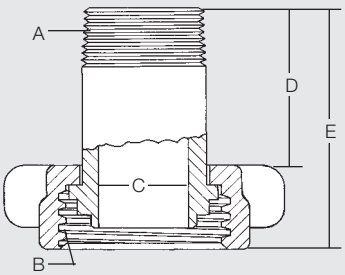
For Liquid Filling

A7575 Series

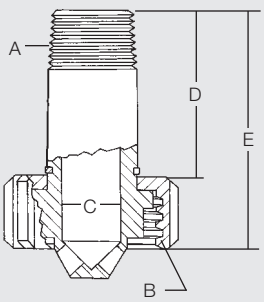
Style A
For Liquid Filling



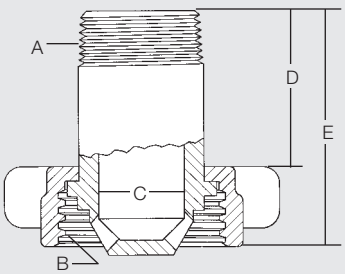
Style B
For Liquid Filling



Style C
For Vapor Equalizing



Style D
For Vapor Equalizing



Ordering Information

Part Number	Material	Style	A Hose Connection (M. NPT)	B Coupling Connection (F. ACME)	C Tailpiece Bore	D Hose End To Nut	E Overall Length
3175B	Brass	A	½"	1¾"	35/64"	2"	2⅞"
3175			¾"		¾"		
3175A			1"				
3185		B	1¼"	2¼"	1 3/16"	2 1/16"	3⅛"
3195	Brass Nut & Steel Nipple		2"	3¼"	1 13/16"	2⅛"	3⅝"
A3175	Steel	A	¾"	1¾"	¾"	2"	2⅞"
A3175A			1"				
A3185		B	1¼"	2¼"	1 3/16"	2⅛"	3⅛"
A3195			2"	3¼"	1 13/16"	2⅛"	3⅝"
3171	Brass	C	3/8"	1¼"	13/32"	1 3/16"	2 7/16"
3171A			½"		17/32"		
3181			¾"	1¾"	11/16"	2"	3¼"
3181A			1"		15/16"	1⅞"	3⅛"
3191		D	1¼"	2¼"	1 3/16"	2⅛"	3 5/16"

H

ACME Check Connectors for Lift Trucks

7141F and 7141M

These brass connectors are especially designed to join the carburetor fuel line to the service valve on lift truck cylinders. Sturdy, long lasting ACME threads allow quick, hand-tight assembly that provides for quick and simple cylinder replacement. Back checks automatically close in each connector when disconnected.

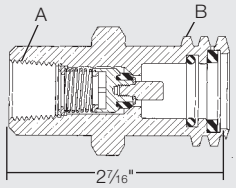
The 7141M couples directly to the service valve. An integral O-ring is designed to seal before the internal check opens, aiding in product loss prevention. A gasket at the ACME thread is a secondary seal when the connectors are tightened together. The connector fits RegO® lift truck cylinder filling adapters for fast, convenient filling.

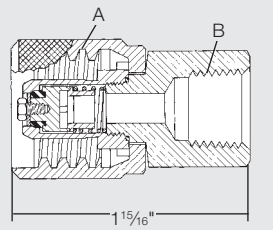
The 7141F accepts fuel line adapter and couples directly to the 7141M. The O-ring seal in the 7141M is designed to seal before the internal check opens to allow product to pass through the connection. The knurled coupling eases threading and the ACME threads provide rapid effortless make-up, even against LP-Gas pressure.

NOTE: Refer to the "Cylinder and Service Valves" section of the L-500 catalog for additional information.

7141M

7141F





Ordering Information

Part Number	Application	A Inlet	B Outlet	Protective Cap*	
				Rubber	Brass
7141M	Service Valve	3/8" F. NPT	1¼" M. ACME	7141M-40	7141FP
7141F	Fuel Line	1¼" F. ACME	¼" F. NPT	—	—

* Recommended to minimize foreign material entering valves which could result in leakage.

Unloading Adapters for Container Evacuation

3119A and 3120

Application

Designed to provide an efficient means of evacuating an LP-Gas container for relocation or repair. They thread directly onto the 1¾" ACME male hose connection of RegO® Filler Valves used on RegO® Double Check Filler Valves and Multivalves®.

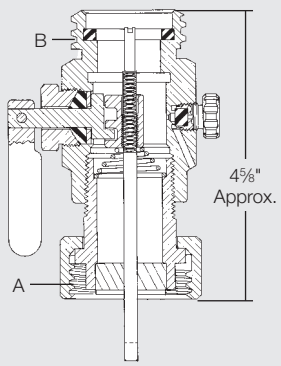
The unloading adapters can be used to withdraw liquid provided the container is equipped with a dip pipe extending from the filler valve to the bottom of the container.

Features

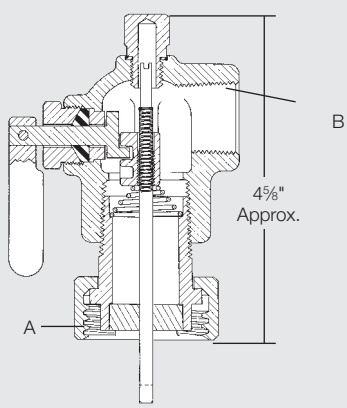
- Available in either angle or in-line type configurations.
- Built-in vent valve provides for a controlled release of gas which may be trapped within the unit after use and also helps to indicate closure of the Filler Valve.
- Integral plunger has two different lengths of travel, ¼" and ½", depending on which way the lever is turned. Can be used with all RegO® Filler Valves.

Materials

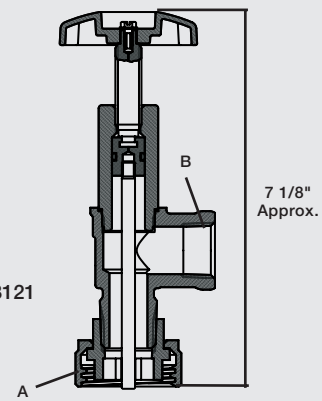
Body ..... Brass
Plunger..... Steel



3119A



3120



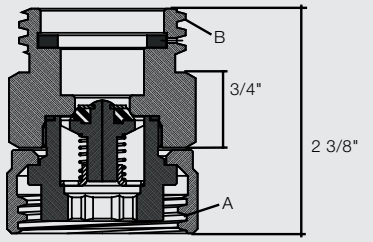
3121

Ordering Information

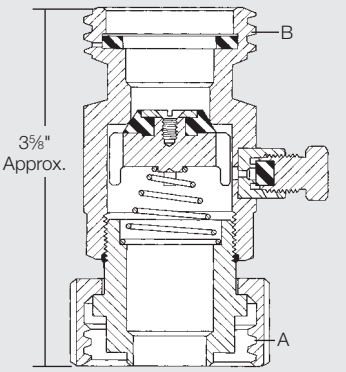
Part Number	Style	A Filler Valve Connection	B Hose Connection
3119A	In-Line	1 3/4" F. ACME	1 3/4" M. ACME
3120	Angle		3/4" F. NPT
3121	Angle		

Filler Hose Adapters

3179A and 7577V



3179B



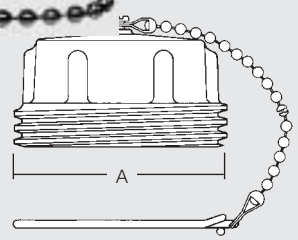
7577V

These adapters are designed with minimal flow restriction and recommended for use on the outlet of the LP-Gas delivery truck filler hose. If the controlled bleed off of the connection indicates the filler valve on the tank being filled has failed to close, the hose adapter should be left in place on the filler valve and disconnection should be made at the regular filler hose coupling. (Repair of the filler valve must be made as soon as possible). An integral check valve in these adapters helps prevent further loss of product. The standard filler valve cap should be attached to these adapters when left on the container.

Ordering Information

Part Number	Built-in Vent Valve	A Filler Valve Connection	B Hose Connection
7577V	Yes	1 3/4" F. ACME	1 3/4" M. ACME
3179B	NO		

ACME Plugs



Specifically designed to withstand the everyday abuse given hose end valves on delivery trucks and hose end couplings on risers in bulk plants. These rugged plugs protect the coupling tip as well as prevent the entrance of dirt, dust, snow and rain. They also prevent possible gas contamination from these same sources. The heavily ribbed outer surface permits hand-tight make-up.

These plugs are available in a choice of four sizes which may be used with liquid as well as vapor type couplings. As a convenience, the nylon plugs have a retaining chain and ring to prevent loss during a transfer operation.

All are suitable for LPG or anhydrous ammonia service except the brass 5765PR, which is for LP-Gas only.

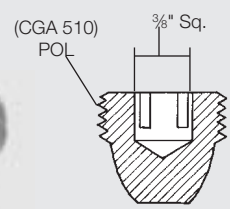
Not intended for use as pressure closures.

Ordering Information

Part Number	Material	A M. ACME	Chain & Ring Fits Pipe Size Up to:
C5763N	ABS Plastic	1 1/4"	3/4"
C5765N		1 3/4"	1 1/4"
5765PR	Brass		Not Applicable
C5767N	ABS Plastic	2 1/4"	1 1/4"
C5769N		3 1/4"	2"

POL Plugs

N970P



10538P
(Has hole for attaching wire to prevent loss of plug)

3705RC
W/Chain & Ring

Highly recommended for installation in LP-Gas cylinder valve POL outlets whenever the service line is disconnected or when the cylinder is being transported.

When properly installed, the POL plug is designed to prevent contamination of the valve outlet and guards against product leakage if the cylinder valve is accidentally opened.

Ordering Information

Part Number	Material	Connection
N970P	ABS Plastic	M. POL (CGA 510)
10538P	Brass	
3705RC		

H

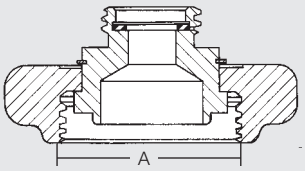
REGO PRODUCTS

Caps and Reducers

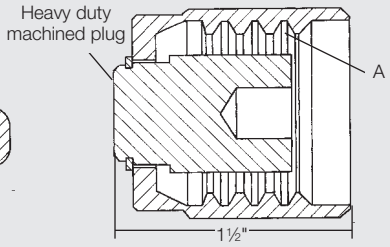
Ordering Information

Cap with Chain & Ring		Cap Only Part Number	Material	A Thread Connection
Part Number	Ring Fits Pipe Size Up to:			
3144-91	3/4"	3144-9P	ABS Plastic	1 1/4" F. ACME
3174-91		3174-9P		1 3/4" F. ACME
3174-93	1 1/4"			
A8016-93		A8016-9P		
1708C	3/4"	-	Brass	F., POL (CGA 510)
-	-	7141FP		1 1/4" F. ACME
3175P	1 1/4"	-		1 3/4" F. ACME
3184-90	2"			2 1/4" F. ACME
3194-90	3"	3194-9		3 1/4" F. ACME
-	-	5776*		
A3184-90	2"	-	Steel	2 1/4" F. ACME
A3194-90	3"			3 1/4" F. ACME
-	-	A5776*		
907FP	1"	-	Brass	1 15/16" F. ACME

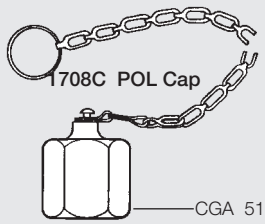
* Reduces to 1¾" M. ACME



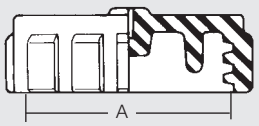
A5776
Reducer Coupling



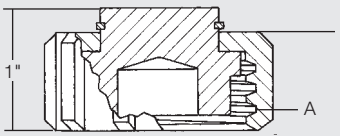
7141FP Cap Plug



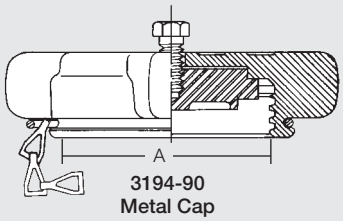
1708C POL Cap



3144-91
Plastic Cap

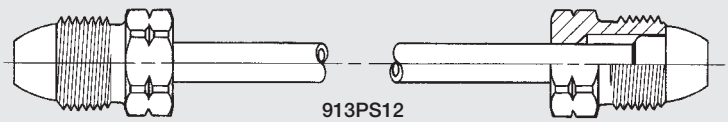


3175P Cap Plug



3194-90
Metal Cap

Copper Pigtails



913PS12

Straight Pigtails Ordering Information

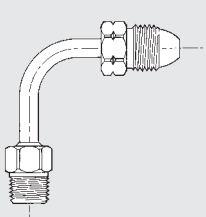
Connections	Approximate Length	Part Number ¼" Tube 7/8" Hex Short Nipple	Part Number ¼" Tube 1⅛" Hex Long Nipple	Part Number ⅜" Tube 7/8" Hex Short Nipple
M.POL x M.POL	5"	—	—	913PS05
	12"	912PS12	—	913PS12
	20"	912PS20	912PA20	913PS20
	30"	912PS30	—	913PS30
	36"	912PS36	912PA36	913PS36
	48"	912PS48	912PA48	913PS48
¼" Inverted Flare x M.POL	12"	912FS12	—	—
	20"	912FS20	912FA20	—
	30"	912FS30	—	—
	36"	912FS36	—	—
¼" M.NPT x M.POL	5"	—	—	913JS05
	12"	912JS12	—	—
	20"	912JS20	—	913JS20
	30"	912JS30	—	913JS30
	36"	912JS36	—	—
½" M.NPT x M.POL	12"	—	—	913LS12
½" M.NPT x ⅜" M.POL	12"	—	—	913KL12

Features

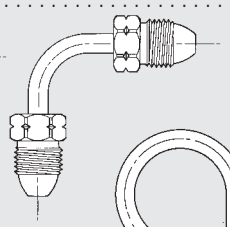
- Heavy duty construction.
- Individually soldered connections to the copper tubing.
- Each pigtail is individually tested prior to shipment.

Materials

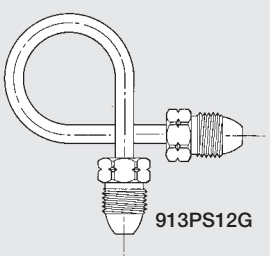
Tubing . . . . . Copper
Connections . . . . . Brass



913JS05A



913PS05A



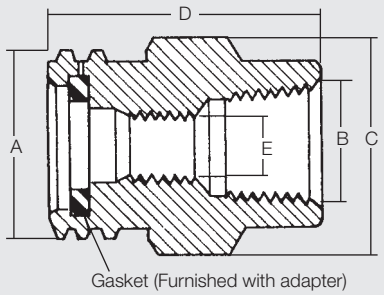
913PS12G

Bent Pigtails Ordering Information

Connections	Approximate Length	Part Number ⅜" Tube 7/8" Hex Short Nipple	Type/Degree of Bend
¼" M. NPT x M. POL	5"	913JS05A	90°
		913PS05A	
M. POL x M. POL	12"	913PS12G	270° Right Hand
		913PS12H	270° Left Hand
		913PS12S	360°

Ordering Information

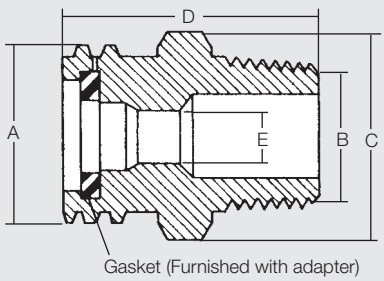
Part Number	Material	A M. ACME	B F. NPT	C Hex	D	E Diameter	For Spare Gasket Order Part No.
5764A	Brass	1¾"	¼"	1¾"	1½"	¾"	A2697-20R
5764B			⅜"		1⅞"		
5764C			½"				
5764D			¾"				
5764E			1"				
5766E		2¼"	1"	2¼"	2 5⁄16"	1⅜"	A3184-8R
5766F			1¼"				
5768G		3¼"	1½"	3½"	3⅝"	2⅛"	A3194-8R
5768H			2"				
5768J			2½"				
A5764D	Steel	1¾"	¾"	1¾"	2 3⁄16"	¾"	A2697-20R
A5764E			1"				
A5768H		3¼"	2"	3¼"	3¼"	1 13⁄16"	A3194-8R



ACME x Female NPT

Ordering Information

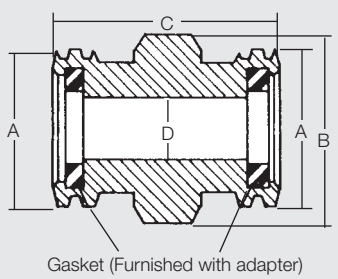
Part Number	Material	A M. ACME	B M. NPT	C Hex	D	E Diameter	For Spare Gasket Order Part No.
5763D	Brass	1¼"	¾"	1¼"	1¾"	7⁄16"	A2797-20R
5765D		1¾"	¾"	1¾"	1⅞"	11⁄16"	A2697-20R
5765E			1"		2⅛"	¾"	
5765F			1¼"				
5767F		2¼"	1¼"	2¼"	2 5⁄16"	1 3⁄16"	A3184-8R
5767G			1½"			1⅜"	
5767H			2"	2⅜"	2 7⁄16"	1 25⁄64"	
5769H		3¼"	2"	3⅜"	2⅞"	1⅞"	A3194-8R
5769J			2½"	3¼"	3½"	2⅛"	
5769K			3"	3½"	3⅝"		
A5765C	Steel	1¾"	½"	1¾"	2 3⁄16"	17⁄32"	A2697-20R
A5765D			¾"			11⁄16"	
A5765E			1"			⅞"	
A5765F			1¼"			15⁄16"	
A5767F		2¼"	1¼"	2¼"	2⅜"	1 3⁄16"	A3184-8R
A5769H		3¼"	2"	3¼"	2⅞"	1⅞"	A3194-8R
A5769K			3"		3 13⁄16"	2⅛"	



ACME x Male NPT

Ordering Information

Part Number	Material	A M. ACME	B Hex	C	D Diameter	For Spare Gasket Order Part No.
5765M	Brass	1¾"	1¾"	2 1⁄16"	⅞"	A2697-20R
5767M		2¼"	2¼"	2 5⁄16"	1 25⁄64"	A3184-8R
5769M		3¼"	3¼"	2¾"	2⅛"	A3194-8R

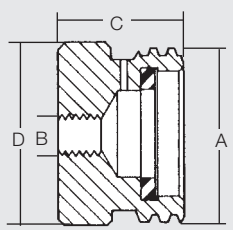


ACME x ACME

Ordering Information

Part Number	Material	A M. ACME	B Thread	C	D Hex	For Spare Gasket Order Part No.
A5764W	Steel	1¾"	⅜" *	1¼"	1 11⁄16"	2697-20

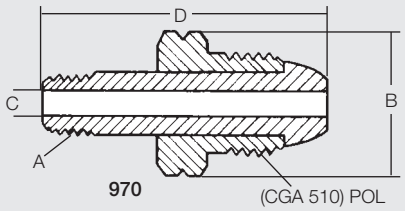
* ⅜" -16 UNC Thread.



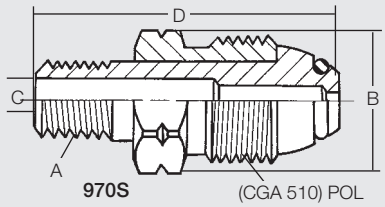
ACME x Miscellaneous
(Recommended for securing hose-end valve when not in use).

H

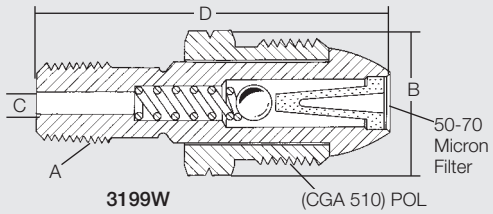
Male POL Swivel Adapters



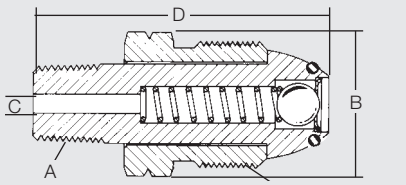
970
Hard Nose POL



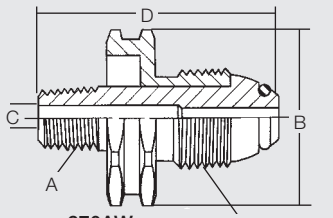
970S
Soft Nose POL w/60 DMS Orifice



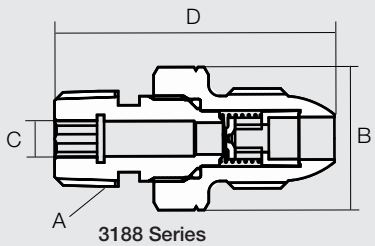
3199W
Heavy Duty Hard Nose POL w/Excess Flow



970AXS
Soft Nose POL w/Excess Flow



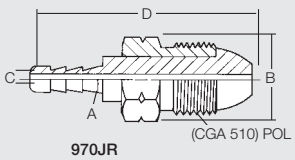
970AW
970HT
Soft Nose POL w/Handwheel



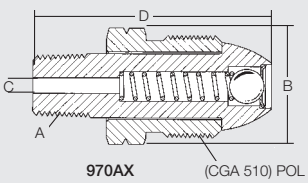
3188 Series
Heavy Duty Hard Nose POL w/Excess Flow

Part Number	UL Listed	Material	A	B Hex	C Drill	D	Clsoing Flow (Propane)	
							Vapor@ 100 PSIG Inlet (SCFH)	Liquid (GPM)
970	No	Brass	1/4" M. NPT	7/8"	5/16"	2 3/8"		
970S					3/16"	2 3/32"		
970AX	Yes				5/16"	2 5/64"	404	1.10
970AXS								
970AW				1 3/8"		2 3/32"		
970HT					3/16"			
970JR	No		1/4" Hose Barb	7/8"	5/32"	2 5/8"		
3188A			1/4" M. NPT	1 1/8"	5/16"	2 1/2"	350	.95
3188B							700	1.9
3188C							1180	2.9
3199W	Yes			7/8"		2 7/16"	450	.95

Note: All nipples incorporate wrench hex section.



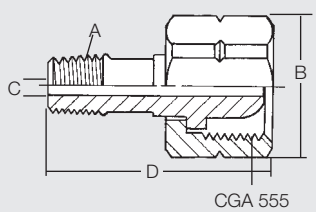
970JR
Hard Nose POL w/Hose Barb Connection



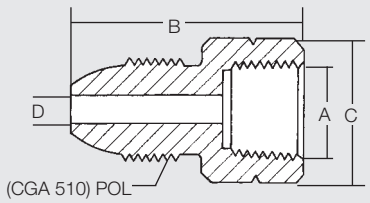
970AX
Hard Nose POL w/Excess Flow

CGA 555 Swivel Adapters

Part Number	Material	A	B Hex	C	D
12982	Brass	1/4" M. NPT	1 1/4"	3/16"	1 15/16"



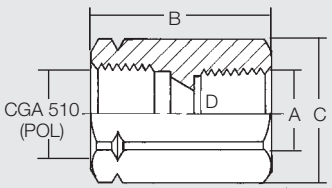
CGA 555



Male POL x Female NPT

Ordering Information

Part Number	Material	A F. NPT	B	C Hex	D
2906A	Brass	¼"	1⅜"	15/16"	¼"
2906G		½"	2"	1⅛"	

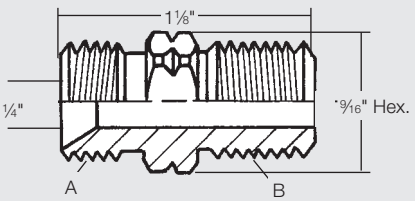


Female POL x Female NPT and Female POL

Ordering Information

Part Number	Material	A F. NPT	B	C Hex	D Diameter
5760Z	Brass	⅛"	1⅝"	1⅛"	5/16"
5760A		¼"			13/32"
5760B		⅜"			35/64"
5760C		½"			43/64"
5760D		¾"	1⅞"	1⅜"	13/32"
5760S		POL (CGA 510)	2⅛"	1⅛"	

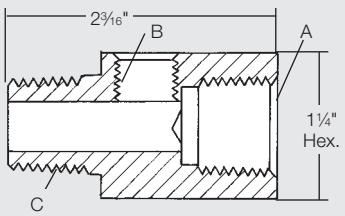
Hose Adapter
For use with fuel gases (LP-Gas, Acetylene).



Ordering Information

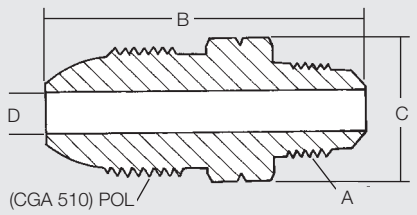
Part Number	Material	A	B
1300	Brass	9/16"-18NF (L.H.)	¼" M. NPT

Pressure Gauge Adapter



Ordering Information

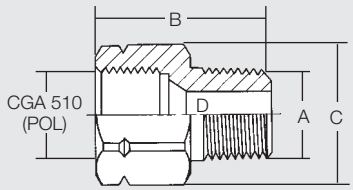
Part Number	Material	A	B	C
1494-1	Brass	½" F. NPT	¼" F. NPT	½" M. NPT



Male POL x Male NPT and SAE Flare

Ordering Information

Part Number	Material	A	B	C Hex	D Diameter
2906D	Brass	⅜" M. NPT	2 1/16"	15/16"	11/32"
2906F		⅜" SAE Flare		⅞"	9/32"
2906E		½" SAE Flare	2¼"		



Female POL x Male NPT

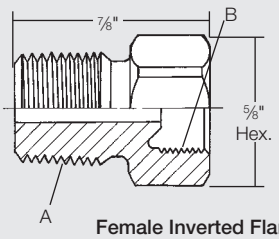
Ordering Information

Part Number	Material	A M. NPT	B	C Hex	D Diameter
5761A	Brass	¼"	1⅝"	1⅛"	3/16"
5761B		⅜"			13/32"
5761C		½"			7/16"
5761D		¾"			

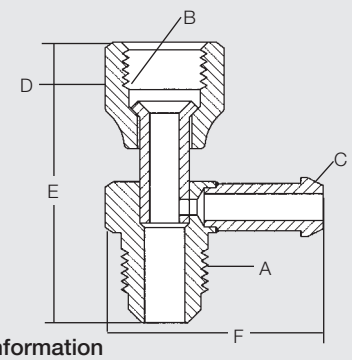
Miscellaneous Adapters

Ordering Information

Part Number	Material	A	B
15774-1	Brass	¼" M. NPT	Female Inverted Flare



Female Inverted Flare x Male NPT



Ordering Information

Part Number	Material	A Male	B Female	C	D	E	F
1328	Brass	5/8"-18 UNF	5/8"-18 UNF	½" Hose Barb	13/16"	2"	1½"
1331		¾"-16 UNF	¾"-16 UNF		15/16"	2⅛"	1¾"
1332		⅞"-14 UNF	⅞"-14 UNF		1 1/16"	2½"	

H

Cross Reference by Part Number

Catalog L-500

REGO® PRODUCTS

LP-GAS & ANHYDROUS AMMONIA EQUIPMENT

ECII® Engineered Controls International, Inc.

Section J

Miscellaneous Equipment (Including Rotogages and ESVs)

Limited Warranty and Limitation of Liability

LIMITED WARRANTY
Engineered Controls International, Inc. warrants products and repair kits manufactured by it to be free from defects in materials and workmanship under normal use and service for a period of 12 months from the date of installation or operation or 18 months from the date of shipment from the factory, whichever is earlier. If within thirty days after buyer's discovery of what buyer believes is a defect, buyer notifies Engineered Controls International, Inc. thereof in writing, Engineered Controls International, Inc., at its option, and within forty-five days, will repair, replace F.O.B. point of manufacture, or refund the purchase price of that part or product found by it to be defective. Failure of buyer to give such written notice within thirty days shall be deemed an absolute and unconditional waiver of any and all claims of buyer arising out of such defect.

This warranty does not extend to any product or part that is not installed and used in accordance with Engineered Controls International, Inc.'s printed instructions, all applicable state and local regulations, and all applicable national standards, such as those promulgated by NFPA, DOT and ANSI. This warranty does not extend to any product or part that has been damaged by accident, misuse, abuse or neglect, nor does it extend to any product or part which has been modified, altered, or repaired in the field.

Except as expressly set forth above, and subject to the limitation of liability below, Engineered Controls International, Inc. makes NO OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, with respect to its products and parts, whether used alone or in combination with others. Engineered Controls International, Inc. disclaims all warranties not stated herein.

LIMITATION OF LIABILITY
Engineered Controls International, Inc.'s total liability for any and all losses and damages arising out of any cause whatsoever shall in no event exceed the purchase price of the products or parts in respect of which such cause arises, whether such cause be based on theories of contract, negligence, strict liability, tort or otherwise.

Engineered Controls International, Inc. shall not be liable for incidental, consequential or punitive damages or other losses. Engineered Controls International, Inc. shall not be liable for, and buyer assumes liability for, all personal injury and property damage connected with the handling, transportation, possession, further manufacture, other use or resale of products, whether used alone or in combination with any other products or material.

If Engineered Controls International, Inc. furnishes technical advice to buyer, whether or not at buyer's request, with respect to application, further manufacture or other use of the products and parts, Engineered Controls International, Inc. shall not be liable for such technical advice and buyer assumes all risks of such advice and the results thereof.

NOTE: Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. The warranty gives you specific legal rights, and you may have other rights that vary from State to State. The portions of this limited warranty and limitation of liability shall be considered severable and all portions which are not disallowed by applicable law shall remain in full force and effect.

WARNING
All Engineered Controls International, Inc. products are mechanical devices that will eventually become inoperative due to wear, corrosion and aging of components made of materials such as rubber, etc. The environment and conditions of use will determine the safe service life of these products. Periodic inspection and maintenance are essential to avoid serious injury and property damage.

Many Engineered Controls International, Inc. products are manufactured components which are incorporated by others on or in other products or systems used for storage, transport, transfer and otherwise for use of toxic, flammable and dangerous liquids and gases. Such substances must be handled by experienced and trained personnel only, using accepted governmental and industrial safety procedures.

NOTICE TO USERS OF PRODUCTS
The Limited Warranty stated above is a factory warranty to the first purchasers of Engineered Controls International, Inc. products. Since most users have purchased these products from Engineered Controls International, Inc. distributors, the user must within thirty (30) days after the user's discovery of what user believes is a defect, notify in writing the distributor from whom he purchased the product/parts. The distributor may or may not at the distributor's option, choose to submit the product/parts to Engineered Controls International, Inc., pursuant to its Limited Warranty. Failure by buyer to give such written notice within thirty (30) days shall be deemed an absolute and unconditional waiver of buyer's claim for such defects. Acceptance of any alleged defective product/parts by Engineered Controls International, Inc.'s distributor for replacement or repairs under the terms of Engineered Controls International, Inc.'s Limited Warranty in no way obligates Engineered Controls International, Inc. to the terms of the above warranty.

Because of a policy of continuous product improvement, Engineered Controls International, Inc. reserves the right to change designs, materials or specification without notice.

Foreword

This catalog describes a complete line of equipment available from Engineered Controls International, Inc. for use with LP-Gas and anhydrous ammonia (NH_3). The following points are important to know for proper use of the catalog:

1. Illustrations and drawings of individual products are representative of "product groups" and all products within a product group are similar in construction.
2. Materials used for construction of products in this catalog are suitable for rated service pressure at temperatures of -40° F. to +165° F., unless otherwise specified.
3. Products in this catalog are only intended for use in LP-Gas and/or anhydrous ammonia service as follows.

a. "A" or "AA" prefix — Products with this prefix are suitable for NH_3 service (i.e., contain no brass parts).

b. "AA" prefix on relief valves — These valves are NOT suitable for use with LP-Gas service. These are of partial aluminum materials and are listed by Underwriters Laboratories (UL) for NH_3 service only.

c. All other products are suitable for use with LP-Gas service.

d. "SS" prefix—Hydrostatic relief valves with this prefix are suitable for NH_3 service (i.e., they have stainless steel materials).

Caution

Do not use any product contained in this catalog with any service commodity other than LP-Gas or NH_3. If you have a need for use of another application, contact Engineered Controls International, Inc., 100 RegO Drive, Elon, NC 27244, (336) 449-7707 before proceeding.

Proper application, installation and maintenance of products in this catalog are essential. Users of these products should obtain further information if there are any doubts or questions.

Warning

All ECII® products are mechanical devices that will eventually become inoperative due to wear, corrosion and aging of components made of materials such as rubber. The environment and conditions of use will determine the safe service life of these products. Periodic inspection and maintenance are essential to avoid serious injury and property damage.

Many ECII® products are manufactured for storage, transport, transfer and use of toxic flammable and dangerous liquids and gases. Such substances should be handled by experienced and trained personnel only, using accepted governmental and industrial safety procedures. Never vent LP-Gas near any possible source of ignition.

Notice

Installation, usage, and maintenance of all ECII® products must be in compliance with all Engineered Controls International, Inc. instructions as well as requirements and provisions of NFPA #54, NFPA#58, DOT, ANSI, and all applicable federal, state, provincial and local standards, codes, regulations, and laws.

Inspection and maintenance on a periodic basis is essential. Installation and maintenance should be performed only by qualified personnel.

Be sure all instructions are read and understood before installation, operation and service.

Filters

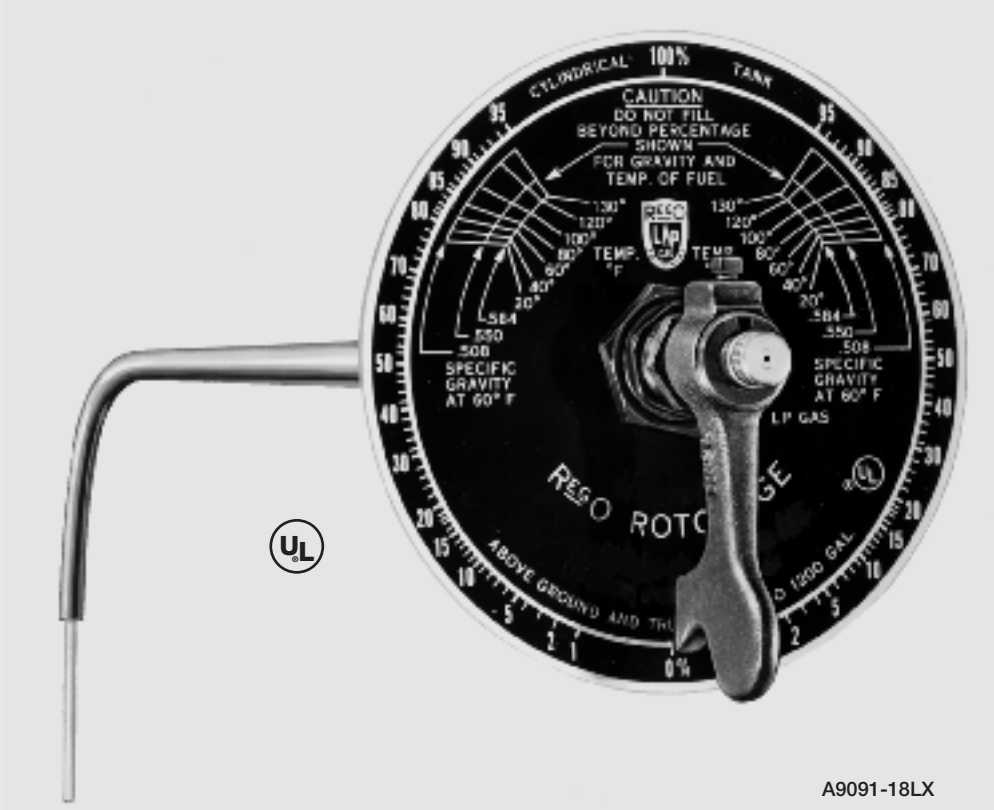
ECII® LP-Gas equipment is designed to operate in a system free from contamination. A variety of in-line filters are commercially available to the LP-Gas industry for installation in domestic systems.
The use of an in-line filter should be considered when other system components may be unclean and the system contaminated by rust, scale, dirt, debris or other foreign material.

Contents

Page

1" Rotogages® for Large Mobile and Stationary Containers

9090 and AA9090 Series



A9091-18LX

Application

Rotogages® are designed to provide an accurate determination of LP-Gas or anhydrous ammonia container contents. They mount in a standard 1" NPT coupling on large mobile or stationary containers.

To operate the Rotogages®, the vent valve is opened and the dip tube rotated slowly from the container vapor space to the liquid space. The difference in appearance of the discharge indicates when the liquid level is reached. Dial readings then indicate the percentage of product in the container.

Features

- Supported design (TS Models) eliminates whipping and the need for internal support hangers.
- Resistance-free nylon bearing inserts reduce friction and promote operating ease.
- Dial face is dual calibrated to provide greater accuracy in reading contents in containers which are not level.
- Interchangeable accessory dials permit interchangeable service between LP-Gas and anhydrous ammonia.

Rotogage® Dials

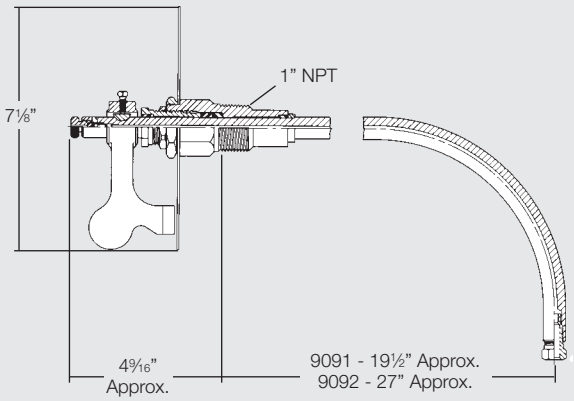
Part Number	Service	Container Size
A9091-18L	LP-Gas	All Sizes
A9091-18LX*	LP-Gas	Over 1200 U.S. gallons
A9091-18N	NH_3	All sizes

* Dial permits higher filling level, as per NFPA 58, (1983) Par. 4-5.2.1, Table 4-5.2.1

Materials

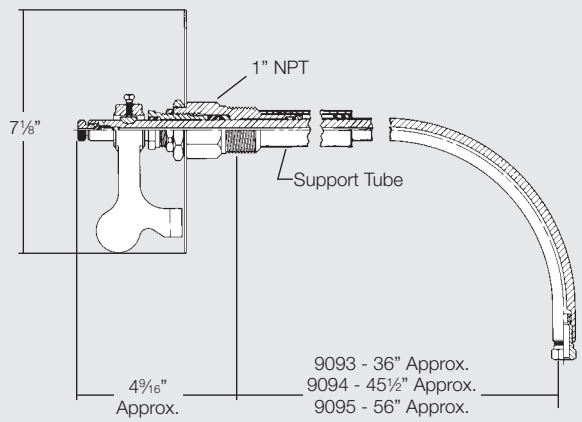
Body ..... Steel
Stem ..... Steel
Dip Tube ..... Seamless Steel
Indicator ..... Malleable Iron
Dial Plate ..... Aluminum
Vent Stem ..... Stainless Steel

For Small Mobile or Stationary Containers
9091RM and 9092RM Series



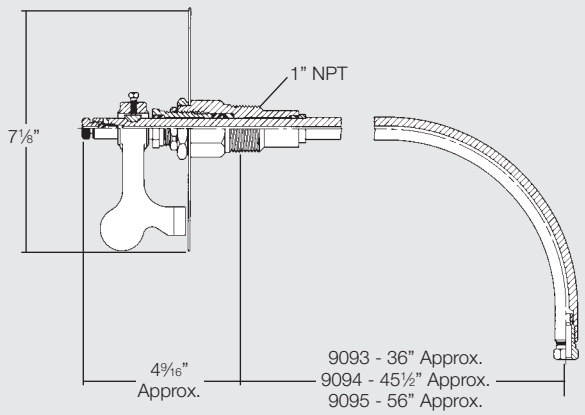
$$\text{Dip Tube Length} = \left(\frac{\text{Container I.D.}}{2}\right)" - 5¾"$$

For Large Mobile or Stationary Containers
9093TSM, 9094TSM and 9095TSM Series



$$\text{Dip Tube Length} = \left(\frac{\text{Container I.D.}}{2}\right)" - 5¾"$$

For Large Stationary Containers
9093RSM, 9094RSM and 9095RSM Series



$$\text{Dip Tube Length} = \left(\frac{\text{Container I.D.}}{2}\right)" - 5¾"$$

Rotogage® Ordering Information

Part Number				For Container Inside Diameter			
For Use With LP-Gas		For Use With NH_3					
				Ellipsoidal Heads		Hemispherical Heads	
For Mobile or Stationary Containers	For Stationary Containers Only	For Mobile or Stationary Containers	For Stationary Containers Only	Side Mounted	End Mounted	Side Mounted	End Mounted
9091RM24	—	AA9091RM24	—	30" - 45"	30" - 75"	30" - 45"	30" - 45"
9092RM36	—	AA9092RM36	—	46" - 61"	76" - 108"	46" - 61"	46" - 61"
9093TSM48*	9093RSM48	AA9093TSM48*	AA9093RSM48	62" - 79"	109" - 147"	62" - 79"	62" - 79"
9094TSM60*	9094RSM60	AA9094TSM60*	AA9094RSM60	80" - 99"	—	80" - 99"	80" - 99"
9095TSM72*	9095RSM72	AA9095TSM72*	AA9095RSM72	100" - 147"	—	100" - 147"	100" - 147"

* Supported Design
NOTE: The dip tube must be cut to the required length (½" of container inside diameter minus 5¾").

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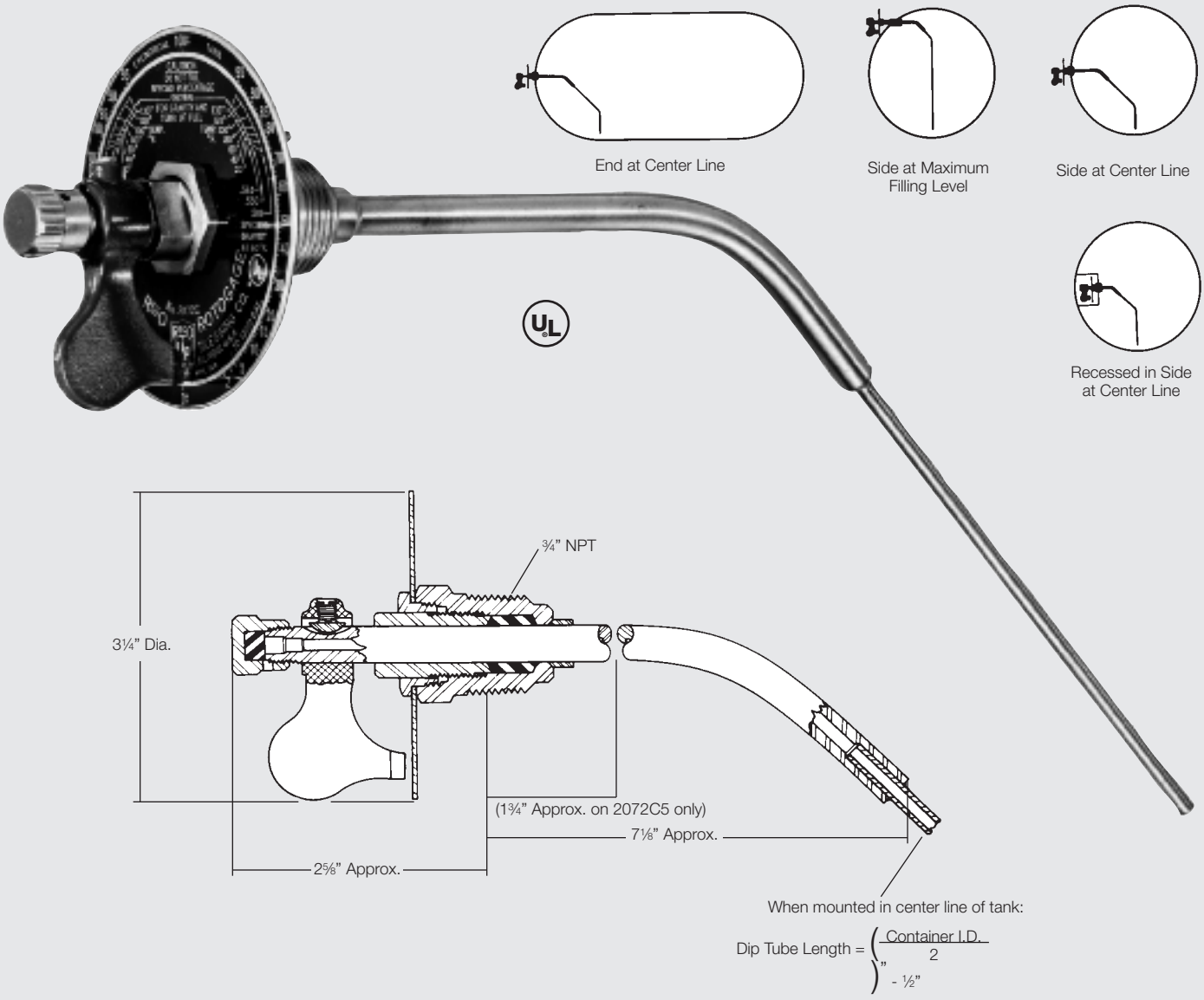
¾" Rotogages® for Small Stationary and Mobile LP-Gas Containers

2070 Series

2070 Series Rotogage® Mounting Positions



Application

Rotogages® are designed to provide accurate determination of LP-Gas container contents. They may be end or side mounted in a standard ¾" NPT coupling on stationary or mobile containers. To guarantee accurate measurement, they should not be used on stationary containers that exceed 60" I.D. or on mobile containers, subject to vibration, with an I.D. of more than 24".

Features

- Provides long, trouble-free performance and ease of operation.
- Polished stems assure bind-proof operation.
- Dial face is dual calibrated to provide greater accuracy in reading contents in containers which are not level.

Materials

Body ..... Brass
Stem ..... Brass Tubing
Dip Tube ..... Seamless Brass Tubing
Dial Plate ..... Aluminum
Indicator ..... Malleable Iron

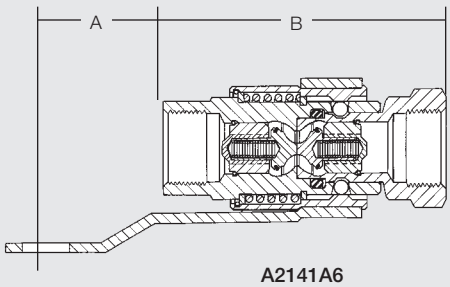
Ordering Information

Part Number		For Containers with Inside Diameter	Tank Connection	Valve Seat Orifice
Rotogage®	Dip Tube			
2070CO	2071-L25.7	Up to 40"	¾" M. NPT	No. 54 Drill Size
	2071-L39.7	Up to 60"		

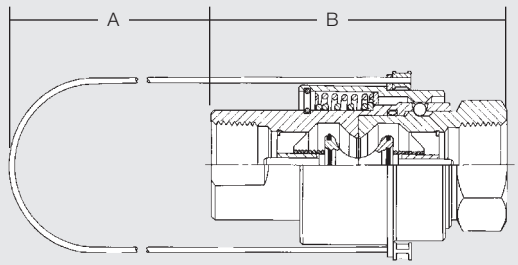
NOTE: The dip tube must be cut to the required length (½ of container inside diameter minus ½"), when mounted on center line of tank.

Pull-Away Valves for Transfer Operations

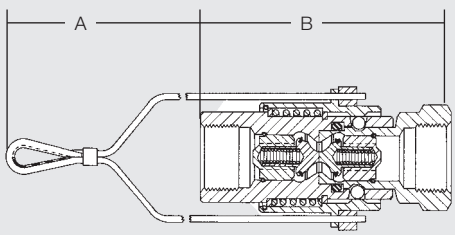
A2141 Series



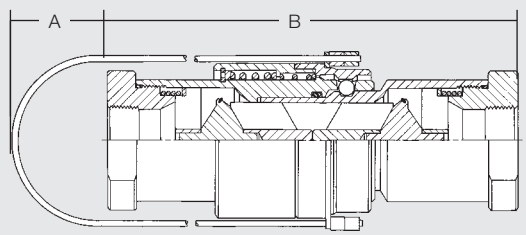
A2141A6
A2141A8



A2141A10



A2141A6L
A2141A8L



A2141A16

Application

Designed especially to provide pull-away protection for LP-Gas and anhydrous ammonia transfer operations including transport and delivery truck loading and unloading, engine fuel container filling and miscellaneous cylinder filling operations. When properly fastened to the inlet end of the discharge hose, the valve is designed to stop gas escape from both upstream and downstream lines in the event of a pull-away. An excessive tension pull causes the valve to automatically separate, closing two internal back pressure checks. Only a few cubic centimeters of gas escape at the instant of separation.

It is recommended that a convenient means be provided to safely remove the pressure from the line upstream of each coupling half to enable reassembly of the valve. To reassemble, simply push the male half firmly into the female half until the retaining balls slip into the retaining groove. Check for leaks after reassembly.

NOTE: It is recommended that pull-away valves be safety-tested at least monthly to confirm that they will separate properly in the event of a pull-away. Dry nitrogen or other inert gas is suggested for a source of pressure during such tests.

If the A2141 pull-away valve is going to be stored for a period of time, such as in seasonal applications, it is recommended that it be sprayed with a good grade of rust-preventive machine oil, and covered to protect it from moisture.

A test should be conducted to confirm proper performance, including a simulated pull-away, prior to putting the pull-away valve back in service.

Features

- Heavy-duty construction for long service life.
- A "true" pull-away type valve which simply reconnects by snapping together without unnecessary downtime or need for new parts.
- Buna-N seals provide leak tight operation.
- 400 PSIG operating pressure.

Materials

Body (¾", 1") .....Cadmium Plated Steel
Body (1¼", 2") .....Aluminum
Seals .....Buna-N Rubber
Cable..... Nylon Coated, Galvanized Steel

Ordering Information

Part Number	Inlet/Outlet Connections F. NPT	Disconnect Force Approx-lbs	Reconnect Force Approx-lbs	A Length	B Length	LP-Gas Liquid Flow Capacity at Various Differential Pressures (GPM)*			
						5 PSIG	10 PSIG	25 PSIG	50 PSIG
A2141A6	¾"	130	80	5⁄8"	3 7⁄8"	11	16	25	36
A2141A6L				6 1⁄8"					
A2141A8	1"	75	50	1 15⁄16"	4 9⁄16"	21	30	47	67
A2141A8L				5 7⁄8"					
A2141A10	1¼"	160	25	5"	5 5⁄8"	52	75	120	170
A2141A16	2"	300	50	8½"	14 5⁄16"	250	350	550	750

* To determine NH_3 liquid flow capacity, multiply by .90.

J

Why and how they should be used for Bobtail Filling and Transport Unloading.

General Information

The primary purpose of Emergency Shut-Off Valves in bobtail filling and transport unloading is to allow quick shut-off of liquid and vapor flow in the event there is an accidental pull-away of a truck or a hose rupture, both of which could cause a fire.

> A system using Emergency Shut-Off Valves will not prevent some spillage of liquid and vapor, but the total system should be constructed so this spillage will be kept to a minimum.

This can be accomplished either by making possible, quick action by the driver or plant personnel in closing the valves by manual remote or pneumatic remote actuation; or in case of a pull-away, by automatic closing of the liquid valve by means of a cable connected to the liquid hose.

By minimizing the presence of liquid and vapor, the chance of a fire or explosion will be reduced. In case of a fire, thermal links at the valves or at other appropriate locations could close the valves and prevent further release of liquid and vapor.

The valve closing systems will be discussed later in this section. The user should decide which system is most appropriate, depending on the piping configuration and the general layout of the filling/-unloading area.

ESV Application for Bobtail Loading and Transport Unloading

A very important function of the typical LP-Gas storage plant is to transfer LP-Gas into bobtails for delivery to customers. How efficiently and rapidly these bobtails can be filled often determines the number of customers that can be served each day, as well as how many bobtails are required to satisfactorily serve all customers. Therefore, the selection of an ESV for the bobtail liquid loading line should be done with care so as to maximize efficiency in filling and have year-round dependability.

The RegO® 2" liquid ESV (7605B) has a full open port so that the restrictions of flow would be no more than you would expect through an equivalent length of 2" schedule 80 pipe. To improve the overall efficiency of the system, the valve was also designed as an operating valve so it could replace an existing globe or angle valve already installed at the end of the fixed piping. Thus, installing a RegO® ESV could actually result in a more efficient pumping operation than the existing system.

Equally important in the consideration of an ESV is its performance in an emergency, especially bobtail pull-aways. According to the NPGA, it is the bobtail filling transfer process that produces almost 99% of all bulk plant accidents and fires. Therefore, when selecting the proper ESV for bobtail filling, also consider the dependability of performance, and simplicity of operation and maintenance.

The RegO® ESV clearly indicates to the operator its open or closed position. It allows full manual control by the operator and provides means for remote operation in emergencies from either in front of the valve or in the rear.

No complicated systems of pulleys and cables are necessary since direct, straight pulls will close the valve. Means are even provided to secure a length of cable to the transfer hose so as to produce an automatic closing in the event the driver pulls away without disconnecting the hose.

NFPA Provisions (1986)

> The pertinent provisions of NFPA Pamphlet 58, as they apply to Emergency Shut-Off Valves and how they are to be installed, are as follows:

Section 2-4.5.4 Emergency shutoff valves shall be approved and incorporate all the following means of closing:

(a) Automatic shutoff through thermal (fire) actuation. When fusible elements are used they shall have a melting point not exceeding 250° F. (121° C).

(b) Manual shutoff from a remote location.

(c) Manual shutoff at the installed location.

This provision sets for the basic criteria for the emergency shutoff valve, a key valve in the protection of many liquid transfer operations. Actuating means for remote control may be electrical, mechanical or pneumatic. Many systems use a pneumatic system where the tubing itself acts as a fusible element releasing the pressure holding the valve open. With respect to the feature of manual shutoff at the installed location, it is recommended that this valve be operated occasionally. Also, the system should be tested periodically to determine that it will function properly.

Section 3-2.7.9 on new installations, and by December 31, 1980 on existing installations, (1) stationary single container systems of over 4,000 gal. (15.1 m^3) water capacity, or (2) stationary multiple container systems with an aggregate water capacity of more than 4,000 gal. (15.1 m^3) utilizing a common or manifolded liquid transfer line, shall comply with 3-2.7.9 (a) and (b).

(a) When a hose or swivel type piping 1½" or larger is used for liquid transfer or a 1¼" or larger vapor hose or swivel type piping is used in this service (excluding flexible connectors in such liquid and vapor piping), and emergency shutoff valve complying with 2-4.5.4 shall be installed in the fixed piping of the transfer system within 20 ft (6m) of lineal pipe from the nearest end of the hose or swivel type piping to which the hose or swivel type piping is connected. The preceding sizes are nominal. Where the flow is only in one direction, a backflow check valve may be used in lieu of an emergency shutoff valve if installed in the fixed piping down-stream of the hose or swivel type piping, provided the backflow check valve has a metal-to-metal seat or a primary resilient seat with a secondary metal seat not hinged with combustible material. When either a liquid or vapor line has two or more hoses or swivel type piping of the sizes designated, either an emergency shutoff valve or a backflow check valve shall be installed in each leg of the piping.

    (1) Emergency shutoff valves shall be installed so that the temperature sensitive element in the valve, or a supplemental temperature sensitive element [250° F. (121° C) maximum] connected to actuate the valve, is not more than 5 ft. (1.5 m) from the nearest end of the hose or swivel type piping connected to the line in which the valve is installed.

(b) The emergency shutoff valve(s) or backflow check valve(s) specified in 3-2.7.9 (a) shall be installed in the plant piping so that any break resulting from a pull will occur on the hose or swivel type piping side of the connection while retaining intact the valves and piping on the plant side of the connection. This may be accomplished by use of concrete bulkheads or equivalent anchorage or by the use of a weakness or shear fitting. Such anchorage is not required for tank car unloading.

> These provisions have been interpreted by the National Propane Gas Association as to how bobtail filling and transport unloading stations should be configured. The diagrams shown here are in essential conformance with NPGA Bulletin 128-77.

LP-Gas Emergency Shut-Off Valves (ESV's)

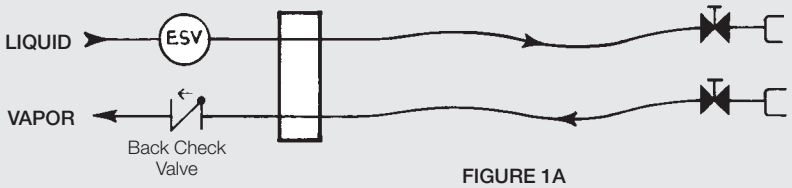


FIGURE 1A
Bobtail Filling Only

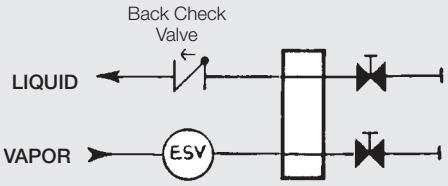


FIGURE 1B
Transport Unloading Only

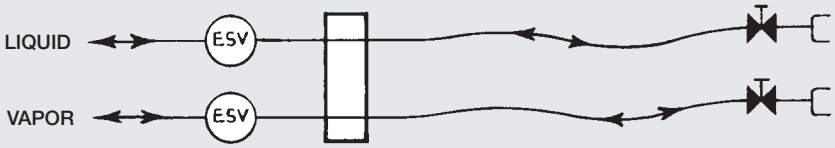


FIGURE 1C
Combined Bobtail Filling
and Transport Unloading

Installation Compliance with NFPA Requirements

A valve that is approved as an ESV may be installed in the fixed piping up to a distance of 20 feet (along the pipe) from the point where the transfer hose is attached to the fixed piping.

However, when the ESV is located more than five feet from the end of the fixed piping, an additional fusible element must be installed within five feet of the point of attachment of the hose, and be connected to the ESV valve in such a manner that it will cause the ESV to close in the event of a fire.

The ideal location of the ESV is as close to the end of the fixed piping as possible. This position eliminates the need for an additional fusible element and cable, and it may also permit the elimination of a restrictive valve already installed at the end of the fixed piping.

To this point, our comments have been principally concerned with ESV protection of the liquid line at bulk plants because this is the area of greatest potential danger in the event of a pull-away or hose rupture.

However, regulations also require an ESV in the vapor transfer line when the vapor hose is 1¼" or larger. A helpful rule of thumb in determining whether or not an ESV control valve is required in your vapor system is this: If the vapor flow is out of the storage tank, an ESV is required. ESV systems are designed to protect the storage tank contents against uncontrolled release.

Therefore, a bobtail loading system could use a 1¼" or larger back pressure check valve in the vapor system since the flow of vapor is always from the bobtail being filled back to the storage tank. To improve transfer rates, the use of the RegO® 6586B back check valve at this location would provide protection at minimum pressure drop.

If the bobtail vapor line is also used when unloading transports, then the RegO® 7781AF ESV should be used. The 7781AF provides thermal protection, manual closing and a remote emergency closing system similar to the RegO® 2" liquid ESV, 7605B.

Remote Control Systems

Usually in transfer loading operations, the valve handles and cables are located in close proximity to the area of greatest potential danger during an emergency. Therefore, each bobtail filling system or transport unloading system should have installed in it at least one readily accessible, alternate remote operating device. There are four basic recommended systems to close the Emergency Shut-Off Valves other than manual closing of the valves themselves. These are:

1. **Direct automatic pull from cables which are attached to the liquid and vapor hoses. See Figure 2.**

   This is the system that is intended to close the ESV automatically should a bobtail or transport pull away with the hose still connected. As the hose stretches, the cable strapped to the hose closes the valve, minimizing spillage of gas.

   The hose cable kit is a necessity in every bulk plant with transfer capabilities. Engineered Controls International, Inc. recommends this kit as a supplement to all other cable kits (note that in Figure 2, the hose cable kit supplements a pneumatic shut-off system). It will stop trouble before it begins. If a pullaway occurs, the cable kit is designed to automatically close the valve, even though a fire does not break out.

   The transfer hose cable kit is Part Number 7609-50.

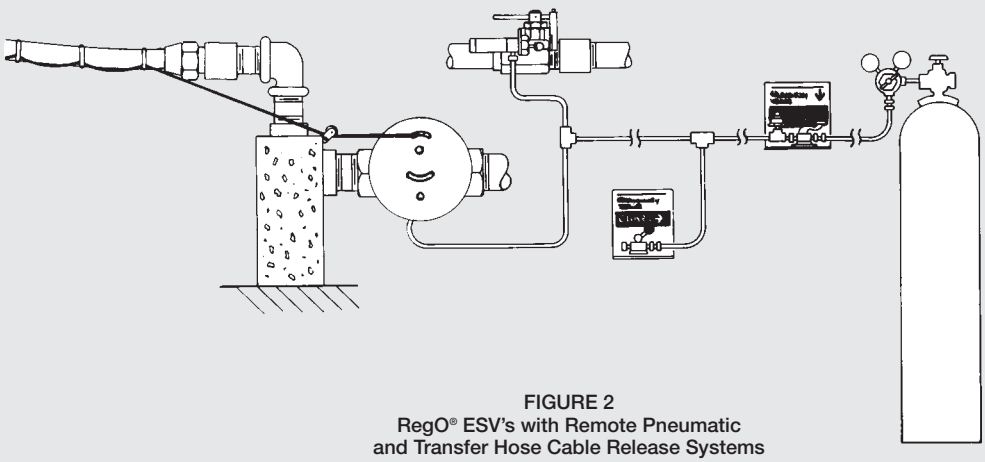


FIGURE 2
RegO® ESV's with Remote Pneumatic
and Transfer Hose Cable Release Systems
TYPICAL INSTALLATION

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2. **Direct manual cable pull from a location some distance from the valve. See Figure 3A.**

   This system is simple and reliable. Because the RegO® Emergency Shut Off Valves are designed so that they can be closed from two opposite directions, considerable flexibility is allowed in selecting the paths of the remote cables. Not only can the valves be closed up to 50 feet away with the use of the remote manual cable kit, but additional cable can be attached and extended to another remote location for manual closing. Order Part Number 7606RM.

3. **Thermal remote cable pull from a remote location. See Figure 3B.**

   Pamphlet 58 requires a supplemental fusible element to be installed in a system if the ESV is more than 5 feet from the nearest end of the hose. To aid dealers in meeting this requirement ECII® manufactures and markets the RegO® 7606RT. This unit incorporates a fusible element holding a spring-loaded release in place in a remote location. In the event of fire the element will melt, releasing the spring, which will pull a cable connected to the ESV, thus quickly and effectively closing the valve.

   The 7606RT can also close an ESV in situations other than loading/unloading at the bulkhead. Typical installations include fork lift fill stations, cylinder charging manifolds, or as protective devices upstream of vaporizers.

4. **Pneumatic actuation from a remote location. See Figure 2.**

   All RegO® ESVs may be field retro-fitted with pneumatic closing systems. Kits are available for the RegO® 2" liquid valves and 1¼" vapor valves. Here, a length of plastic tubing connects the Emergency Shut-Off Valve actuators to a source of pressurized gas such as air or nitrogen.

   A pneumatic outfit is ideal as a "fail safe" backup closing system. When the remote pneumatic closing system is pressurized, it allows the latched open valve to remain open. When the pressure is released at a remote location of your choosing (the office, for example) by operating a small control valve, the ESV automatically closes. In the event of fire, the plastic tubing could melt, releasing the pressure, causing the ESV to close.

   A pneumatic system is also desirable when the remote release point is some distance away from the Emergency Shut-Off Valve. Also, with a pneumatic system, a number of remote control valves can be installed along the run of plastic tubing to provide a flexible protection system.

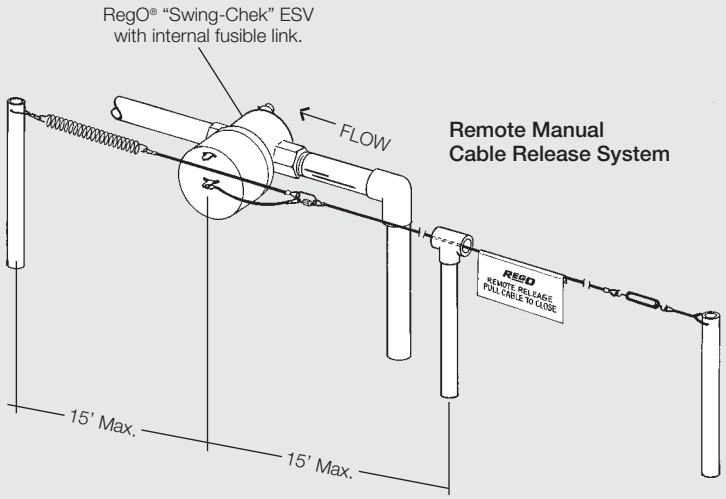


FIGURE 3A

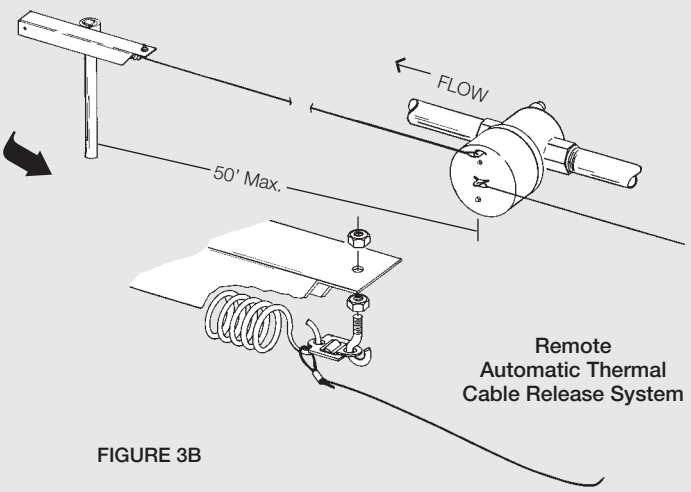


FIGURE 3B

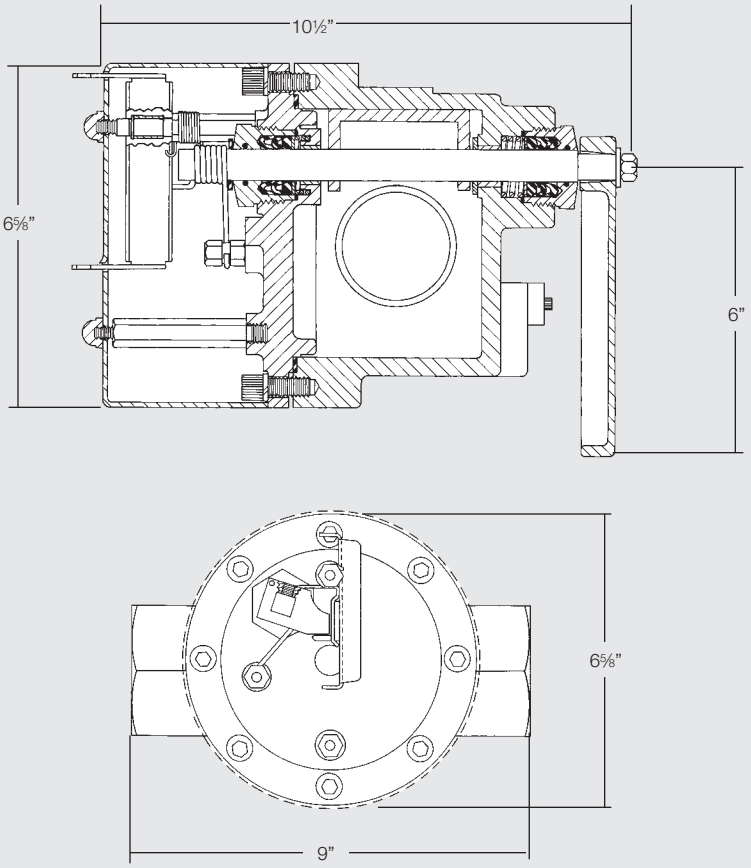
Bulkheads

Transfer hoses are extremely strong when pulled in tension. Therefore, NFPA Pamphlet 58 requires that the bulk plant piping be designed so as to provide for a breakaway connection between the ESV and the transfer hose. To accomplish this, the pamphlet suggests the use of bulkheads. Bulkheads, however, without some engineered point of failure in the piping, will not solve the problem completely.

It has been reported that in some "pullaways," when bulkheads were installed without weakness points, valves or connections were pulled out of the bobtail delivery truck. With the increasing use of concrete and structural steel bulkheads, it becomes imperative that, when revamping your bulk plant piping to install the required ESVs, you provide means for the plant piping to fail outside the bulkhead to protect the balance of the piping and bobtail valves. Tests have shown that a 90° or 45° elbow installed where the hose attaches to the fixed piping is a likely breaking point in a "pullaway" if the pull from the truck is transmitted to the piping at an angle, the failure will likely occur in the threaded joint of the elbow.

2" "Swing-Chek" ESVs for Bulk Plants

7605B and A7605B



Application

Especially designed for installation in liquid transfer lines at LP-Gas or anhydrous ammonia bulk plants to provide for quick shut-off of liquid or vapor flow in the event of an accidental pull-away or hose rupture, both of which can cause a fire.

Features

Meets NFPA and UL Requirements

- Fusible link triggers closing mechanism at 212° F.
- Valve can be easily closed by remote cable or pneumatic system.
- Trip levers at valve allows manual shut-off at point of installation.

Sturdy, Rugged Construction

- Rugged design withstands hydraulic shock of sudden closings, piping strains, and temperature variations.
- Removable metal cover protects release mechanism from dirt and weather.
- One-piece ductile iron body has no sealing areas under stress which could cause eventual leakage.
- Valve has only two moving parts - stem assembly and latch - and they are constructed of stainless steel to prolong service life.
- 7605B is Underwriters Laboratories listed for use with LP-Gas as an emergency and operating shut-off valve. (Must close, stay shut, and not leak through a UL fire test.)
- Over 50,000 automatic opening and closing cycles without a failure.
- Stem seals spring loaded for maximum effectiveness at low temperatures.
- Seats are metal protected to minimize leakage in case of fire.

Provides Full Flow and Rapid Closing

- Straight-through design allows a liquid flow of 150 gpm with only a 1 psig drop. This means no lost time in loading, using present pumps and piping systems.
- Quick closing is accomplished whether the pump is running or not.

Simple to Operate, Maintain, and Highly Dependable

- Exclusive floating valve seat disc assures leak-free, long-life operation.
- Opens manually and closes by remote pneumatic release, manual remote cable release, thermal link actuation and manual operation.
- Remote cables may be run in several different directions.
- First opening movement of handle moves equalizing stem assembly to open position. This allows pressure to equalize across valve seat, permitting easy opening.
- Field repairs of the valve, integral thermal release and remote closing mechanisms can be done without removal from the piping and can usually be accomplished in less than one hour with conventional hand tools.

Installs Quickly

- Threaded inlet and outlet connections for easy installation.
- Necessary accessory cable kits are available for quick installation of manual remote, hose remote, and pneumatic remote closing devices.

Materials

Body and Handle.....Ductile Iron
Stem .....303 Stainless Steel
Seals .....Teflon
Seat Disc.....High Temperature Viton
Springs..... 18-8 Stainless Steel
Gaskets.....Teflon

Ordering Information

Part Number	For Use Only With:	Inlet and Outlet Connections	Liquid Flow Capacity at 10 PSIG Pressure Drop (GPM)
7605B	LP-Gas	2" F. NPT	475 (LP-Gas)
A7605B*	NH_3		427 (NH_3)

* Must be actuated pneumatically, manually by cable or by cable connection to pull-away valve.

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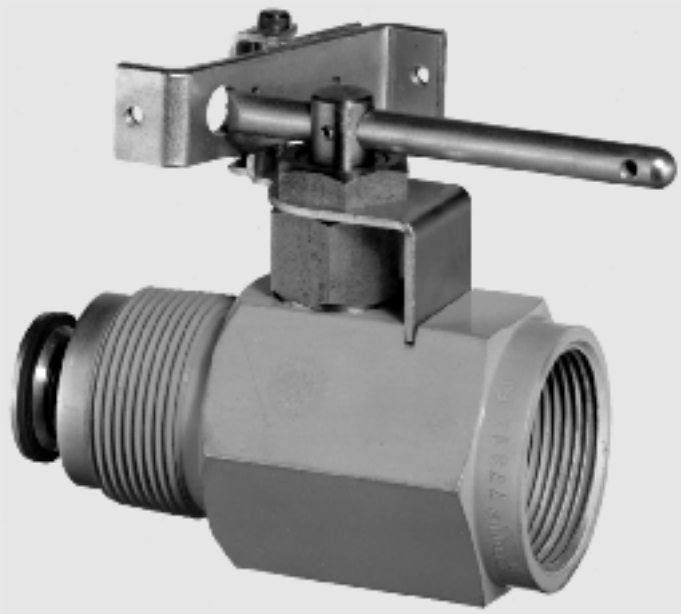
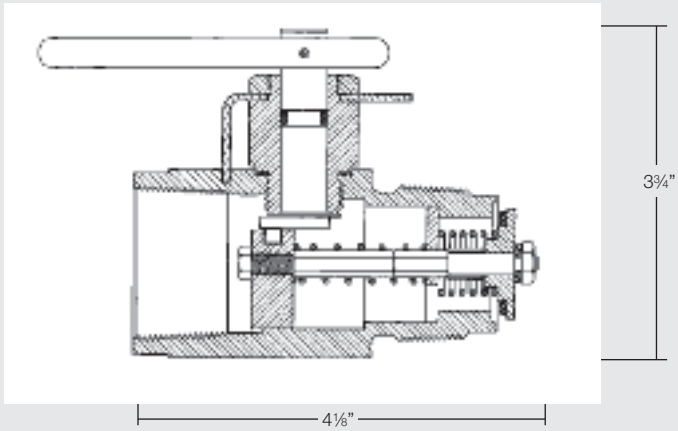
1¼" ESV for LP-Gas Bulk Plants

A 7781AF





Application

Especially designed for installation in vapor transfer lines at LP-Gas bulk plants to provide for quick shut-off of vapor or liquid flow in the event of an accidental pull-away or hose rupture, both of which can cause a fire.

Features

Meets NFPA and UL Requirements

- Integrated latch lever and fuse laminated with 220° F. eutectic alloy.
- Valve can be easily closed by remote cable or pneumatic system.
- Control latch at valve allows manual shut-off at point of installation.
- Underwriters' Laboratories listed as an emergency shut-off valve. (Must close, stay shut, and not leak for a 30 minute fire test.)

Sturdy, Rugged Construction

- Carbon steel body.
- Corrosion resistant stainless steel operating stem and seal bushing.
- Valve stem directly connected to seat disc mechanism for positive opening and closing.
- Resilient, heat resistant seat disc for positive, bubble-tight shut-off.

Simple to Operate and Maintain

- External operating mechanism can be replaced without removing valve from piping.
- Pressure equalizing feature allows easy opening of valve manually even at high vapor pressures.
- Opens manually and closes by:
  - Remote pneumatic release
  - Manual remote cable release
  - Thermal link actuation
  - Manual operation
- Remote cables may be actuated from front or back.
- Field replacement of fuse mechanism is possible in about ten minutes.

Installs Quickly

- Threaded inlet and outlet connections for easy installation.
- Necessary accessory cable kits are available for quick installation of manual remote and transfer hose remote closing devices.

Materials

Body ..... Carbon Steel, Cadmium Plated
Operating Stem ..... Stainless Steel
Seal Bushing ..... Stainless Steel
Stem Seal O-Ring ..... Buna N with Teflon Back-Up Ring
Seat Disc ..... High Temperature Viton

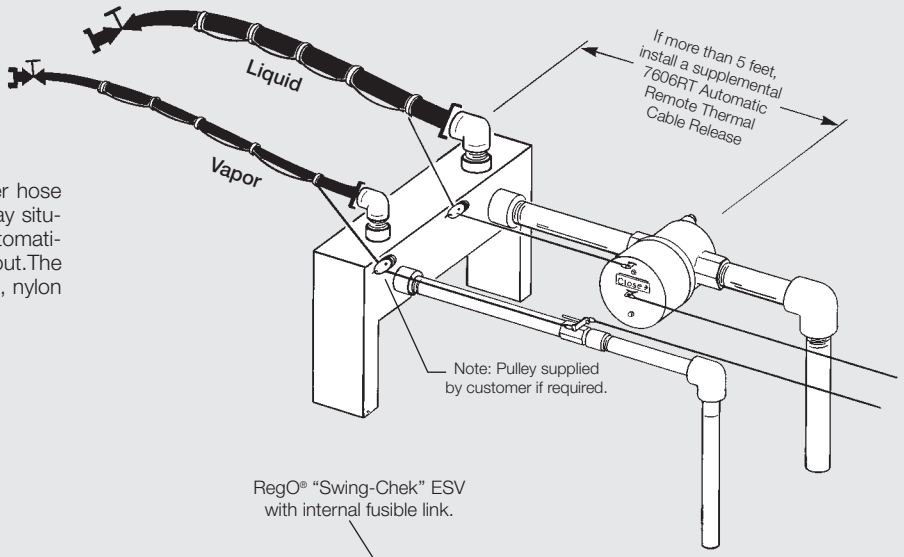
Ordering Information

Part Number	For Use With:	Inlet Connection M. NPT	Outlet Connection F. NPT	Flow Capacity	
				Vapor At 100 PSIG and 10 PSIG Pressure Drop SCFH	Liquid At 10 PSIG Pressure Drop GPM
A7781AF	LP-Gas and NH_3	1¼"	1¼"	26,000	55

ESV Remote Cable Controls

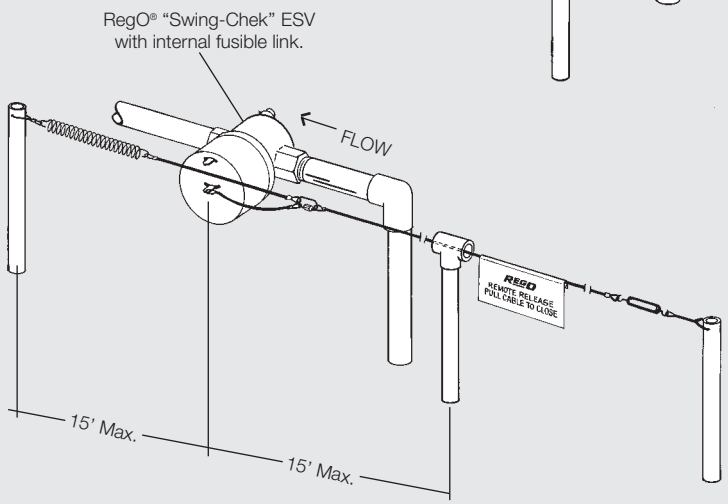
7609-50 Transfer Hose Cable Release Kit

This supplemental kit connects an ESV to the transfer hose for valve shut-down due to hose stretching in pull-away situations. If a pull-away occurs, the kit is designed to automatically close the ESV, even though a fire does not break out.The kit contains 20 feet of 1⁄16" stainless steel aircraft cable, nylon cable ties, stainless steel clamp and splicing sleeves.



7606RM Remote Manual Cable Release Kit

Permits manual closing of one or more ESV's from remote locations up to 50 feet away. Complies with NFPA #58 provision for remote manual shut-off of ESV's. The kit contains 50 feet of 1⁄16" stainless steel aircraft cable, loop sleeves, turnbuckle, threaded chain connector, spring and cable signs.

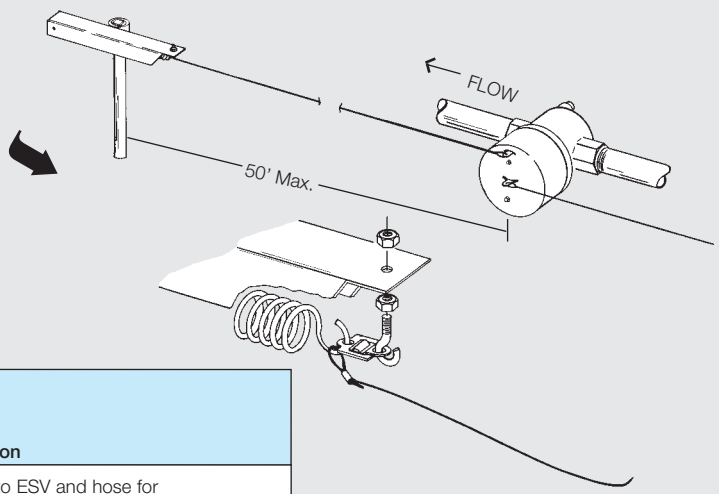


7606RT Remote Thermal Cable Release Kit

Permits remote automatic thermal closure of the ESV in accordance with NFPA #58 requirements where the ESV is installed more than 5 feet from the nearest end of hose.

The thermal pedestal incorporates a fusible link holding a spring in tension and a cable connects the spring to the ESV. A temperature in excess of 220° F. separates the fuse link, pulling the cable and closing the ESV.

The kit contains a steel shroud body, 50 feet of 1⁄16" stainless steel aircraft cable, fuse, eyebolt assembly, spring, pin and loop sleeves.



Ordering Information

Part Number	Description
7609-50	Transfer hose cable release kit. Attaches to ESV and hose for automatic closing as hose stretches.
7606RM	Remote manual cable release kit. Permits manual closing of one or more ESVs from remote location.
7606RT	Remote thermal cable release kit. Provides high temperature closing of ESV. Required if ESV is more than 5 feet from nearest end of hose.
7606RM-1	100' roll of extra cable.
A3219-34	Replacement fusible link for 7606RT.
7605B-20	Replacement fuse latch assembly for 7605B.

Application

RegO® Emergency Shut-Off Valves modified for remote pneumatic shut-down operation retain all the operating features of the standard valves. Once equipped with pneumatic cylinders and then pressurized, the pneumatic cylinder piston rod disengages from a striker plate, allowing the ESV to be manually opened and the striker plate to act as a latch and hold the valve open. Release of the control system pressure for any reason closes the ESV for fail-safe operation.

Features

Convenience

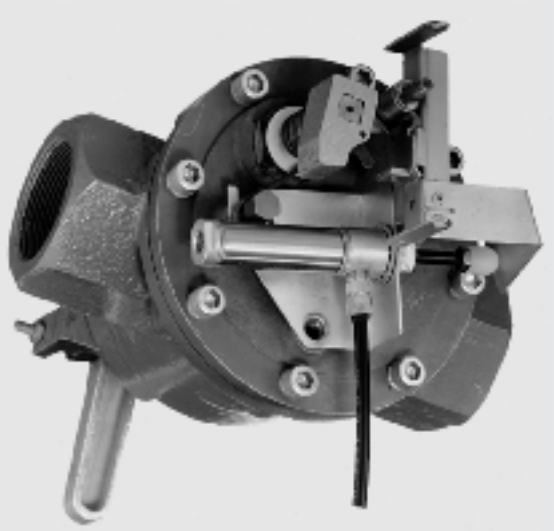
- Closes the liquid and vapor ESV from a convenient remote location.
- Independent closed loop system allows the ESV to be pneumatically charged, but opened or closed manually or with cable controls to conserve pressurized gas.

Reliability

- Independent closed loop system will continue to hold pressure and close ESV in an emergency - even if supply pressure is cut off.

Security

- Any loss of pressure from the control line, such as accidents or the line melting from fire, automatically shuts down the liquid and vapor ESV.
- ESV must be reset after automatic shutdown.



7605APN-1 Pneumatic Conversion Kit for 7605B and A7605B ESV

Retrofit conversion kit with components necessary to add pneumatic closing capability to the 2" ESV. Includes pneumatic cylinder, bracket, fuse release assembly and machine screws.

7781AFPN-1 Pneumatic Conversion Kit for 7781AF ESV

Retrofit conversion kit with components necessary to add pneumatic closing capability to the 1¼" ESV. Includes pneumatic cylinder, bracket, striker plate and machine screws.

7605PN-50 Pneumatic Remote Control Kit

Control kit with components for connecting and charging the pneumatic controls from a source of compressed gas (air or nitrogen) to a RegO® liquid or vapor ESV. Includes charging valves with low pressure indicator, operating valves, 100 feet of ¼" plastic tubing and tube fittings.

Ordering Information

Part Number	Description
7781AFPN-1	Cylinder assembly kit to convert 7781AF ESVs to pneumatic shutdown.
7605APN-1	Cylinder assembly kit to convert 7605B ESVs to pneumatic shutdown.
7605PN-50	Pneumatic remote shutdown system kit, complete with 100' of tubing, fittings, 1 charging valve assembly and 1 remote shutdown valve assembly.
7605APN-8A	Extra shutdown valve assembly.
7605A-BT	100' roll of ¼" pneumatic tubing.
7605AP-16	¼" tubing tee, w/nuts.
7605AP-15	⅛" NPT x ¼" tubing, straight connector.

Hydraulic Automatic Cylinder Filling System

7194MD and 7194HD

Application

Designed to provide accurate, economical filling of LP-Gas DOT and fork lift cylinders by weight. Filling stops automatically as the total weight of the cylinder reaches the amount pre-set on the scale. One individual can efficiently handle up to four cylinder filling operations simultaneously, to maximize profits, increase efficiency and allow servicing of more customers.

The RegO® automatic cylinder filling system is designed for use with these scales only:

FAIRBANKS-MORSE SCALES

New Style - 1280A Double Beam Scale or Single Beam Scales 1124A and 1174A.
Old Style - 1280 Double Beam Scale or Single Beam Scale 1123 with or without Howe No. 12108 "Over or Under" Indicator.

HOWE SCALES
(with or without Howe No. 8325 Balance Indicator)

—No. 54X Wood Pillar and Shelf Scale.
—No. 57 Steel Pillar and Shelf Scale (single beam).
—No. 57X Steel Pillar and Shelf Scale (double beam).

Features

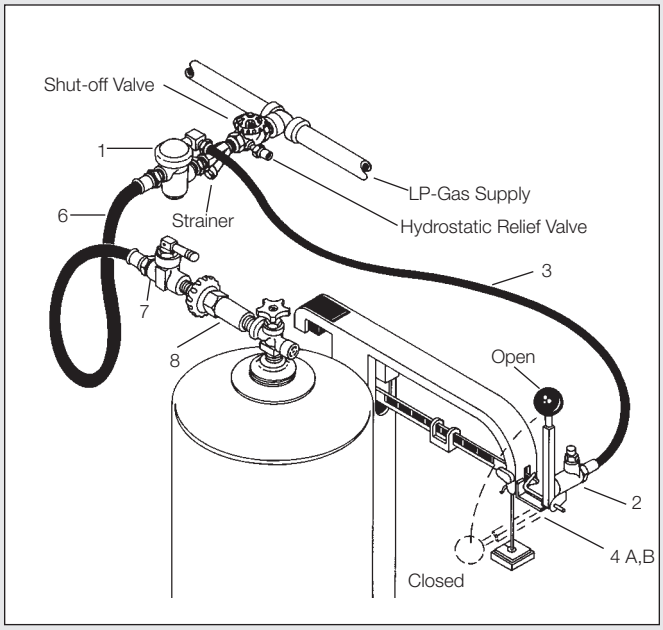
- Completely self-contained with no electrical source or wiring required.
- Works hydraulically, like brakes on a car.
- Filling stops automatically when cylinders reach pre-set weight.
- Up to four stations can be handled by one individual.

How It Works

The scale beam weight is adjusted to the desired filled weight and the empty cylinder is placed on the scale. The loading hose is connected to the cylinder valve, and the lever on the master cylinder is moved to the vertical position. When the quick-acting valve on the loading hose is opened, the cylinder will rapidly fill. The master cylinder lever is designed to trip, move to a horizontal position and automatically shut off the control valve as soon as the scale reaches the pre-set filled weight.

Components may be ordered separately with piping done by the installer. Two completely assembled manifold configurations are also available.

Hydraulic self-contained system.
No external power required.



Ordering Information
Hydraulic System Components

Key No.	Description	Size	Part No.
Assembly for Fairbanks-Morse. Includes items 1 thru 8 below.			**7194MD**
Assembly for Howe. Includes items 1 thru 8 below.			**7194HD**
1	Propane control valve	½" NPT female, with ⅛" NPT female hydraulic connection	**7177**
2	Master cylinder, with actuator lever	⅛" NPT hydraulic connection	**7188**
3	Hydraulic hose assembly	3⁄16" I.D. with ⅛" NPT male ends, 43½" overall length	**7194-1**
1-3	Valve, Cylinder, and Hose Assembly for Fairbanks-Morse scales	—	**7188MS**
1-3	Valve, Cylinder, and Hose Assembly for Howe scales	—	**7188HS**
4A	Bracket Kit for Fairbanks Morse scales, complete with screws, washers, nuts and instructions	—	**7194M-3K**
4B	Bracket kit for Howe scales, complete with screws, washers, nuts and instructions	—	**7194H-3K**
5	Can of hydraulic fluid, complete with filling spout	1½ ounce	**7188-21**
6	Propane filling hose assembly	½" I.D., with ½" NPT male ends. 50½" overall length	**7193-4**
7	Quick-acting shut-off valve	½" NPT inlet x ¼" NPT outlet	**7901TB**
8*	Soft nose cylinder connector	¼" NPT male x POL male	**7193D-10**

* Any of the RegO® hose end adapters for cylinder filling may be used with these systems. See the "Hose End Adapters for Cylinder Filling" sections of this catalog for ordering information.
NOTE: Part No. 7188HS contains items 1, 2, 3, 4B and 5. Part No. 7188MS contains items 1, 2, 3, 4A and 5.

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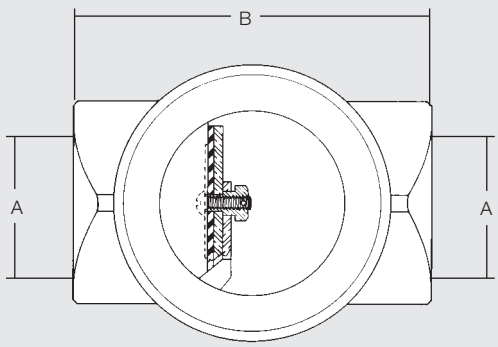
A7794 and A7796



Application

Designed to promote maximum pump efficiency, these indicators enable bulk plant operators to visually inspect liquid flow conditions. With glass on both sides of the indicator, flow can be observed from either side, even under some poor light conditions. The integral swing check also serves as a back-check valve to prevent reverse flow and product loss if the hose fails in a loading operation.

By installing an indicator on the upstream side of the plant pump, suction conditions can be observed and the pump speed adjusted to obtain the maximum possible flow rate without cavitation. Additionally, if an indicator is installed in the piping at the loading rack, just ahead of the loading hose, the operator can maintain a constant check on pump conditions.

Both installations are designed to allow for observation to provide maximum pump efficiency and assure safe plant pump operation.

In compressor operations a sight flow indicator installed in the liquid line will give a visual indication when the tank car or transport is emptied. Compressor operation can then be immediately reversed to start recovery of the vapor.

Features

- Durable ductile iron body assures long, trouble-free operation with design working pressure of 400 PSIG.
- Glass is polished, ground and tempered after fabrication for maximum strength up to 2,500 PSIG.
- Set screws minimize loosening of glass retainer rings.
- O-ring glass seals provide for leak-tight operation.

Materials

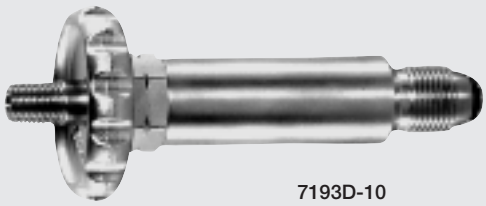
Body ..... Ductile Iron
Swing Check ..... Stainless Steel
Check Seat Disc ..... Resilient Synthetic Rubber
Glass ..... Polished, Ground and Tempered
Tested to 2,500 PSIG.

Ordering Information

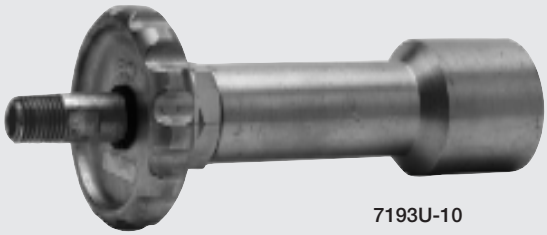
Part Number	A Inlet/Outlet Connections	B Length
A7794	2" F. NPT	5¾"
A7796	3" F. NPT	7⅜"

Hose End Adapters for DOT Cylinder Filling

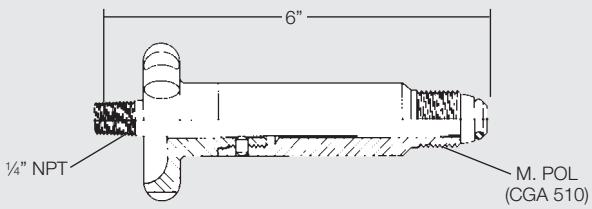
7193D-10 and 7193U-10

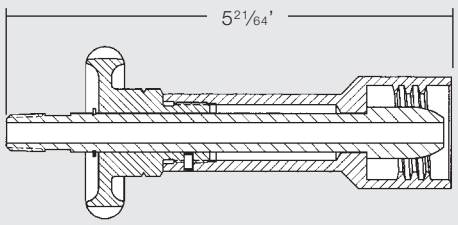


7193D-10



7193U-10





Designed to provide quick and easy filling of DOT cylinders with POL or Type I connections. This adapter may be used with hydraulic and electric automatic systems or with manual systems in conjunction with a RegO® 7901TB Quick Acting Shut-Off Valve.

These filling connectors have an extended connection on the hand-wheel, which makes it possible to connect the loading hose to valves on cylinders with fixed collars. The handwheel is well outside the collar for easy operation.

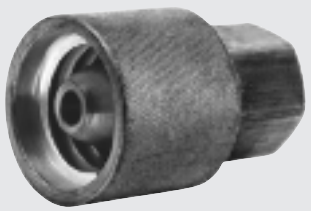
Part Number	Application	Inlet Connection	Outlet Connection	Materials
7193D-10	Filling DOT Cylinders w/ POL Connections	1/4" M. NPT	M. POL (CGA 510)	Brass & Stainless Steel
7193U-10	Filling DOT Cylinders w/ Type I Connections		Type I Connection	Brass

Connector for DOT Cylinder Filling Adapter

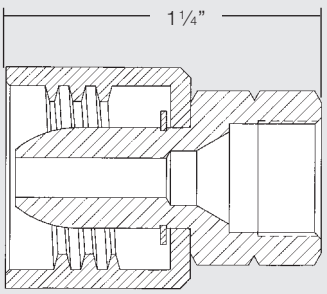
7193T-10

The 7193T-10 Connector is designed for use on the 7193D-10 Filling Adapters. Connector allows quick connection to the Type I 1 5/16 M. ACME threads for operators that fill both POL and Type I valves.

Part Number	Application	Inlet Connection	Outlet Connection	Materials
7193T-10	Converts 7193D-10 Adaptor from POL to Type I Connection	M. POL (CGA 510)	Type I Connection (CGA 791)	Brass



7193T-10



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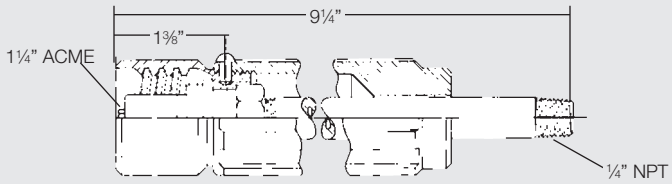
Hose End Adapter for Lift Truck Cylinder Filling

7193L-10A



The 7193L-10A is designed to provide quick and easy attachment of the filling hose to DOT cylinders equipped with RegO® 7141M check connectors.

The 1¼" ACME outlet threads facilitate rapid make-up. When connected, back-checks in the adapter and check connector automatically open. Low pressure drop between the two assures high filling rates. An integral check closes when disconnected, eliminating the need to close any valves manually to disconnect the charging hose.

Because a leak-tight seal is formed before the integral check opens or closes, product loss is kept to an absolute minimum when connecting or disconnecting the loading hose.

Ordering Information

Part Number	Application	Inlet Connection	Outlet Connection	Body Material	Accessories: Adapter
7193L-10A	Filling of Fork Lift Cylinders*	¼" M. NPT	1¼" F. ACME	Brass	**5760A**

* The 7193L-10A is intended to be permanently attached to the filling hose. A 5760A adapter enables the 7193L-10A to be attached to the POL connection on the 7193D-10 at regulator cylinder filling stations to allow for occasional filling of fork lift cylinders.

Lever Operated Hose End Adapter for Fork Lift Cylinder Filling

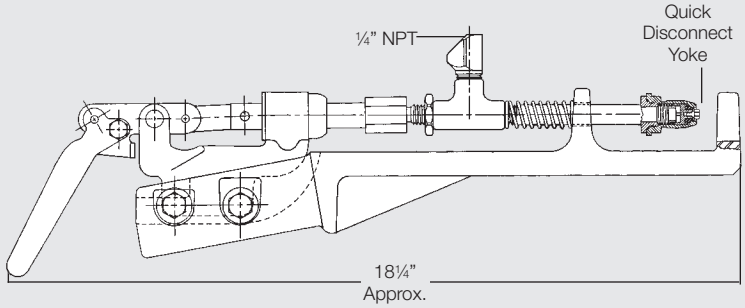
7193K-10B

Designed to drastically reduce labor and time when continuously filling large numbers of lift truck cylinders equipped with RegO® 7141M check connectors.

Rapid make-up is accomplished by simply slipping the adapter yoke behind the hex wrenching section of the 7141M connector and depressing the lever. When the cylinder is filled, the adapter is easily disengaged by releasing the operating lever. When connected, back checks in the adapter and connector automatically open. An integral check closes when disconnected, eliminating the need to close any valves manually on the filling manifold to disconnect the charging hose. The shut-off valve on the container must be closed after filling.

Because a leak-tight seal is formed before the checks close, product loss is kept to an absolute minimum when connecting or disconnecting the loading hose.

The 7193K-10B is intended to be permanently attached to the filling hose.



Ordering Information

Part Number	Application	Inlet Connection	Outlet Connection	Materials
7193K-10B	Lever Operated for Quick Filling of Fork Lift Cylinders	¼" F. NPT	Quick Disconnect Yoke*	Brass and Steel

* For use with RegO® 7141M check connector.

7193R-10

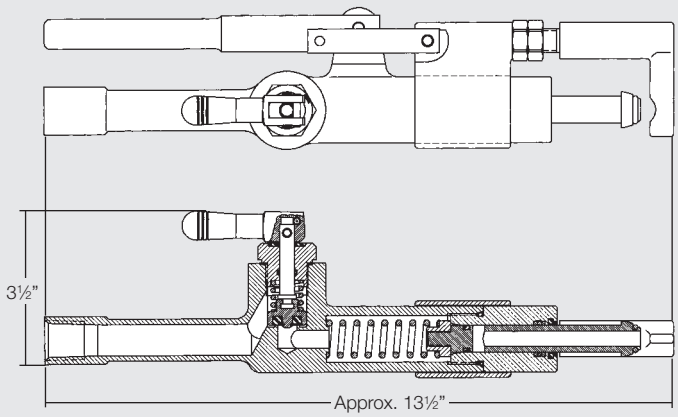
The 7193R-10 is designed for use in LP-Gas filling systems including fill rooms and dispensing stations. The quick acting lever allows fast connection to POL type (CGA 510) cylinder valves. It fits both compact and heavy duty cylinder valves commonly found on 5 to 100 lb. DOT LP-Gas cylinders.

The 7193R-10 eliminates the need for threaded POL adapters to assemble and disassemble filling connection.

This filling adapter is designed so there is not gas flow until connected to cylinder valve. Gas flow stops when disconnected from POL outlet. There is a minimal gas loss to atmosphere during disconnection. A back up quick acting shut-off valve is built in.

Materials

Body ..... Brass
Tailpiece ..... Stainless Steel
Lever ..... Carbon Steel
Clamp ..... Stainless Steel
Seats & Seals ..... Resilient Rubber



Ordering Information

Part Number	Applications	Inlet Connection	Outlet Connection
7193R-10	Lever Operated for Quick Filling of Cylinders with POL Outlets	½" F. NPT	Fits Female POL

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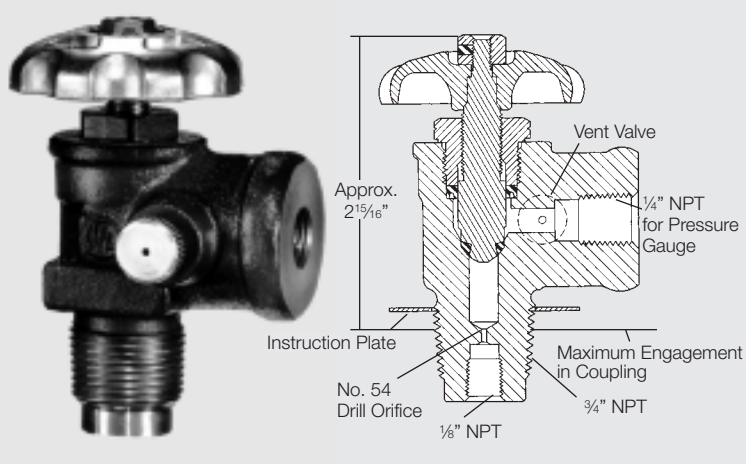
Combination Valve for Bulk Storage Containers

A2805C



Application

Designed for installation on bulk storage containers, this valve combines a pressure gauge mounting and provision for a fixed tube liquid level gauge.

The shut-off valve prevents the pressure gauge from being subjected to constant pressure, thereby prolonging its life and accuracy. The valve may be closed, and the vent valve opened to vent pressure from the gauge to permit replacement.

For fixed liquid level gauging, the valve can be mounted at the maximum permitted filling level. When equipped with a dip tube threaded 1/8" M.NPT, it can be installed at any convenient level.

Features

- No. 54 drill orifice locates below the top of the coupling when the valve is installed and restricts product loss should the valve or pressure gauge be sheared off.
- "Stop Filling When Liquid Appears" instruction tag furnished with each valve.

Materials

Body 2805C	Brass
A2805C	Ductile Iron
Bonnet	Steel
Valve Stem	Stainless Steel
Vent Stem	Stainless Steel
Valve Stem Seal	Resilient Synthetic Rubber
Vent Seal	Resilient Synthetic Rubber
Valve Seat	Nylon

Ordering Information

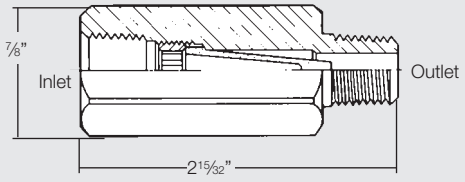
Part Number	Container Connection	Service Connection	Liquid Level Vent
A2805C	3/4" M. NPT	1/4" F. NPT for Gauge Mounting	Knurled*

* Has 1/8" F. NPT opening for installing separate dip tube.

Gritrol Fuel Line Filters

12802

Designed especially for use in liquid motor fuel lines to trap foreign material which otherwise may damage precision components in the LP-Gas carburetion system. These filters incorporate an integral sintered metal filter element in a straight through design.



Ordering Information

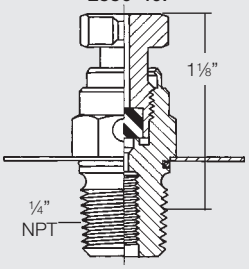
Part Number	Inlet Connection	Outlet Connection
12802	1/4" F. NPT	1/4" M. NPT

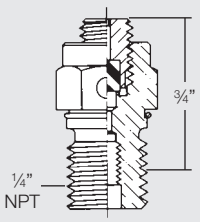
3165C, 3165S and TSS3169

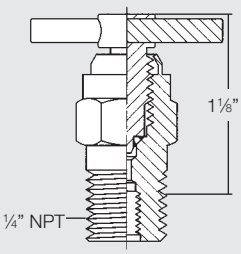
3165C with 2550-40P

3165S

TSS3169







Especially designed to bleed off liquid or vapor pressures trapped in transfer lines. When installed in the downstream boss of RegO® globe and angle valves used at the end of a liquid transfer hose, the bleeder valve allows for the controlled venting of the product and indicates to the operator that the valves are closed and he can disconnect the coupling. They may also be used as a fixed liquid level gauge where the dip tube is part of the container.

All these valves incorporate a No. 54 drill size orifice.

An optional instruction plate with "Stop Filling When Liquid Appears" may be ordered for use with these valves.

Materials:

Body (3165)..... Brass
Body (TSS3169)..... Stainless Steel
Seat Disc (3165)..... Resilient Synthetic Rubber
Seat Disc (3169)..... Teflon

Ordering Information

Part Number	Service	Connection	Actuation	Accessories: Warning Plate Kit
3165C	LP-Gas Only	¼" M. NPT	Knurled	2550-40P
3165S			Slotted	
TSS3169	LP-Gas & NH_3		Tee Handle	

3165SF12.0

TA3169F12.0

Fixed Liquid Level Gauges

3165 Series and TA3169F

Especially designed to provide a visible warning when containers are filled to the maximum permitted filling level. At the start of the filling operation, with the vent stem opened, the valve discharges vapor. When the maximum permitted filling level is reached, the valve discharges liquid. These valves are normally furnished with a 12", 3⁄16" O.D. dip tube and incorporate a No. 54 drill size orifice.

An optional instruction plate with "Stop Filling When Liquid Appears" may be ordered for use with these valves.

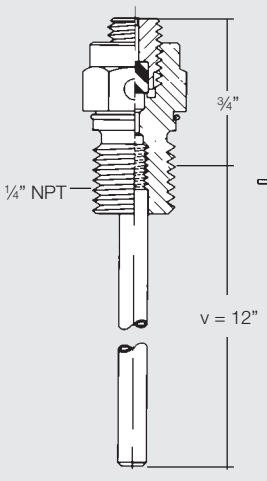
Materials:

Body (3165)..... Brass
Body (TA3169)..... Stainless Steel
Seat Disc (3165)..... Resilient Synthetic Rubber
Seat Disc (TA3169)..... Teflon

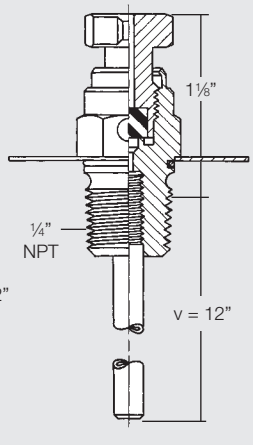
Ordering Information

Part Number	Service	Connection	Actuation	Dip Tube Length	Accessories: Warning Plate Kit
3165CF*	LP-Gas Only	¼" M. NPT	Knurled	*	2550-40P
3165CF12.0				12"	
3165SF12.0			Slotted		
TA3169F12.0	LP-Gas & NH_3		Tee Handle		

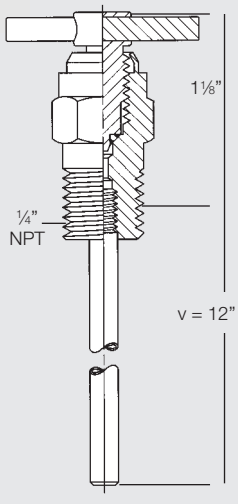
* Dip tube must be ordered separately. Add to suffix.
Example: 11" Dip Tube = 3165F11.0.



3165SF12.0



3165CF12.0



TA3169F12.0

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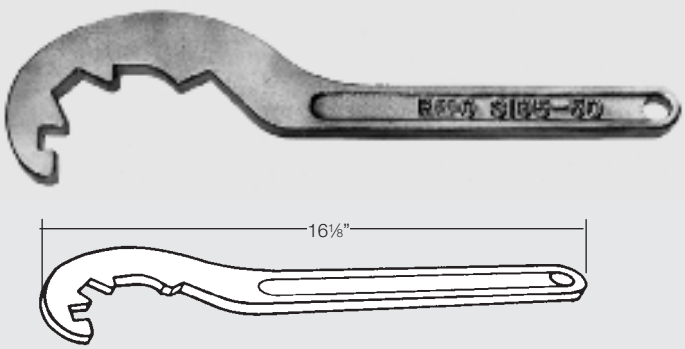
Spanner Wrench for ACME Connectors

3195-50

This aluminum spanner wrench is especially designed for use with 2¼" and 3¼" ACME couplings, adapters and caps.



Ordering Information

Part Number	For Use With ACME Connector Size
3195-50	2¼" & 3¼"

Pressure Gauges

Ordering Information

Part Number	Service	Case Material	Maximum Pressure	Case Size	Increment Divisions
2434A-2*	LP-Gas Only	Steel	35" w.c. and 20 oz. (Dual)	2½"	1" w.c. and 1 oz.
2434-2**					
3226A-3			30 PSIG	2"	½ PSI
2411		Brass			
5575			60 PSIG		1 PSI
5547		Steel			
5576		Brass	100 PSIG		2 PSI
1286		Steel			
		Brass		2½"	
948			300 PSIG	2"	5 PSI
948B		Steel			
A8060	NH_3 and LP-Gas	Steel	60 PSIG	2½"	5 lb.
A8150			150 PSIG		
A8400			400 PSIG		

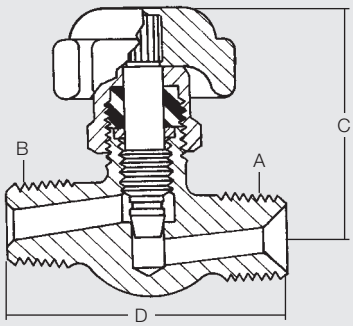
* 1/4" Hose Connection
** 1/8" M. NPT Connection

Especially designed in a variety of sizes and construction for the LP-Gas and anhydrous ammonia industry.

All RegO® pressure gauges have a ¼" M. NPT connection unless otherwise noted.

Needle Valves

1224, 1316 and 1318



These valves are high quality, “true” throttling valves. Unlike most so-called needle valves, both the body seat and stem are tapered to provide fine, precise control over a wide range of adjustment without stem galling.

The 1224 may be used as a small, inexpensive shut-off valve between a pressure gauge and bulk storage container to allow for convenient gauge replacement.

The 1316 and 1318 provide taper pipe thread by left hand hose connection threads and are useful in a wide range of torch and fuel burner applications where an accurate throttling action is required.

Ordering Information

Part Number	A Inlet Connection	B Outlet Connection	C	D
1224WA	1/4" M. NPT	1/4" M. NPT	1 9/16"	1 3/4"
1316WA	9/16" - 18 L.H.	1/4" M. NPT		
1318WA	1/4" M. NPT	9/16" - 18 L.H.		

Household Gas Detector/Alarm

100-HGD

Application

The 100-HGD gas fume detection/alarm unit gives advance warning of gas leaks well below the hazard level (¼th the lowest explosive level). It provides the homeowner more time to take action to protect the family and remedy the problem.

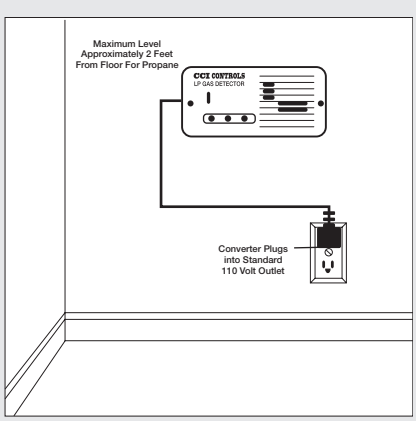
Features

- Available in attractive high impact plastic housing.
- Fume detection systems are reliable and a snap to install.
- Early warning: a high pitched audio alarm and red light visual alarm is activated when propane fumes reach a level of only ¼th the danger level.
- Built in power filtering system for protection against power fluctuations.
- Every semiconductor sensor unit is properly acclimatized and custom calibrated to the individual circuitry in which it is installed to ensure maximum sensitivity, reliability and accuracy.
- Solid state electronic circuitry.
- Supplied with CSA approved converter for use with standard 110 volt outlets.

Unit Specifications

Height . . . . . 3¾”
Width . . . . . 5¾”
Depth . . . . . 1⅜”

Typical Installation



Ordering Information

Part Number	Description
100-HGD	Household Propane Gas Alarm

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Cross Reference by Part Number

REGO® LP-GAS & ANHYDROUS AMMONIA EQUIPMENT

A2075 UL REGISTERED FIRM ISO 9001

ENGINEERED CONTROLS INTERNATIONAL, INC.

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